

Dixon Quarry Group

Old Northern Road Quarry, Maroota

Annual Review

2024 - 2025

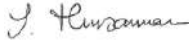
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Appendices

Appendix A – Dust Deposition Reports

Appendix B – PM10, TSP and Weather Station Reports

Appendix C – Groundwater and Surface Water Monitoring Data

Appendix D – Noise Monitoring Reports

Appendix E – Monthly Site Inspection

Appendix F – Waste Register

Appendix G – Bush Regeneration Report

Appendix H – Annual Biodiversity & Rehabilitation Management Report

Appendix I – S94 Contribution

Appendix J –CCC Meeting Minutes

Appendix K – Complaint Register

Abbreviations

796/00/HE	Development Consent 796/00/HE for the Old Northern Road quarry,
Annual Review	This document (also formerly known as 'Annual Environmental Management Report')
DA250-09-01	Development Consent DA250-09-01 for the Old Northern Road Quarry
DA165-7-2005	Development Consent DA165-7-2005 for the Haerses Road Quarry
Dixon Sand	Dixon Sand Pty Ltd
DRG	Division of Resources and Geoscience of the Department (now Resources Regulator, NSW Resources, Department of Primary Industries and Regional Development)
DPHI	Department of Planning, Housing and Infrastructure
DPIRD	Department of Primary Industries and Regional Development
EIS	Environmental Impact Statement
EPA	NSW Environment Protection Authority
EP&A Act	<i>NSW Environment Planning and Assessment Act 1979</i>
EPL3916	Environment Protection Licence 3916 for the Old Northern Road quarry
HRBOA	Biodiversity Offset Area, located at Haerses Road Quarry (for Old Northern Road DA250-09-01)
IEA	Independent Environmental Audit
MEDM	Maximum Extraction Depth Map
MTSGS	Maroota Tertiary Sands Groundwater Source
NVC	Native Vegetation Corridor, located at Old Northern Road Quarry
PIRMP	Pollution Incident Response Management Plan
PM10	Particulate matter <10µm
SCBGS	Sydney Central Basin Groundwater Source
TEOM	Tapered Element Oscillating Microbalance
TSP	Total suspended particulates
WAL	Water Access License

1. Statement of Compliance

Table 1: Statement of Compliance

All Conditions of the relevant approval(s) were complied with?		
Old Northern Road Quarry	DA250-09-01	No
	EPL3916	Yes
	WAL 24341	Yes

Table 2: Non-compliances

Relevant Approvals	Condition #	Condition description (summary)	Compliance Status	Section addressed in Annual Review
DA 250-09-01	Cond. 12 of Sch.5	Submission of Annual Review later than end of March 2024, however DPHI approved an alternative date.	Non-compliant	Table 36, Section 11.1
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-compliances	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

2.1 Project Background

Dixon Sand Pty Ltd (Dixon Sand) operates two sand quarries on the Old Northern Road (Lots 29 and 196 DP 752025 and Lots 1 and 2 DP 547255) and at Haerses Road (Lot 170 DP 664766, Lot 170 DP 664767, Lots A and B DP 407341, Lots 176 and 177 DP 752039 and Lot 216 DP 752039) in Maroota, New South Wales. The quarry sites are located approximately 40 kilometres north of Parramatta. The locations of the quarries are shown in Figure 1.

Extraction commenced on Lots 29 and 196, DP752025 at Old Northern Road Quarry in the early 1980s, with Dixon Sand undertaking extraction from 1992 to December 1998. The continued approval for extraction on Lots 29 and 196 was granted by the Land and Environment Court NSW on 7 July 2000 with subsequent multiple Modification applications being lodged. Current extraction operations occur on Lot 196, 1 and 2, with materials being processed at the central processing plant, stockpiled and sold to the market on Lot 196.

Extraction commenced at the Haerses Road quarry in 2006 with current extraction operations in Stages 1 and 2, and Cells 1A, 1B, 2A, 2B, 3A and 3B. Sand is being transferred to the Old Northern Road Quarry for processing, product blending and sales. Products are also permitted to be sold directly to the market from Haerses Road Quarry.

Environmental Monitoring locations for Old Northern Road Quarry are shown in Figure 2.

2.2 Scope of this document

The objective of this Annual Review is to report on the overall environmental performance, management of the operations and compliance of Old Northern Road Quarry with the consent conditions issued by the Secretary of NSW Department of Planning, Housing and Infrastructure (DPHI). The reporting period is from 01 July 2024 to 30 June 2025, based on the date of the original quarry development consent 796/00/HE. Reporting for the rehabilitation assessment and ecological monitoring extends outside the specified period due to seasonal timing requirement for the surveys.

Development consent DA250-09-01 (Modification 5) is applicable to this Annual Review.

The following consent conditions outline the requirement of the Annual Review:

Schedule 5 of Condition 12 of DA250-09-01 (Modification 5) states:

By the end of March each year, or other timing as may be agreed by the Secretary, the Applicant must submit a review to the Department reviewing the environmental performance of the development to the satisfaction of the Secretary. This review must:

- (a) describe the development (including any progressive rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year;*
- (b) include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year, which includes a comparison of these results against the:*
 - relevant statutory requirements, limits or performance measures/criteria;*
 - requirements of any plan or program required under this consent;*

- *monitoring results of previous years; and*
 - *relevant predictions in the documents listed in condition 2(a) of Schedule 2;*
- (c) *evaluate and report on:*
- *the effectiveness of the air quality and noise management systems; and*
 - *compliance with the performance measures, criteria and operating conditions in this consent.*
- (d) *identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to ensure compliance;*
- (e) *identify any trends in the monitoring data over the life of the development;*
- (f) *identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies;*
- (g) *describe what measures will be implemented over the current calendar year to improve the performance of the development.*

The Applicant must ensure that copies of the Annual Review are submitted to Council and are available to the Community Consultative Committee (see condition 8 of Schedule 5) and any interested person upon request.

