Boral Peppertree Quarry

Annual Review

January – December 2022

Document Control

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Boral Peppertree Quarry

STATUS	DATE	DISTRIBUTION
DRAFT	27th February 2023	Michael Higgins (Boral Peppertree Quarry Manager) Chris Brown (Stakeholder and Environment Advisor)
Final	31st March 2023	Michael Higgins (Boral Peppertree Quarry Manager) Chris Brown (Stakeholder and Environment Advisor)

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Boral Peppertree Quarry

Annual Review (Jan 2022 – Dec 2022

Name of operation	Peppertree Quarry
Name of operator	Boral Resources (NSW) Pty Ltd
Development consent / project approval #	06_0074
Name of holder of development consent / project approval	Boral Resources (NSW) Pty Ltd
Mining lease #	Not applicable
Name of holder of mining lease	Not applicable
Water licence #	10WA102701,10WA116000 & WAL43829
Name of holder of water licence	Boral Resources (NSW) Pty Ltd
MOP/RMP start date	Not applicable
MOP/RMP end date	Not applicable
Annual Review start date	1st January 2022
Annual Review end date	31st December 2022

I, Michael Higgins, certify that this audit report is a true and accurate record of the compliance status of Peppertree Quarry for the period 2021 Calendar Year and that I am authorized to make this statement on behalf of Boral Resources (NSW) Pty Ltd .

Note.

a) The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, $1 million and for an individual,

$250,000.

b) The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or $22,000, or both).

Name of authorised reporting officer: Michael Higgins	
Title of authorised reporting officer: **Peppertree Quarry Operations Manager**	

	
Signature of authorised reporting officer	
Date 31st March 2023	

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Commonly Used Abbreviations and Acronyms

AR	Annual Review
AHMP	Aboriginal Heritage Management Plan
AMC	Aboriginal Management Committee
ANZECC	Australian and New Zealand Environment Conservation Council
AQMP	Air Quality Management Plan
AS	Australian Standard
EC	Electrical Conductivity
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC	Environment Protection and Biodiversity Conservation
EPL	Environment Protection Licence
DO	Dissolved Oxygen
DPE	Department of Planning and Environment
Ha	Hectares
HSE	Health, Safety and Environment
HSEQMS	Health, Safety, Environmental Management System
HVAS	High Volume Air Sampler
kL	Kilolitres
LOR	Limit of Reporting
mgbl	metres below ground level
NATA	National Association of Testing Authorities
NBMP	Noise and Blast Management Plan
NSW	New South Wales
NTU	Nephelometric Turbidity Units
O&G	Oil & Grease
PIRMP	Pollution Incident Response Management Plan
PM_{10}	Particulate Matter (10 microns in diameter)
POEO Act	*Protection of the Environment Operations Act 1997*
RL	Reduced Level
TDS	Total Dissolved Solids
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
$\mu g/m^2$	micro grams per square metre
$\mu g/m^3$	micro grams per cubic metre
WMP	Water Management Plan

1 STATEMENT OF COMPLIANCE

The Statement of Compliance for the 2021 Reporting Period is contained in Table 1.

Table 1: Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	
Approval MP 06_0074	No
EPL 13088	No
EPBC 2018/8243	Yes

The Non compliances identified during the reporting period are detailed in Table 2. Each non-compliance has been risked ranked as per the DPE Annual Review Guidelines Compliance Status key outlined in Table 3.

Table 2: Non-Compliances

Relevant Approval	Condition #	Condition description	Compliance status	Comment	Where addressed in the Annual review
MP 06_0074	Part B Condition B36	The Surface Water Monitoring Program must include: (a) detailed baseline data on surface water flows and quality in Tangarang Creek and Barbers Creek.	Administrative non-compliant	Water Flow monitoring is not possible within Barbers Creek due to accessibility. Fossickers Flat is a monitoring site for Water NSW in the Shoalhaven River and downstream of the Quarry operations. This site will be used as an alternative with data reviewed regularly to identify any potential impacts. This was approved by the DPIE in response to the Annual review 2020 and is included in the Water Management plan 2021.	Section 7

MP 06_0074	Part B Condition B20	The proponent must ensure that particulate matter emissions generated by the project do not cause exceedances of the criteria in Table 6 at any residence.	Administrative non-compliance	From the period 27 December 2021- 4 February 2022 the TSP (total suspended particulate) high volume air sampler (HVAS) failed to operate. EPA and DPIE were notified.	Section 6.3
EPL 13088	M2 – M2.1 and M2.2	Requirement to monitor concentration of pollutants discharged M2.1 For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns.	Administrative non-compliance	From the period 27 December 2021- 4 February 2022 the TSP (total suspended particulate) high volume air sampler (HVAS) failed to operate. EPA and DPIE were notified.	Section 6.3

Table 3: Compliance Status 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 compliance	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)

2 INTRODUCTION

Peppertree Quarry (the Quarry) is owned and operated by Boral Resources Pty Ltd (Boral). The hard rock quarry is located south-east of Marulan in the NSW Southern Tablelands, approximately 175 km south-west of Sydney (refer to Figure 1).

The Quarry was first granted planning approval in February 2007 under Part 3A of the *Environmental Planning and Assessment Act 1979* following the preparation and display of an Environmental Impact Assessment. The project has since been the subject of seven separate modification applications which were approved in March 2009, November 2011, October 2012, August 2016, October 2019, April 2020 and most recently in September 2021.

The Quarry has an identified resource area of approximately 250 million tonnes, which dependent upon extraction rates, would allow quarrying for 70 years or more over an area of approximately 104 hectares (ha), within a 650-ha parcel of land.

All quarry products and materials (granodiorite aggregate products and manufactured sand) are transported by rail to and a capped quantity of trucks to a number of Boral rail terminals for distribution by trucks into the Sydney metropolitan area.

This Annual Environmental Management Report (AR) provides a summary of the Quarry's activities, environmental performance, statutory compliance and community relationships between the periods of 1st January 2022 to 31st December 2022 (the reporting period).

The AR has been prepared in accordance with the requirements of the Project Approval 06_0074 Modification 7 (Condition D11 - PART D), which requires:

- Details on works (including rehabilitation) conducted in the previous calendar year and the proposed works planned for the next 12 months;
- A review of monitoring results and community complaint records;
- A review of compliance with statutory requirements in relation to specified limits, plans, programs and performance criteria;
- A summary of corrective actions required to address any non-compliances identified during the AR reporting period;
- Reporting monitoring results with an analysis of trends from previous years' results;
- A review of discrepancies between predicted and actual environmental impacts and an analysis of the potential cause of any significant discrepancies; and
- Measures to be implemented in the next 12 months to improve environmental performance.

The AR has also been prepared in line with the DPE Annual Review Guideline October 2015.

Copies of the AR will be submitted to:

- NSW Department of Planning, Industry and Environment.
- NSW Environment Protection Authority.
- Goulburn Mulwaree Shire Council.
- Water NSW;
- DPE Water;

- Biodiversity Conservation Division
- The Peppertree Quarry Community Consultative Committee; and
- Aboriginal Heritage Management Committee.

The report will also be available at the Boral website:

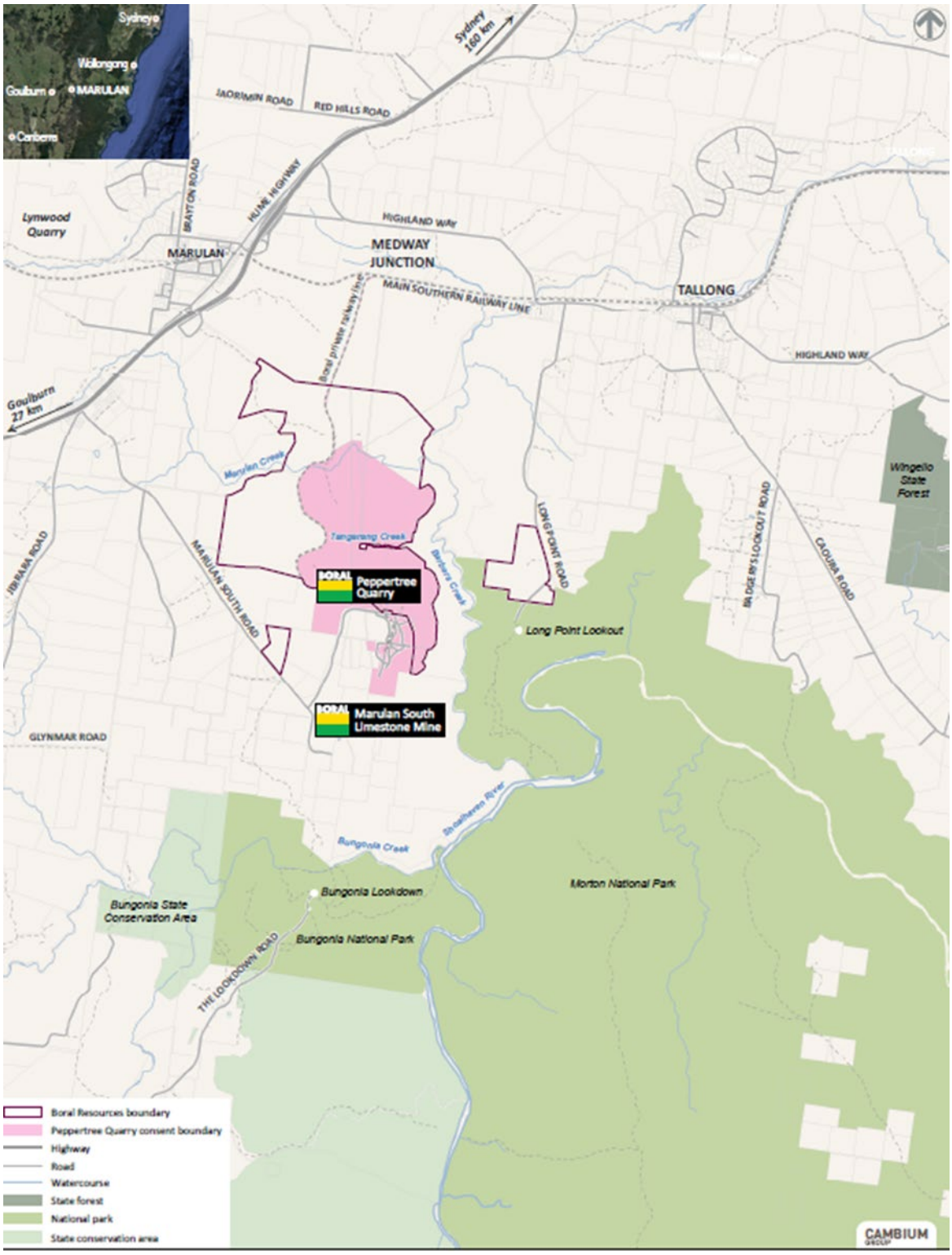
https://www.boral.com.au/locations/peppertree-quarry

Key contacts associated with the management of the Quarry operations, environment, safety and stakeholder relationships are provided in Table 4.

Table 4: Key Contact Details – Peppertree Quarry

Contact Person	Position Title	Contact Details
Michael Higgins	Quarry Manager	Tel: (02) 4841 1701 Email: michael.higgins@boral.com.au
Christopher Brown	Stakeholder and Environment Advisor	Tel: (02) 4841 1701 Email: christopher.brown@boral.com.au

Figure 1: Peppertree Quarry Location



3 APPROVALS

The Quarry operates under several regulatory approvals and licences which are summarized in Table 5 below.

Table 5: Approvals

Approval	Detail	Regulatory Authority
Project Approval 06_0074 Modification 7 (2021)	Quarry operating conditions updated for approval to extend the WOE footprint to relocate a sediment basin P2 and removal of one tree.	NSW Department of Planning and Environment
EPL No. 13088	The EPL is issued for the scheduled activity of: Crushing, Grinding, Separation and Extractive activities for tonnages greater than 2 million tonnes per annum. The EPL was varied in 2021 in line with the Approval conditions mainly in relation to noise.	NSW Environment Protection Authority
EPBC 2018/8243	The EPBC approval was issued for the removal of Box Gum Grassy Woodland as part of the Mod 5 (SWOE) works.	Department of Climate Change, Energy, the Environment and Water
10WA102701	Extraction of water from 110ML dam	Water NSW
10WA116000	Water bore licence allowing an annual extraction of up to 15 ML.	Water NSW
WAL43829	Water approval works for the incidental take of 300ML of groundwater from pit operations	Water NSW

A copy of the Project Approval is available on request or can be accessed under the "general approvals- peppertree quarry" tab through the following Boral website:

https://www.boral.com.au/locations/peppertree-quarry

A copy of the EPL is available on request or can be accessed through the following Boral website:

https://www.boral.com.au/what-we-do/environmental-reporting

Approval was granted of Modification 7 in September 2021 to modify Peppertree Quarry's operation extending the footprint of the WOE to allow the relocation of a proposed sediment basin P2 and the removal of one tree.

This Annual Return reflects compliance of the operation to the Modification 7 Condition of Consent.

4 QUARRY OPERATIONS

4.1 OPERATIONS LAST 12 MONTHS

Over the last 12 months, the pit has continued to move in a south easterly direction.

The mobile primary crusher has been relocated from RL540 to RL555 via the new conveyor system that grants the in pit crusher access to rock materials to the north east and allows it to head in a south easterly direction.

Load and haul operations within the pit area, taking blasted rock from the drop cut at RL525 to the in pit crusher on RL555 have continued.

Load and haul operations were commenced removing overburden material from the pit area to the South Western Overburden Emplacement. (Modification 5)

Operations occurred within the prescribed hours of operation.

No exploration activities were undertaken.

4.2 OPERATIONS NEXT 12 MONTHS

Over the next 12 months, the pit will continue to move in a south easterly direction.

The Western Overburden Rehabilitation works will continue.

The mobile crusher will remain on the RL555 and operate there for the remainder of the year.

The Southern western overburden emplacement (Modification 5) activities will continue throughout the 2023 reporting period.

4.3 PRODUCTION, SALES AND TRANSPORT LAST 12 MONTHS

During the reporting period, the Quarry produced 2 207 266 million tonnes of aggregate, slightly below the forecasted 2 333 304 million tonnes for the 2022 period. (Refer to Figure 2).

The DRE Production results Form for the Financial Year ending 2022 is contained in Appendix 1.

Project Approval Condition A9 (Part A) requires a capped tonnage of 3.5 million tonnes per annum. During the 2022 calendar year 2,712,911 tonnes of product transported by road and rail to Boral terminals at Maldon, Enfield and St Peters. This volume included both Peppertree product, as well as Limestone sand.

Road transportation is allowed as per Condition A10, (Part A) – *The Proponent may Dispatch up to two laden trucks containing quarry products per calendar day. Any additional truck Dispatches of quarry products will require the written approval of the Secretary.*

Peppertree Quarry has an authorisation system in place, to manage the requirement for only 2 loads per day to be dispatched. Beginning in June 2021, Peppertree began to dispatch 2 laden trucks per day to Maldon rail terminal to aid in meeting operational demand.

A request for exemption for road transport was made to the DPE on three occasions during the reporting period. The first in July 2022 and the second in September 2022 and lastly in November 2022 in response disruptions in the rail network as a result of industrial action.

The exemptions were approved by the DPE allowing up to 60 truck movements (in total) per day. The quarry's neighbours and Marulan South Road residents were advised of these movements on the 5th July 2022, 2nd September 2022 and 24th November 2022 respectively. This equated to a volume of circa 40 000 tonnes.

Road transportation for 2022 is summarised in Table 6.

Table 6: Approval Requests for Road Transport

Date	Who	Material	Trucks
July 2022 (15th)	PTQ Employee	Scalps	2
July 2022 (16th)	PTQ Employee	Scalps	1
July 2021 (21st)	PTQ Employee	10mm	1
August 2022 (7th)	PTQ Employee	Scalps	1
August 2022 (8th)	PTQ Employee	Scalps	1
December 2022 (7th)	PTQ Employee	Scalps	2
December 2022 (8th)	PTQ Employee	Scalps	1
December 2022 (15th)	PTQ Employee	Scalps	2

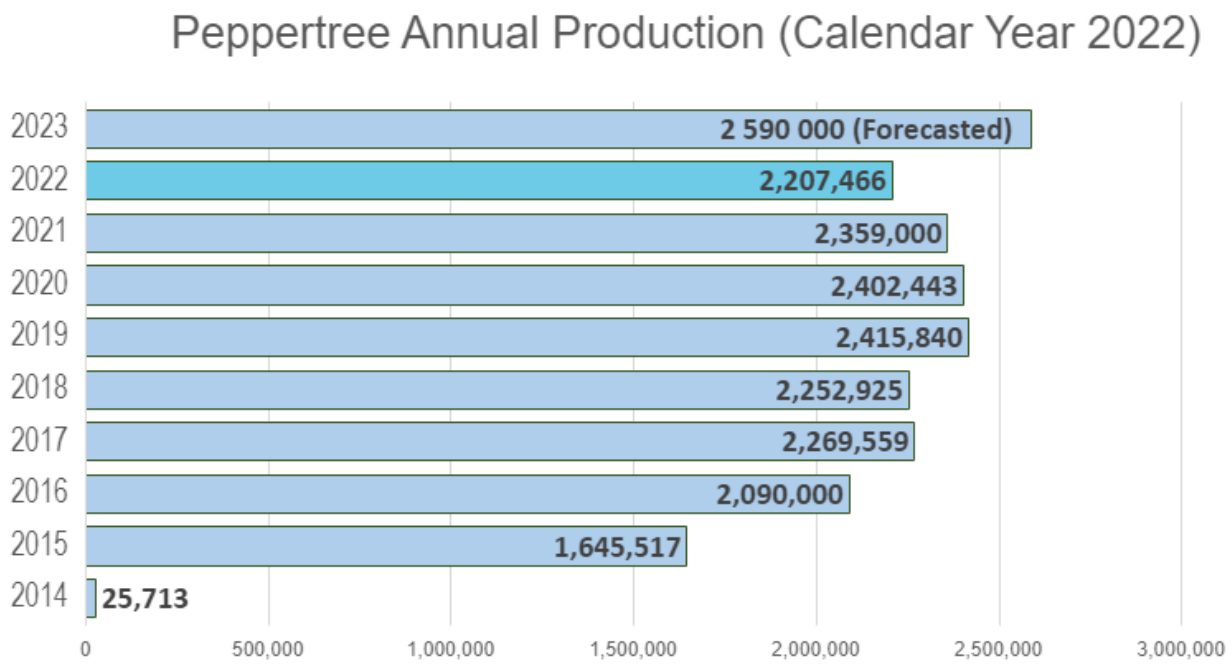
4.4 PRODUCTION, SALES AND TRANSPORT NEXT 12 MONTHS

The anticipated production for 2023, from Peppertree Quarry is 2 590 000 million tonnes. However, actual realised tonnage will be dependent on market demand and the production levels at other Boral hard rock quarries.

Primarily during the 2023 reporting period product dispatch will be mainly via rail. However, beginning in 2023 under the Boral Marulan South Limestone (SSD 7009), Condition A10, Peppertree Quarry will begin to store quarry products in the "shared road sales stockpile area." This will allow Peppertree Quarry to dispatch laden trucks to service local concrete plants and customers.

It is estimated that Peppertree will dispatch via rail and road, approximately 2.8 million tonnes, which will also include Limestone sand.

Figure 2: Quarry Production Trends



5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

Table 7 lists specific actions from the 2021 AR that were required to have been undertaken during the 2022 reporting period.

Table 7: Actions Required from 2021 AR

Proposed Activities for 2021	Requested by	Status	Where Discussed
Undertake progressive Overburden stabilization and rehabilitation and implement recommendations of the 2021 Rapid Visual Assessment and Ecological assessment	Operator	Consultants reports prepared outlining the required scope of works for rehabilitation and erosion and sediment control. Works being progressively undertaken.	Section 8
Review and/or prepare management plans - NBMP, AQMP, BRMP, WMP, EMS, BFMP as per modification 6 approval requirements and audit findings	Operator	Management plans in place and approved.	Section 6.1
Undertake annual Rehabilitation Rapid Visual Assessment (November 2022)	Operator	Complete. Undertaken by Cambium Group.	Section 8
Undertake 2 year Ecological assessment (November 2022)	Operator	Complete. Undertaken by Ecoplanning.	Section 8
Undertake audit of the surface water management system at the Southern Overburden emplacement once system is installed	Operator	Audit yet to be undertaken as emplacement not yet completed, with final water management system yet to be completed.	Section 12
Implementation of the Real time noise monitoring alert system in the Control room	Operator	The real time noise monitoring system has been installed and is online. The weather station has been upgraded to provide data in line with the noise measurements. An alert system is to be trialled in the control room in 2023.	Section 6.4
Permanently fence scar trees	Operator	Complete	Section 6.9
Finalise Artefact collation and review and return Artefacts to Country	Operator	Commenced- approximately 65,570 Returned to Country. Artefact analysis ongoing.	Section 6.9
Implement Stakeholder Engagement plan for 2022	Operator	Complete	Section 9
Pit expansion to the East and commence south western overburden as per Modification 5	Operator	Commenced	Section 4
Redevelopment of ground water wells in line with assessment report	Operator	Report prepared by consultants as to the status of the wells and the new preferred locations.	Section 7.2
Purchase and commission a back-up HVAS	Operator	Complete	Section 6.3

Implement real time air monitoring and investigate relocation of air monitoring sampling locations to boundary locations	Operator	Real time air monitoring was delayed till mid 2022 and will continue to collect data throughout 2023. Will require 12 months worth of data to make a comparison.	Section 6.3
Joint CCC meetings between Marulan South Limestone and Peppertree Quarry following DPIE approval	Operator	Complete- Meetings held on a quarterly basis.	Section 9
Interim aboriginal heritage report to be prepared, final report to be completed in 2024	Operator	Interim Aboriginal Heritage report complete- due for submission in 2023	Section 6.9

6 ENVIRONMENTAL PERFORMANCE

The Quarry has a comprehensive management and monitoring program that collects information and data for the assessment of environmental impacts, regulatory compliance and performance against continual improvement objectives. Management and Monitoring is undertaken in accordance with the respective activity specific Management Plans, which define the framework for measuring environmental performance and compliance with statutory requirements.

Table 8 provides an overall summary of the environmental performance of the quarry across a number of parameters, with further details provided in the following sections.

Table 8: Summary of Environmental Performance

Aspect	performance during the reporting period	Trend / Key management implications	Implemented / proposed management actions
Deposition gauges	Quarry contribution complies with criteria at the neighbouring residence	Data collected over time is consistent with the EIS predictions, Modification modelling and previous AR reporting	Continue to monitor and assess performance
PM10 HVAS	Quarry Contribution complies with criteria at the neighbouring residence	Data collected over time is consistent with the EIS predictions, Modification modelling and previous AR reporting	Continue to monitor and assess performance
TSP HVAS	Quarry Contribution complies with criteria at the neighbouring residence	Data collected over time is consistent with the EIS predictions, Modification modelling and previous AR reporting	Continue to monitor and assess performance
Noise	Quarry Contribution complies with criteria at the sensitive receivers	Data collected over time is consistent with the EIS predictions, Modification modelling and previous AR reporting	Real time noise monitoring implemented to allow for management of potential noise impacts
Blast - vibration	Complies with criteria at the nominated receivers	Data collected over time is consistent with the EIS predictions, Modification modelling and previous AR reporting	Continue to operate as per NBMP and Blast Management procedures
Blast – over pressure	Complies with criteria at the nominated receivers	Data collected over time is consistent with the EIS predictions, Modification modelling and previous AR reporting	Continue to operate as per NBMP and Blast Management procedures
Waste	Waste management segregation system installed.	Waste minimization, recycling and tracking in Place	Continue to Implement waste management plan including review of recycling options and reduction at Waste to Landfill
Dangerous goods & Hazardous materials	Complies with relevant requirements with systems in place	Database in place	Continue to maintain systems
Bush fire management	Complies with relevant requirements with systems in place	Bush Fire management Plan in place and reviewed by the RFS	Continue to maintain systems and review bush fire management plan as required.
Heritage conservation	Complies with AHMP requirements with unidentified finds and the completion of salvage works	Continue to work with AHMC representatives. Bi-monthly meeting established to ensure all actions are identified and communicated.	Undertake collation of the artefacts and plan to conduct a second “return to Country” activity
Biodiversity and rehabilitation	Complies with BRMP	Rehabilitation continues to do well. Some erosion control needed at identified locations.	Implement recommendations of the Rapid Visual Assessment and Ecological review

6.1 BORAL INTEGRATED MANAGEMENT SYSTEM

Peppertree Quarry operates in accordance with the Boral integrated Health Safety, Environment and Quality Management System (HSEQ MS) which establishes a strategic platform for Regulatory compliance and continual improvement in environmental management. This system is documented in the Peppertree Quarry Environmental Management System plan approved by the DPIE in May 2020.

Management plans required by modified approvals are reviewed and / or prepared in line with conditions of consent as well as aligned with the Boral HSEQ requirements.

6.2 METEOROLOGICAL MONITORING

In accordance with Project Approval Condition B26 (Part B), the Quarry continues to utilize the onsite weather station established upon the commencement of the quarry development.

Information from the weather station is supplied in real time graphical form to the Quarry along with a monthly data report.

A monthly review of the Weather station data is undertaken by a consultant to confirm that the station and the data are within operational compliance limits.

In addition, a forecasting system via Weatherzone is in place to provide alerts to relevant site personnel on predicted significant weather events such as high winds and extreme rainfall events, so that appropriate actions and controls can be proactively implemented.

6.3 AIR QUALITY

The Quarry operates an air quality monitoring system in accordance with the Air Quality Management Plan (AQMP) approved in May 2020. Management actions have been accordingly developed and are outlined in the AQMP.

6.3.1 Deposition Dust Monitoring

There are three dust deposition gauges used for monitoring of larger dust particles (typically >50µm) that settle out from the air and are referred to as depositional dust. All gauges are located on Boral owned land (refer Appendix 2).

The dust deposition gauges were sampled monthly (+/- 2 days) during the reporting period with the corresponding results from the gauges comprising insoluble (mineralogical) matter and ash residue (organic).

Condition B20 (Part B) of the Project Approval requires that long term deposited dust emissions do not exceed an annual average criterion of 4 g/m^2/month at any neighbouring residence or privately owned land.

The criterion allows for consideration of extraordinary events such as fire incidents and dust storms, which may cause exceedances beyond the actual dust contribution of activities associated with the Quarry. To account for such events, the ash content of the monthly deposition gauge samples is also analysed to identify organic matter, which would not be typically be representative of the Quarry activities.

As all deposition gauges are located on Boral owned land, a review of the monitoring data and gauge locations was conducted by Todoroski Air Sciences during the reporting period. The monitoring data collected was interpolated to the neighbouring residences (in line with Condition B20 Part B) with no exceedances recorded to occur above the criteria (Refer to Appendix 2 for results). As part of the review, it has been previously recommended that at least 2 of the gauges be relocated.

A discussion with the EPA has been undertaken to support the proposed change in the monitoring locations to be closer to the boundary and receivers. The EPA have recommended that monitoring occurs at both the current and proposed

locations for a period of time to assess the data before ceasing monitoring at the previous locations and moving all monitoring to the new proposed locations. This was assessed in 2022, with the installation of a Real Time Dust Sampler and will continue to be assessed throughout 2023.

The monthly results and annual averages recorded during the reporting period from the three dust deposition gauges (D1, D2 and D3) are detailed in Appendix 2.

6.3.1.1 Deposited Dust – Performance Review (2022)

For much of the 2022 reporting period, Sites D1, D2 and Site D3, were below the criteria of 4g/m^2/month, with the exception of 3 occurrences. For most of the samples, the analysis shows the ash content, is at least half of the insoluble solids concentrations. This is an indication that the samples are likely to have had some level of organic matter, which is not generally representative of mineralogical based quarry dust.

All sites were below the criteria of 4g/m^2/month when the recorded data was interpolated to the boundary.

6.3.1.2 Long Term Trend Analysis and assessment (2014 – 2022)

Dust Deposition modelling for the EA (2006) was based upon conservative assumptions and indicated that the annual average dust concentrations and deposition levels would be below relevant air quality criteria at the nearest residential properties.

The latest modification (April 2020) also modelled that the dust concentrations would remain below the relevant air quality criteria.

The Dust deposition results, when assessed at the boundary of the operations, have consistently been below the criteria, since operations commenced in 2014 and therefore are in line with the predictions of the EA and the latest Modification.

6.3.1.3 Deposited Dust Summary and opportunities for improvements

As the dust gauges are situated on Boral owned land and not at the Boundary, monthly interpolation of the data will continue to assess compliance. A Real Time dust sampler was installed in 2022 and will continue to monitor throughout 2023 with a view to gather information to support a relocation of gauges D1 and D2 to the boundary.

6.3.2 PM2.5, PM10 and TSP High Volume Samplers (HVAS)

The three HVASs are on Boral owned land, situated together (refer to appendix 2) for the measurement of particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), less than 10 microns in diameter (PM_{10}) and Total Suspended Particulates (TSP.) They are programmed to operate on a continuous 24-hour period, on six in seven-day cycle. The HVAS sampler flows are subject to bi-monthly calibration and other parameters are calibrated on an annual basis.

A PM2.5 HVAS, which measures particulate matter less than 2.5 microns in diameter was brought online in March 2021. This monitor is in the same location of the existing PM10 and TSP HVASs.

Condition B20 (Part B) of the Project Approval requires that the operation of the Quarry must meet the PM2.5, PM_{10} and TSP criteria presented in Table 9 at any neighbouring residence or privately owned land.

Table 9: TSP, PM10 and PM2.5 Criteria

Pollutant	Averaging period	Criteria
TSP	Annual average	90 µg/m^3
PM_{10}	Annual average	30 µg/m^3 Changed to 25 µg/m in July 2020
	24-hour average (short term impact)	50 µg/m^3

$PM_{2.5}$	Annual average	8 µg/m^3
	24-hour average (short term impact)	25 µg/m^3

It has been identified that the HVAS are not located at the boundary of the Peppertree Quarry and therefore data obtained from these samplers needs to be interpolated to determine compliance at the nearest receiver.