Dixon Sand requested approval from the DPHI for the submission deadline of the Annual Review to be adjusted to reflect the financial year reporting. Approval was granted by the DPHI on 9 February 2018 to submit the Annual Review by the end of September each year.

This Annual Review will report on the environmental performance in relation to the requirements of DA250-09-01 (Modification 5), Environment Protection License (EPL) # 3916 (dated 12 September 2024) and Water Access License (WAL) 24341. The Annual Review has been prepared in accordance with *Post-approval requirements for State Significant mining developments – Annual Review Guideline* (DP&E, October 2015).

2.3 Old Northern Road Quarry Approvals

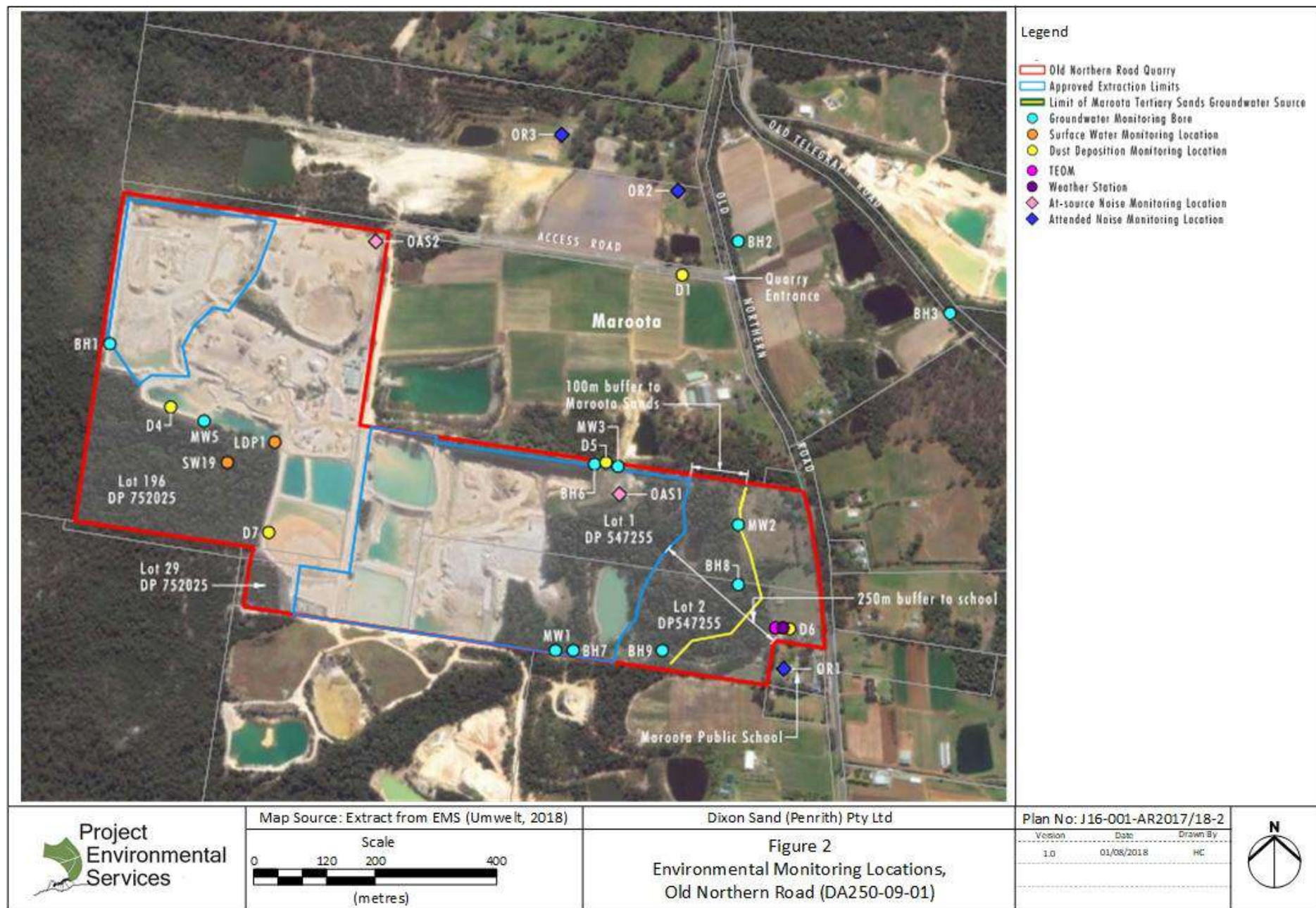
Development consents for the quarry on Lots 29 and 196 and extension into Lots 1 and 2 were issued by the Land and Environment Court on 7 July 2000 (796/00/HE) and 24 May 2004 (DA250-09-01), respectively. Consent No. 796/00/HE allowed for sand extraction, processing, and rehabilitation within Lots 29 and 196. This consent lapsed on 22 March 2010. Continued extraction on Lots 29 & 196 is permitted in DA250-09-01, which now forms a single integrated consent for all activities within Lots 1, 2, 29 and 196. Extraction of Lot 29 has concluded with the area currently being utilised for sediment basins and haul road, with native vegetation rehabilitation commencing in the dedicated Native Vegetation Corridor.

Continued use of the central processing plant on Lot 196, transport of product from the site, water management, and rehabilitation operations are approved under DA250-09-01.

Five modifications to DA250-09-01 have been lodged and approved. Modification 5 is current and was approved on 14 November 2018. A summary of the development consents and modifications is provided in Table 3.

Table 3: Summary of Old Northern Road Quarry Development Consents and Modifications

Development Consents	Status	Date of Determination	Comments
Old Northern Road Quarry			
796/00/HE	Approved and superseded by DA250-09-01	7 July 2000	Approval for sand extraction, processing and rehabilitation of Lots 29 and 196, Old Northern Road.
DA250-09-01	Approved and superseded by Modification 1	2 January 2003	Continual of sand extraction on Lot 29 and 196, and the extension of extraction operations into Lots 1 and 2.
DA250-09-01 Modification 1	Approved and superseded by Modification 2	14 February 2006	Haerses Road sand to be transported and processed at the main Processing Plant on Lot 196 at the Old Northern Road
DA250-09-01 Modification 2	Approved and superseded by Modification 3	20 August 2008	Increased truck movements from 120 to 180 per day
DA250-09-01 Modification 3	Approved and superseded by Modification 4	30 August 2012	Amended DA250-09-01 to include extraction on Lots 29 and 196 Permit the extraction of Lot 196 to a level not within 2 metres of the wet weather high groundwater table Surrender of DA796/00/HE issued by the Land and Environment Court
DA250-09-01 Modification 4	Approved and superseded by Modification 5	6 July 2015	Application to include additional extraction areas on Lots 1 and 2 for extraction
DA250-09-01 Modification 5	Approved and current	17 November 2017	Application to extend the life of the quarry to 24 May 2042. Revision and update of the consent conditions in line with modern development consent format



3. Operations Summary

3.1 Production and Vehicle Movements

All bulk sand truck movements from the Haerses Road site since commencement of extraction in November 2006 have delivered raw product to the Old Northern Road site for processing. Direct sale of products from Haerses Road Quarry commenced in 2015 under a separate development consent DA165-7-2005.

A total of **244,976.63** tonnes of sand and sandstone products have been produced and sold from the Old Northern Road Quarry during the 2024 - 2025 reporting period. A total of **188,675** tonnes of materials have been extracted from Haerses Road and transferred to Old Northern Road for processing and product blending.

Table 4 provides a summary of the annual production quantities, transfers and truck movements for Old Northern Road Quarry during the reporting period.

Table 4: Production Data, Transfers & Truck Movements at Old Northern Road Quarry.

Month	Total combined Production ONR from Lots 1, 2, 29 and 196 and HR (t)	Total Transfers from Haerses Rd to ONR (t)	Maximum Daily Truck Movements at ONR	Maximum No. Trucks 5:45 - 7:00 am at ONR
Jul 2024	23,540.26	17,615	170	32
Aug 2024	21,884.39	17,485	158	26
Sep 2024	24,706.73	17,274	178	26
Oct 2024	21,890.99	17,680	160	22
Nov 2024	28,144.79	19,511	176	28
Dec 2024	16,092.93	15,044	176	24
Jan 2025	16,745.14	17,160	178	38
Feb 2025	19,567.24	19,565	168	24
Mar 2025	23,721.46	17,420	178	22
Apr 2025	17,870.05	16,120	176	16
May 2025	14,639.35	12,285	144	18
Jun 2025	16,173.30	1,216	84	18
Totals / Maximum	244,976.63	188,375	178	38
Annual Limit	495,000	190,000		
Daily Max Criteria			180	40

3.2 Submission of Quarry Production Data to DRG

Condition 13 of Schedule 2 of DA 250-09-01 requires Dixon Sand to submit calendar year annual production data to the DRG (now Resources Regulator within NSW Resources, Department of Primary Industries and Regional Development, (DPIRD)) using the standard form and include a copy of this data in the Annual Review.

The DPIRD Minerals Return form require reporting of extractive materials for the financial year, and not for the calendar year as specified in the abovementioned consent condition.

The Minerals Return form for the financial year 2024 - 2025 was submitted to DPIRD on 1 August 2025.

4. Actions Required from Previous Annual Review

The proposed recommendations contained in the previous 2023 - 2024 Annual Review have been actioned by Dixon Sand and are summarised in Table 5.

Table 5: Summary of Recommendations and Actions

Recommendation from the 2023 - 2024 Annual Review	Actions
Air Quality Monitoring	
Undertake consultation with the EPA regarding the review (and revision if required) of the current air quality monitoring locations. The Air Quality Management Plan will be updated accordingly.	Actioned – ongoing consultation with EPA regarding the review of the current air quality monitoring locations. EPA issued a notice of variation for EPL 3916 which included a Pollution Study and Reduction Programs (EPL 3916, Condition U1 Air Quality Monitoring). Dixon Sand submitted the draft Air Quality Monitoring Plan to the EPA on 12 November 2024. The draft Air Quality Monitoring Plan is currently being reviewed by the EPA.
Vegetation Clearing and Extraction	
Vegetation clearing will be undertaken in accordance with the Pre-clearing procedures.	No vegetation clearing undertaken during this reporting period.
Rehabilitation and bush regeneration	
Old Northern Road Quarry Native Vegetation Corridor Rehabilitation Area	
Continue with routine weed control and monitoring of regenerating native species.	Actioned – ongoing routine weed management and monitoring undertaken in the NVC area
Supplementary planting on the southern boundary to prevent weed encroachment	Not actioned – a planting of a dense row of <i>Imperata cylindrica</i> is recommended along the southern fence line during the next reporting period.
Old Northern Road Quarry Lots 1 and 2	
Continue management of <i>Lantana camera</i> and review techniques recommended in the Ecological Monitoring Report (South East Environmental, 2024)	Actioned – ongoing management of <i>Lantana camera</i> and review of techniques
Continue management of other weeds including exotic grasses	Actioned – management of exotic grasses undertaken
Supplementary planting or similar treatment in identified areas as required.	Actioned - supplementary planting undertaken in targeted area
Old Northern Road Quarry other areas	
Continue with routine weed management along the southern boundary of Cons Hill (Lot 196) and carry out direct seeding or supplementary planting of remnant canopy species and competitive native grasses (such as	Actioned – ongoing weed management undertaken. Multiple campaigns of supplementary planting undertaken in this area.