Regular reports are prepared by Todoroski Air Sciences with a review of the results that are then interpolated to the receivers. Details of the interpolated data are included in Appendix 2.

6.3.2.1 PM2.5, TSP and PM10 – Performance Review (2022)

Graphical results for the annual average of TSP, PM10 and PM2.5 for the 2022 reporting period are contained in Appendix 2.

Results for TSP annual average were within the Project Approval criteria of 90 µg/m^3.

Results for PM10 24-hour average (short term impact) and annual average were within the Project Approval criteria of 50 µg/m^3 and 25 µg/m^3 respectively.

As of July 2020, the PM10 Annual average criteria was reduced to 25 µg/m^3, as per Modification 6.

Results for PM2.5 24-hour average (short term impact) remained below the Project Approval criteria of 25 µg/m^3 and below the annual average goal when interpolated to the boundary.

Results for PM2.5 annual average have been above or on the criteria for the first four months of the reporting period. This was a result of the HVAS with an annual average of 63 results not being achieved until March 2022.

Problems were experienced with the consistent operation of the TSP sampler at the beginning of 2022. Another machine was purchased and commissioned during the 2022 reporting period as well as a backup machine to ensure consistent sampling during periods of equipment failure.

6.3.2.2 Long Term Trend Analysis and assessment – PM2.5, TSP and PM10

The TSP monitoring results have all been below the average annual criteria of 90ug/m^3. These results indicate that TSP dust levels are well below the long-term impact assessment criteria, which has been consistent over the years, and consistent with the EA and Modification 6 predicted annual averages.

The PM10 monitoring results have all been below the average annual criteria of 30ug/m^3, until January 2020, where the impact of bushfire smoke was seen on the PM10 levels measured. In July 2020, the criteria was reduced to 25ug/m^3 and levels had remained above this annual average criteria until December 2020. The long term result has consistently been below the criteria since December 2020 and throughout the 2022 reporting period.

The PM_{10} results have all been under the 24 hour average criteria (50ug/m^3) with the exception of a number of specific events in 2015, early in 2016, 2017, 2018, 2019, 2020 and on one occasion during 2021. However, when interpolated to the boundary, all results were determined to be below the relevant criteria in Table 9.

These results indicate that PM10 dust levels are generally below the long-term impact assessment criteria, which has been consistent over the years, and consistent with the EA and Modification 6 predicted annual averages, taking into account the impact of smoke from bushfires.

Problems have been experienced with the consistent operation of the PM10 sampler at the end of 2020 and beginning of 2021. Similarly, problems were experienced with the consistent operation of the TSP sampler at the beginning of 2022. Another machine was purchased and commissioned during the 2022 reporting period as well as a backup machine to ensure consistent sampling during periods of equipment failure.

Results for PM2.5 annual average have been above or on the criteria for the first four months of the reporting period. This was a result of the HVAS with an annual average of 63 results not being achieved until March 2022.

6.3.2.3 PM2.5, PM10, TSP Summary and opportunities for improvements

As the HVAS are situated on Boral owned land and not at the Boundary, monthly interpolation of the data will continue to assess compliance with the relevant criteria shown in Table 9. A Real Time air sampler was installed in 2022 reporting period and continue to monitor throughout 2023 to assess levels at the boundary with the potential for future relocation of the static HVASs.

6.4 NOISE

The Noise and Blast Management Plan May 2020 (NBMP) provides the framework and guidance for the Quarry activities to be conducted in a manner such that appropriate control measures are implemented to minimise the potential for adverse impacts on the amenity, property and safety of quarry neighbours and to ensure compliance with the Project Approval CoA requirements. A number of management actions have been put in place to assist in meeting these objectives with guidance on performance occurring through the implementation of a quarterly noise monitoring program.

The results and a general review of the quarterly noise monitoring program conducted during the reporting period are presented in Appendix 3.

In accordance with NBMP, operational noise assessments are conducted on a quarterly basis. During the reporting period noise assessments were conducted in March, June, August and December.

Attended monitoring is conducted during both day and night time periods to enable measurement of operational noise from quarry activities conducted during the Project Approval permissible hours of operation. Unattended monitoring is generally continuous between the device deployment and collection, measuring noise levels for all assessment periods.

Operator attended noise measurements are conducted at or near the locations specified in Table 2 of Project Approval Condition B3 Part B. Appendix 3 shows the receiver locations required to be monitored.

Table 10 presents the criteria for receiver locations required to be assessed in accordance with Condition B3 (Part B) of the Project Approval and EPL Condition L2.

Table 10: Operational Noise Assessment Criteria

Residential Receiver Locations	Noise Assessment Criteria			
	Day (7am to 7pm)	Evening (7pm to 10pm)	Night (10pm to 7am)	
	LAeq (15 min)	LAeq (15 min)	LAeq (15 min)	LA1 (1Min)
R3	40	35	35	52
R2	40	35	35	52
R8	40	35	35	52
Any other noise sensitive residential receiver location (R4 & R17)	40	35	35	52

A real time noise monitor has been installed and is in operation at the Residential Receiver R3. A procedure has been developed as to the management of quarry noise, based upon real time noise measurements and weather conditions. An alert system is to be investigated that is simple for control room operators to instigate.

6.4.1 Noise Management Performance Review

A summary of the maximum day and night time noise assessment measurements against the respective Project Approval compliance criteria for LAeq (15 minutes) noise levels (Condition 3B – Part B) is provided in Appendix 3.

The assessment results found that the Quarry LAeq (15minutes) noise levels were in compliance at all receiver locations with the majority of the measured results considerably lower than the respective limits prescribed by the Project Approval.

A summary of the maximum night time noise assessment measurements against the respective Project Approval compliance criteria for measured LA1 (1 minute) noise levels at all receiver locations is also provided in Appendix 3. The assessment results found that the LA1 (1 minute) noise levels were in compliance at all receiver locations, with the averaged levels being considerably lower than the respective prescribed limits under the Project Approval.

Furthermore, Low Frequency Noise was assessed as per the requirements of the Consent. Assessment of Low frequency noise was undertaken every quarter as part of the regular monitoring conducted at all receivers.

Tonal, low frequency, impulsive and intermittent noise characteristics were not found to present in the quarry noise emission results.

6.4.2 Long Term Trend Analysis and Assessment

Long term trend analysis has been undertaken on monitoring data for residential receivers R2, R5, R6 and R16 as monitoring commenced prior to operations in 2014. Analysis on residential receivers R4 and R17 has been undertaken since October 2016.

Extended hours of operation for in pit activities commenced in August 2016, however no noticeable variation has been identified in the noise monitoring.

Graphical representations of the noise monitoring results (estimated Quarry LAeq [15 minute and 1 min) contribution sourced from the quarterly monitoring reports) are contained in Appendix 3. The monitoring results have generally remained consistently below criteria since the commencement of operations at all locations.

Noise modelling for both the 2007 EA and Modification 6 indicated that all receiver locations will experience noise levels below the criteria. Sleep disturbance and cumulative noise impact due to the operations are not considered likely.

The quarterly noise monitoring data has found that the quarry achieved compliance with the approved operating noise criteria at all locations for the majority of the time and therefore is in line with the predicted models.

6.4.3 Noise summary and opportunities for improvement.

Implementation of a real time noise monitoring alert system to allow pit operations to be managed under temperature inversion conditions in order to reduce potential noise impacts on receivers, will be progressed throughout 2023.

6.5 BLASTING

All blasts are conducted in accordance with the Noise and Blast Management Plan May 2020.

Monitoring of overpressure and ground vibrations at four nominated sensitive receptors is conducted during every blast (refer to Appendix 4 for locations).

As part of every blast air, overpressure and ground vibration is monitored for compliance with the relevant assessment criteria in the Project Approval.

Conditions B12 and B13 (Part B) of the Project Approval requires that air-blast overpressure and ground vibration should not exceed the criteria in presented Tables 11 and 12, respectively, at any residence on privately-owned land.

Table 11: Air-blast Overpressure Impact Criteria

Air-blast overpressure (dB Lin peak)	Allowable Exceedance
115	5% of the total number of blasts over a period of 12 months
120	0%

Table 12: Ground Vibration Criteria

Peak Particle Velocity (mm/s)	Allowable Exceedance
5	5% of the total number of blasts over a period of 12 months
10	0%

6.5.1 Blast Management Performance Review

Blast monitoring results for over pressure and ground vibration collected during the reporting period are presented in Appendix 4. The maximum measurements for over pressure and ground vibration were 113.3 (22/2/22 – B2) and 2.87 mm/sec (24/08/22 – B2)

The Quarry conducted 47 blasts during the reporting period, all of which complied with Project Approval criteria.

All blasts were performed in accordance with the following Environmental Performance Conditions under Part B of the Project Approval:

- Monitored for overpressure and ground vibration levels (Conditions B12 and B13 respectively);
- Best practice considerations associated with safety and minimisation of fumes and dust (Condition B16); and
- Notifications to neighbours and public information (Condition B16).

6.5.2 Long Term Trend Analysis and Assessment

Graphical representations of the blast monitoring results since the commencement of operations are presented in Appendix 4.

For both parameters, the results for this reporting period are consistent with previous years. Additionally, trend analysis depicts that throughout the operational period, airblast overpressure and ground vibration has remained consistent.

Since the first AR reporting period in 2014, the Quarry has conducted 419. All blasts were found to be compliant with Airblast Overpressure and Ground Vibration blasting criteria as predicted in the EA.

6.6 WASTE MANAGEMENT

Boral is committed to continuing the minimisation of waste from its operations, in accordance with the waste hierarchy and minimizing the amount of waste sent to landfill. All liquid and solid wastes are classified and sorted so they can be appropriately reused and recycled.

Waste generated by the quarry operations is collected and segregated to allow the proper storage and end use of the waste material to be managed.

Waste is classified in accordance with the NSW EPA Waste Classification Guidelines thereby advising on the appropriate management and / or disposal.

A Waste Management Plan is in place, which outlines the management methods in place for each waste, with contracts in place with licensed contractors where appropriate, refer Table 13.

Table 13: Waste Management Methods for Peppertree Quarry

Waste	Waste Classification	Management Method	Contractor
Oil absorbent pads	Solid general waste	Once used, bagged and placed in bin for landfill providing no liquid oil present.	Cleanaway – local Council landfill
Food scraps	Solid general waste	Bagged and placed in bin for landfill	Cleanaway – local Council landfill
Disposable Coffee Cups	Solid general waste	Coffee cups are made of compostable materials rather than polystyrene. Currently cups are bagged and placed in the bin for landfill.	Cleanaway – local Council landfill
Screen mats	Solid general waste	Placed in nominated bin for recycling	Cleanaway
Oil filters	Solid general waste once oil has been drained	Drained of oil, placed in bin for recycling	Cleanaway
Oily rags / waste	Solid general waste	Oily rags are bagged and placed in bin for landfill	Cleanaway – local Council landfill
Plastic / Glass bottles / Aluminium cans	Solid general waste	Separated in the crib room and offices for recycling.	Endeavour Industries
Office Paper and Cardboard	Solid General waste	Separated in the crib room and offices for recycling	Endeavour Industries
Cardboard	Solid general waste	Separated at the workshop and warehouse and placed in specific cardboard bins	Cleanaway – recycling
Conveyor belt	Solid general waste	Complete belts are collected and stockpiled for reuse. Contract is in place with companies who repair the belts to remove the damaged belts. Scrap belting is placed in a designated bin for recycling.	Fenner Dunlop or Spice Tech with belt on sold for mainly agricultural uses. Scrap conveyor belt is recycled by Cleanaway
Oil drums	Solid general waste	Drained on site, stockpiled in designated area, and crushed for recycling	Fast Skips
Empty IBC Containers	Solid general waste	Stockpiled in designated area and returned to supplier	Polo Citrus
Steel	Solid general waste	Offcuts and parts are placed in designated steel skip bins for recycling	Fast Skips
Waste oil	liquid waste	Collected and stored onsite in purpose designed oil tank adjacent to the workshop.	Clean away

Waste	Waste Classification	Management Method	Contractor
		This tank is emptied on a regular basis with the oil taken for recycling by a licensed regulated waste transporter	
Tyres	solid general waste	There is very little storage of tyres on site. Tyres are replaced by designated contractors who take the damaged tyre for recycling or disposal.	Bridgestone, Premier Tyres
Timber pallets	Solid general waste	Pallets and timber waste are placed in designated timber skip bins for recycling. Pallets in good condition will be returned to the supplier where possible	Clean away
Photocopy toners	Solid general waste	Bagged and posted for recycling	Onsite management
Sewage Effluent	liquid waste	Above ground absorption trench on site.	Onsite management
Batteries	Solid general waste	Collected and recycled through regional facilities	Onsite management
Manganese Crusher liners	Solid General waste	Placed in designated skip bin and recycled	Fast Skips
Tungsten tips	Solid General waste	Placed in designated skip bin and recycled	Fast Skips
E Waste	General solid waste	Collected and recycled through regional facilities	Onsite management
General rubbish	General	General solid waste	General rubbish
Overburden	Virgin excavated natural material (VENM)	Emplaced within approved designated emplacements on site	Onsite management
Granodiorite Fines	Virgin excavated natural material (VENM)	Emplaced within approved designated emplacements on site	Onsite management
Scalps	Virgin excavated natural material (VENM)	Stockpiled on site prior to sale	Onsite management

6.7 DANGEROUS GOODS AND HAZARDOUS MATERIALS MANAGEMENT

The Quarry has a Safety Data System (SDS) in place utilising the ChemAlert Program. A Hazardous and Dangerous Goods Register is in place, which identifies each chemical stored onsite. The register is electronically filed with a physical copy kept within the Site Office.

In accordance with Project Approval Condition B74 (Part B), all dangerous goods and chemicals are handled and transported in accordance with AS1940 and AS1596 and the Dangerous Goods Code.

The only Dangerous Goods Licence pertaining to the Quarry is for two aboveground double skinned bunded diesel tanks, one being 100 kl that is used for refuelling locomotives, the other being 60 kl used to refuel contractors heavy machinery. The WorkCover Notification (NDG200221) was issued on behalf of an on-site contractor who operates and maintains the

100kl refuelling facility. The Contractor's operation and management of the facility is audited on a regular basis for compliance.

6.8 BUSH FIRE MANAGEMENT

Part B, condition B76 requires the quarry to:

(a) Prepare a Fire management plan in consultation with NSW RFS Southern Tablelands District office, within six months of approval of Modification 5;
(b) Ensure the project:
    (i) Provides for asset protection in accordance with the relevant requirements in the *Planning for Bushfire Protection* (RFS, 2006) guideline 5;
    (ii) Ensure that there is suitable equipment to respond to any fires on site; and
(c) Assist the RFS and emergency services to the extent practicable if there is a fire in the vicinity of the site.

Peppertree quarry has in place an extensive fire management system, which is audited by independent experts on a quarterly basis.

Emergency response plans contain details for bush fire management and response.

As per Part B Condition B76 a Bush Fire Management plan was prepared and reviewed by NSW RFS Southern Tableland District Office, before being approved in May 2020.

For the 2022 reporting period, there was no requirement to use the Bushfire emergency response plans.

6.9 HERITAGE CONSERVATION

The Aboriginal Heritage Management Plan (AHMP) was updated in 2021 to reflect management associated with the current quarry activities.

The AHMP continues to provide the framework for the identification, protection, conservation and presentation of Aboriginal cultural values at the Quarry with the primary objectives of the AHMP to identify, protect, conserve, present and transmit the Aboriginal heritage values associated with the land, on which the Quarry activities are conducted.

Aboriginal Heritage Site works were undertaken during 2022 on the Mod 5 site prior to the construction commencement of the SWOE. Approximately 800 artefacts were salvaged as part of the MSL055 management measures. A report has been prepared detailing the outcomes of the measurement measures.

Five scarred trees were relocated from the SWOE (Mod 5) to a temporary storage area South-East of the quarry pit following the involvement and advice of the Peppertree Quarry Aboriginal Heritage Management committee (AHMC). A decision has been made by the AHMC for the display and final location (within the Peppertree quarry site) of the 5 scarred trees that will be erected during the 2023 reporting period following a conservation and preservation report being developed by a specialist consultant.

Over a non-consecutive 3 day period (9th, 10th and 27th September 2022) the Peppertree Quarry Aboriginal Heritage Management committee (AHMC) held four return to country ceremonies of approximately 65 570 artefacts. Detailed analysis of the remaining (24,430) artefacts is currently ongoing. However, these artefacts will be returned to country upon completion unless requested by the AHMC to be kept for display at Peppertree Quarry for educational purposes. This is planned for 2024 prior to the final Aboriginal Heritage report completion.

A report for the Mod 5 (SWOE) salvage works has been completed along with an interim Aboriginal heritage report detailing the findings of salvage works completed at Peppertree Quarry so far.

Regular meetings have continued to be held with the Aboriginal Heritage Management Committee. The agenda covers future quarry operations, possible community projects and the implementation of the Boral Reconciliation Action Plan.

7 WATER MANAGEMENT

Surface and groundwater is managed in accordance with a Water Management Plan (WMP), 2022.

Table 14 provides an overall summary of the environmental performance of the quarry in regard to water management, with further details provided in the following sections.

Table 14: Summary of Environmental Performance – Water Management

Aspect	performance during the reporting period	Trend / Key management implications	Implemented / proposed management actions
Surface water quality	No results were over the trigger levels for 3 consecutive samples requiring detailed investigation	Data collected over time is consistent with the EIS predictions, Modification modelling and previous AR reporting	Continue management and monitoring
Environmental flow	Complies with criteria	Data collected over time is consistent with the EIS predictions, Modification modelling and previous AR reporting	Continue management and monitoring
Groundwater standing level	Complies with criteria	Data over time is consistent with the EIS predictions, Modification modelling and previous AR reporting	Continue management and monitoring
Groundwater quality	Results are consistent with trends and show no marked variations in water quality nor any impacts associated from quarry operations	Data collected over time has been consistent within each groundwater well.	Review trigger levels and re development of bores

7.1 SURFACE WATER

Surface water management at the Quarry is conducted in accordance with a Water Management Plan (WMP) 2017.

In accordance with Condition B33 (Part B) of the Project Approval, the WMP includes a surface water quality program that involves quarterly sampling from the Tangarang Creek, Dam 1, the upstream culvert, Marulan South Creek and overflow from any sediment ponds during extreme storm events. (Refer to Appendix 5 for sampling locations).

This condition also details that the Surface Water monitoring program includes…

"(a) detailed baseline data on surface water flows and quality in Tangarang Creek and Barbers Creek"

Tangarang Creek is sampled on a quarterly basis, with Barbers Creek sampled twice a year. Sampling is conducted either by Peppertree or Marulan South operations. Flow is measured in Tangarang creek as part of the Environmental flow requirements for Peppertree Quarry.

No surface water flow data is obtained from Barbers Creek. This area is difficult to access, and the use of solar powered flow monitoring equipment has been investigated and found not to be suitable. Flow data is available further downstream in the Shoalhaven River at a NSW Water monitoring site (Fossickers Flat). Data associated with this site is contained at Appendix 5.

The quarry has a practice to ensure sediment ponds associated with overburden emplacements are emptied within 5 days of a rain event, by pumping the water to the main pit, so there is sufficient capacity in the dams for the next rain event. No ponds overflowed, within their design capacity and required monitoring during 2022.

The Quarry's main Dam provides environmental flows into the ephemeral Tangarang Creek and as such the downstream water quality is largely representative of the discharges, with some minor natural variations from the wider catchment influences.

The suite of parameters analysed for each water quality sample collected is listed in Table 15.

Table 15: Summary of Creek Water Quality Parameters

Laboratory Analysis of analytes		
Total Dissolved Solids (mg/L)	Potassium (K+)	Bicarbonate (HCO_{3-})
Total Suspended Solids (mg/L)	Magnesium (Mg2+)	Nitrate (NO_{3-})
Turbidity – Laboratory (NTU)	Sodium (Na+)	Nitrite (NO_{2-})
TPH C10-C36	Ammonia (NH4+)	Total Nitrogen
Benzo[a]pyrene	Chloride (Cl-)	Total Phosphorous
Naphthalene	Sulphate (SO42-)	Faecal coliforms (cfu/100mL)
Calcium (Ca2+)		

The Water Management Plan outlines trigger levels for the suite of analytes in line with ANZECC guideline recommendations.

Table 16 summarises the trigger values used to assess any potential impacts on the water quality in creeks in the vicinity of the Quarry. However, it should be noted that observations to date indicate that while the water quality in the Shoalhaven River mostly meets the ANZECC ecosystem protection levels, the upstream contributing creeks do not. Therefore, the trigger values shown in Table 16 are adopted as benchmark goals, rather than performance or compliance criteria.

Table 16: Water Quality Trigger Values

Indicator	ANZECC Default Trigger for Ecosystem Protection[1]	WaterNSW Benchmarks for Catchment Streams	Proposed 'Triggers'
pH	6.5 – 7.5	6.5 – 8.0	6.5 – 8.5
EC (µS/cm)	30 – 350		400-1,500
Total nitrogen (mg/L)	0.25	<0.25	1.1
Total phosphorus (mg/L)	0.02	<0.02	0.09
Turbidity (NTU)	2 - 25	0 - 25	

[1] Default trigger values for physical and chemical stressors for South-east Australia for slightly disturbed ecosystems (upland river)

The trigger values are applied as follows for ongoing monitoring in Tangarang Creek (both upstream and downstream of any influence from the Quarry):

- If the upper bound for pH, EC, total suspended solids or turbidity is exceeded for a period of three consecutive months downstream of the quarry but is not exceeded upstream of the quarry, this would be the trigger to undertake further assessment of potential sources within the Quarry.
- If the additional assessment finds that the change in water quality may be affected by quarry operations, then further investigation would be required to identify the source of the water quality impact, and review and revise practices to minimise the impact.

This further assessment would include investigation of the potential pathways for water quality impacts within the Quarry area in order to identify whether the change in water quality is attributable to quarry activities, and the nature of activity that has caused the change.

7.1.1 Surface Water Monitoring Results

The quarterly surface water quality monitoring data is presented in Appendix 5. Due to the ephemeral nature of Tangarang Creek, the upstream monitoring point (U1) only flowed for 3 of the monitoring events during the reporting period.

7.1.2 Surface Water Management Performance Review

The Quarry surface water quality trends are generally consistent over the 2022 reporting period with historic trends (refer to Appendix 5).

The results for pH were in the range of the trigger levels (i.e. pH 6.5 to 8.5), apart from one result from U1.

Fluctuations in Total Dissolved Solids (TDS) during the reporting period were all below the ADWG guideline value of 500 mg/L (ANZECC (2000)), with the exception of one sample for Marulan South creek.

Turbidity levels were generally consistent over the 4 sampling periods in 2022 and in most cases were below the ANZECC guideline for both the Dam and T1. For the March sampling period, turbidity results for every sampling location were higher than the trigger level due to a rain event.

Total Nitrogen and Phosphorous are indicators of nutrient levels in water systems and results are depicted in Appendix 5.

Total Nitrogen levels recorded for the Dam, reflected rain events and fluctuated over the reporting period. Samples collected from the T1 location remained consistently lower than the main dam and U1 sampling points. All sites had higher than usual levels associated with a higher than average rainfall amount during the reporting period.

Total Phosphorus levels remained low and below trigger levels at T1, U1 and the Dam during the second third and fourth quarters. Samples at all monitoring points collected during the first quarter gave results higher than the trigger level due to a rainfall event.

All results for hydrocarbon and Polycyclic Aromatic Hydrocarbons (PAHs) were at concentrations below the Laboratory levels of reporting (LORs).

No results in the T1 Creek Samples for any of the above parameters were found to exceed the trigger levels for 3 consecutive samples, which were attributable to quarry operations and would require a detailed investigation.

7.1.3 Long Term Trend Analysis and Assessment

Long term trend analysis has been undertaken on pH, TDS, Turbidity, total Phosphorus and total Nitrogen with the results presented in Appendix 5.

pH is consistently between the range of 6.5 to 8.5, with some higher than usual levels occurring in the Dam in rain or low flow events. Levels at T1 downstream have consistently remained within the trigger levels. Barber Creek samples are also consistently below the trigger levels.

Long term TDS levels recorded at the Dam, T1 and U1 sites have remained below the ADWG guidelines, for the majority of the time since rain events in 2013. Barbers Creek levels have fluctuated over time and will be influenced by other factors rather than the quarry.

For the majority of time, Turbidity in both the Dam and for the T1 samples have been below the ANZECC criteria. Turbidity has been over the criteria at both sites in times of large rain events, when water from the catchment above enters the dam and downstream creek.

Total Phosphorus levels fluctuate over time at all sampling sites. For most of the time, levels were below the trigger criteria for all sites. Levels increased in the Dam and at Marulan south creek at the end of 2018, which may be attributed to outside activities associated with local farming practices. Levels were higher than usual in February 2020 and March 2022 in relation to a significant rain events.

Total Nitrogen levels have fluctuated over time. Samples collected from the T1 location have continued to be below trigger levels since 2014, with the exception of storm related events. This was evident throughout the 2022 reporting period with all monitoring points seeing elevated nitrogen levels, potentially attributed to increased rainfall and inflow from the catchment above the quarry.

The initial EA and management plans predicted compliance with the appropriate ANZECC and ADWG criteria based on limited background sampling. With the exception of periods of storm events, the results obtained from surface water analysis has been in line with the EA predictions and the criteria.

Overall, there would appear to be no impact to T1 and Barbers Creek from quarry operations.

7.1.4 Environmental Flows

Under Project Approval Condition B31 (Part B), the supply of 10% of daily inflows into the Quarry main dam must be provided as environmental flows to Tangarang Creek. The monthly averages of inflow and outflow volumes in comparison with the required 10% of environmental flow requirement are presented in Table 17. The environmental flows were above the 10% requirement each month throughout the reporting period.

Overall, for 2022 the quarry complied with the 10% environmental flow requirement.

No surface water flow data is collected from Barbers Creek. This area is difficult to access, and the use of solar powered flow monitoring equipment has been investigated and found not to be suitable. Flow data is available further downstream in the Shoalhaven River at a NSW Water monitoring site (Fossickers Flat). This site has been in operation since July 1977. Data associated with this site is contained in appendix 5.

Fossickers Flat data shows a consistent water level in the river with increases in water level and flow associated with rainfall events.

Table 17: Environmental Flow Data (2022)

Month (2021)	Inflow (Megalitres)	Outflow Requirement (10%)	Outflow (Megalitres)	Compliance
January	19.4	1.94	239.7	Yes
February	10.8	1.08	4.35	Yes

March	54.2	5.42	1201.31	Yes
April	30.3	3.03	656.16	Yes
May	22.6	2.26	316.52	Yes
June	3.1	0.31	6.6	Yes
July	60.6	6.06	820.91	Yes
August	34.2	3.42	341.8	Yes
September	18	1.8	22.88	Yes
October	62.5	6.25	999.7	Yes
November	42.2	4.22	411.49	Yes
December	0.9	0.09	1.34	Yes
Total	358.8	35.88	5022.76	Yes

7.1.5 Surface water summary and opportunities for improvement

Results over the operation of the Quarry show little detrimental impact on the downstream environment in Tangarang creek and Barbers Creek.

Water management strategies need to remain in place with ongoing quarterly monitoring at nominated sites. Flow monitoring data will continue to be reviewed from Fossickers Flat.

7.2 GROUNDWATER

The Quarry WMP includes a groundwater monitoring program aimed to be conducted quarterly of five shallow and seven deep piezometers ranging from between 15 m to 100 m in depth (refer to Appendix 5). The groundwater monitoring is undertaken in general accordance with AS 5667.11 – 1998 Water Quality Sampling – Guidance on Sampling of Groundwaters.

The groundwater monitoring program has been undertaken for 6 years since commencing in October 2015.

Indicative trigger values were proposed and included in the Water Management Plan (2021), to allow an assessment of potential impacts, with an aim to develop more specific targets once sufficient data had been gathered. New specific targets have been developed and are being included in the revision of the Water Management Plan.

Sampling in 2019 had shown several wells which required further development or repairs. Consultants undertook a detailed well inspection and, where possible, repairs in October 2020. It was identified that some wells were not repairable. An assessment of the overall groundwater well network was undertaken, in March 2021. An additional report was prepared reviewing groundwater flow and results with recommendations for the installation of 4 replacement wells and one new monitoring point.

Installation of new wells as per the recommendation is planned was planned for mid 2022, however due to the increased rainfall and poor ground conditions throughout the reporting period this was delayed until 2023.

A technical review was also undertaken of the trigger levels in the preparation of the revised Water Management plan.

A technical review of the Nutrient Concentrations of the groundwater was also conducted in July 2021 to better understand the nitrogen and phosphorous levels, concluding that quarry operations do not appear to have an influence on nutrient status.

Assessment of groundwater results is undertaken following each monitoring round with any analytes above trigger levels being noted. In instances where trigger levels are exceeded in two consecutive rounds of monitoring, further

assessment is undertaken to determine whether the potential anomaly is the result of quarrying activities or due to natural variability.

Ground water flow was mapped and shows a pattern of very slow recharge due to the nature of the granodiorite and with a direction of flow towards the pit. RPS, groundwater consultants who undertook the monitoring (until mid 2022) and assessment have advised….

"Groundwater at the site appears to flow in the direction towards the pit, which is acting locally as a sink. Considering the low hydraulic conductivity of the aquifer, risks to the receiving environment from any contamination that may be present in groundwater are likely to be low. "

The groundwater field sampling measurements, standing water levels and the Laboratory analytical results from the quarterly groundwater sampling completed during the reporting period are presented in Appendix 5.

In line with progressing approvals with NRAR in association with the site's Water approval works for the incidental take of 300ML of groundwater from pit operations, a hydrological assessment was also prepared.

7.2.1 Groundwater Management Performance Review

Groundwater monitoring first commenced in October 2015. Groundwater results and trends presented in Appendix 5 and discussed below are in the early stages of a long-term monitoring program which will generate a greater data set from which more detailed and accurate interpretation of any potential or actual impacts on groundwater may be occurring through quarry activities.

pH trends have remained relatively stable in each piezometer for 2022. The pH levels vary considerably between the respective piezometers with a range of 6.51 to 8.87.

Field measured Electrical Conductivity (EC) during the reporting period ranged from 374 to 3286 uS/cm, indicative of fresh to brackish water quality. EC trends are relatively stable and consistent between each of the piezometers.

Dissolved oxygen (DO) trends showed a high degree of variability in individual and between respective piezometers throughout the reporting period, but did not indicate any degradation in water quality.

Standing water levels remained relatively stable in each of the piezometers. PQ5 is identified as the sentinel water bore and over the last 12 months has shown an increase in water level, assumedly associated with increased rainfall.

Key findings from the analytical results were:

- Concentrations of nutrients (total nitrogen and total phosphorous) are above the trigger values in most of the piezometers throughout the reporting period, and as such it is believed that these levels are representative of background levels. In field filtering, has identified that the nitrogen is accounted for by total Kjeldahl nitrogen (sum of ammonia and organic nitrogen) and supports that the nitrogen is more likely to represent an agricultural influence than quarry operations.

- Organic analyses (oil & grease, polycyclic aromatic hydrocarbons, volatile and semi-volatile total recoverable hydrocarbons and benzene, toluene, ethyl benzene, xylenes and naphthalene) were not detected at the majority of the piezometers. On a limited number of occasions, Oil and grease or TPH was detected in single bores. Follow up investigations have not identified any ongoing issues.

For all the other analytes, all piezometers across the site showed levels in line with the historic trends and below the trigger values.

7.2.2 Long term trend and assessment

pH trends have remained relatively stable in each piezometer since the commencement of the monitoring program in 2015. The pH levels have varied considerably between the respective piezometers with a range of neutral to alkaline. These levels occur in both in pit groundwater bores as well as those outside of any influence from quarry activities.

The early EC trends are relatively stable and consistent between each of the piezometers. Variations appear to occur consistently across most of the bores and are most likely in response to recharge rain events.

A rapid decrease in Dissolved Oxygen (DO) trends occurred from the development of the piezometers in 2015 through to 2016. Spikes in DO have occurred in several of the piezometers during 2017 and 2018 and are likely to have been influenced by recharge rain events. For 2019, a change was made in the measurement of the DO to better identify any issues within the groundwater. There has been no indication of water quality degradation through the variable DO results.

Standing water levels remained stable in each of the piezometers, with some fluctuation due to rainfall events. PQ5 is identified as the sentinel water bore and shows some reaction to rainfall events since 2015. The standing Water level has fallen less than 2metres since monitoring commenced, and therefore has not triggered any need for investigation, required if the level falls 5m or more.

Key findings from the analytical results were:

- Concentrations of nutrients (total nitrogen and total phosphorous) were above the trigger values in most of the piezometers, and as such it is believed that these levels are representative of background levels. In field filtering of samples was undertaken in 2020 and showed total Kjeldahl nitrogen (sum of ammonia and organic nitrogen), accounts for the Total Nitrogen and supports that the nitrogen is more likely to represent an agricultural influence than quarry operations. A technical review of the nutrients undertaken in 2021, showed levels were not associated with quarry operations.

- Organic analyses (oil & grease, polycyclic aromatic hydrocarbons, volatile and semi-volatile total recoverable hydrocarbons and benzene, toluene, ethyl benzene, xylenes and naphthalene) have been detected at times in some of the piezometers. These have been one off occurrences and on investigation have not been associated with quarry operations. It is more likely to be associated with development of the piezometers or laboratory level of detections.

For all the other analytes, all piezometers across the site showed levels above the trigger values at times.

A review of these occurrences show that the results are consistent with previous trends and do not indicate marked variations or impacts in water quality.

7.2.3 Ground water summary and opportunities for improvement

A review of the data over the sampling rounds, since 2015 has shown results above trigger values.

A review of these results show that they are consistent with previous trends and do not indicate marked variations in water quality nor any impacts associated from the quarry operations.

RPS, groundwater consultants who undertake the monitoring (until mid 2022) and assessment have advised….

“Groundwater at the site appears to flow in the direction towards the pit, which is acting locally as a sink. Considering the low hydraulic conductivity of the aquifer, risks to the receiving environment from any contamination that may be present in groundwater are likely to be low. “

An assessment of the overall groundwater well network was undertaken in 2021 to determine what wells need to be reestablished, with a program for installation to be developed in 2023.

8 REHABILITATION

During the 2022 AR period, a total of 141.02 ha of Quarry land remained disturbed. All works have continued within the existing disturbed footprint. Rehabilitation works in 2022 have focussed on maintenance, infill planting and repairs on existing areas.

Table 20 presents the total estimated areas of disturbance and rehabilitation.

Table 20: Areas of Disturbance and rehabilitation

Area Reference	Total Disturbed Area (ha)	Total rehabilitated Area (ha)	Disturbed Area during 2022 (ha)	Rehabilitated Areas as of the end of 2022 (ha)
1: Infrastructure area – (Primary, STQ and TLO)	25	0 (Not applicable till end of life)	0	0
2: Quarry extraction area	46.5	0 (Not applicable till end of life)	0	0
3: Eastern overburden emplacement	17.9	8.12	0	Areas overplanted with trees in 2022, Seed dispersed on rocky slopes
4: west pad	0	0	0	Now included included in SWOE disturbance
5: Overburden emplacement / Noise bund	12	12.1	0	0
6: Dam and creek rehabilitation area	10	10.3	0	No further rehabilitation work required. Now in maintenance
7. Heritage salvage	13.2	0	0	0
8. Western overburden emplacement	4.6	0	0	0
9. Southern overburden emplacement	11.52	8.3	0	Areas overplanted with trees in 2022
10. South Western Overburden Emplacement (SWOE)	27.68	0	27.68	0
Total area Disturbed / Rehabilitated as of the end of 2022	168.7	35.4	0	0

A Biodiversity and Rehabilitation management plan was prepared and discussed with the Biodiversity Conservation Department in 2021 in accordance with Development Consent Condition B60 (Part B). The finalised plan with issued to DPE being approved in 2022.

As Part of the Quarry's rehabilitation monitoring program, the annual Rapid Visual assessment and biennial Ecological Assessment was undertaken in November 2022. This assessment was conducted by independent consultant Mark Nolan of Cambium Group.

The assessment recommended that the following be considered in the next 12 months of rehabilitation maintenance planning:

- Management of blackberry
- Continue to monitor and treat weeds along Tangarang Creek (RMU1b).
- Continue the feral goat control program.
- Rock armour identified slopes to improve slope stability and minimise potential for erosion
- Re-commence tube stock establishment program to increase species diversity on slopes currently revegetated with groundcover species.
- Maintain (but prevent further spread of) weed cover amongst the tube stock plantings on emplacements to facilitate stability,
- Continue the recovery and placement of rock piles and wooden debris on (or adjacent to) rehabilitated surfaces and landforms.
- Complete remedial repair works on the gully that has formed on the rock armoured drop structure that drains the eastern emplacement.
- Assess and manage real erosion on slopes on the eastern and southern slopes

The next detailed Ecological Assessment will be undertaken in November 2024. This Assessment is undertaken every 2 years to determine the status of the rehabilitation areas against the closure completion criteria and to provide advice for improvements. An updated three year plan was developed in 2021 to guide the rehabilitation of the quarry site, table 21 shows the three year plan status.

Table 21: Biodiversity Rehabilitation Management Plan- three year plan status

Unit	Area	Activity	Due date	Status
1	Habitat Management area	Maintenance- Weed and pest management	Quarterly 2022 Quarterly 2023 Quarterly 2024	Completed, heavy focus on serrated tussock and blackberry
		Ecological Assessment	2022 2024	Completed
		Rapid visual Assessment	2022 2023 2024	Completed
2	**Peppers Woodlands (proposed biobank site)** This area is no longer a biobank site but now the benchmark for the rehabilitation works at Peppertree	Ecological Assessment	2022 2024	Completed
		Rapid visual Assessment	2022 2023 2024	Completed
3	**Pit void**	Landform establishment of batters	2022 2023 2024	Ongoing as batters become available

		Land preparation and revegetation	2022 2023 2024	
		Maintenance of rehabilitated areas	2022 2023 2024	N/A no rehabilitated areas within the pit void, ongoing as they become available
		Ecological Assessment	2022 2024	Completed
		Rapid visual Assessment	2022 2023 2024	Completed
4	**Southern overburden emplacement**	Land preparation	2022	Ongoing, some completed throughout 2022, will continue throughout 2023
		Revegetation	2022	Areas available for revegetation have been completed
		Maintenance of rehabilitated areas	2022 2023 2024	Completed, heavy focus on serrated tussock and blackberry and goat removal
		Ecological Assessment	2022 2024	Completed
		Rapid visual Assessment	2022 2023 2024	Completed
5	**Western Overburden emplacement**	Landform establishment	2022	Ongoing, some completed throughout 2022, will continue throughout 2023
		Land preparation	2022	Ongoing, some completed throughout 2022, will continue throughout 2023
		Revegetation	2023	
		Maintenance of rehabilitated areas	2022 2023 2024	Completed, heavy focus on serrated tussock and blackberry
		Ecological Assessment	2022 2024	Completed
		Rapid visual Assessment	2022 2023 2024	Completed
6	**Eastern Overburden Emplacement**	Land preparation	2022	Ongoing, some completed throughout 2022, will continue throughout 2023
		Revegetation	2022 2023 2024	Area grassed, spot sprayed and overplanted
		Maintenance of rehabilitated areas	2022 2023 2024	Completed, heavy focus on serrated tussock and blackberry and goat removal
		Ecological Assessment	2022 2024	Completed
		Rapid visual Assessment	2022 2023	Completed

			2024	
7	**Infrastructure footprint**	Maintenance of rehabilitated areas	2022 2023 2024	Completed, heavy focus on serrated tussock and blackberry
8	**Southern Western Overburden Emplacement**	Revegetation	2022 2023 2024	Not yet completed, construction delayed until 2022
		Maintenance of rehabilitated areas	2022 2023 2024	Completed, heavy focus on serrated tussock and blackberry
		Ecological Assessment	2022 2024	Completed
		Rapid visual Assessment	2022 2023 2024	Completed

9 COMMUNITY

9.1 ENVIRONMENTAL COMPLAINTS MANAGEMENT

The Quarry maintains an environmental complaint register that identifies actions required to resolve issues and concerns raised by the community. A 24-hour telephone complaints line is in place and advertised through the regular community newsletter and on the website. A list of the nature of any complaints is published to the Boral website on a regular basis.

The Quarry received 1 complaint, during the current reporting period. This complaint was investigated, and all appropriate actions taken at the time, with details shown in Table 22.

As part of an ongoing noise assessment program that was managed during the reporting period, text notifications have also been received from two residents regarding noise. A real time noise monitor is now in place at one residence. Information received from the residence is correlated with the real time noise measurements, Quarry operations occurring at the time, and the weather conditions, to allow the quarry to establish an operating procedure around the management of the noise. Additional noise monitoring is undertaken at the second residence as deemed necessary.

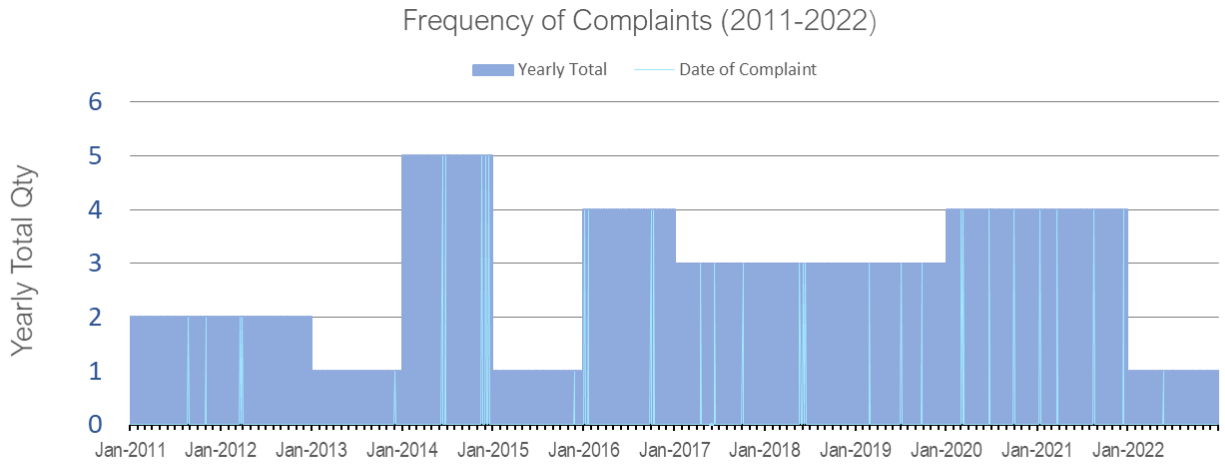
Boral will continue to develop and maintain relationships with the community and ensure their concerns are addressed to an acceptable outcome, wherever possible.

Complaints received since the Quarry commenced production are presented in Figure 3 (2011- 2022).

Table 22: Complaints

Date - 2021	Nature of Concern	Outcome of investigation
28th May 2022	Squealing metal/an unoiled rotating implement sound coming from the quarries	Operations and weather conditions assessed for the period of time leading up to and after the notification. Peppertree operations were as normal, no in-pit operations at the time. Issue was forwarded to MSL for further investigation.

Figure 3: Long term trend Complaints (2011 – 2022)



9.2 COMMUNITY CONSULTATION

The Quarry has actively engaged with the local community since the commencement of the 2006 Environmental Assessment for the project. The program has included:

- The establishment of a Community Consultation Committee;
- Regular community newsletters;
- Active participation in local events;
- Arranging site inspections and one on one consultation;
- Active engagement with key government and non-government organisations; and
- Maintenance of an environmental and community complaints register and actively managing and resolving community issues as they arise.

9.3 COMMUNITY CONSULTATIVE COMMITTEE

A Community Consultative Committee (CCC) has been established since 2011 in accordance with Condition A16 of Part A of the Project Approval. The CCC is comprised of:

- Two representatives from Peppertree Quarry including the Environment and Community Advisor;
- One representative from Goulburn Mulwaree Council (Councillor); and
- Three Local Community Representatives

Independently chaired, the role of the CCC is to offer the Quarry input from the community perspective on matters of environmental performance and stakeholder relations. Meetings include the review of environmental data and any feedback provided to the site from local community members. Issues of concern can be raised with the site by the CCC representatives.

The timing of the meetings is determined by the CCC and generally undertaken at least 6 monthly. The CCC met four times during the 2022 calendar year – March, June, September and December

An Annual CCC report is being prepared, by the Chair (as per the Community Consultative Guidelines) and will be issued to the DPE once received.

In 2021 DPE approved the joint CCC for the Marulan South operations, including both Marulan South Limestone and Peppertree Quarry, with the first meeting held in June 2022.

9.4 COMMUNITY NEWSLETTERS

Community Newsletters are produced on a regular basis in order to inform local residents of the Quarry operations and activities as well as detailing Boral's involvement in local community events. These are distributed via the Marulan Messenger" newsletter issued to the local community. These can be found under the communications tab at:

https://www.boral.com.au/locations/peppertree-quarry

The first newsletter was circulated in 2011 and continued to be frequently issued during the reporting period.

9.5 COMMUNITY EVENTS

The Quarry staff are actively engaged with community events in the Marulan and Goulburn area.
Community and stakeholder activities that occurred during the reporting period included:

- Charity Golf Day – Financial sponsorship, Quarry team representation and promotional goods giveaway;
- Tallong Apple Festival – Financial sponsorship and stall holder;
- Marulan Village Plan – Meeting and program support;
- Goulburn Mulwaree Council Community Bike ride as part of Bike week
- Support for the printing of the Marulan Messenger local newsletter on a monthly basis
- Marulan Discretionary fund – Meeting and program support;
- Marulan Chamber of Commerce – Meeting and program support;

9.6 BLAST LIAISON

In accordance with the Development Consent, Condition B16 (Part B), landowners and occupiers of residences within 2 kilometres of the Quarry pit are encouraged to register interest in order to be advised of any future blasts at the pit. Two parties are advised by email with one notified by phone.

9.7 ACCESS TO INFORMATION

Boral has a number of websites for each corporate division. Peppertree Quarry has its own site at:

https://www.boral.com.au/locations/peppertree-quarry

The site contains all public information in relation to Statutory approvals and development activities.

10 INDEPENDENT AUDIT

In accordance with Project Approval Condition 5 (Schedule 5) an Independent Audit was conducted in December 2021.

A copy of the final audit report and a response to the recommendations was provided to the Department of Planning and Environment in 2022.

All site management plans were reviewed in line with Condition D6, Part C as a result of the audit.

The Next independent audit, as per Condition D13, is planned for mid-2024.

11 INCIDENTS & NON COMPLIANCES DURING THE REPORTING PERIOD

11.1 INCIDENT MANAGEMENT AND RESPONSE

In accordance with NSW EPA requirements, a Pollution Incident Response Management Plan (PIRMP) has been developed and implemented which details the:

- Risks and hazards associated with quarry operations, equipment and materials;
- Controls in place to reduce the risk in the occurrence of potential incidents;
- Inventory of pollutants and respective volumes stored on-site;
- Safety and incident response equipment;
- Communication strategy for the immediate notification of an incident to relevant government agencies and neighbours;
- Actions to be taken during or immediately after an incident; and
- Training and responsibilities of response staff.

The PIRMP was last reviewed and revised V14 in November 2022 and a copy can be accessed on the Boral website at:

https://www.boral.com.au/what-we-do/environmental-reporting

11.2 SUMMARY OF REGULATORY NOTIFICATIONS

One notification was provided to Department of Planning and Environment and EPA during the reporting period in regard to Peppertree Quarry operations. From the period 27 December 2021- 4 February 2022 the TSP (total suspended particulate) high volume air sampler (HVAS) failed to operate. EPA and DPE were notified.

12 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

The activities proposed to be undertaken during the 2023 AR reporting period are presented in Table 22. The activities have been selected and prioritized based on:

- Internal and Independent Audit findings and recommendations;
- Operational requirements; and
- Continual improvement objectives in accordance with Boral's Environmental Policy and integrated HSEQ management System.

Table 23: Proposed Activities in 2023 AR Period

Proposed Activities in 2023	Objectives
Undertake progressive Overburden stabilization and rehabilitation and implement recommendations of the 2022 Rapid Visual Assessment and Ecological assessment	• Minimise erosion and sediment runoff • Move towards achieving biodiversity management plan goals of establishing vegetation corridors
Review and/or prepare management plans - NBMP, AQMP, BRMP, WMP, EMS, BFMP as per modification 7 approval requirements following approval of AEMR	• Document management protocols for quarry operations
Undertake annual Rehabilitation Rapid Visual Assessment (November 2023)	• Move towards achieving biodiversity management plan goals of establishing vegetation corridors
Undertake audit of the surface water management system at the Southern Overburden emplacement once system is installed	• Surface water management
Implementation of the Real time noise monitoring alert system in the Control room	• Minimisation of noise in the community • Voluntary undertaking commitment
Finalise Artefact collation/analysis and review and return Artefacts to Country	• Preservation of culture
Implement Stakeholder Engagement plan for 2023	• Ongoing community engagement
Pit expansion to the East and commence south western overburden as per Modification 5	• Ongoing operations
Redevelopment of ground water wells in line with assessment report	• Management of groundwater
Implement real time air monitoring and investigate relocation of air monitoring sampling locations to boundary locations	• Air quality management
Interim aboriginal heritage report to be submitted, final report to be completed in 2024	• Aboriginal heritage management
Undertake geomorphological assessment of overburden emplacements	• Landform stability

APPENDIX 1: ANNUAL RETURN FOR EXTRACTIVE MATERIALS – FINANCIAL YEAR 2022

Extractive Materials Return 2021-2022

NSW GOVERNMENT | Regional NSW

Form S1 – Period Ending 30 June 2022

Quote RIMS ID in all correspondence

Quarry Id: Rims ID: 400960 Operators Name: BORAL RESOURCES (NSW) PTY LTD Address: PO BOX 6041 NORTH RYDE NSW 2113 Email: jon-paul.amodio@boral.com.au Quarry Name: PEPPERTREE QUARRY Quarry Address: MARULAN SOUTH RD, MARULAN NSW 2579	**Inquiries** please telephone: (02) 4063 6713 **Completed or Nil Returns** Email – mineral.royalty@planning.nsw.gov.au Postal Address (see below) ***Please amend name, postal address and location of mine or quarry if incorrect or incomplete.***

The return should be completed and forwarded to **Senior Advisory Officer, RESOURCE ECONOMICS, STRATEGY, PERFORMANCE & INDUSTRY DEVELOPMENT, DEPARTMENT OF REGIONAL NSW, PO BOX 344 HUNTER REGION MAIL CENTRE NSW 2310 on or before**. If completion of the return is unavoidably delayed, an application for extension of time should be requested **before** the due date. If no work was done during the year, a **NIL** return must be forwarded.

The return should relate to the **above quarrying establishment** and should cover the operations of quarrying and treatment (such as crushing, screening, washing etc.) carried out at or near the quarry. A return is required even if the operations are solely of a developmental nature and whether the area being worked is held under a mining title or otherwise.

Director, Resources Policy

Please complete all the following information to assist in identifying the location of the Quarry

Typical Geology _____

Nearest Town to Quarry _____Marulan_____

Local Council Name _____Goulburn Mulwaree Council _____

Deposited Plan and Lot Number/s of Quarry _____

Email Address of Operator _____

Name of Owner or Licensee _____Boral Resources (NSW) Pty Ltd _____

Postal Address of Licensee _____

Licence/Lease Number/s (if any)

From Mining, Exploration & Geoscience (NSW Mineral Resources) _____

From Crown Lands or other NSW Department _____

If any output was obtained from land NOT held under licence from the above Departments, state the Name/s and Address/es of the Owners of the land _____

To the best of my knowledge, information entered in this return is correct and no blank spaces left where figures should have been inserted.

SIGNATURE of PROPRIETOR or MANAGER ___Jon-Paul Amodio_____ DATE _____

CONTACT PERSON for this return _____

NAME (Block letters) ____JON-PAUL AMODIO_____ Telephone _____90335416_____

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Extractive Materials Return 2021-2022

Regional NSW

Form S1 – Period Ending 30 June 2022

Sales During 2021-2022

Production information may be published in aggregated form for statistical reporting. However, production data for individual operations is kept strictly confidential.

Product	Description	Quantity Tonnes
Virgin Materials		
Crushed Coarse Aggregates		
Over 75mm		**11,717**
Over 30mm to 75mm		
5mm to 30mm		**1,451,830**
Under 5mm		
Natural Sand		
Manufactured Sand		**997,876**
Prepared Road Base & Sub Base		**190,621**
Other Unprocessed Materials		
Recycled Materials		
Crushed Coarse Aggregates		
Over 75mm		
Over 30mm to 75mm		
5mm to 30mm		
Under 5mm		
Natural Sand		
Manufactured Sand		
Prepared Road Base & Sub Base		
Other Unprocessed Materials		
River Gravel		
Over 30mm		
5mm to 30mm		
Under 5mm		
Construction Sand	Excluding Industrial	
Industrial Sand		
Foundry, Moulding		
Glass		
Other (Specify)		
Dimension Stone	Building, Ornamental, Monumental	
Quarried in Blocks		
Quarried in Slabs		
Decorative Aggregate	Including Terrazzo	
Loam	Soil for Topdressing, Garden soil, Horticultural purposes)	
TOTAL SITE PRODUCTION		**2,640,327**
Gross Value ($) of all Sales		**$89,108,731**
Type of Material		
Number of Full-Time Equivalent (FTE) Employees	**Employees = 46**	**Contractors**

Please Note: A return for clay-based products can be obtained by contacting the inquiry number.

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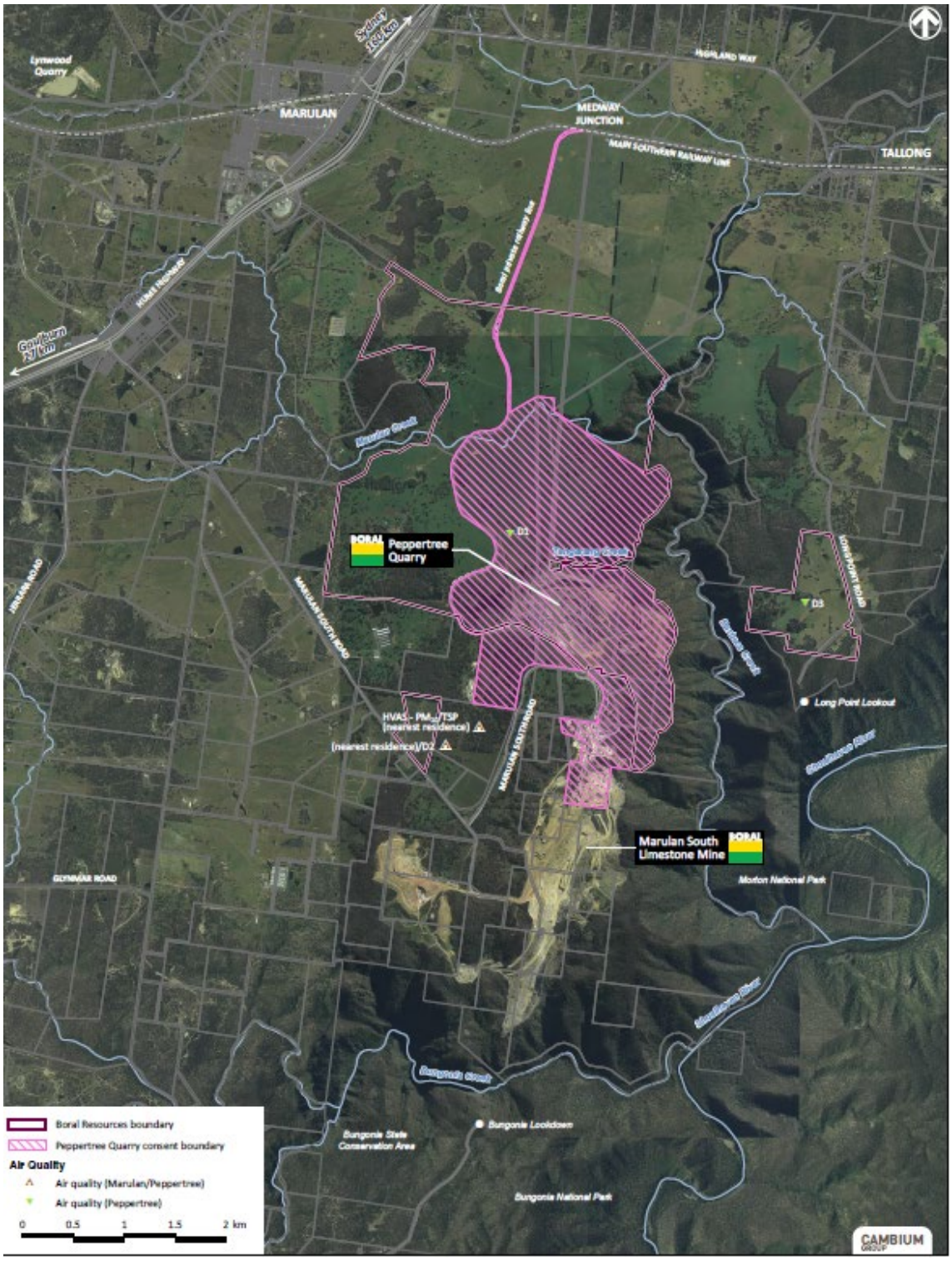
APPENDIX 2 AIR QUALITY MONITORING INFORMATION

Air monitoring locations



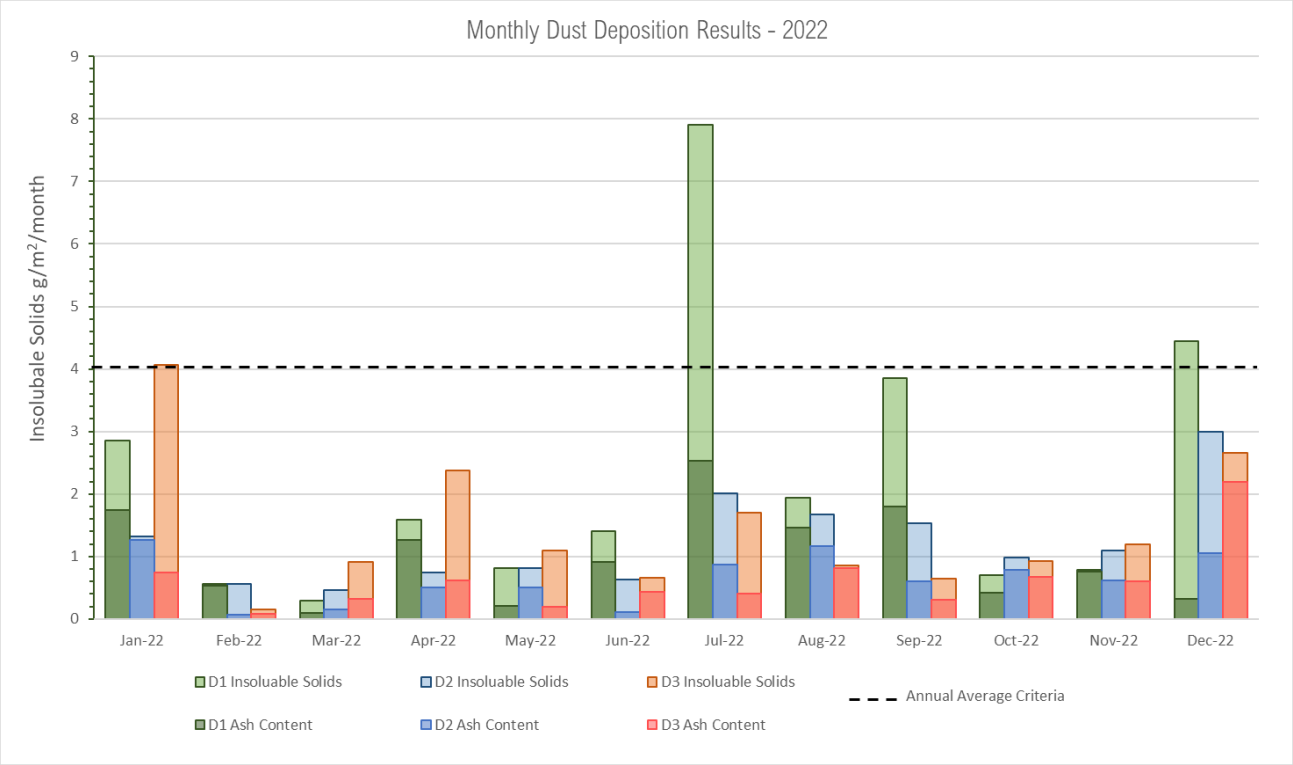
Dust Deposition Results

Sample Identification		Monthly Dust Deposition (Insoluble Solids g/m2/month)												Annual Average Criteria: (4 g/m²/m)
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
D1	Insoluble Solids	2.85	0.56	0.3	1.59	0.81	1.41	7.9	1.94	3.85	0.7	0.78	4.45	**2.26**
	Ash Content	1.75	0.54	0.1	1.26	0.21	0.92	2.53	1.46	1.8	0.42	0.76	0.32	**1.01**
D2	Insoluble Solids	1.32	0.56	0.47	0.75	0.82	0.63	2.01	1.67	1.53	0.98	1.1	2.99	**1.24**
	Ash Content	1.26	0.07	0.16	0.51	0.51	0.11	0.87	1.16	0.6	0.79	0.62	1.05	**0.64**
D3	Insoluble Solids	4.06	0.16	0.91	2.38	1.1	0.66	1.7	0.86	0.65	0.93	1.2	2.66	**1.44**
	Ash Content	0.75	0.09	0.32	0.62	0.2	0.44	0.41	0.81	0.31	0.67	0.6	2.19	**0.62**