Recommendation from the 2023 - 2024 Annual Review	Actions
<i>Imperata cylindrica</i>) to revegetate compacted areas, exposed areas and edge areas.	
Supplementary planting at Front Embankment with some remnant canopy and shrub species to occupy areas prone to the spread of invasive grasses.	Not actioned as priority given over other areas that require management – recommend a small planting with some remnant canopy and shrub species in exposed areas prone to the spread of invasive grasses during the next reporting period.
Haerses Road Biodiversity Offset Area (HRBOA)	
Continue with management of invasive grass and annual species along the North-western border of the HRBOA	Actioned - continued weed management at the designated location

5. Environmental Performance

5.1 Air Quality

5.1.1 Dust Sources and Mitigation Measures

The objectives, criteria limits, procedures, response, reporting and responsibilities of air quality management are contained in the Air Quality Management Plan.

The following potential sources of dust generated from Old Northern Road Quarry and mitigation measures have been identified in Table 6.

Table 6: Potential sources of dust and mitigation measures.

Potential Dust Sources	Mitigation Measures
- topsoil stripping. - ripping with a bulldozer; - extraction with an excavator and truck; - crushers and screens at the processing plant; - wind erosion from stockpiles; - loading sand products into trucks;	- minimising the area of disturbance by only clearing areas immediately prior to extraction; - progressive rehabilitation; - maintaining dust suppression equipment to all processing plant; - maintaining a manual sprinkler system including fine sprays on the conveyors of the dry processing plant, overhead sprinklers and a conical jet stockpile sprinkler; - stabilising topsoil stockpiles by planting with a cover crop of non-invasive cereal or legumes; - using a water cart to suppress dust on unsealed roads, during dry conditions on days of operation; - limiting vehicle speed to 20 km/hr on internal unsealed access tracks;

- | | |
|---|---|
| <ul style="list-style-type: none"> • vehicle movement and haulage on site; • product transportation along unsealed haul roads; and • occasional haul road grading. | <ul style="list-style-type: none"> • ensuring all loads leaving the site are covered; and • regularly maintaining mobile and fixed equipment to minimise exhaust emissions. |
|---|---|

5.1.2 Compliance Limits

Condition 8 of Schedule 3, DA250-09-01 requires Dixon Sand to operate a continuous air quality monitoring system to minimise the impacts at sensitive receivers such as the Maroota Public School. The following air quality criteria are to be complied with:

- dust deposition - 4g/m²/month (annual average) or 2g/m²/month increase;
- total suspended particulate matter (TSP) – 90µg/ m³ (annual mean); and
- particulate matter <10µm (PM10):
 - 50 µg/m³ (average for 24-hour period)
 - 30 µg/m³ (annual mean).

The NSW Environment Protection Authority (EPA) also requires the automatic alarm system of the Tapered Element Oscillating Microbalance (TEOM) continuous dust monitoring device to be set at a PM10 trigger value which triggers specific dust mitigation measure:

- 42 µg/m³ (average for rolling 24-hour period for wind directions between 270° and 315°) for the Old Northern Road Quarry

Table 7 lists the relevant PM10 and Total suspended particulates (TSP) criteria as required by the Development Consent and Environment Protection Licence.

Table 7: PM10 and TSP Criteria.

Source	Condition	Criteria / Trigger Value	Comments
Old Northern Road			
DA250-09-01	Sch. 3, Cond. 7	30 µg/m ³	Annual PM ₁₀ average – long term impact assessment
		50 µg/m ³	24-hour PM ₁₀ average – short term impact assessment
EPL3916	O3.3	37 µg/m ³	Trigger value for PM ₁₀ automatic alarm
EPL3916	M2.4	42 µg/m ³ with prevailing wind direction from 270° - 315°	Criteria for enacting management plan strategies to notify the EPA, reduce dust emissions immediately and cease operations specific extraction pits, in response to the triggers.
DA250-09-01	Sch. 3, Cond. 7	90 µg/m ³	Annual average criteria for TSP

5.1.3 Results

Climatic Data

Monthly climatic measurements were recorded by the weather station located adjacent to the Maroota Public School, in accordance with:

- Condition M4.1 of the EPL 3916,

These results are shown in Table 8.

Table 8: Monthly Total Rainfall and Averaged Temperatures.

Month	Jul 2024	Aug 2024	Sep 2024	Oct 2024	Nov 2024	Dec 2024	Jan 2025	Feb 2025	Mar 2025	Apr 2025	May 2025	Jun 2025
Ave Temp (°C)	11.1	14.7	16.0	16.9	19.9	23.2 *	22.1 *	22.1 *	21.4 *	18.3 *	14.8 *	11.3
Total Rainfall (mm)	42.2	19.2	51.2	59.4	48.0	19.6	129.8	33.8	107.2	77.6	215.8	5.4

Note* data from Richmond RAAF Weather Station

Data presented in Table 8 shows that the highest monthly rainfall of 215.8mm was recorded in May 2025 and the lowest monthly rainfall of 5.4mm was recorded in June 2025. The total annual rainfall recorded during this reporting period is 809.2mm which is drier in comparison to the previous reporting periods which recorded 872mm (2023 - 2024), 915.4mm (2022 – 2023), 1527mm (2021 - 2022) and 1090.4mm (2020 - 2021).