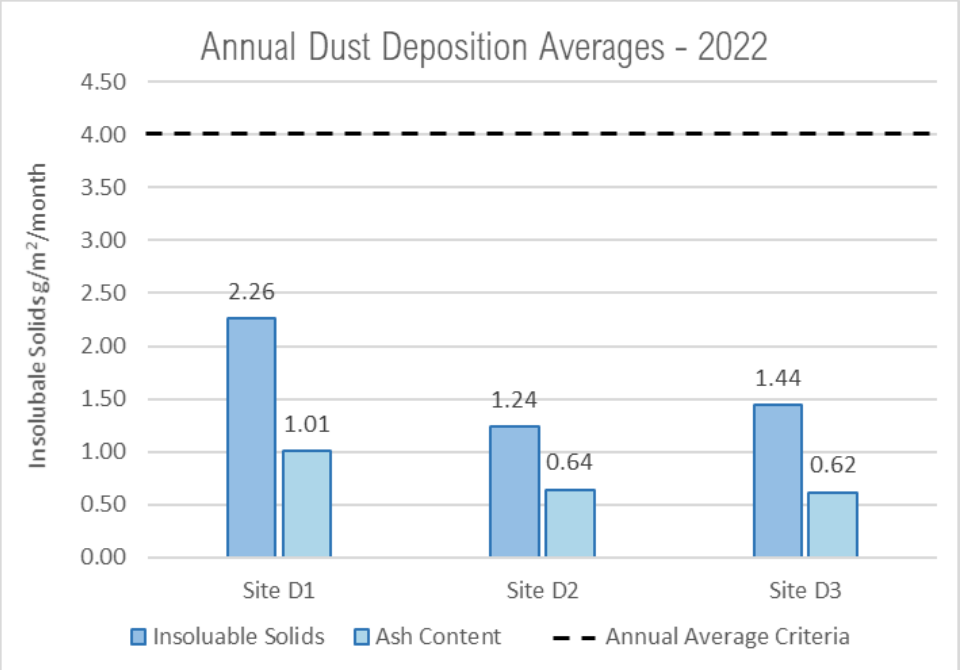
Interpolated deposited dust levels - Todoroski Air Sciences

Sample Identification		Monthly Dust Deposition (Insoluble Solids g/m2/month)											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
D1	Insoluble Solids annual average (at the gauge)	2.16	2.13	1.92	1.97	1.44	1.48	2.06	2.1	2.01	1.95	1.9	2.3
	Insoluble Solids annual average (at the boundary)	0.5	0.5	0.4	0.5	0.3	0.3	0.5	0.5	0.5	0.5	0.4	0.5
D2	Insoluble Solids annual average (at the gauge)	1.16	1.12	1.16	1.08	0.98	1.0	1.13	1.22	1.08	1.06	1.1	1.2
	Insoluble Solids annual average (at the boundary)	0.8	0.8	0.7	0.7	0.6	0.6	0.7	0.8	0.7	0.7	0.7	0.8
D3	Insoluble Solids annual average (at the gauge)	1.54	1.49	1.29	1.37	1.34	1.33	1.44	1.48	1.3	1.2	1.3	1.4
	Insoluble Solids annual average (at the boundary)	1.0	1.0	0.8	0.9	0.9	0.9	0.9	1.0	0.8	0.8	0.8	0.9

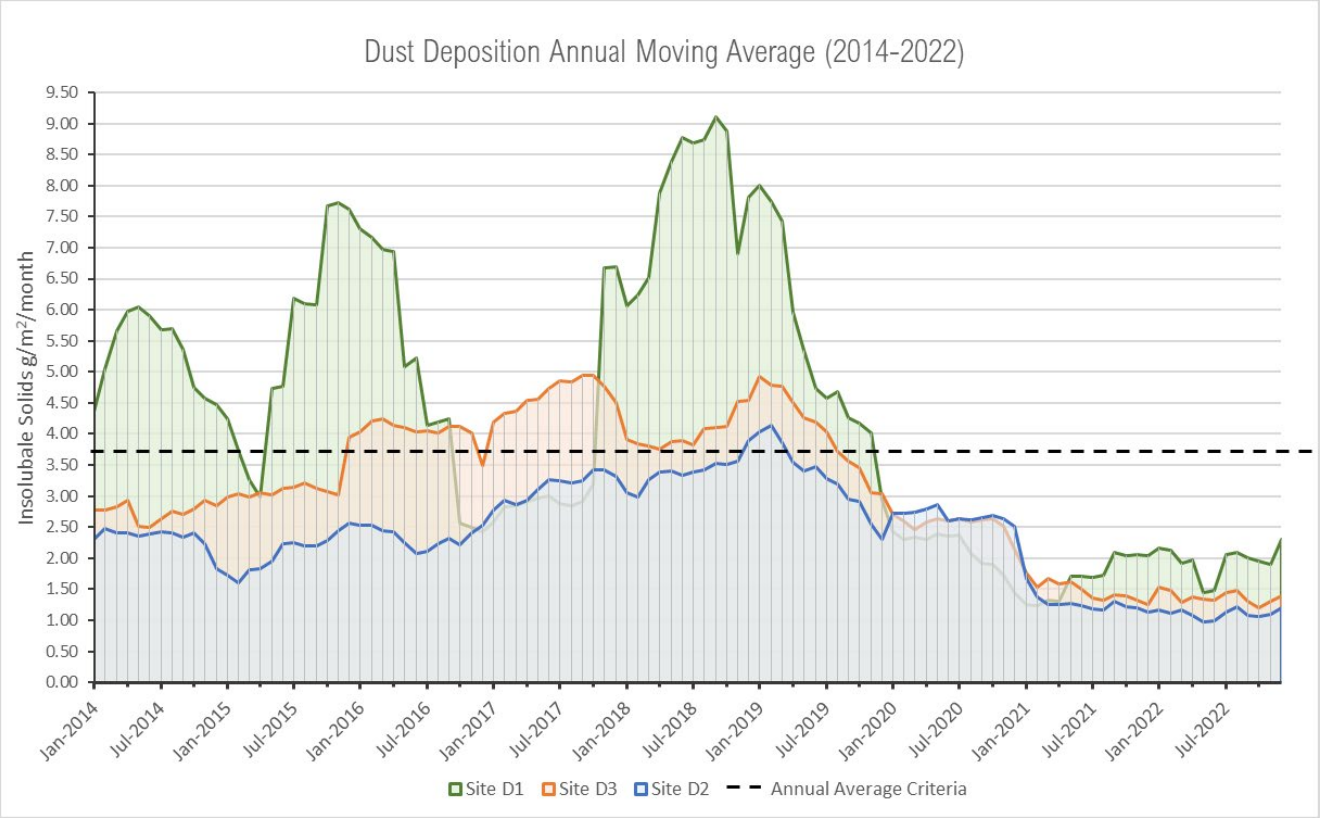
Dust Deposition Results – Annual Averages 2022



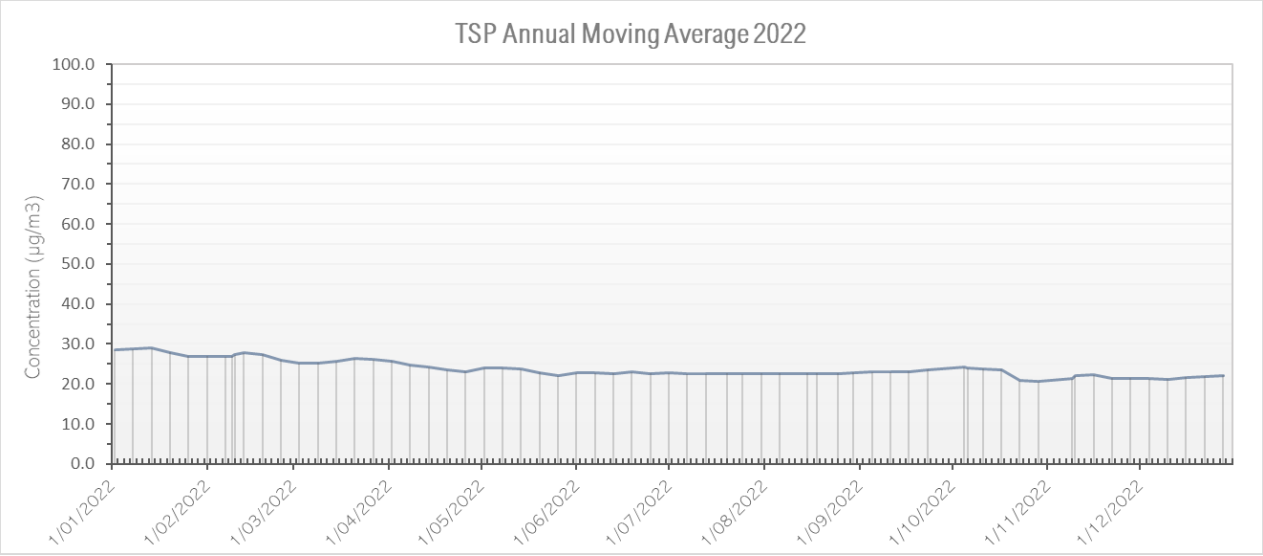
Dust Deposition Results – Annual Averages – Total 2022



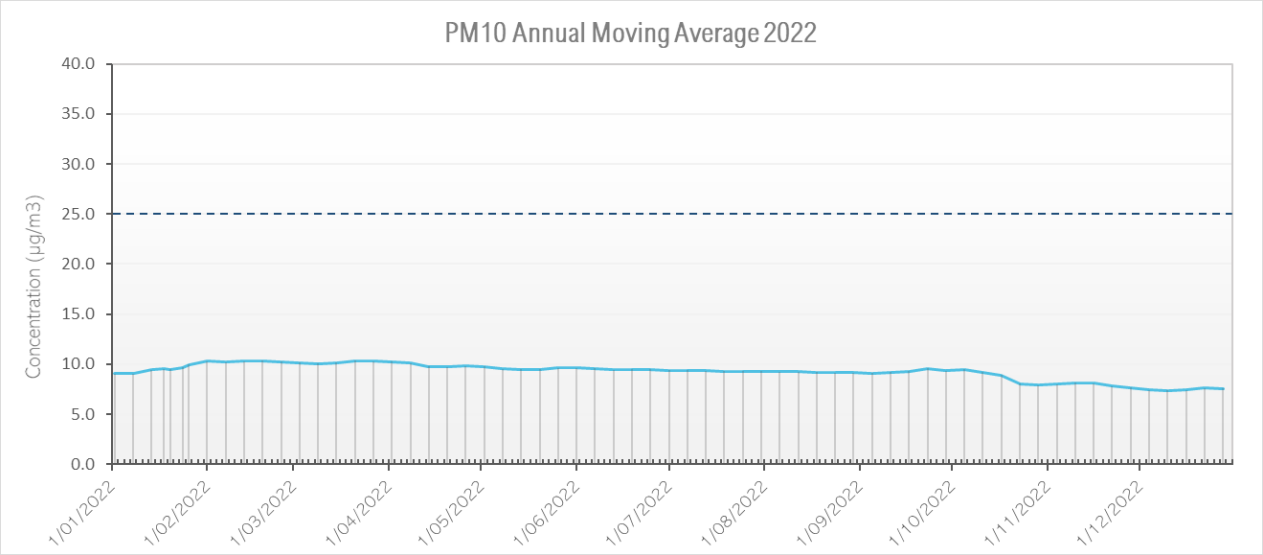
Dust Deposition Results – Annual Averages trend 2014 to 2022



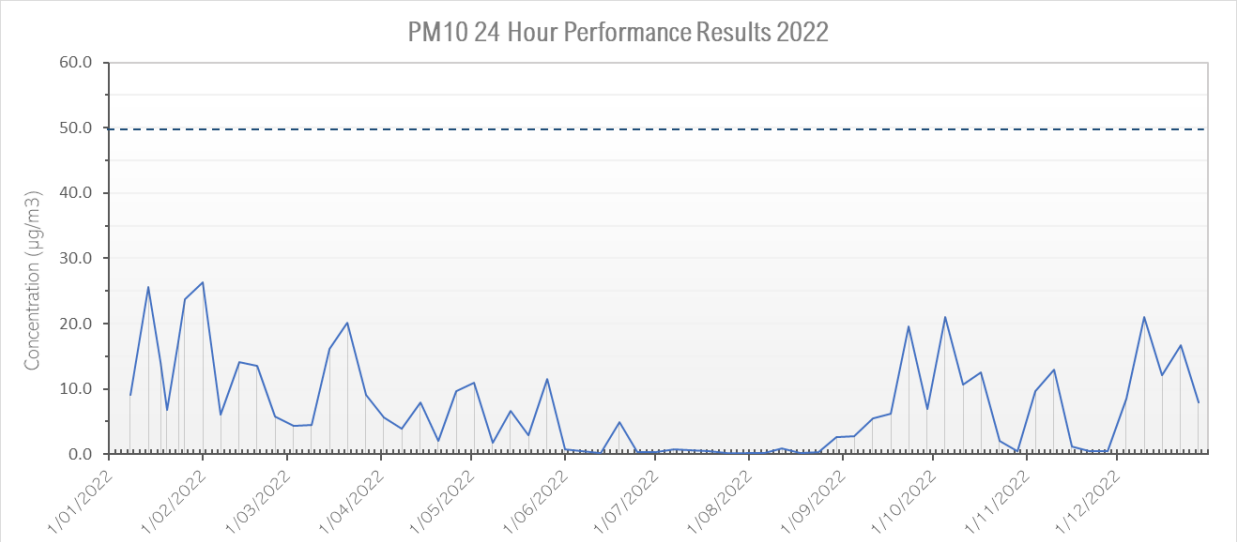
TSP - Annual Average results – 2022



PM_{10} annual average results 2022



PM10 24 hour performance results – 2022



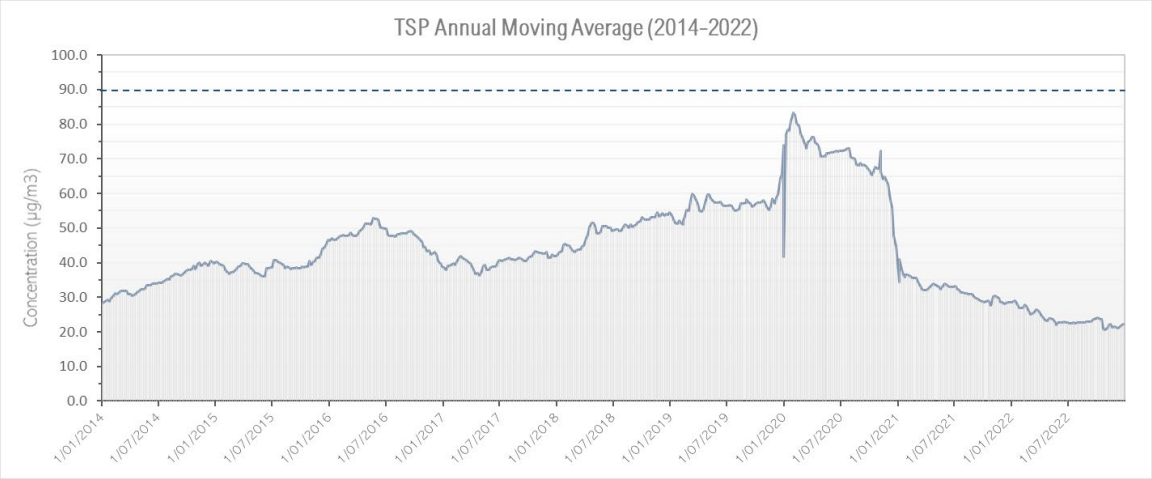
Interpolated HVAS dust levels - Todoroski Air Sciences

Dates	PM10 (Measured)	PM10 (Estimated contribution to receptor)
8/01/2022	9.14	1.8
14/01/2022	25.65	10.6
18/01/2022	14.05	5.8
20/01/2022	6.73	3.5
24/01/2022	17.31	9

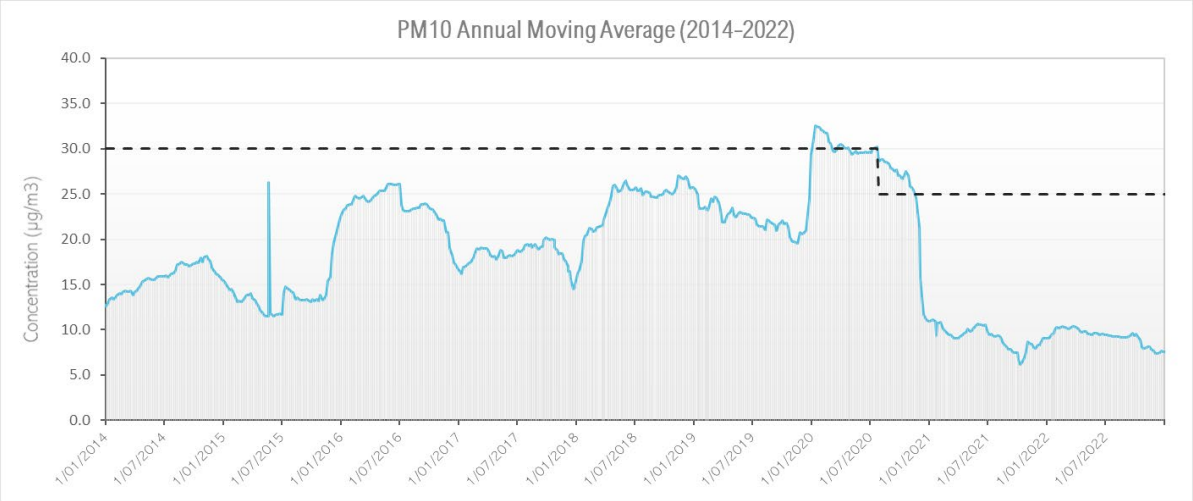
Dates	PM10 (Measured)	PM10 (Estimated contribution to receptor)
26/01/2022	23.68	11.8
1/02/2022	26.39	0
7/02/2022	6.01	3
13/02/2022	14.15	5.7
19/02/2022	13.56	7.1
25/02/2022	5.85	3
3/03/2022	4.4	2.3
9/03/2022	4.52	2.4
15/03/2022	16.07	8.4
21/03/2022	20.12	9.2
27/03/2022	9.11	4.7
2/04/2022	5.66	1.7
8/04/2022	3.96	2.1
14/04/2022	7.89	3.4
20/04/2022	2.07	0
26/04/2022	9.73	4.9
2/05/2022	11	1.9
8/05/2022	1.72	0
14/05/2022	6.59	0
20/05/2022	2.92	1.4
26/05/2022	11.49	2.9
1/06/2022	0.72	0
7/06/2022	0.51	0
13/06/2022	0.19	0
19/06/2022	4.93	1.1
25/06/2022	0.26	0
1/07/2022	0.26	0.1
7/07/2022	0.8	0.1
13/07/2022	0.59	0.2
19/07/2022	0.45	0.2
25/07/2022	0.13	0
31/07/2022	0.13	0

Dates	PM10 (Measured)	PM10 (Estimated contribution to receptor)
6/08/2022	0.13	0
12/08/2022	0.86	0
18/08/2022	0.2	0
24/08/2022	0.32	0
30/08/2022	2.69	0.1
5/09/2022	2.83	0.9
11/09/2022	5.46	0
17/09/2022	6.21	0
23/09/2022	19.55	7.2
29/09/2022	6.97	3.6
5/10/2022	21.02	11
11/10/2022	10.69	5.6
17/10/2022	12.56	6.5
23/10/2022	2.06	1
29/10/2022	0.48	0
4/11/2022	9.69	3.4
10/11/2022	12.94	6.2
16/11/2022	1.15	0.1
22/11/2022	0.47	0
28/11/2022	0.41	0.1
4/12/2022	8.48	1.8
10/12/2022	21.08	10.5
16/12/2022	12.15	6.3
22/12/2022	16.75	2.5
28/12/2022	8	0

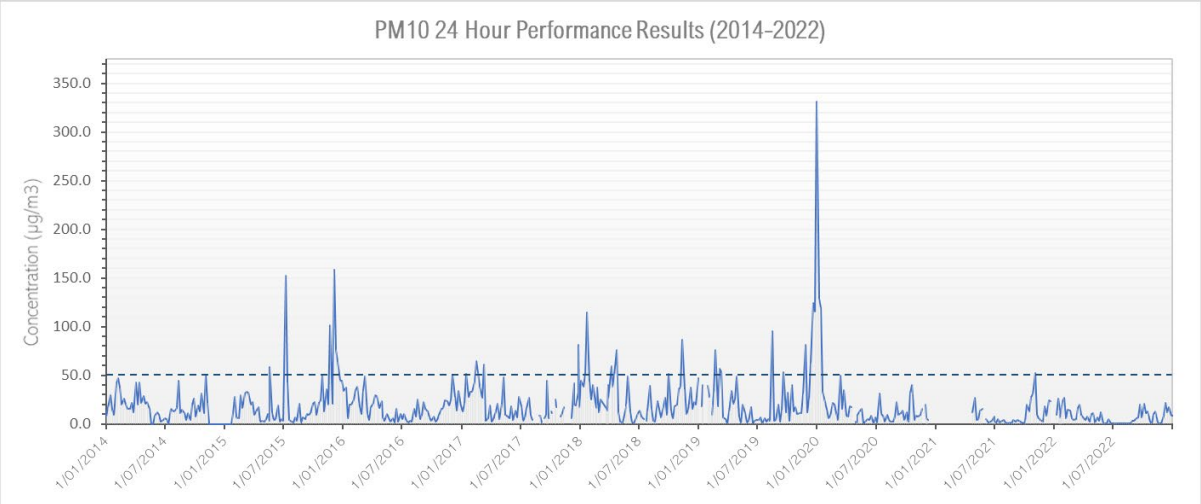
Long Term TSP Trend – 2014 to 2022



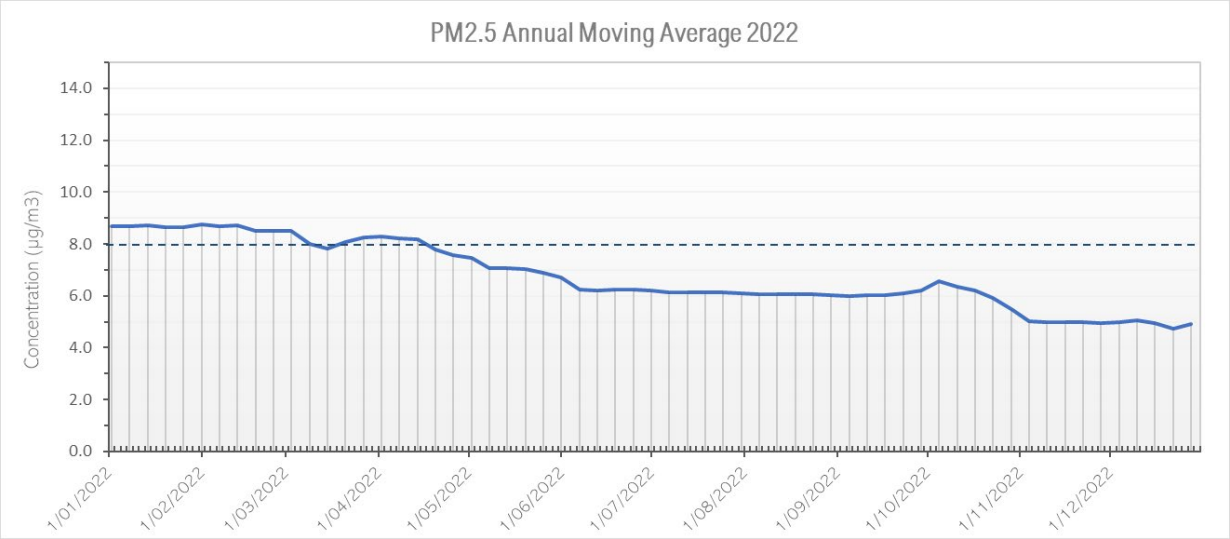
Long Term PM10 Trend – 2014 to 2022



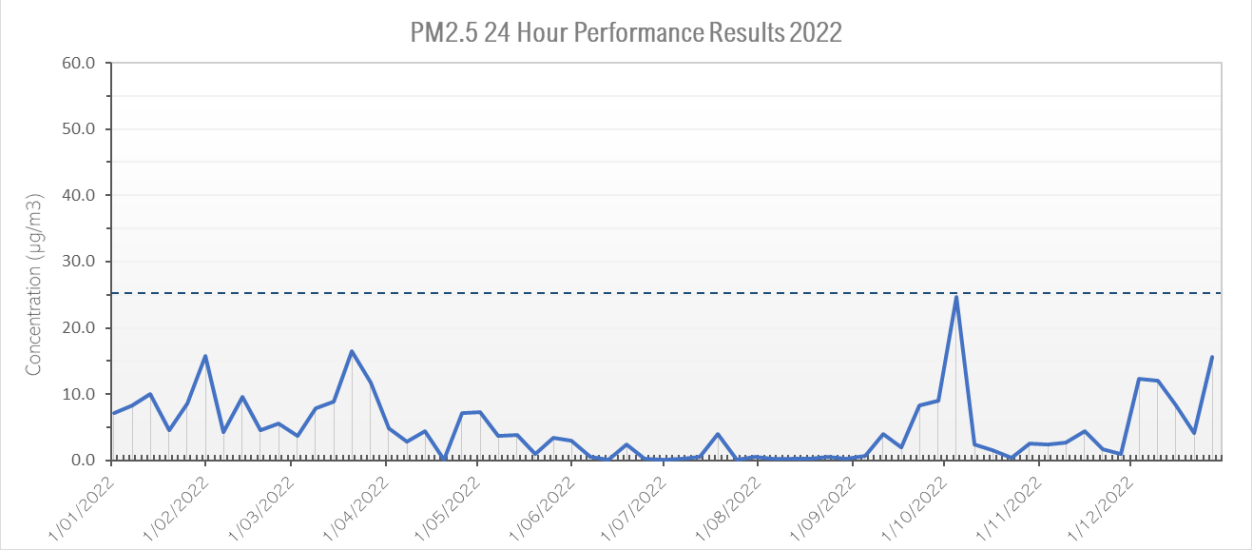
PM10 24 hour performance results - 2014 to 2022