From the recorded monthly temperature data, December 2024 experienced the highest average temperature at 23.2°C whilst July 2024 experienced the lowest average temperature at 11.1°C.

Fluctuations in temperatures and rainfalls are generally influenced largely by the El-Nino and La-Nina climatic cycle. A reduction in total rainfall has been observed during this reporting period which was directly influenced by the conclusion of the La-Nina climatic event.

Dust Deposition

Five dust deposition gauges are located on the Old Northern Road Quarry. Table 9 lists the locations of the dust gauges.

Table 9: Site location of dust deposition gauges

Dust Gauge I.D.	Location Reference	Quarry Site
D01A	Quarry Access Road, near the Old Northern Road	Old Northern Road
D04	Rehabilitation Area	Old Northern Road
D05	Bundwall, Lot 1	Old Northern Road
D06	Maroota Public School	Old Northern Road
D07	Mulloc Heap	Old Northern Road

Dust deposition results were collected and analysed monthly by a NATA accredited laboratory. Table 10 presents the monthly dust deposition results between 26 June 2024 and 25 June 2025. Table 11 contains the calculated rolling annual averages for the dust deposition gauges.

The monthly laboratory results for dust deposition for this reporting period are presented in Appendix A.

Table 10: Dust Deposition Results: 26 June 2024 – 25 June 2025.

Dust Gauge Location	26/06/24	27/07/24	21/08/24	18/09/24	16/10/24	13/11/24	11/12/24	08/01/25	05/02/25	05/03/25	02/04/25	30/04/25	28/05/25
	24/07/24	21/08/24	18/09/24	16/10/24	13/11/24	11/12/24	08/01/25	05/02/25	05/03/25	02/04/25	30/04/25	28/05/25	25/06/25
DA1A Front Gate	2.2	3.4	1.2*	2.9*	1.6*	2.4*	7.8*	3.2*	5.2*	2.6*	1.6*	19.7*	2.1*
D4 Rehab	0.2	0.3	0.4*	0.5*	0.6*	0.7*	0.6*	1.6	1.3	0.3	0.3*	0.3	0.1
D5 Bundwall	4.3*	12.2*	3.4*	6.3*	1.3*	2.0*	2.6*	1.9*	2.2	1.2*	1.2*	1.1*	1.2
D6 School	4.3*	4.9*	0.8*	1.2	0.9*	3.1*	1.8*	2.9*	1.9*	2.6*	0.9*	0.6	1.0*
D7 Mulloc Heap	0.2	0.4	0.3	1.0	0.7*	1.3*	0.6	1.8	0.9*	0.6	0.4	2.4*	0.2

Note:

- x.x* Vegetation / algae present in dust gauge
- x.x* Insects / Spider web present in dust gauge
- x.x* Bird dropping present in dust gauge
- x.x* Ash present in dust gauge
- x.x* Sand present in dust gauge
- x.x* Dust present in dust gauge
- ** Bottle broken – no dust result

Table 11: Calculated Rolling Annual Averages of Dust Deposition: 26 June 2024 – 25 June 2025.

Dust Gauge Location	26/06/24	27/07/24	21/08/24	18/09/24	16/10/24	13/11/24	11/12/24	08/01/25	05/02/25	05/03/25	02/04/25	30/04/25	28/05/25
	24/07/24	21/08/24	18/09/24	16/10/24	13/11/24	11/12/24	08/01/25	05/02/25	05/03/25	02/04/25	30/04/25	28/05/25	25/06/25
DA1A Front Gate	3.0	3.0	2.9	3.0	2.9	3.0	2.5	2.6	2.8	2.9	2.9	4.3	4.3
D4 Rehab	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.6	0.6	0.5	0.6	0.6
D5 Bundwall	5.7	6.6	6.8	7.0	6.8	6.1	4.5	4.2	4.1	4.0	4.0	3.5	3.1
D6 School	2.4	2.7	2.7	2.8	2.7	2.7	2.6	2.7	2.6	2.4	2.2	2.0	2.1
D7 Mulloc Heap	0.8	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8

Charts 1 to 4 illustrate the annual average dust deposition results for the reporting periods of 2021 – 2022, 2022 – 2023, 2023 – 2024 and 2024 – 2025 respectively.

TEOM PM₁₀ and TSP

PM₁₀

In accordance with Condition 8 of Schedule 3, DA250-09-01, the concentration of particulates with an aerodynamic diameter less than ten microns (PM₁₀) is monitored via the continuous dust monitor (TEOM) near Maroota Public School. The TEOM records data for the whole 360° angles, of which the 270° - 315° quadrat (westerly to north-westerly) indicate potential dust contributions from the Old Northern Road Quarry. Chart 8 illustrates the PM₁₀ results for this reporting period, in comparison with relevant consent criteria. Charts 5 to 7 show the PM₁₀ results for the previous reporting periods of 2021 – 2022, 2022 – 2023 and 2023 – 2024 respectively.

The annual average PM₁₀ result for this reporting period is 14.8 µg/m³.

During the reporting period, the following PM₁₀ criteria has been complied with:

- Annual average PM₁₀ criteria of 30 µg/m³.

During the reporting period, the following PM₁₀ criteria have been exceeded:

- EPL 24-hour average PM₁₀ criteria of 42 µg/m³, and
- NEPM 24-hour maximum PM₁₀ criteria of 50 µg/m³

TSP

Charts 9 to 12 display TSP results during the 2021 – 2022, 2022 – 2023, 2023 – 2024 and 2024 – 2025 respectively.

No TSP exceedance occurred during this reporting period. The following TSP criteria has been complied with:

- Annual average TSP criteria of 90 µg/m³

The annual average TSP result for this reporting period is 37.0 µg/m³.

A copy of the full reports containing TEOM, TSP and meteorological data provided by CBased Environmental Pty Ltd are contained in Appendix B.

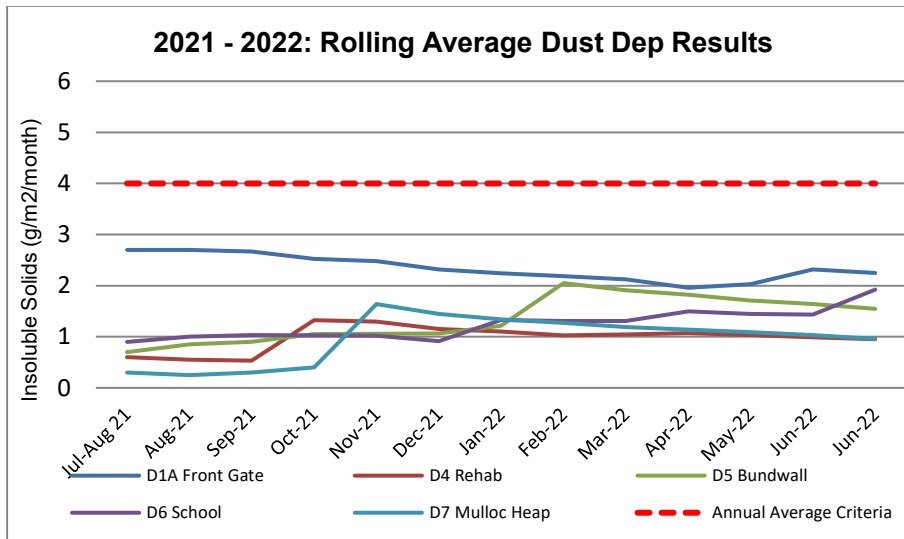