PM2.5 annual average results 2022

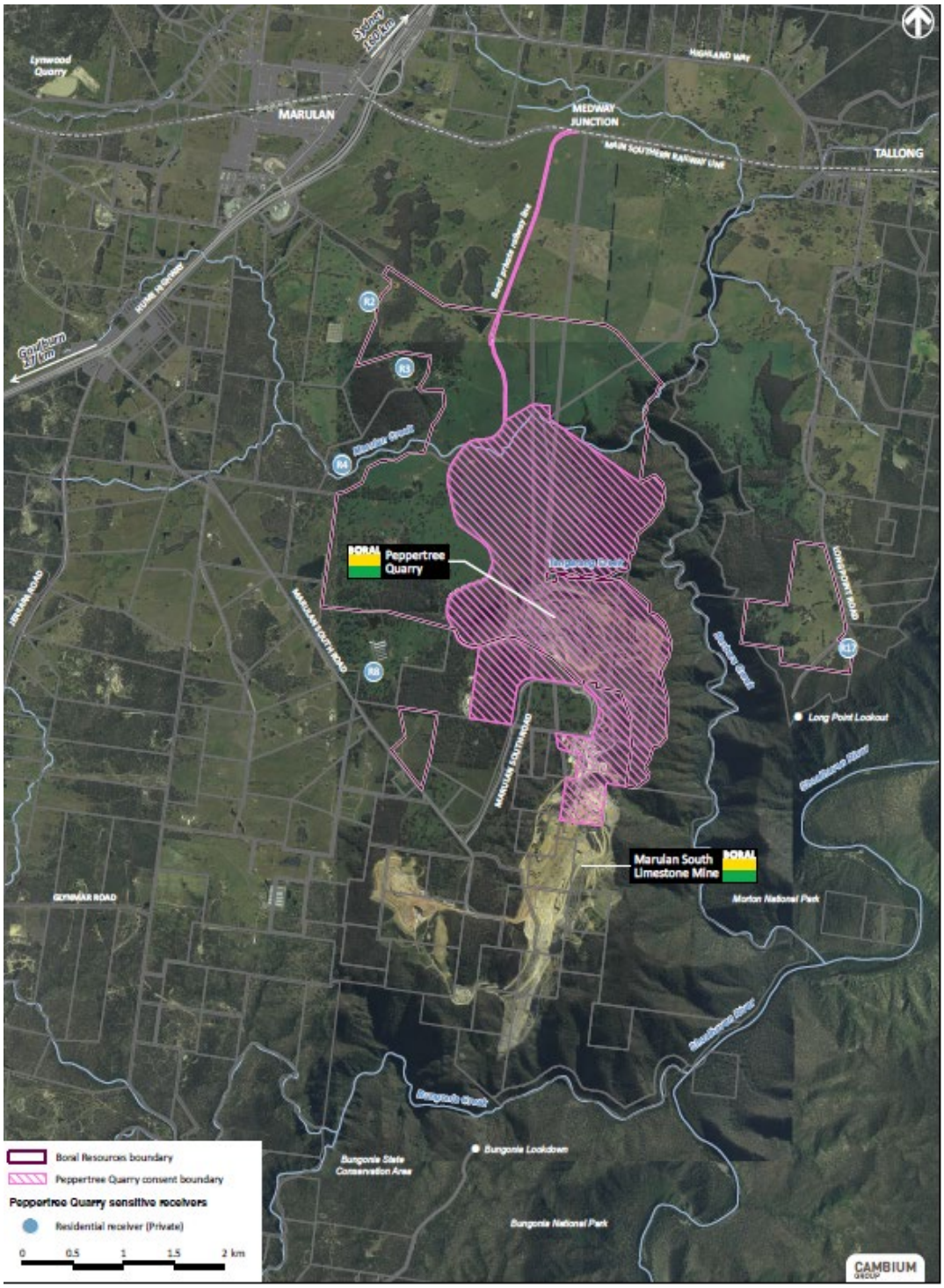


PM2.5 24 hour performance results – 2022



APPENDIX 3 NOISE MONITORING

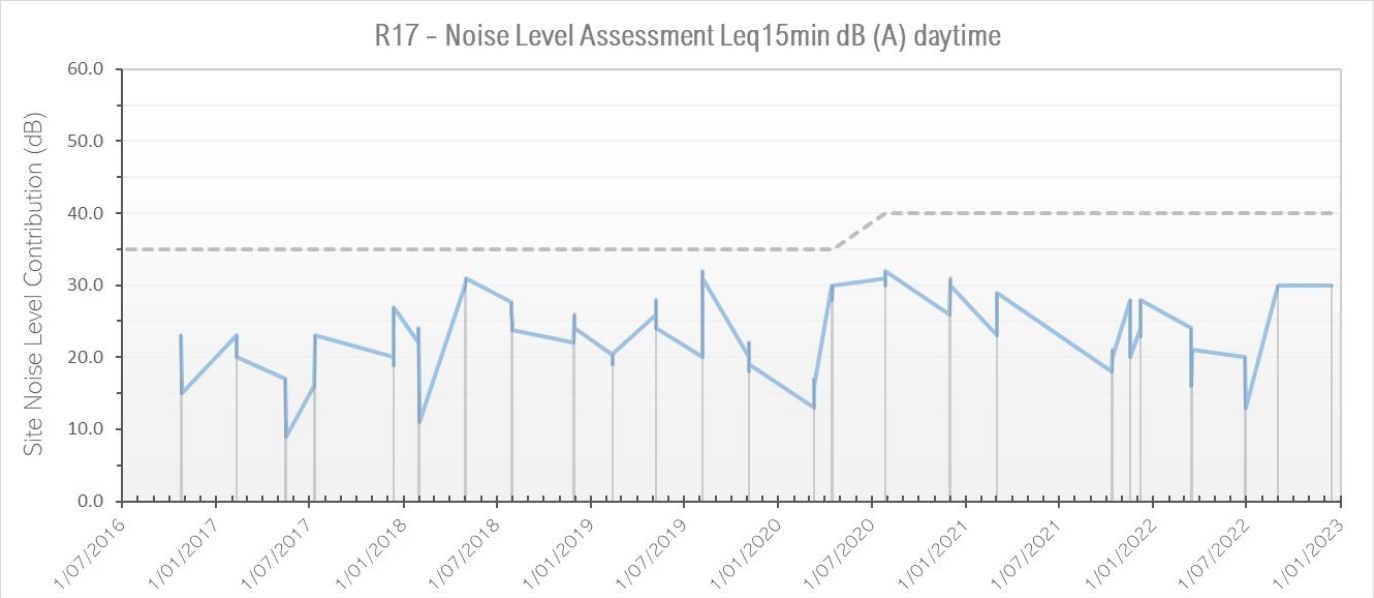
Residential receiver locations

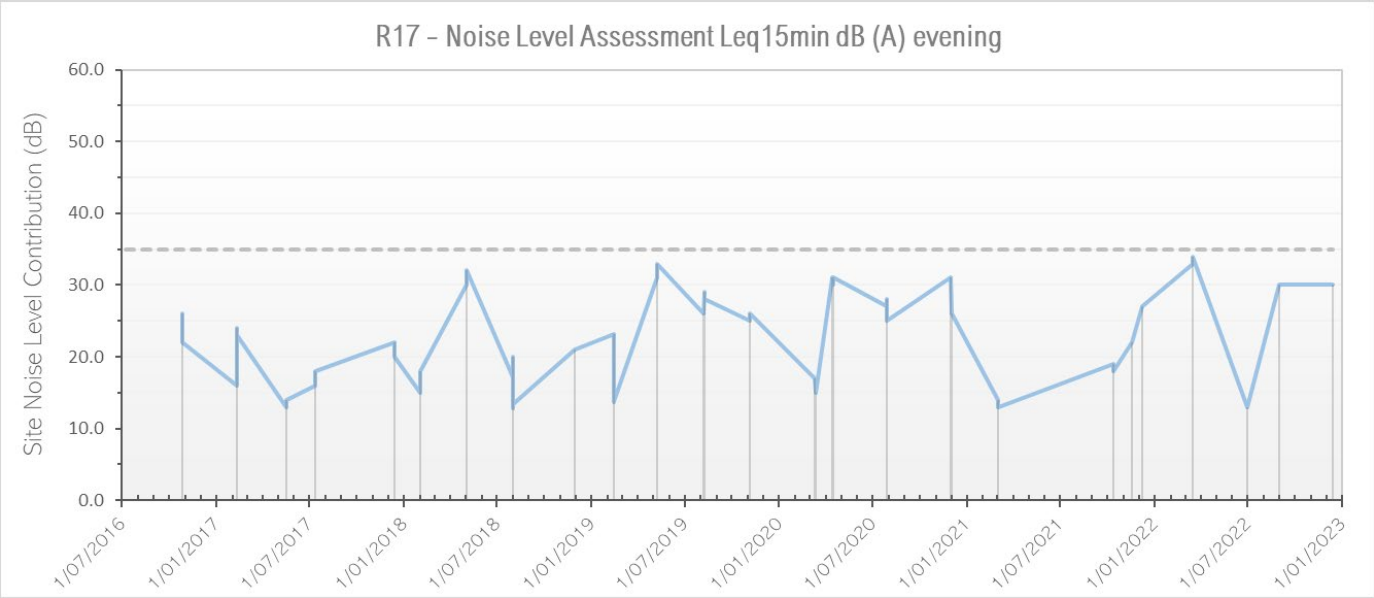


Noise Assessment Results (LAeq (15min))

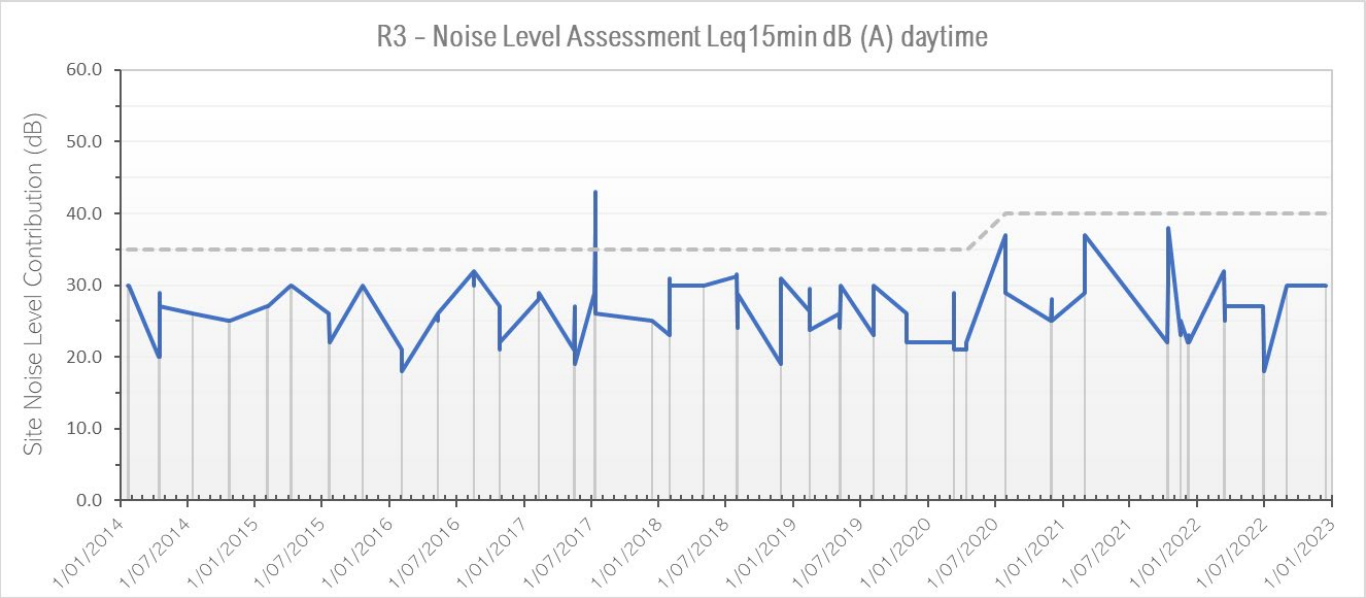
Residential Receiver	Assessment Dates (2020)	Noise Level Assessment (LAeq (15min))		
		Compliance Criteria	Measured Noise Levels dB(A)	Compliance with Criteria
Receiver R3	March	Day: 40 Evening/Night: 35	32/25/27 32/32	Yes Yes
	June	Day: 40 Evening/Night: 35	27/19/18 17	Yes Yes
	August	Day: 40 Evening/Night: 35	30/30 35	Yes Yes
	December	Day: 40 Evening/Night: 35	30 35/35	Yes Yes
Receiver R2	March	Day: 40 Evening/Night: 35	30/27/32 28/29	Yes Yes
	June	Day: 40 Evening/Night: 35	36/32/30 23/25	Yes Yes
	August	Day: 40 Evening/Night: 35	35/35 35	Yes Yes
	December	Day: 40 Evening/Night: 35	35 35/35	Yes Yes
Receiver R8	March	Day: 40 Evening/Night: 35	31/29/33 29/30	Yes Yes
	June	Day: 40 Evening/Night: 35	38/34/31 35/35	Yes Yes
	August	Day: 40 Evening/Night: 35	30/30 35	Yes Yes
	December	Day: 40 Evening/Night: 35	30 30/30	Yes Yes
Receiver R4	March	Day: 40 Evening/Night: 35	34/23/29 24/33	Yes Yes
	June	Day: 40 Evening/Night: 35	23/21/28 35/35	Yes Yes
	August	Day: 40 Evening/Night: 35	30/30 35	Yes Yes
	December	Day: 40 Evening/Night: 35	30 30/35	Yes Yes
Receiver R17	March	Day: 40 Evening/Night: 35	24/16/21 33/34	Yes Yes
	June	Day: 40 Evening/Night: 35	20/12/13 13/13	Yes Yes
	August	Day: 40 Evening/Night: 35	30/30 30	Yes Yes
	December	Day: 40 Evening/Night: 35	30 30/30	Yes Yes

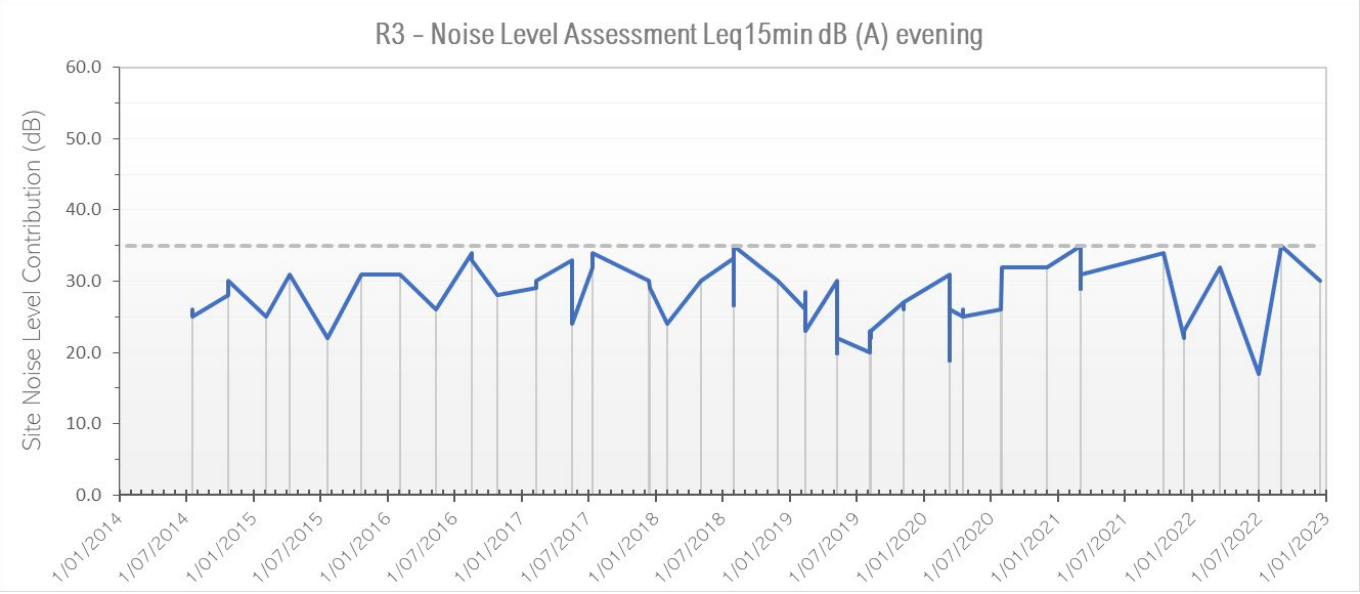
R 17 Off-Site Noise Level Trends (LAeq 15) 2016 – 2022



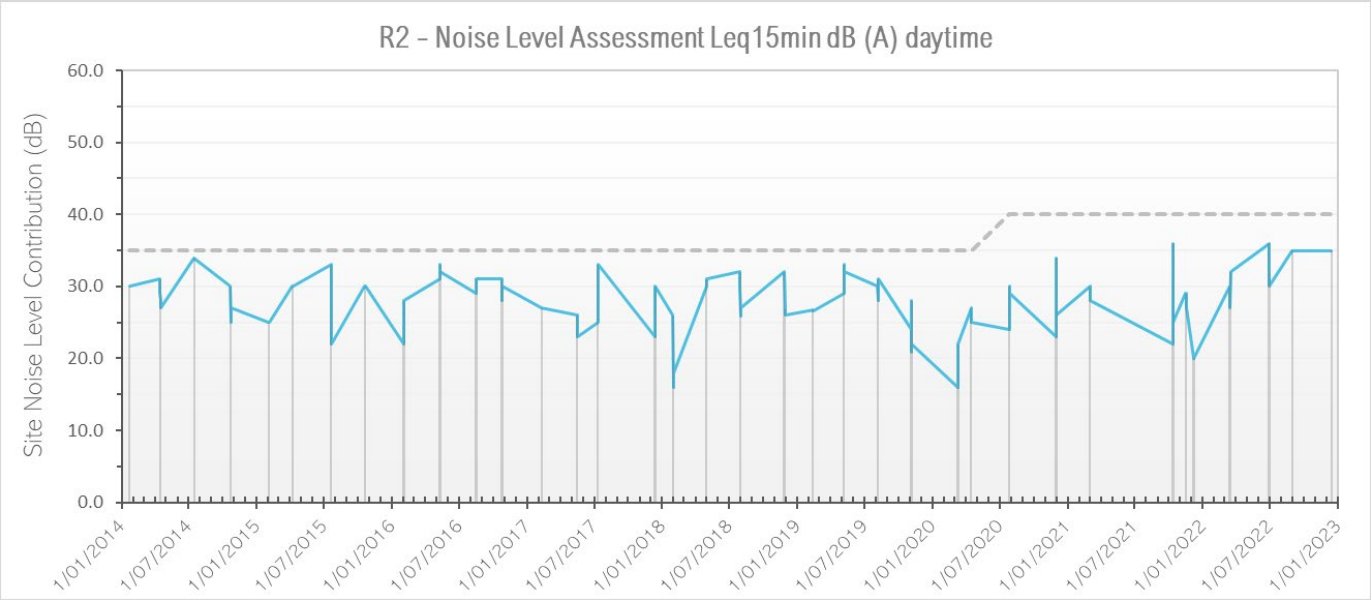


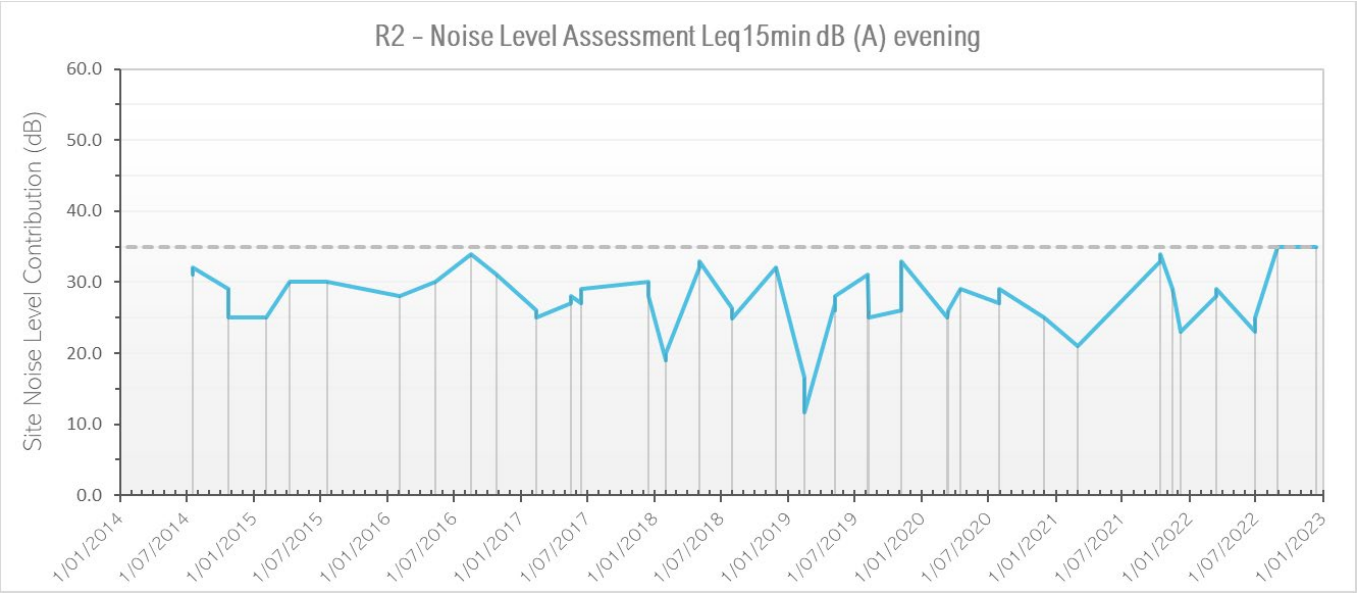
R 3 Off-Site Noise Level Trends (LAeq 15) 2014 – 2022



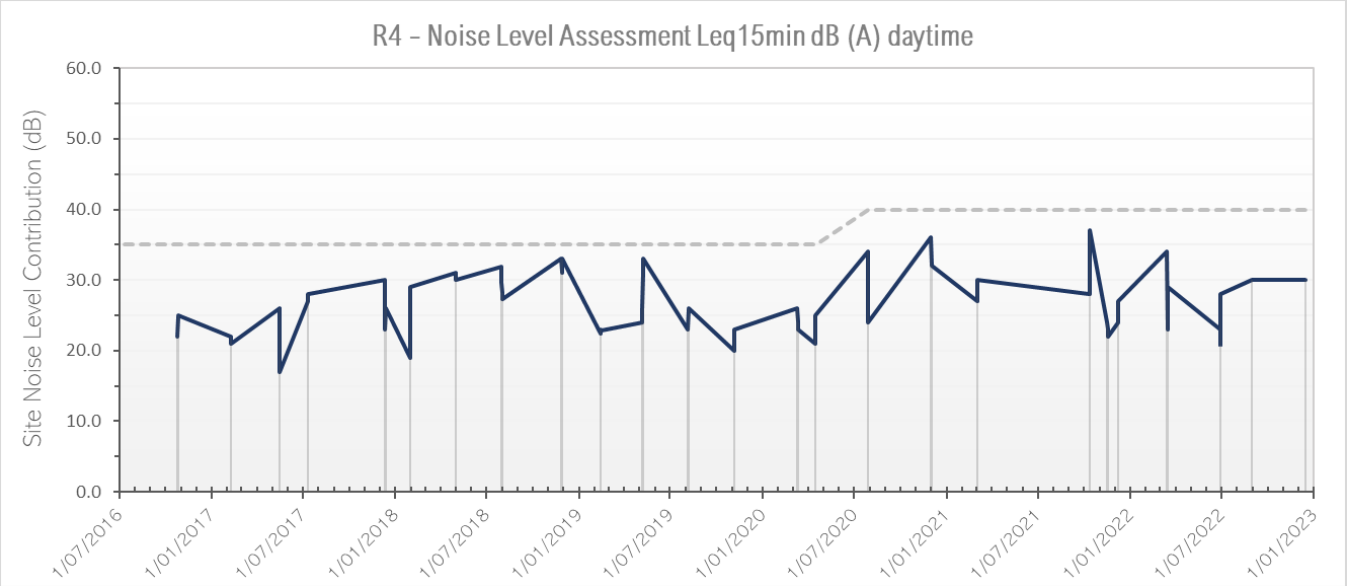


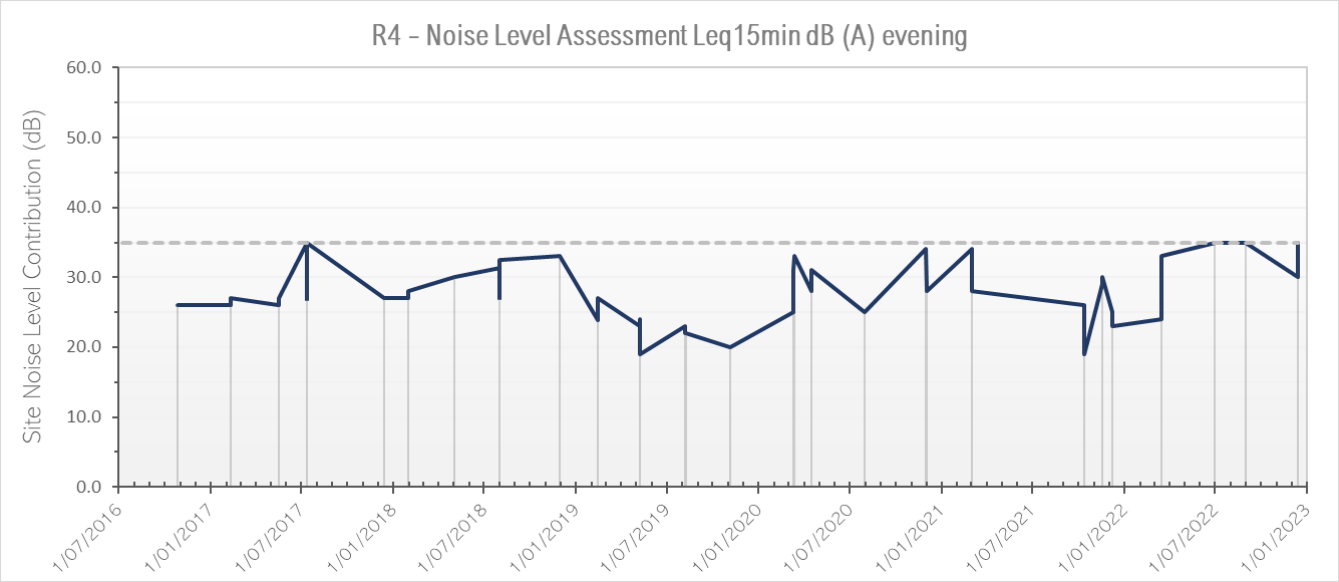
R2 Off-Site Noise Level Trends (LAeq 15) 2014 – 2022



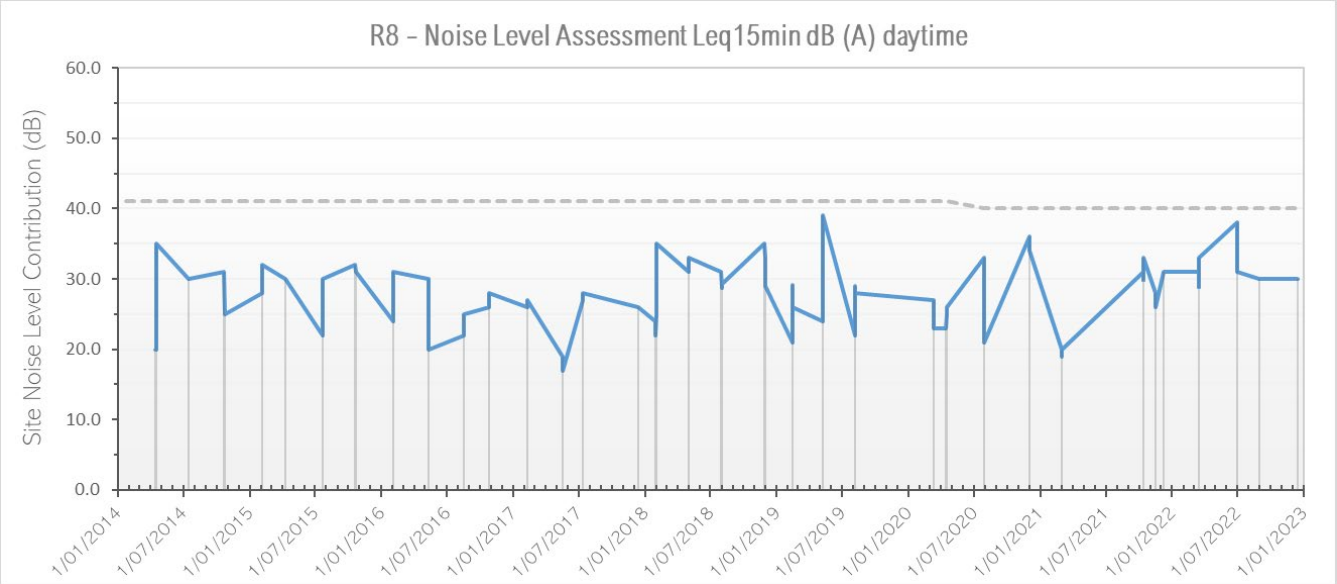


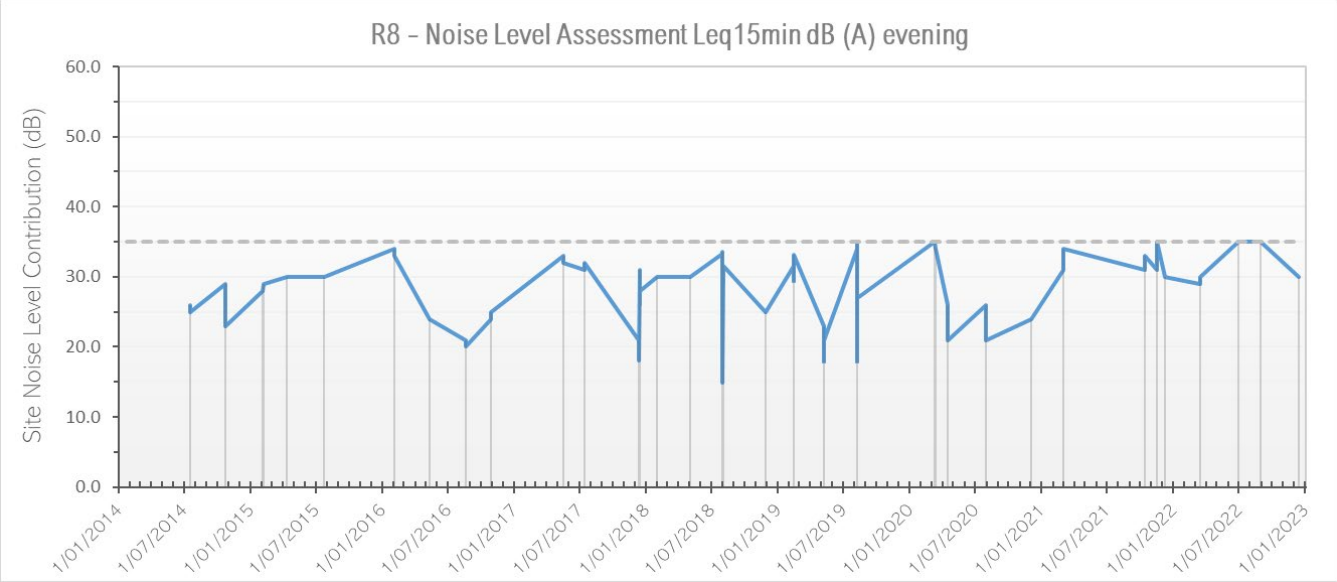
R 4 Off-Site Noise Level Trends (LAeq 15) 2016 – 2022