Chart 1: 2021 - 2022 Rolling Average of Dust Deposition Results

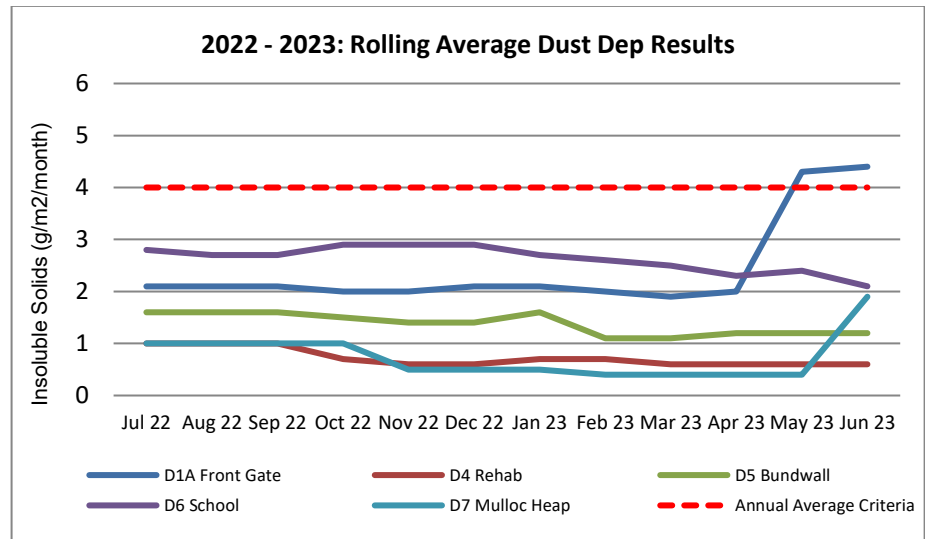


Chart 2: 2022 - 2023 Rolling Average of Dust Deposition Results

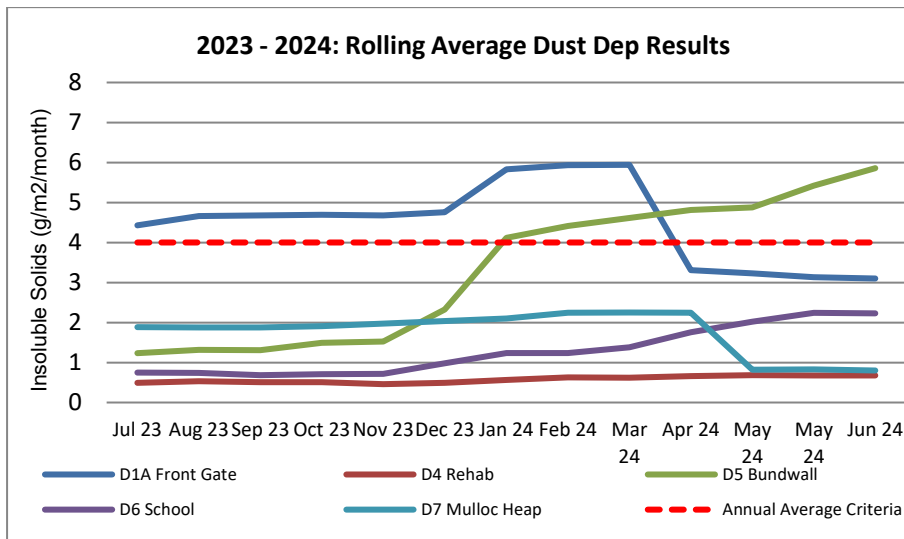


Chart 3: 2023 - 2024 Rolling Average of Dust Deposition Results

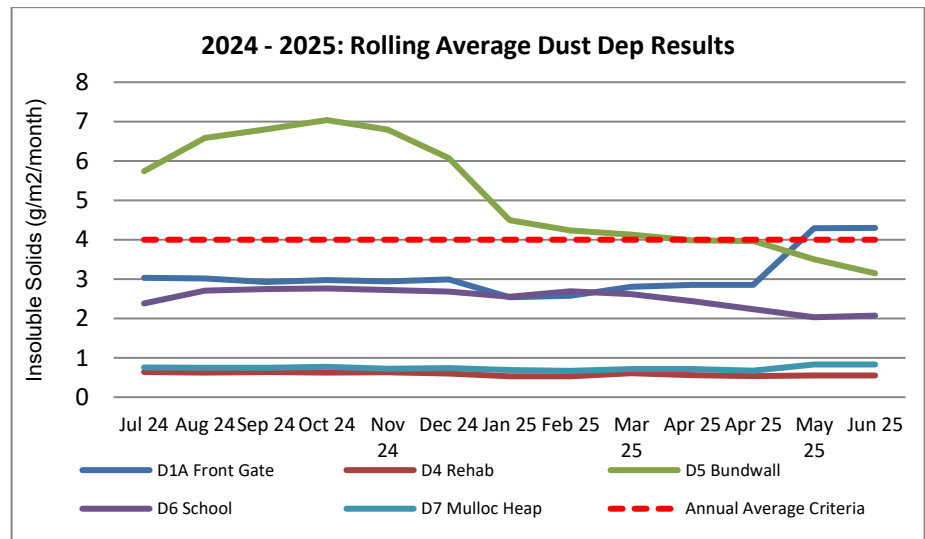


Chart 4: 2024 - 2025 Rolling Average of Dust Deposition Results

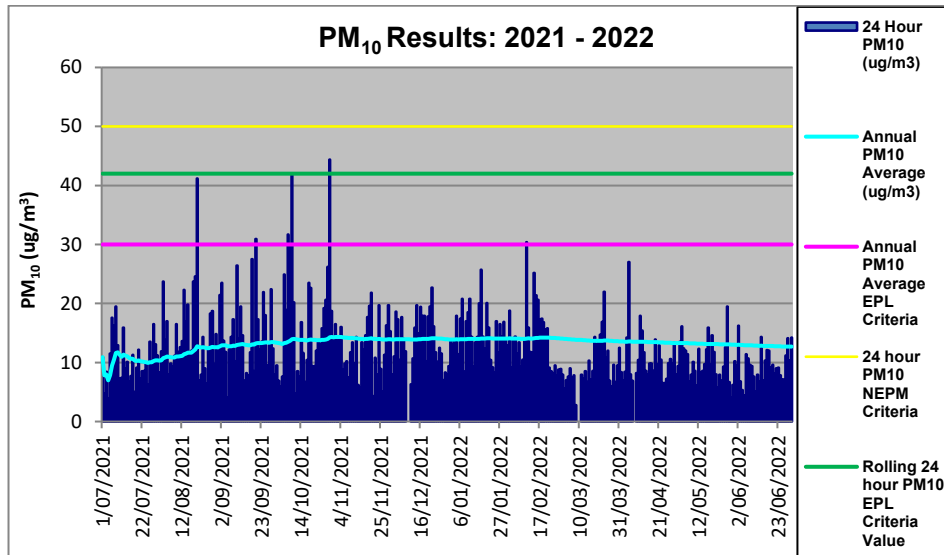