R8 Off-Site Noise Level Trends (LAeq 15) 2014 – 2022

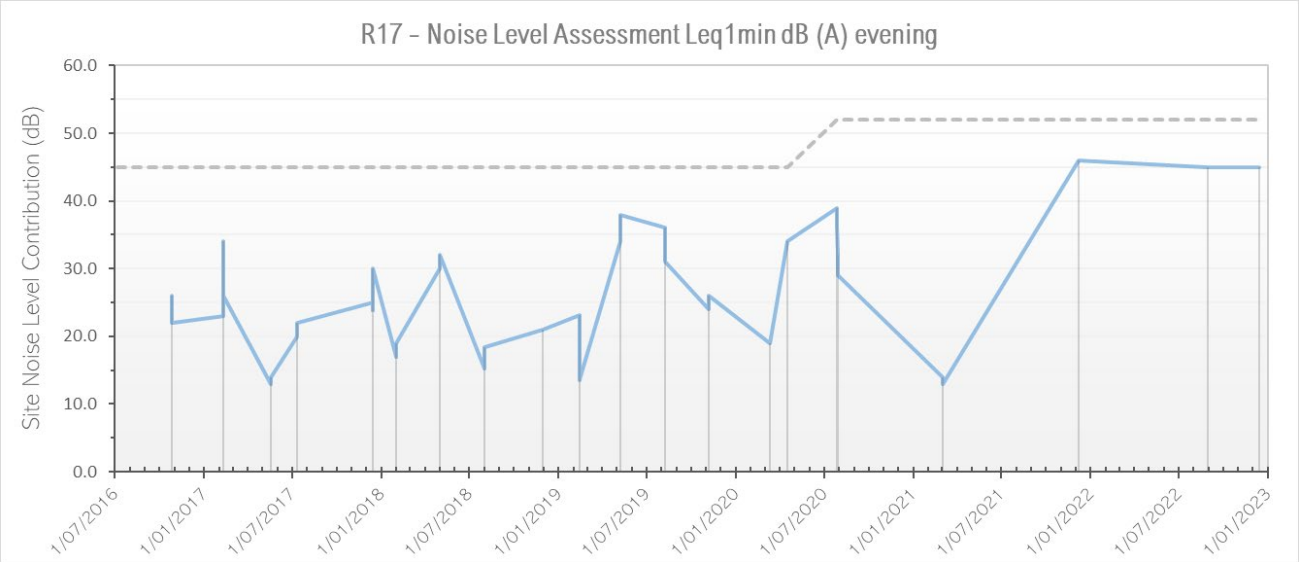




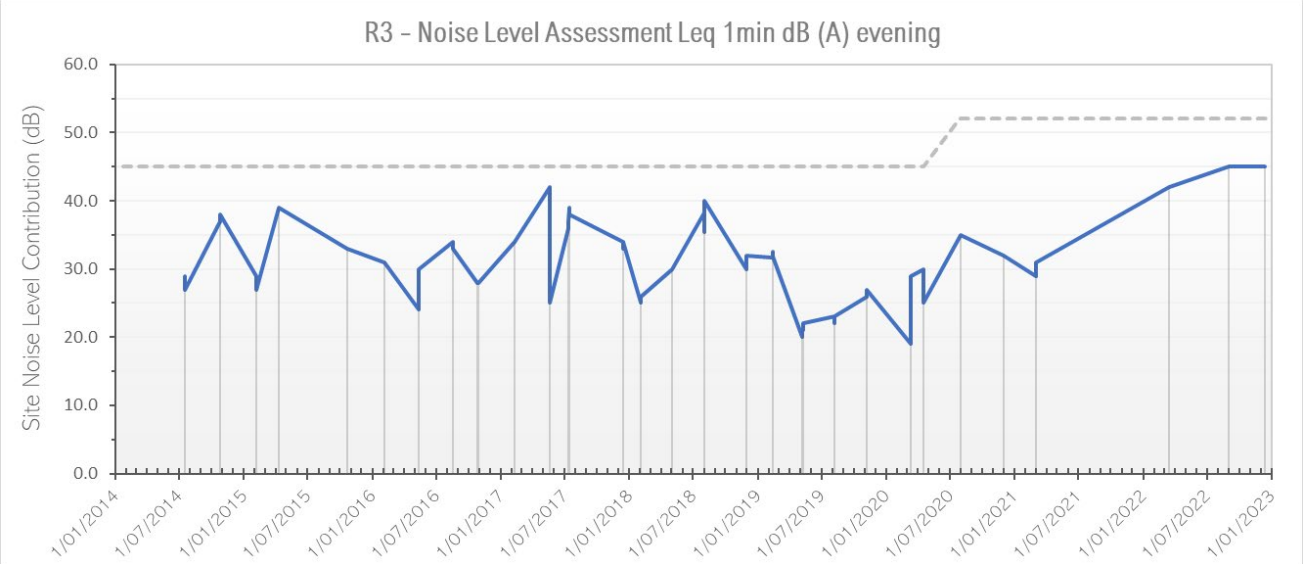
Noise Assessment Results (LA1 (1min))

Residential Receiver	Assessment Dates (2021)	Noise Level Assessment (LA1 (1min))		
		Compliance Criteria	Measured Noise Levels dB(A)	Compliance with Criteria
Receiver R3	March	52	42	Yes
	June	52	No Monitoring	Yes
	August	52	45	Yes
	December	52	45/45	Yes
Receiver R2	March	52	No monitoring	Yes
	June	52	No Monitoring	Yes
	August	52	45	Yes
	December	52	45/45	Yes
Receiver R8	March	52	42	Yes
	June	52	35	Yes
	August	52	45	Yes
	December	52	45/45	Yes
Receiver R4	March	52	44	Yes
	June	52	35	Yes
	August	52	45	Yes
	December	52	39/43	Yes
Receiver R17	March	52	No Monitoring	Yes
	June	52	No Monitoring	Yes
	August	52	45	Yes
	December	52	45/45	Yes

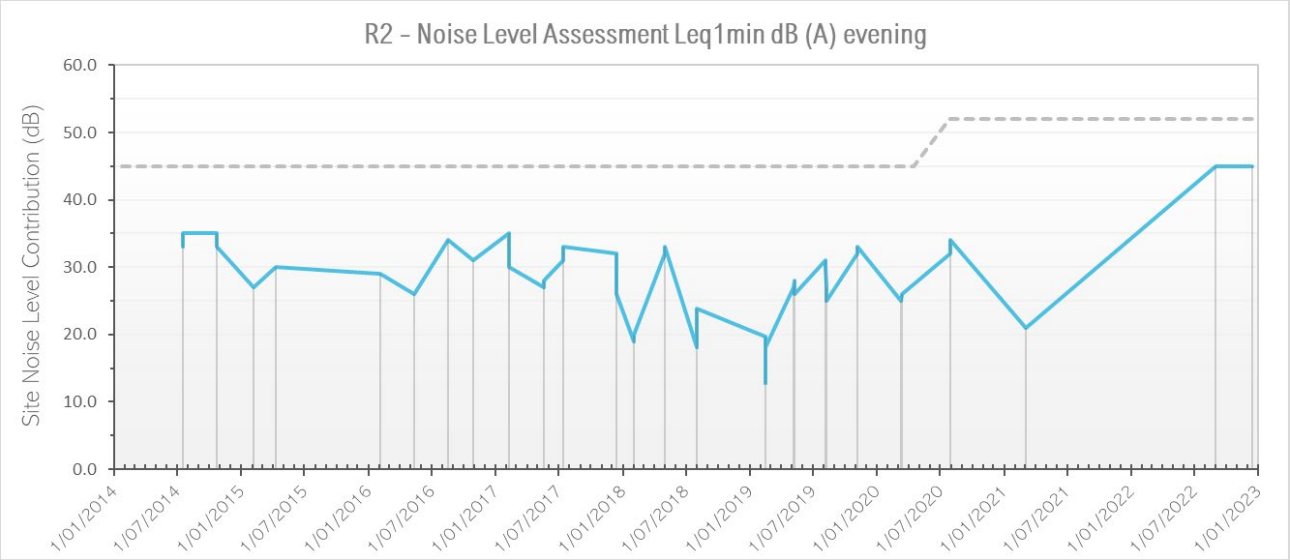
R17 Noise Level Trends (LA1, 1minute) 2016 – 2022



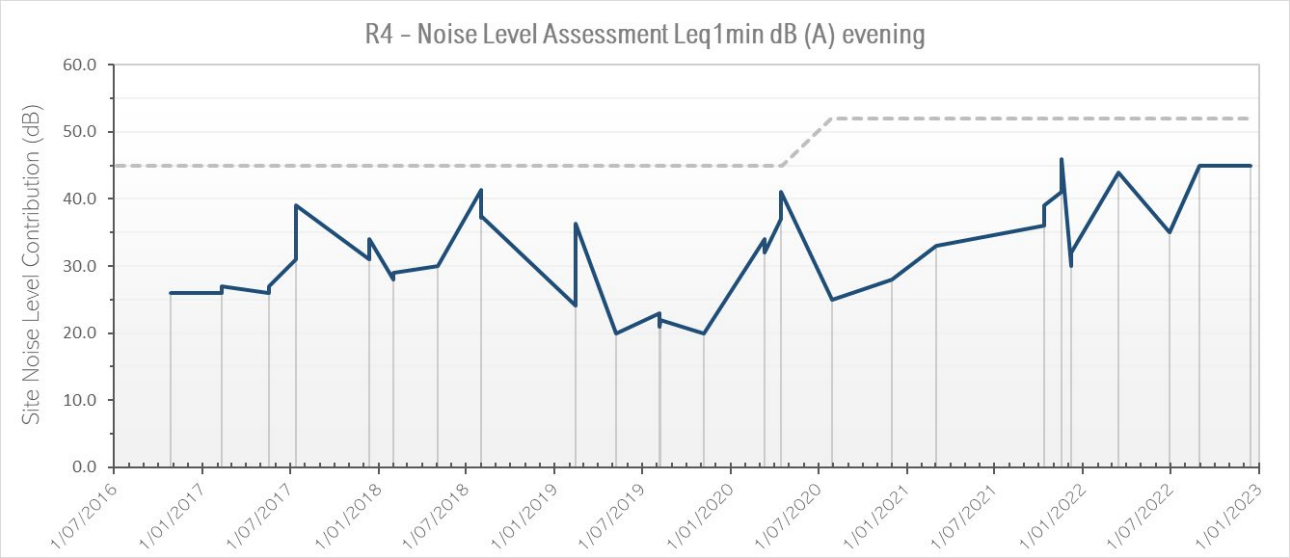
R3 Noise Level Trends (LA1, 1minute) 2014 – 2022



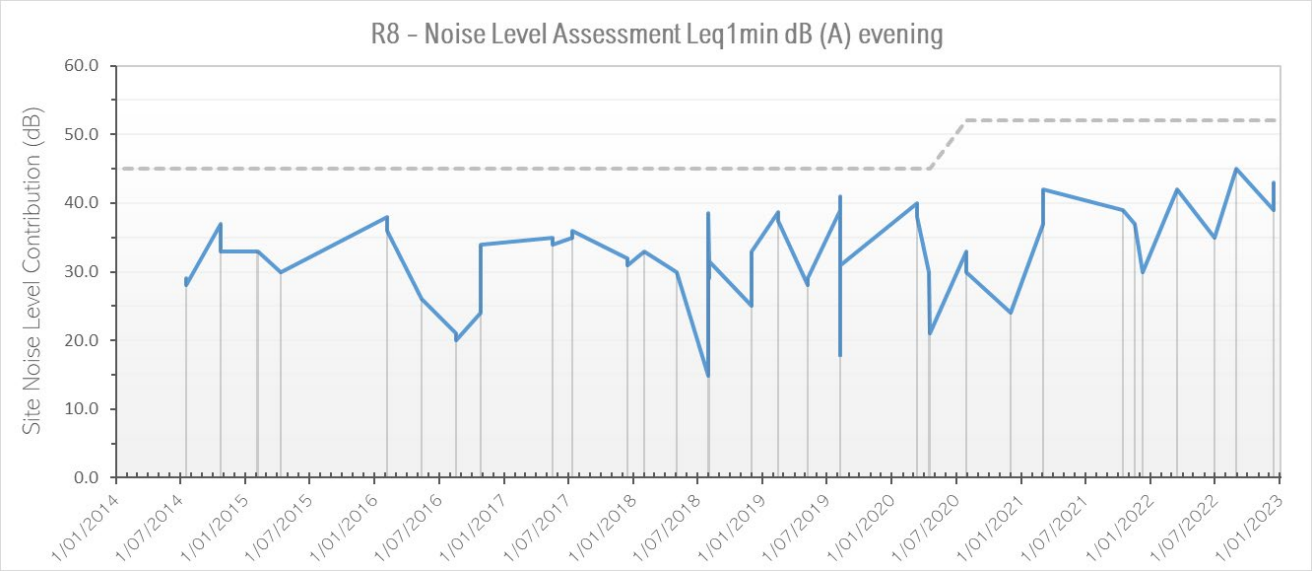
R2 Noise Level Trends (LA1, 1minute) 2014 – 2022



R4 Noise Level Trends (LA1, 1minute) – 2016 - 2022

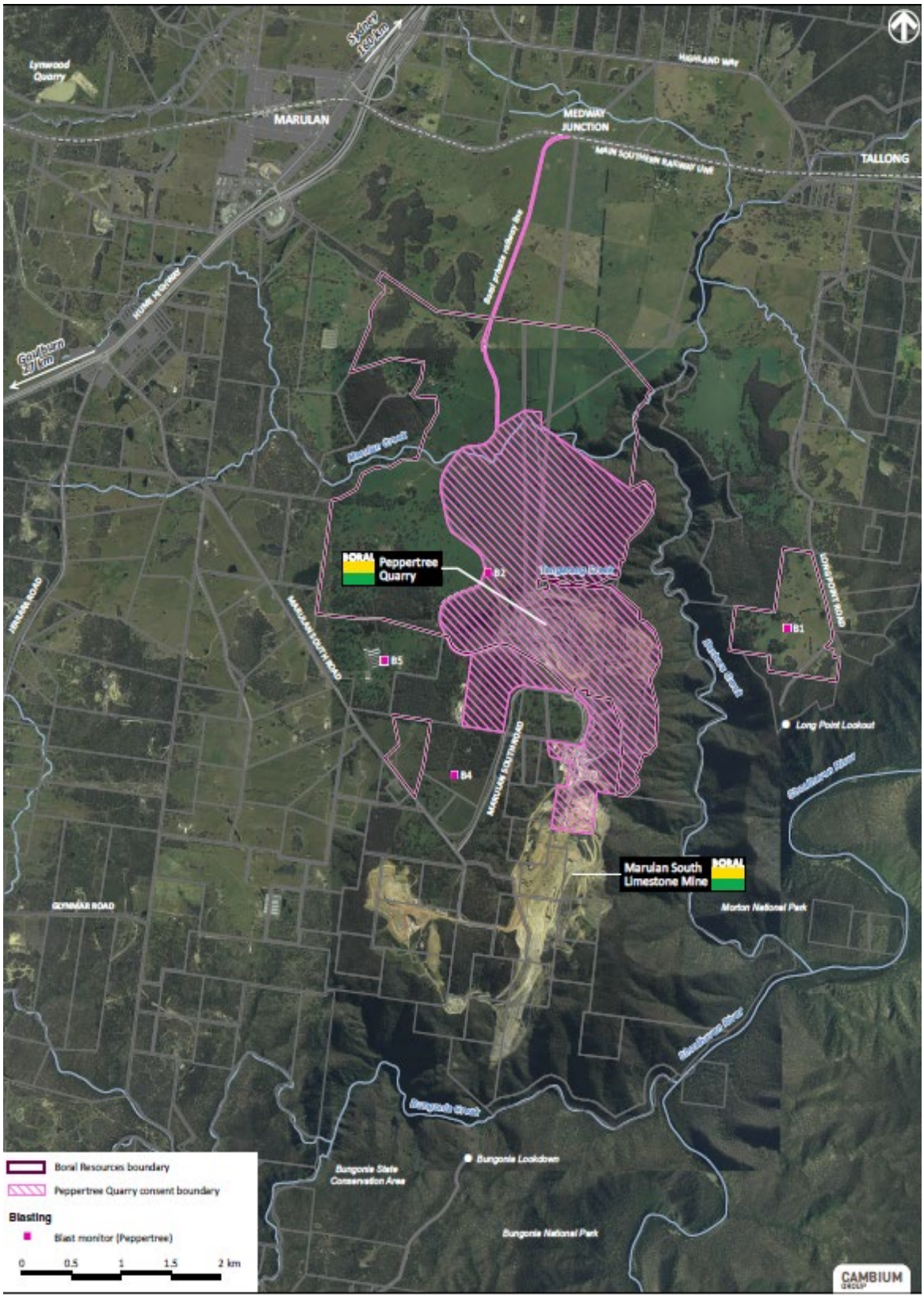


R8 Noise Level Trends (LA1, 1minute) – 2014 - 2022



APPENDIX 4 BLAST MONITORING INFORMATION

Blast monitoring locations



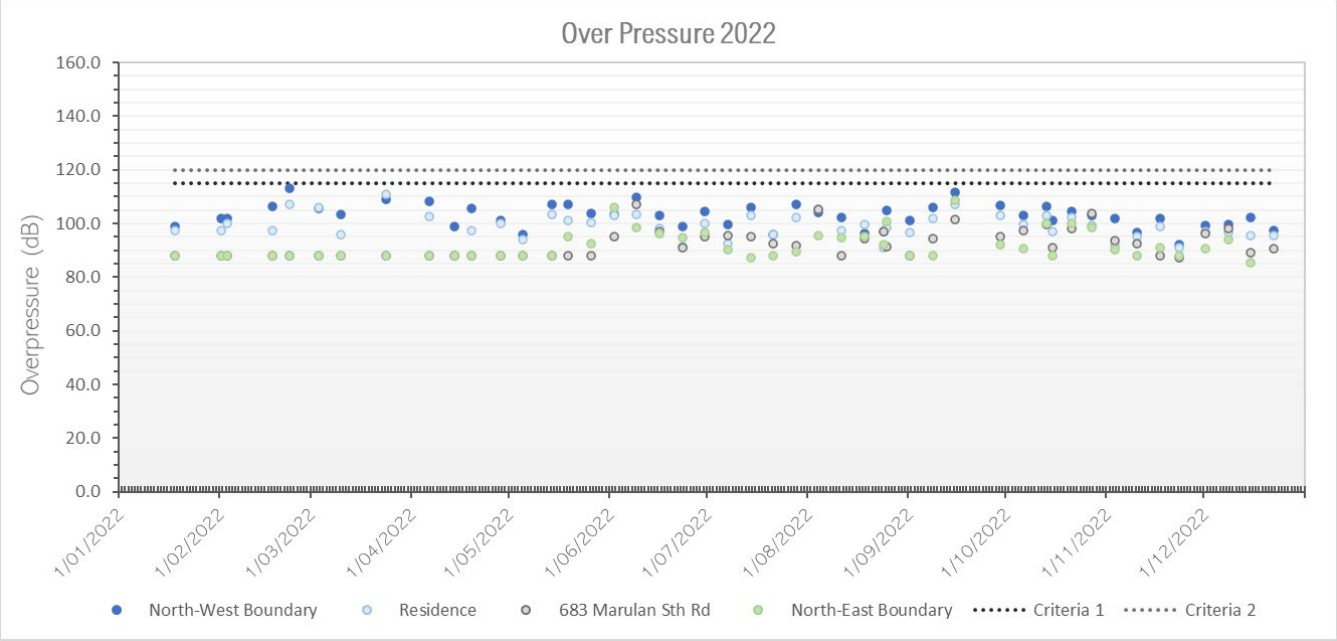
Blast Monitoring Results

Blast Date	Over Pressure (db – Linear) Max Criteria: 120 5% Exceedance: 115				Ground Vibration (mm/sec) Max Criteria: 10 5% Exceedance: 5				Compliance
	Monitoring Locations				Monitoring Locations				
	B2 (north west)	B1 (north east)	B4 Marulan sth rd)	B5 (Residence)	B2 (north west)	B1 (north east)	B4 Marulan sth rd)	B5 (Residence)	
18/01/2022	98.8	88	88	97.5	1.9	No Trigger	No Trigger	2	YES
1/02/2022	101.9	88	88	97.5	2.8	No Trigger	No Trigger	2.4	YES
3/02/2022	101.9	88	88	100	3	No Trigger	No Trigger	2.7	YES
17/02/2022	106.5	88	88	97.5	2.4	No Trigger	No Trigger	2.8	YES
22/02/2022	113.3	88	88	107	1.5	No Trigger	No Trigger	0.9	YES
3/03/2022	105.5	88	88	106	3.7	No Trigger	No Trigger	2.2	YES
10/03/2022	103.5	88	88	95.9	0.8	No Trigger	No Trigger	0.8	YES
24/03/2022	109.2	88	88	110.9	1.4	No Trigger	No Trigger	1.3	YES
6/04/2022	108.4	88	88	102.8	1	0.5	0.5	0.8	YES
14/04/2022	98.8	88	88	88	1.1	No Trigger	No Trigger	No Trigger	YES
19/04/2022	105.5	88	88	97.5	1.3	No Trigger	No Trigger	1	YES
28/04/2022	101	88	88	100	1.7	No Trigger	No Trigger	1	YES
5/05/2022	95.9	88	88	94	1.9	No Trigger	No Trigger	2.2	YES
14/05/2022	107	88	88	103.5	1.66	No Trigger	No Trigger	1.1	YES
19/05/2022	107.3	88	88	101.3	1.34	No Trigger	No Trigger	0.66	YES
26/05/2022	103.9	95	88	100.3	1.36	0.19	No Trigger	0.78	YES
2/06/2022	103.5	92.6	95.3	103.1	1.51	0.25	0.16	0.71	YES
9/06/2022	109.9	106.2	107.1	103.5	1.35	0.27	0.18	0.68	YES
16/06/2022	103.2	98.5	97	98.1	1.1	0.17	0.11	0.65	YES

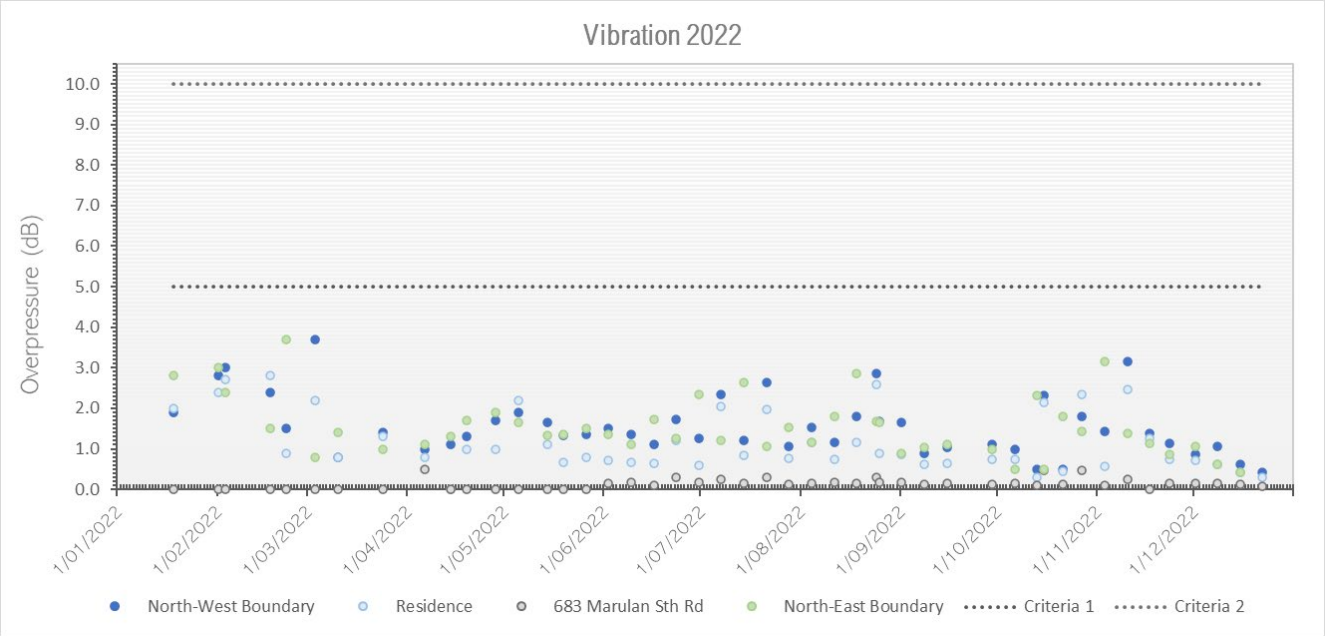
Blast Date	Over Pressure (db – Linear) Max Criteria: 120 5% Exceedance: 115				Ground Vibration (mm/sec) Max Criteria: 10 5% Exceedance: 5				Compliance
	Monitoring Locations				Monitoring Locations				
	B2 (north west)	B1 (north east)	B4 Marulan sth rd)	B5 (Residence)	B2 (north west)	B1 (north east)	B4 Marulan sth rd)	B5 (Residence)	
23/06/2022	98.9	96.1	90.9	91.4	1.73	0.13	0.31	1.21	YES
30/06/2022	104.7	94.9	95.1	100.2	1.25	0.2	0.17	0.6	YES
7/07/2022	99.5	96.7	95.5	92.4	2.34	0.14	0.26	2.05	YES
14/07/2022	106.2	90.1	95.2	102.9	1.22	0.19	0.15	0.83	YES
21/07/2022	95.8	87.4	92.5	95.8	2.65	0.15	0.31	1.98	YES
28/07/2022	107.1	88.2	91.9	102.4	1.07	0.22	0.13	0.77	YES
4/08/2022	104.3	89.4	105.2	105.1	1.54	0.25	0.14	1.17	YES
11/08/2022	102.1	95.5	88	97.3	1.15	0.17	0.17	0.73	YES
18/08/2022	96.3	94.7	94.4	99.5	1.79	0.25	0.15	1.17	YES
24/08/2022	97	95.1	97.1	90.9	2.87	0.17	0.31	2.6	YES
25/08/2022	105	92.1	91.4	98.5	1.67	0.27	0.17	0.9	YES
1/09/2022	101.3	100.6	88	96.7	1.66	0.28	0.17	0.87	YES
8/09/2022	106.1	88	94.3	102	0.9	0.14	0.13	0.61	YES
15/09/2022	111.7	88	101.4	107.2	1.04	0.22	0.14	0.64	YES
29/09/2022	106.6	108.8	95.2	102.9	1.12	1.81	0.13	0.74	YES
6/10/2022	103	92.1	97.4	99.6	0.98	0.15	0.14	0.73	YES
13/10/2022	106.3	90.5	99.6	102.9	0.49	0.13	0.1	0.31	YES
15/10/2022	101	100.1	91.1	97	2.31	0.21	0.47	2.15	YES
21/10/2022	104.6	88	98.2	102.4	0.49	0.15	0.12	0.44	YES
27/10/2022	102.9	99.9	103.6	99.2	1.79	0.2	0.46	2.35	YES
3/11/2022	101.9	98.5	93.8	91.6	1.44	0.15	0.11	0.56	YES

Blast Date	Over Pressure (db – Linear) Max Criteria: 120 5% Exceedance: 115				Ground Vibration (mm/sec) Max Criteria: 10 5% Exceedance: 5				Compliance
	Monitoring Locations				Monitoring Locations				
	B2 (north west)	B1 (north east)	B4 Marulan sth rd)	B5 (Residence)	B2 (north west)	B1 (north east)	B4 Marulan sth rd)	B5 (Residence)	
10/11/2022	96.5	90.1	92.4	95.2	3.15	0.15	0.24	2.46	YES
17/11/2022	101.9	88	88	98.8	1.39	No Trigger	No Trigger	1.27	YES
23/11/2022	92.1	90.9	87.4	91.2	1.13	0.18	0.16	0.75	YES
1/12/2022	99.1	88	96.3	97.2	0.87	0.16	0.14	0.71	YES
8/12/2022	99.5	90.7	98.1	96.7	1.07	0.18	0.14	0.62	YES
15/12/2022	102.3	93.9	89.1	95.7	0.62	0.12	0.12	0.43	YES
22/12/2022	97.3	85.3	90.6	95.4	0.41	0.12	0.08	0.29	YES

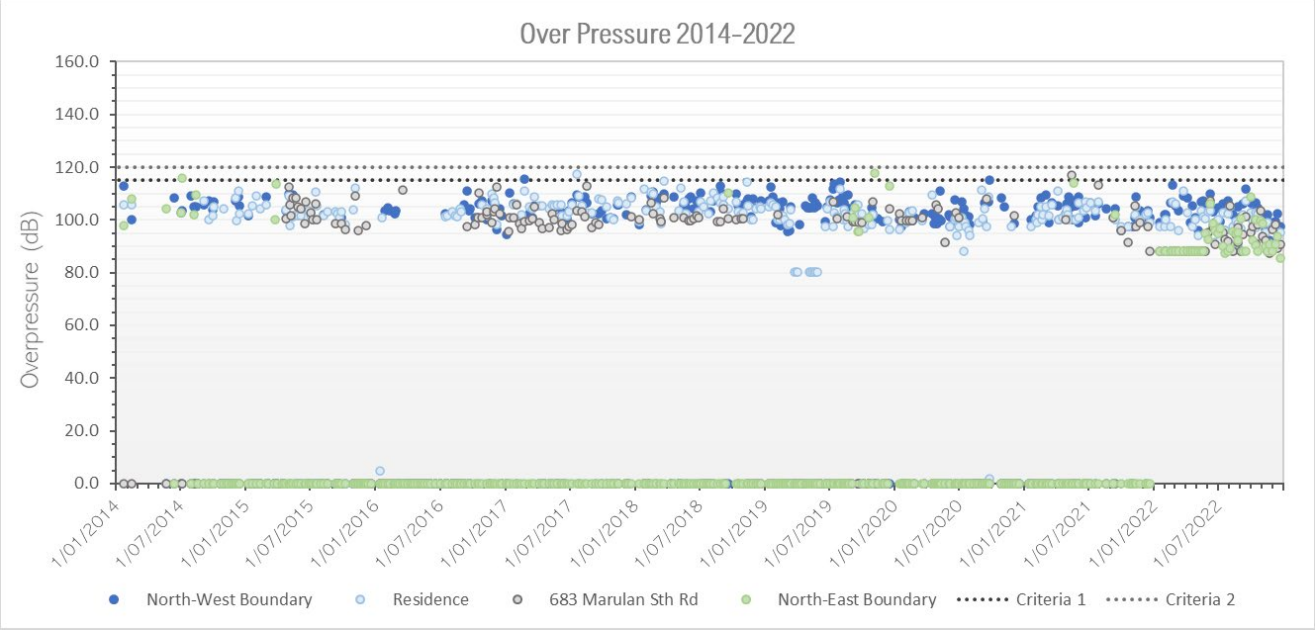
Blasting Overpressure Performance for 2022



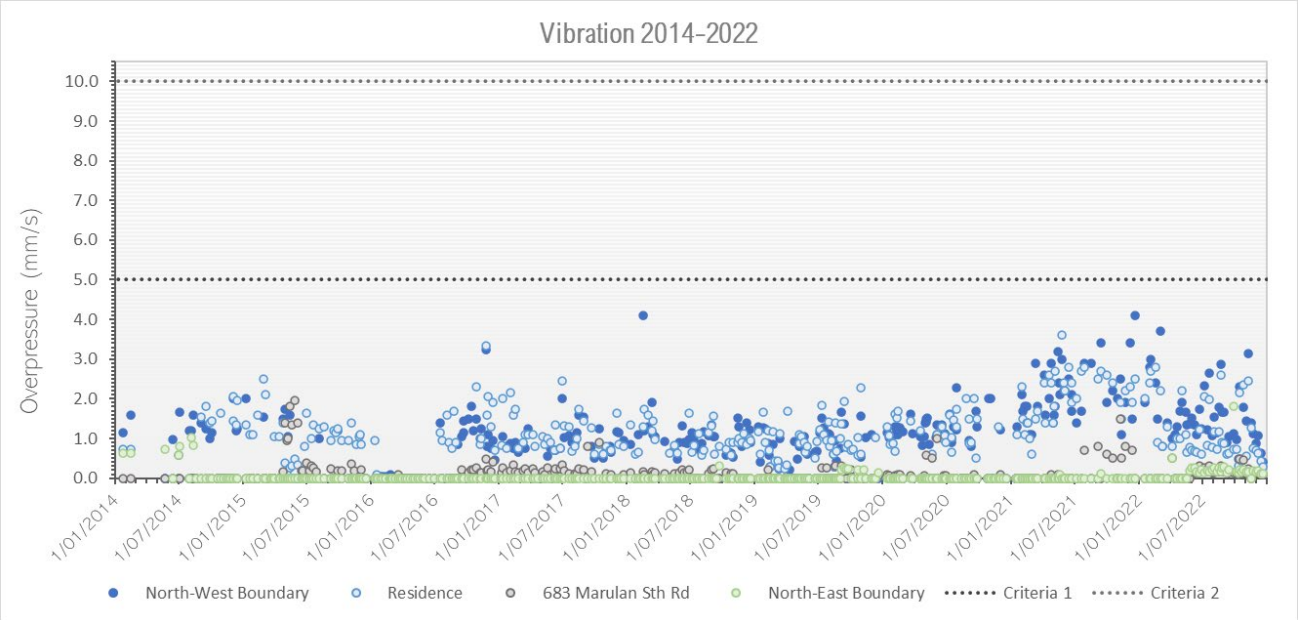
Blasting Ground Vibration Performance for 2022



Long Term Blast Trends – Overpressure

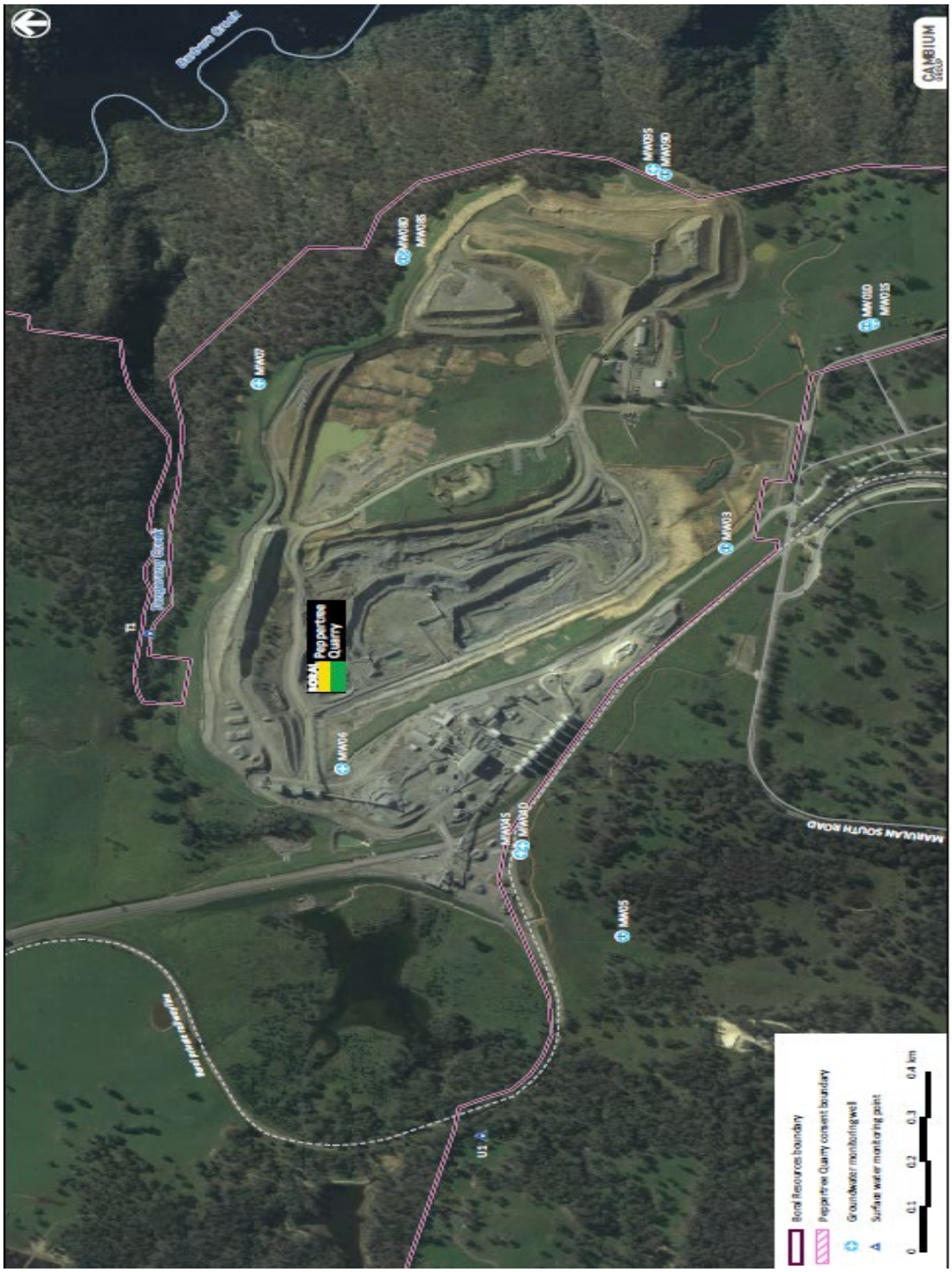


Long Term Blast Trends – Vibration



APPENDIX 5 SURFACE AND GROUNDWATER MONITORING INFORMATION

Surface and groundwater monitoring locations



Surface Water Monitoring Results (2022)

Parameter	Dam				Marulan South Creek				Tangarang Creek - Downstream				Tangarang Creek - Upstream				Barbers Creek - Upstream				Barbers Creek - Downstream			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Ph	7.65	8.53	7.52	7.83	7.49	7.72	7.73	7.49	7.78	8.35	8.05	8.4	7.45	7.82	7.52	NF	NA	7.22	NA	7.76	NA	7.24	NA	7.74
Total Suspended solids (mg/l)	31	8	5	6	24	<2	9	8	34	2	4	3	54	5	8	NA	NA	<5	NA	<5	NA	<5	NA	<5
Total Dissolved solids (mg/l)	135	335	189	223	302	386	256	434	132	405	233	391	114	822	253	NA	NA	250	NA	252	NA	400	NA	252
Ammonia -N (mg/l)	<0.01	<0.1	<0.1	0.1	<0.01	<0.1	<0.1	<0.1	<0.01	<0.1	<0.1	<0.1	<0.01	<0.1	<0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate-N (mg/l)	<0.05	0.85	0.48	0.36	0.1	<0.05	<0.05	0.09	0.05	0.94	0.59	0.44	<0.05	<0.05	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite-N (mg/l)	0.01	0.02	0.02	<0.1	0.01	0.01	<0.01	<0.1	<0.01	0.01	0.01	<0.1	0.01	0.07	<0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulphate (mg/l)	5.1	33.6	16.5	14.6	4.7	7.7	7.6	4.4	5	14.8	14.8	6.8	3.5	17.4	4.6	NA	NA	10	NA	10	NA	14	NA	10
Chloride (mg/l)	9.6	46.8	28.3	32	8.6	115	56.9	117	9.6	75.5	34.6	42.4	9.1	322	68.2	NA	NA	60	NA	50	NA	60	NA	50
Turbidity (NTU)	26.6+	5.9	11.1	4.3	25.6	1.8	14.5	2.5	30.4	2.9	6.6	1.5	27.7	5.7	14.3	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium (mg/l)	10.1	33.1	21.8	27.4	9.32	31.3	20.7	43.6	9.95	46.1	25.4	47.4	5.56	60.5	18.6	NA	NA	21	NA	27	NA	23	NA	27
Potassium (mg/l)	3.7	3.1	3.5	2.7	4.4	4.3	4.8	2	3.4	1.6	3.2	1.8	2.4	2.7	2.4	NA	NA	2	NA	2	NA	2	NA	2
Magnesium (mg/l)	2.82	9.79	6.44	7.87	2.61	20.5	12.6	26.6	2.93	25.1	10.5	24	2.04	41.4	13.2	NA	NA	12	NA	16	NA	13	NA	15
Sodium (mg/l)	9.1	34.5	23.4	22.8	7.3	48.4	30	57.5	8.6	51.9	24.1	54.3	6.4	81.3	27.3	NA	NA	26	NA	25	NA	27	NA	25
Total phosphorus (mg/l)	0.24	0.04	0.07	0.06	0.36	0.01	0.07	0.03	0.21	0.01	0.04	0.01	0.1	<0.01	0.02	NA	NA	0.1	NA	0.05	NA	0.05	NA	0.08
Total Nitrogen (mg/l)	1.59	1.74	1.55	1.46	1.5	0.69	1.06	0.82	1.5	1.11	1.41	0.56	1.61	0.79	1.15	NA	NA	0.9	NA	1.1	NA	1	NA	1
Hardness (CaCo3) (mg/l)	44	111	63	87	39	137	136	185	44	260	106	253	25	134	66	NA	NA	102	NA	133	NA	111	NA	129
TKN (mg/l)	1.59	0.88	1.05	1.1	2.07	0.69	1.06	0.73	1.45	0.16	0.81	0.12	1.61	0.74	1.05	NA	NA	0.7	NA	0.8	NA	0.8	NA	0.7
Faecal Coliform (cfu/100ml)	3700	<2	2	<2	5500	2	54	140	5600	<2	6	12	6900	8	362	NA	NA	NA	NA	NA	NA	NA	NA	NA
TPH C10-C14 (µg/l)	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	NA	NA	NA	NA	NA	NA	NA	NA

TPH C15-C28 (µg/l)	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	NA	NA	NA	NA	NA	NA	NA	NA
TPH C29-C36 (µg/l)	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	NA	NA	NA	NA	NA	NA	NA	NA
sum TPH C10-C36 (µg/l)	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthere	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	NA	NA	NA	NA	NA	NA
Flourene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	NA	NA	NA	NA	NA	NA
Anthracence	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b+k)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	NA	NA	NA	NA	NA	NA

note NF – No flow NA – not analysed

Quarters

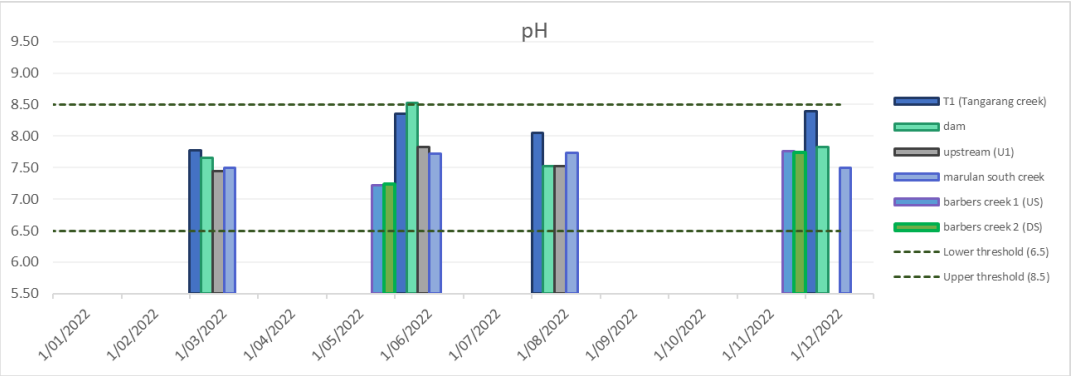
1st – 3rd March 2022

2nd – 27th June 2022

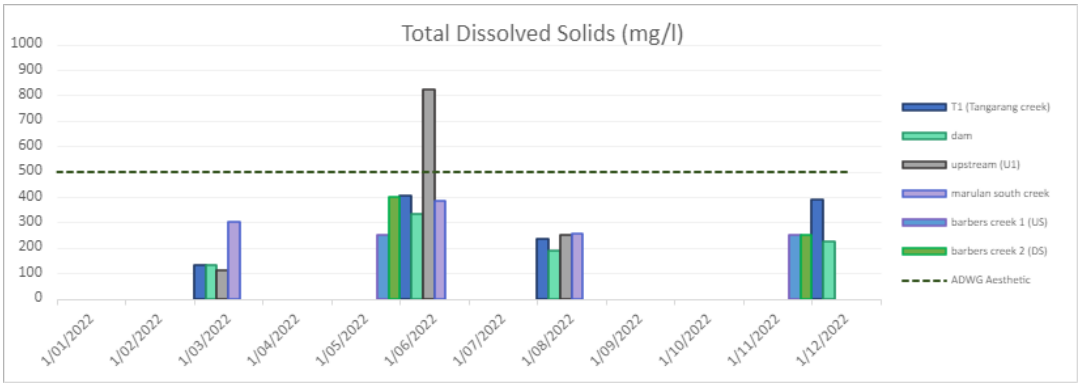
3rd – 18th August 2022

4th – 8th December 2022

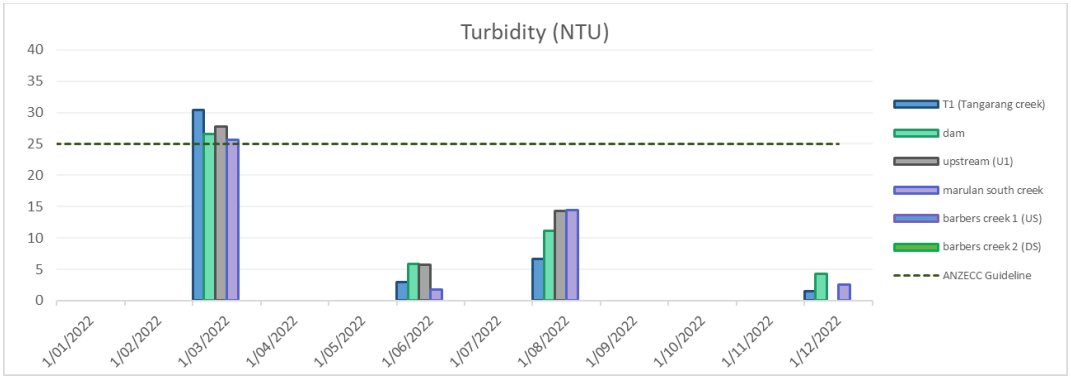
pH Surface Waters Trends 2022



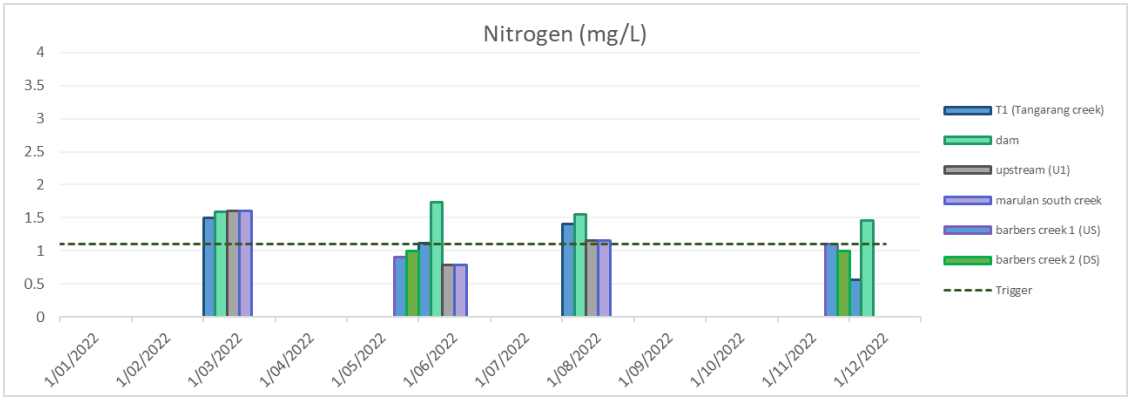
TDS surface water trends 2022



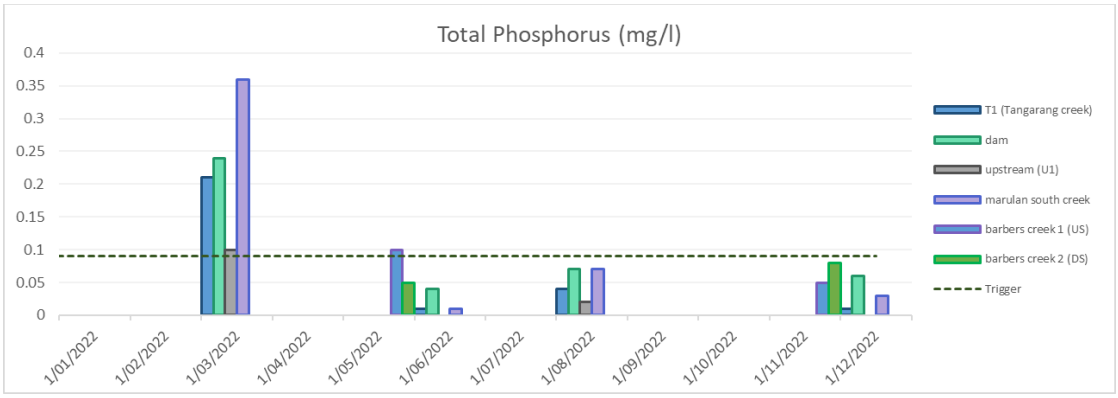
Turbidity surface water trends 2022



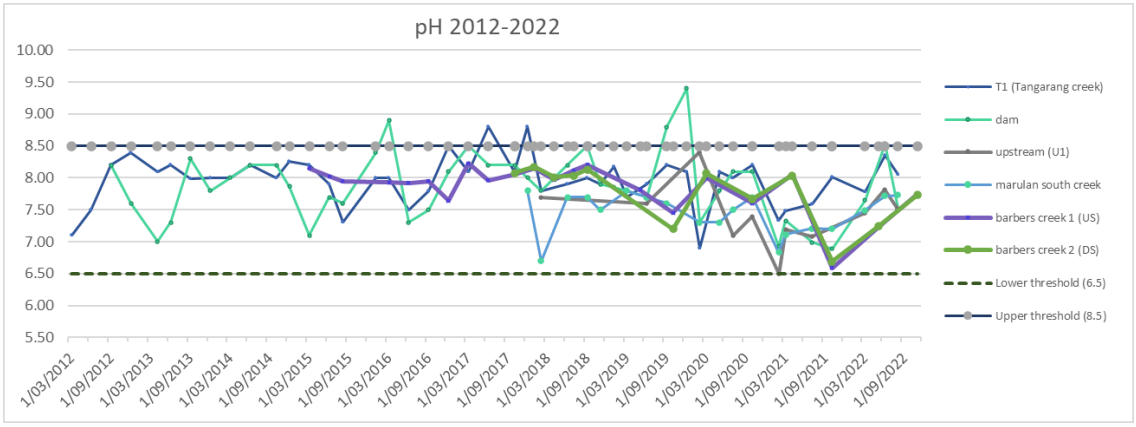
Nitrogen surface water trends 2022



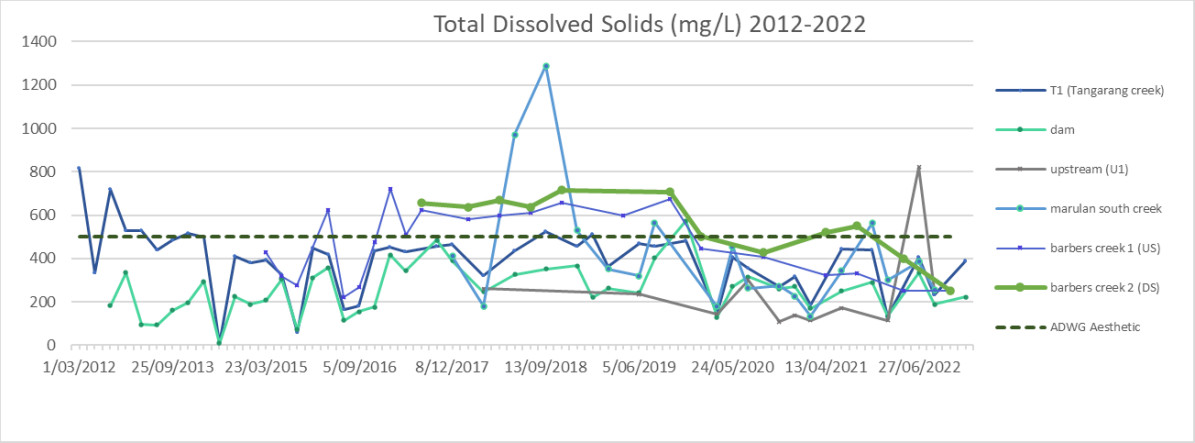
Total phosphorus surface water trends 2022



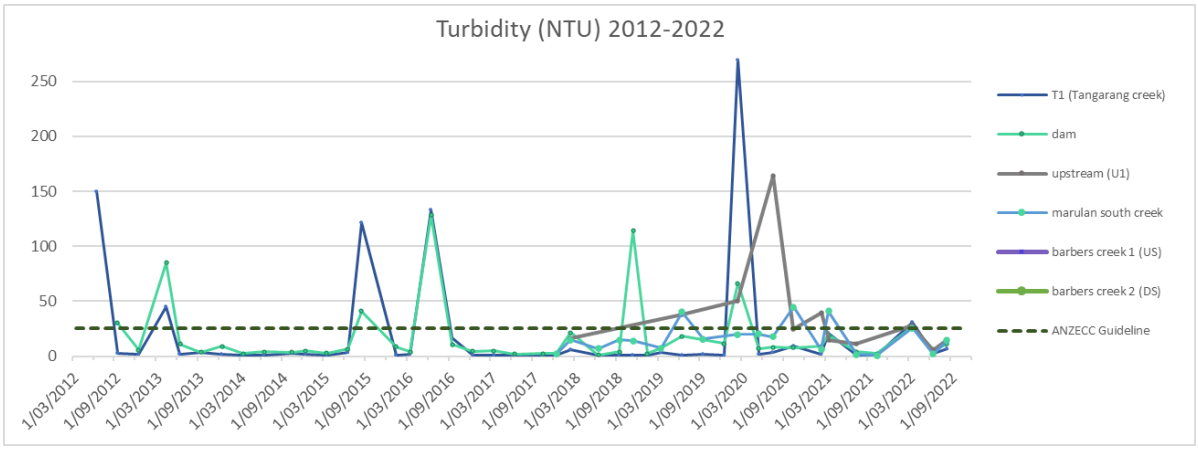
Long Term Water Quality - pH



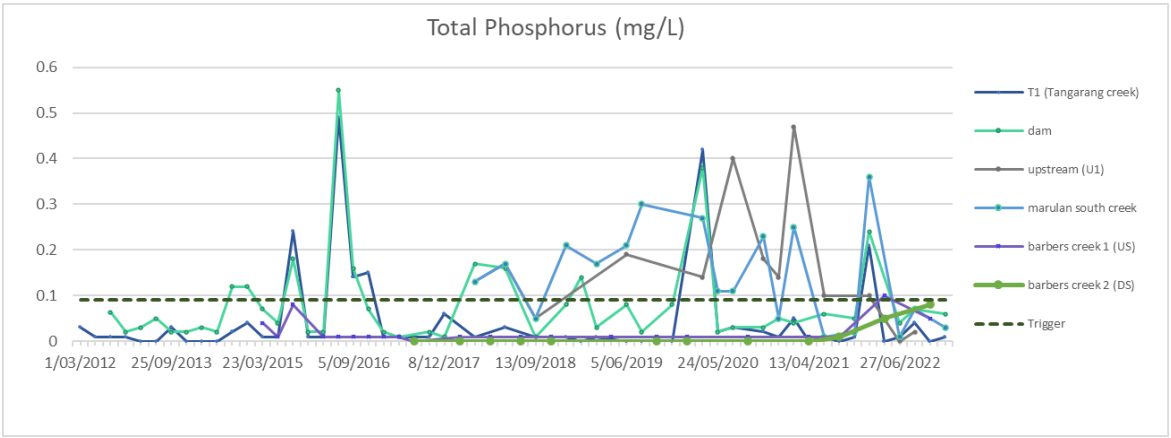
Long Term Water Quality – TDS



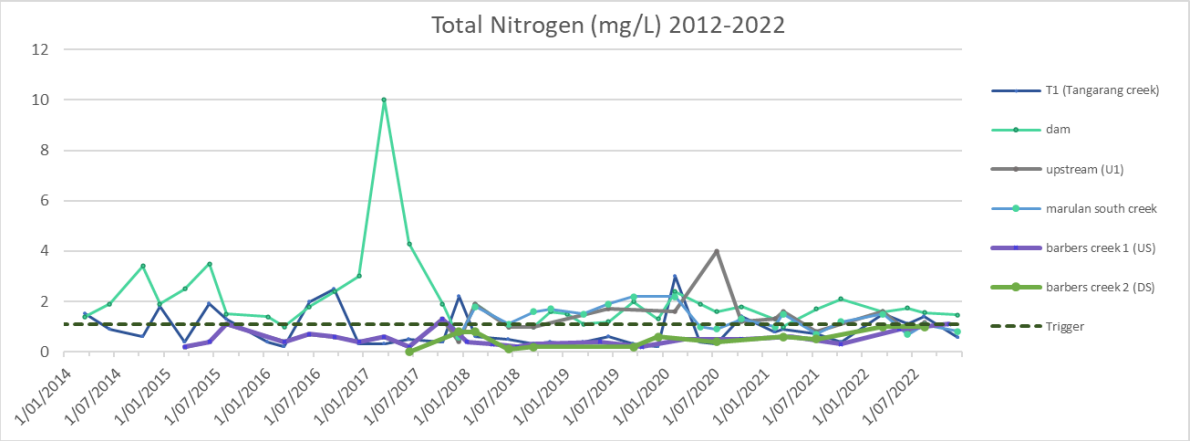
Long Term Water Quality – Turbidity



Long Term Water Quality – Total Phosphorus



Long Term Water Quality – total Nitrogen

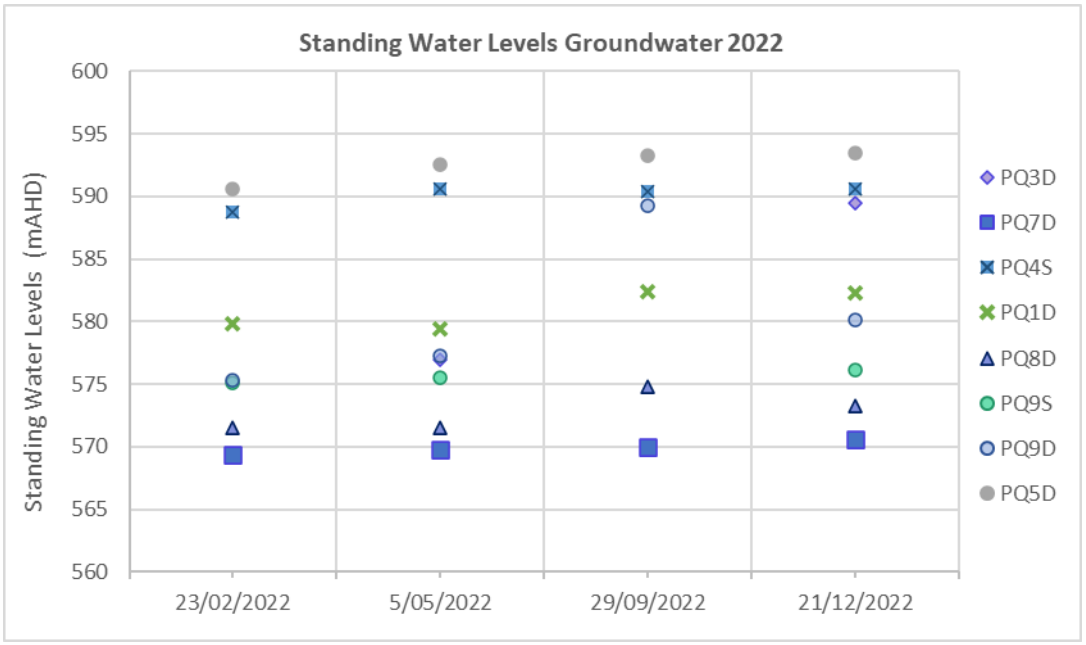


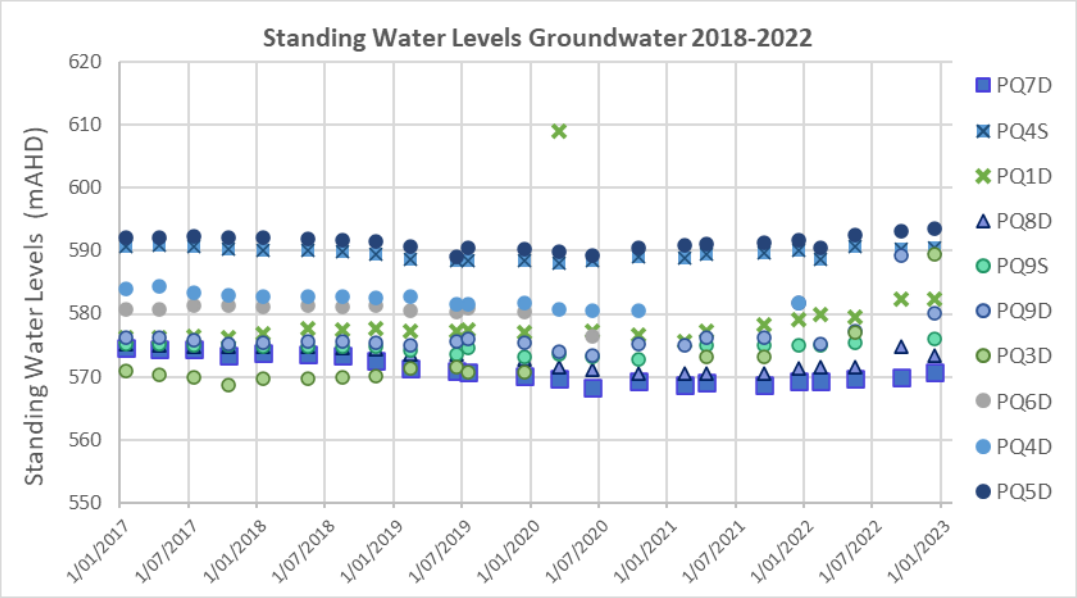
Groundwater Field Parameters

Bore ID	Field Parameters 2022											
	pH				EC (µs/cm)				DO (%)			
	February	April	September	December	February	April	September	December	February	April	September	December
PQ01S	DRY											
PQ01D	8.6	8.3	8.34	8.2	2761	2631	2327	2662	48.2	46.9	29.1	8.2
PQ03D	BLOCKAGE AT 30M NO SAMPLING POSSIBLE											
PQ04D	INTERIOR OF WELL CASING DAMAGED. NO SAMPLING POSSIBLE											
PQ04S	7.6	7.0	8.06	7.62	2328	2002	2060	790	39.7	31.3	25.1	23.7
PQ5D	9.3	9.3	9.21	9.33	1516	1581	1432	1858	32.6	33.4	21.9	17.4
PQ6D	WELL CASING CRACKED											
PQ7D	8.2	8.7	8.8	8.7	367.1	319	337.7	5.2	71.7	41.5	21.8	22.4
PQ8D	6.8	6.8	7.52	7.5	2457	2195	2151	2614	29.3	28.1	24.7	41.7
PQ8S	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
PQ9D	7.3	7.8	7.66	9.24	1526	1587	1331	1637	35.1	30.1	16.1	27.3
PQ9s	BLOCKAGE AT 31.7M NO SAMPLING POSSIBLE											

Groundwater Standing Water Levels

Bore ID	Standing Water Levels (mAHD) 2022			
	February	April	September	December
PQ01D	579.81	579.43	582.35	582.3
PQ01S	DRY			
PQ03D	NS	576.95	NS	589.45
PQ04D	NS	NS	NS	NS
PQ04S	588.73	590.6	590.35	590.55
PQ5D	590.54	592.54	593.23	593.48
PQ6D	NS	NS	NS	NS
PQ7D	569.37	569.75	570	570.65
PQ8D	571.52	571.55	574.81	573.31
PQ8S	DRY			
PQ9D	575.31	577.31	589.23	580.18
PQ9S	575.07	575.48	NS	576.11





Groundwater - Laboratory Analysis Results (2015 - 2022)

NOTES:

1. Shaded Cells: Exceedances of ANZECC (2000) threshold values
2. NA: Not Analysed
3. ND: Non-Detecte

Sample ID	Date	Inorganics																	
		Total Dissolved Solids	Suspended Solids	Turbidity	Total Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Sulfate	Chloride	Calcium	Magnesium	Potassium	Sodium	Fluoride	Nitrate + Nitrite as N	Total Kjeldahl Nitrogen as N	Total Nitrogen as N	Reactive Phosphorous as P	Oil & Grease
		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L N	mg/L N	mg/L N	mg/L P	mg/L
		<10	<1	<1	<20	<20	<10	<5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.2	<0.2	<0.01	<10
ANZG 2018 (95% Protection Values)				25											0.015		0.25	0.02	
PQ01D	19/01/2017	2570	294	52.7	156			70	1180	197	144	28	335	0.1	0.07	1.1	1.2	1.33	<5
PQ01D	27/04/2017	2230	10	5.3	36			92	972	210	6	30	313	<0.1	1.68	0.4	2.1	<0.01	<5
PQ01D	27/07/2017	2130	9	0.6	27			93	830	249	7	32	374	0.1	3.03	0.3	3.3	<0.01	<5
PQ01D	26/10/2017	2190	124	27.2	18			123	948	190	47	41	370	<0.1	3.64	0.4	4	0.01	<5
PQ01D	23/01/2018	2100	117	85.5	28			108	1060	228	44	38	370	<0.1	3.51	1.2	4.7	0.1	**74**
PQ01D	11/05/2018	1840	103	44.6	25			125	1070	216	32	22	330	<0.1	3.59	3.1	6.7	0.06	**8**
PQ01D	8/08/2018	1970	48	42.4	10			104	854	214	52	27	334	<0.1	3.45	0.8	4.2	0.01	<5
PQ01D	8/11/2018	2690	53	46.1	16			90	1010	236	45	52	344	<0.1	2.94	0.5	3.4	0.03	<5
PQ01D	26/02/2019	2130			10			104	1080	235	49	36	384		2.81	0.3	3.1	<0.01	<5
PQ01D	12/06/2019	2030			10			104	1000	262	42	26	341		3.06	0.5	3.6	<0.01	<5
PQ01D	23/07/2019	2080			<1			139	976	237	52	34	380		2.75	1.3	4	0.1	<5
PQ01D	16/10/2020	2200	1.6	< 1	< 20	< 20	< 10	76	910	180	77	32	300	< 0.5	3.1	< 0.2	3.1	< 0.01	< 10
PQ01D	2/02/2021	3200	3.2	< 1	< 20	< 20	< 10	80	1000	190	77	17	330	< 0.5	2.6	1.6	4.2	< 0.01	< 10
PQ01D	21/04/2021	2400	9.8	-	< 20	< 20	< 10	79	1000	130	77	14	280	< 0.5	2.7	0.78	1.92	< 0.01	< 10
PQ01D	29/09/2021	1800	< 1	< 1	56	56	< 10	67	900	150	100	15	320	< 0.5	1.1	0.6	1.7	< 0.01	-

PQ01D	23/02/2022	3800	< 5	<1	32	32	<10	55	890	140	75	14	300	1.1	1.9	0.6	2.5	<0.05	<10
PQ01D	6/05/2022	2000	6.5	<1	<20	<20	<10	49	890	160	56	15	290	<0.5	2	0.8	2.8	<0.01	<10
PQ01D	29/09/2022	2560	5		10	10	<1	49	941	201	35	13	289	0.1	2.15	0.2	2.4	0.02	<5
PQ01D	21/12/2022	2020	< 5	0.6	13	13	<1	54	1050	222	47	17	356	<0.1	2.71	0.7	3.4	<0.01	<5
PQ03D	19/01/2017	1110	123	91.3	556			13	224	64	<1	222	196	0.4	<0.01	1.2	1.2	0.01	<5
PQ03D	27/04/2017	1100	88	53.3	518			14	212	76	<1	160	159	0.3	<0.01	1.5	1.5	0.05	<5
PQ03D	27/07/2017	977	118	49.3	503			12	174	78	<1	171	176	0.5	0.02	1.1	1.1	<0.01	<5
PQ03D	26/10/2017	923	111	55.5	457			12	198	37	<1	148	175	0.4	<0.01	1.3	1.3	0.06	<5
PQ03D	23/01/2018	975	81	49	303			12	215	76	<1	141	178	0.4	<0.01	1.3	1.3	0.03	<5
PQ03D	11/05/2018	910	26	9.2	400			18	226	80	<1	111	162	0.4	<0.01	1.5	1.5	0.06	<5
PQ03D	8/08/2018	956	32	32.7	482			18	197	87	<1	110	168	0.4	0.03	1.2	1.2	0.03	<5
PQ03D	8/11/2018	785	443	536	401			20	216	88	<1	106	172	0.4	0.02	1.9	1.9	0.19	<5
PQ03D	26/02/2019	886			377			24	201	90	<1	117	194		0.02	1.3	1.3	<0.01	<5
PQ03D	12/06/2019	1000			423			28	214	99	<1	122	179		0.26	2	2.3	0.01	<5
PQ04S	19/01/2017	1930	136	36.7	410			86	881	65	72	4	602	1.3	0.45	0.7	0.9	0.07	<5
PQ04S	27/04/2017	1950	61	21.5	368			89	865	58	63	3	444	0.9	0.21	1	1.2	0.07	<5
PQ04S	27/07/2017	1940	48	35.6	474			43	698	62	64	5	534	1	0.03	0.4	0.4	<0.01	<5
PQ04S	26/10/2017	1650	234	48	565			23	649	55	56	5	464	1	<0.01	0.5	0.5	0.13	**6**
PQ04S	24/01/2018	1400	110	28.6	504			50	654	69	62	4	437	0.9	0.08	0.5	0.6	0.1	**11**
PQ04S	11/05/2018	1390	78	5.2	580			39	641	71	57	4	417	0.9	0.11	1.2	1.3	0.1	<5
PQ04S	8/08/2018	1550	10	3	590			29	501	70	55	3	405	0.9	0.02	0.2	0.2	0.02	<5
PQ04S	8/11/2018	1650	48	13.7	486			44	570	74	59	3	409	0.9	0.02	0.3	0.3	0.03	<5
PQ04S	26/02/2019	1560			484			90	598	83	62	4	464		0.03	0.2	0.2	0.02	<5
PQ04S	26/06/2019	1160			406			195	206	23	<1	166	253		<0.01	2	2	<0.01	<5
PQ04S	23/07/2019	1690			450			106	756	110	76	4	536		0.44	0.6	1	0.33	<5
PQ04S	22/11/2019	1800	81	41	570	570	<10	110	620	90	66	4.5	450		<0.05	0.6	0.6		<10
PQ04S	5/03/2020	1820	39	14	485	485	<0.1	705	100	102	72	4.8	445	1	0.36	0.2	0.56	0.02	<1
PQ04S	24/06/2020	1600	600	370	700	700	< 10	130	650	110	76	4.9	470	1.2	< 0.05	< 0.2	< 0.2	0.11	**12**
PQ04S	16/10/2020	1200	2	1.4	680	650	26	100	510	69	59	5	430	0.9	0.09	0.2	0.29	< 0.01	< 10
PQ04S	2/02/2021	1600	9.8	1.8	990	960	32	74	460	86	61	5.5	450	1	0.07	0.5	0.57	< 0.01	< 10
PQ04S	21/04/2021	1500	3.2	-	860	790	69	69	440	17	23	4.6	340	1	< 0.05	< 0.2	< 0.2	0.01	-
PQ04S	29/09/2021	1400	1.6	1.1	790	790	< 10	31	430	65	61	16	460	1.1	0.1	< 0.2	< 0.2	< 0.01	< 10
PQ04S	15/12/2021	1500	< 5	1.1	750	720	30	12	460	46	53	15	500	1.1	< 0.05	0.2	0.2	0.01	97

PQ04S	23/02/2022	2900	<5	5.9	710	710	<10	56	380	58	57	6.4	460	1.8	<0.05	0.8	0.8	<0.05	47
PQ04S	6/05/2022	1200	5.2	2	1000	1000	<10	23	390	25	45	5.1	420	1.1	<0.05	<0.2	<0.2	0.01	21
PQ04S	29/09/2022	1520	<5		834	834	<1	51	401	73	49	7	401	1.1	<0.01	0.2	0.2	0.02	<5
PQ04S	21/12/2022	1560	21	1.9	676	676	<1	70	415	75	52	9	452	1.2	0.01	1.1	1.1	<0.01	<5
PQ04D	19/01/2017	736	18	7.4	102			31	355	38	19	10	184	1.6	0.25	0.2	0.4	0.02	<5
PQ04D	27/04/2017	760	<5	2	93			33	365	33	18	10	148	1.3	0.27	0.1	0.4	0.16	<5
PQ04D	27/07/2017	770	28	17.5	110			31	310	40	22	15	187	1.7	0.29	<0.1	0.3	0.08	<5
PQ04D	26/10/2017	707	9	5.8	122			33	345	33	20	14	181	1.5	0.37	0.2	0.6	0.01	<5
PQ04D	24/01/2018	712	36	22.2	117			30	386	44	25	14	186	1.5	0.38	0.2	0.6	<0.01	<5
PQ04D	11/05/2018	688	38	2.9	117			35	394	39	21	10	181	1.6	0.37	0.2	0.6	0.02	<5
PQ04D	8/08/2018	818	23	16.2	129			34	325	41	24	10	184	1.5	0.37	0.2	0.6	0.02	<5
PQ04D	8/11/2018	761	26	9.4	120			32	369	41	25	11	188	1.6	0.36	0.2	0.6	0.01	<5
PQ04D	26/02/2019	828			110			34	383	45	27	15	218	-	0.52	<0.1	0.5	0.01	<5
PQ05D	19/01/2017	1190	521	420	618			1	391	140	40	24	262	0.3	<0.01	0.6	0.6	0.19	<5
PQ05D	27/04/2017	1110	1490	622	504			4	390	110	32	7	218	0.2	<0.01	0.4	0.4	0.12	<5
PQ05D	27/07/2017	1120	48	98.9	460			7	320	125	35	8	232	0.3	0.02	0.6	0.6	0.08	<5
PQ05D	26/10/2017	984	78	154	529			<1	360	108	33	6	210	0.4	<0.01	<0.1	<0.1	0.02	<5
PQ05D	24/01/2018	992	1310	640	381			35	398	134	51	30	149	0.2	0.03	0.4	0.4	0.04	<5
PQ05D	11/05/2018	1150	3640	1780	478			6	410	137	36	5	184	0.3	0.01	0.6	0.6	0.16	**22**
PQ05D	8/08/2018	1080	42	148	490			16	334	140	43	15	172	0.2	<0.01	<0.1	<0.1	0.02	<5
PQ05D	8/11/2018	1200	183	138	383			5	376	139	42	13	174	0.3	0.04	0.5	0.5	0.18	<5
PQ05D	26/02/2019	1070			356			26	368	122	47	38	162		0.03	<0.1	<0.1	<0.01	<5
PQ05D	12/06/2019	981			332			42	367	133	52	49	132		<0.01	0.4	0.4	<0.01	<5
PQ05D	23/07/2019	1060			282			58	371	122	52	49	138		<0.01	0.6	0.6	0.01	<5
PQ05D	21/11/2019	110	38	31	410	410	<10	41	320	130	49	33	140		<0.05	0.3	0.3		
PQ05D	5/03/2020	1150	43	101	406	406	<0.1	11.6	339	150	46.2	25.1	134	0.22	<0.01	0.15	0.24	<0.02	<1
PQ05D	24/06/2020	1200	50	100	540	540	< 10	10	370	160	55	27	150	< 0.5	< 0.05	0.4	0.4	0.01	< 10
PQ05D	16/10/2020	990	< 1	< 1	250	190	63	55	320	25	40	200	150	< 0.5	0.3	0.8	1.1	< 0.01	**46**
PQ05D	2/02/2021	770	5.9	< 1	380	300	76	62	340	10	38	210	160	0.6	< 0.05	2.1	2.1	< 0.01	< 10
PQ05D	21/04/2021	920	2.4	-	340	240	100	58	360	7.8	43	220	160	< 0.5	0.09	2.1	2.19	< 0.01	< 10
PQ05D	29/09/2021	860	< 1	< 1	330	220	120	54	380	2.4	47	230	170	< 0.5	0.13	2.4	2.53	< 0.01	**11**
PQ05D	15/12/2021	1100	< 5	<1	130	130	< 10	300	350	1.8	41	230	150	< 0.5	0.23	0.9	1.13	< 0.01	<10
PQ05D	23/02/2022	1900	15	68	390	390	<10	7.4	360	150	58	14	130	<0.5	<0.05	0.5	0.5	<0.01	<10
PQ05D	6/05/2022	1300	18	58	480	480	<10	7.4	370	130	53	8	120	<0.5	<0.05	0.3	0.3	<0.01	<10

PQ05D	29/09/2022	1220	23		442	442	<1	5	409	173	53	14	117	0.2	0.04	0.2	0.2	0.02	<5
PQ05D	21/12/2022	1190	39	67.0	417	417	<1	10	448	180	59	23	135	0.3	0.07	0.7	0.8	<0.01	<5
PQ06D	19/01/2017	1240	26	11.4	406			168	213	27	<1	204	252	0.6	<0.01	1.5	1.5	0.01	<5
PQ06D	27/04/2017	1260	46	24.2	467			178	210	50	<1	166	208	0.5	<0.01	1.9	1.9	0.04	<5
PQ06D	27/07/2017	1130	34	13.4	463			169	172	48	<1	189	253	0.6	<0.01	1.5	1.5	<0.01	<5
PQ06D	26/10/2017	1120	57	22	421			198	190	17	<1	153	238	0.6	<0.01	2	2	0.02	<5
PQ06D	24/01/2018	1110	64	33.4	351			174	211	23	<1	169	261	0.5	0.03	1.7	1.7	0.03	<5
PQ06D	11/05/2018	1040	28	4.2	422			181	218	49	<1	147	235	0.5	<0.01	1.9	1.9	0.02	<5
PQ06D	8/08/2018	1190	157	90.6	469			163	185	23	<1	162	244	0.5	0.03	1.7	1.7	0.02	<5
PQ06D	8/11/2018	1420	112	42.4	366			176	194	4	<1	164	256	0.5	<0.01	2.1	2.1	0.06	<5
PQ06D	26/02/2019	1220			375			189	211	52	<1	158	283	-	0.05	1.3	1.4	<0.01	<5
PQ06D	12/06/2019	1730			506			64	731	105	76	4	480	-	0.05	0.5	0.6	0.02	<5
PQ07D	19/01/2017	937	33	13.7	86			124	331	106	<1	88	166	0.2	<0.01	0.4	0.4	<0.01	<5
PQ07D	27/04/2017	892	24	22.8	150			123	333	79	<1	76	138	0.1	<0.01	0.6	0.6	0.02	<5
PQ07D	27/07/2017	898	54	24.4	124			121	274	93	<1	86	164	0.2	0.02	1.6	1.6	2.1	<5
PQ07D	26/10/2017	994	1210	540	99			140	302	66	<1	81	159	0.2	<0.01	0.6	0.6	0.02	<5
PQ07D	24/01/2018	916	2720	1670	86			116	326	85	<1	81	164	0.2	0.02	0.5	0.5	0.04	<5
PQ07D	11/05/2018																		
PQ07D	8/08/2018	824	52	21.8	119			111	288	77	<1	72	157	0.2	0.02	0.5	0.5	0.06	<5
PQ07D	8/11/2018	652	58	12.6	66			77	319	36	27	55	135	0.1	<0.01	0.4	0.4	<0.01	<5
PQ07D	26/02/2019	482			80			80	220	23	15	65	114		0.07	1.3	1.4	0.09	<5
PQ07D	12/06/2019	472			137			43	115	18	9	76	82		0.67	1.1	1.8	0.02	<5
PQ07D	23/07/2019	625			52			83	284	24	15	74	145		0.04	0.8	0.8	0.02	<5
PQ07D	21/11/2019	760	120	75	85	77	<10	71	270	26	20	62	140		<0.05	0.9	0.9		
PQ07D	5/03/2020	366	89	43.5	142	142	<0.1	37.1	37.6	24.6	10.7	46.9	56.1	0.16	18.5	0.2	18.7	0.04	<1
PQ07D	24/06/2020	440	120	67	180	180	< 10	45	88	38	14	40	51	< 0.5	11	1.6	12.6	0.02	< 10
PQ07D	16/10/2020	250	1.2	1.2	160	150	< 10	26	16	19	12	32	31	< 0.5	1.8	< 0.2	1.8	0.01	< 10
PQ07D	2/02/2021	300	4.6	1.9	220	220	< 10	33	16	24	17	22	26	< 0.5	0.57	1.3	1.87	< 0.01	< 10
PQ07D	21/04/2021	300	4.2	-	160	150	10	36	22	15	8.8	39	35	< 0.5	0.6	0.7	1.3	0.01	< 10
PQ07D	29/09/2021	88	56	2	130	130	< 10	39	19	28	8.9	28	33	< 0.5	0.28	0.6	0.88	0.02	< 10
PQ07D	15/12/2021	240	28	24	160	150	< 10	45	22	17	5.7	30	29	< 0.5	0.14	0.3	0.44	0.01	<10
PQ07D	23/02/2022	220	13	11	44	150	140		21	23	5.5	26	34	<0.5	0.08	0.8	0.88	0.02	<10
PQ07D	29/09/2022	280	62		46	136	127		23	24	7	30	38	0.2	0.03	1.1	1.1	0.08	<5
PQ07D	21/12/2022	269	132	73.9	123	123	<1	40	31	25	8	30	39	0.3	0.25	1.7	2.0	<0.01	<5

PQ08D	19/01/2017	2110	37	68.5	402			54	822	240	162	3	143	0.2	<0.01	<0.1	<0.1	<0.01	<5
PQ08D	27/04/2017	2260	23	52.4	371			55	823	217	141	2	113	0.2	<0.01	<0.1	<0.1	<0.01	<5
PQ08D	27/07/2017	2250	35	25	391			38	664	235	145	7	134	0.2	0.03	0.1	0.1	<0.01	<5
PQ08D	26/10/2017	2230	52	58	442			66	745	211	146	3	130	0.3	<0.01	<0.1	<0.1	0.02	<5
PQ08D	24/01/2018	2070	39	60.4	389			61	828	239	147	3	133	0.2	0.05	<0.1	<0.1	<0.01	<5
PQ08D	11/05/2018	1600	20	38.4	405			61	835	242	137	3	124	0.2	<0.01	<0.1	<0.1	0.01	<5
PQ08D	8/08/2018	1890	17	46.7	427			48	673	226	140	4	128	0.2	0.02	<0.1	<0.1	<0.1	<5
PQ08D	8/11/2018	2550	35	61.1	318			43	754	238	139	3	125	0.3	<0.01	<0.1	<0.1	0.02	<5
PQ08D	26/02/2019	2000			364			70	809	239	150	4	137		0.1	<0.1	0.1	0.02	<5
PQ08D	12/06/2019	1860			371			46	767	247	150	5	132		<0.01	0.2	0.2	<0.01	
PQ08D	23/07/2019	1900			333			57	746	234	148	4	135		<0.01	0.3	0.3	0.03	<1
PQ08D	21/11/2019	2800	39	78	430	430	<10	60	1100	230	140	3.4	130		<0.05	2.2	2.2		<1
PQ08D	5/03/2020	1790	45	55.9	326	326	<0.1	46.2	747	224	139	4	124	0.2	<0.05	0.16	0.16	<0.02	<1
PQ08D	24/06/2020	2100	47	92	400	400	< 10	55	770	240	150	5.2	140	< 0.5	0.26	0.6	0.86	0.03	<1
PQ08D	16/10/2020	1600	7.3	35	370	370	< 10	56	680	190	120	21	120	< 0.5	0.21	0.4	0.61	< 0.01	<1
PQ08D	2/02/2021	2700	10	2.3	500	500	< 10	59	790	230	140	12	130	< 0.5	0.08	0.6	0.68	0.01	< 10
PQ08D	21/04/2021	1900	9.8	-	430	430	< 10	58	770	160	150	12	130	< 0.5	< 0.05	3.6	3.6	< 0.01	< 10
PQ08D	29/09/2021	2200	< 1	< 1	430	430	< 10	57	720	240	150	18	140	< 0.5	0.22	< 0.2	0.22	0.11	< 10
PQ08D	15/12/2021	2100	31	40	370	370	< 10	52	800	220	140	16	130	< 0.5	0.16	< 0.2	< 0.2	< 0.01	< 10
PQ08D	23/02/2022	2900	17	53	430	430	<10	61	820	210	160	3	140	<0.5	<0.05	0.5	0.5	<0.05	<10
PQ08D	6/05/2022	1400	15	47	450	450	<10	70	830	230	150	3.4	140	<0.5	<0.05	0.3	0.3	<0.01	<10
PQ08D	29/09/2022	2750	18		405	405	<1	56	852	271	151	3	136	0.2	<0.01	<0.1	<0.1	0.01	<5
PQ08D	21/12/2022	2020	35	54.0	396	396	<1	66	920	265	167	5	150	0.2	0.03	0.3	0.3	<0.01	<5
PQ09S	19/01/2017	1830	803	426	472			23	712	180	172	8	153	0.3	4.95	0.9	5.8	0.51	<5
PQ09S	27/04/2017	1870	601	253	443			23	685	160	144	6	122	0.2	3.58	1	4.6	1.14	<5
PQ09S	27/07/2017	1860	150	54.8	476			23	560	166	148	7	139	0.3	7.37	0.3	7.7	<0.01	<5
PQ09S	26/10/2017	1730	76	14.6	456			24	595	146	144	7	131	0.3	6.47	1	7.5	<0.01	<5
PQ09S	24/01/2018	1780	480	297	477			22	650	168	149	7	140	0.3	5.23	0.8	6	2.23	<5
PQ09S	11/05/2018	1280	200	88.4	490			26	653	154	134	5	125	0.3	6.4	0.5	6.9	0.08	<5
PQ09S	8/08/2018	1550	1047	61.4	515			24	531	154	138	6	130	0.3	6.82	0.4	7.2	0.04	<5
PQ09S	8/11/2018	2040	121	68.1	422			23	597	149	145	6	136	0.3	6.57	1.9	8.5	0.09	**5**
PQ09S	26/02/2019	1660			436			29	632	163	152	8	140		6.67	0.3	7	0.01	<5
PQ09S	12/06/2019	1420			470			18	590	170	151	7	136		6.76	1.2	8	0.21	<5
PQ09S	23/07/2019	1500			412			21	585	162	150	7	141		6.3	1.7	8	0.12	<5

PQ09S	21/11/2019	1700	690	430	520	520	<10	37	580	150	140	6.1	130		5.1	<0.2	5.1		<10
PQ09S	5/03/2020	1670	324	140	483	483	<0.1	19.8	538	149	137	6.5	122	0.27	3.67	<0.05	3.48	<0.02	<1
PQ09S	24/06/2020	1500	940	430	600	600	< 10	29	570	170	150	7.1	140	< 0.5	2.5	< 0.2	2.5	0.29	< 10
PQ09D	19/01/2017	1010	382	201	360			25	352	120	95	4	101	0.3	<0.01	<0.1	<0.1	0.07	<5
PQ09D	27/04/2017	868	686	285	425			21	354	118	86	3	82	0.2	<0.01	0.1	0.1	0.37	<5
PQ09D	27/07/2017	1070	117	52.2	432			24	294	118	98	4	105	0.3	0.02	<0.1	<0.1	0.01	<5
PQ09D	26/10/2017	1020	49	29.9	513			20	320	106	89	4	94	0.4	<0.01	0.1	0.1	0.03	<5
PQ09D	24/01/2018	1060	66	42.6	496			9	349	122	93	5	100	0.2	0.03	0.1	0.1	<0.01	<5
PQ09D	11/05/2018	906	59	11	482			30	367	113	91	3	93	0.2	<0.01	<0.1	<0.1	0.06	<5
PQ09D	8/08/2018	970	23	18.3	535			12	301	117	92	7	97	0.2	0.1	0.2	0.3	0.01	<5
PQ09D	8/11/2018	1180	28	18	425			10	326	108	94	6	98	0.3	<0.01	0.3	0.3	0.04	<5
PQ09D	26/02/2019	1110			445			12	337	122	97	10	98		<0.01	<0.1	<0.1	<0.01	<5
PQ09D	12/06/2019	1050			467			10	336	131	101	8	103		<0.01	0.2	0.2	<0.01	<5
PQ09D	23/07/2019	988			397			11	342	123	99	9	101		0.01	0.4	0.4	0.02	<5
PQ09D	21/11/2019	1200	24	14	540	540	<10	19	300	120	94	8.2	99		<0.05	0.3	0.3		<10
PQ09D	5/03/2020	1050	30	6.9	465	465	<0.1	13.1	284	115	87.6	20.5	90.8	0.24	<0.05	0.37	0.37	<0.02	<5
PQ09D	24/06/2020	1100	47	32	490	490	< 10	15	310	120	100	22	110	< 0.5	< 0.05	0.3	0.3	< 0.01	< 10
PQ09D	16/10/2020	920	13	< 1	470	450	13	15	310	110	95	32	94	< 0.5	< 0.05	< 0.2	< 0.2	< 0.01	< 10
PQ09D	2/02/2021	1200	6.6	3.7	620	620	< 10	30	550	100	89	24	100	< 0.5	< 0.05	0.7	0.7	< 0.01	< 10
PQ09D	21/04/2021	1000	2.6	-	530	530	< 10	29	310	110	98	19	99	< 0.5	< 0.05	0.9	0.9	< 0.01	< 10
PQ09D	29/09/2021	910	1.6	< 1	530	530	< 10	22	270	99	86	29	94	< 0.5	< 0.05	0.4	0.4	0.02	< 10
PQ09D	15/12/2021	1100	11	13	540	540	< 10	21	300	88	91	46	96	< 0.5	< 0.05	< 0.2	< 0.2	< 0.01	<10
PQ09D	23/02/2022	1300	22	14	550	550	<10	21	310	100	95	10	96	<0.5	<0.05	1	1	<0.05	<10
PQ09D	6/05/2022	1200	20	6.9	560	560	<10	31	310	92	93	13	96	<0.5	<0.05	0.4	0.4	0.04	<10
PQ09D	29/09/2022	1110	92		509	509	<1	22	354	125	94	9	95	0.2	<0.01	<0.1	<0.1	0.03	<5
PQ09D	21/12/2022	1160	42	25.8	454	454	<1	22	379	132	105	18	111	0.3	0.15	0.6	0.8	<0.01	<5