Chart 5: 2021 - 2022 PM10 Results and Criteria

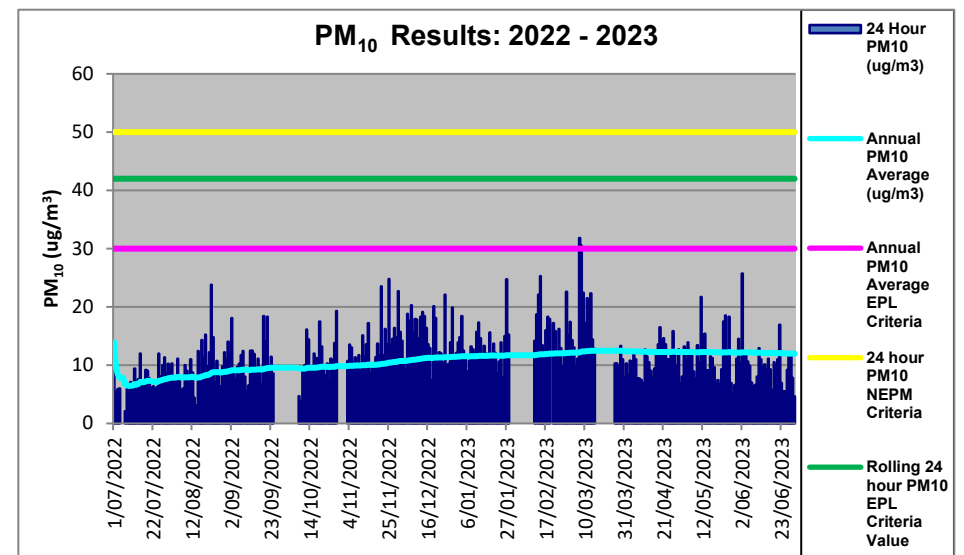


Chart 6: 2022 - 2023 PM10 Results and Criteria

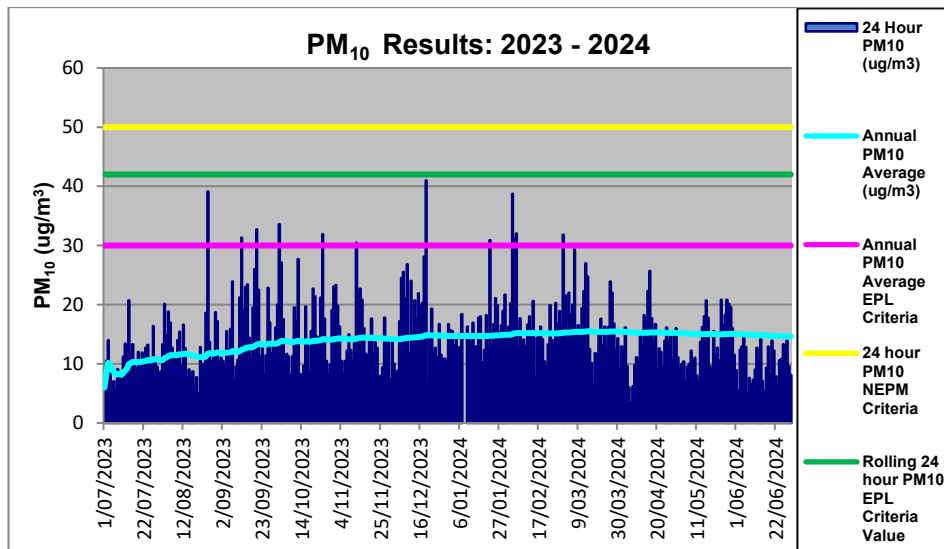


Chart 7: 2023 - 2024 PM10 Results and Criteria

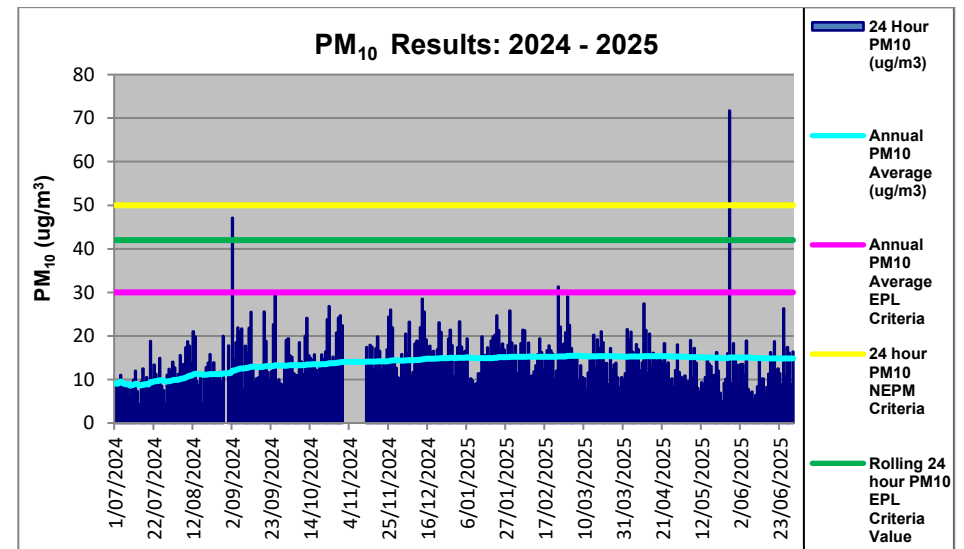


Chart 8: 2024 - 2025 PM10 Results and Criteria

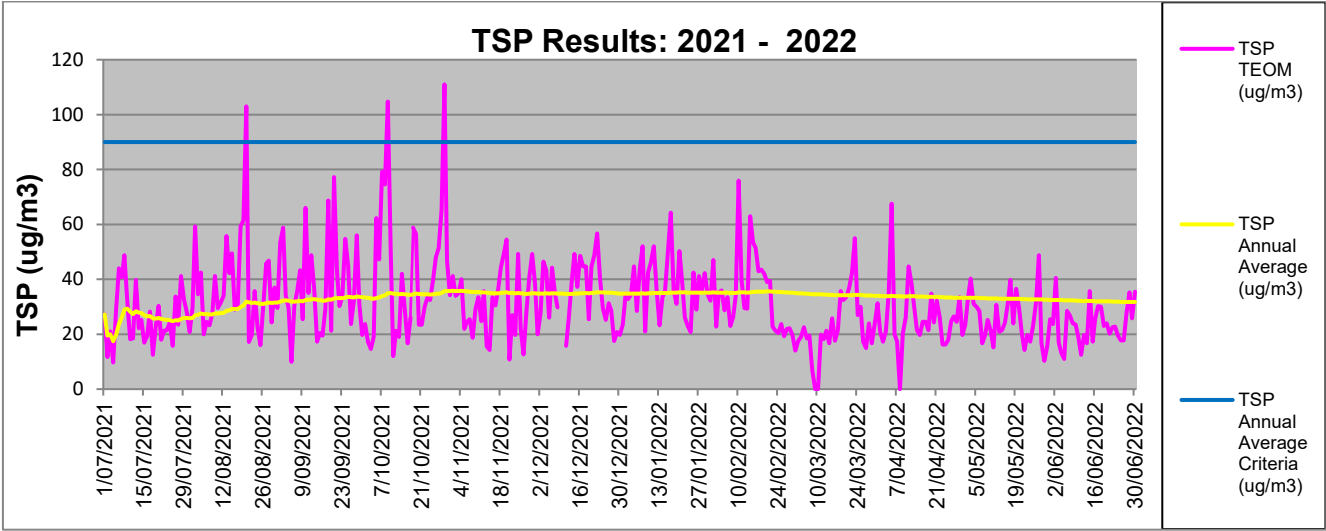


Chart 9: 2021 - 2022 TSP Results and Criteria

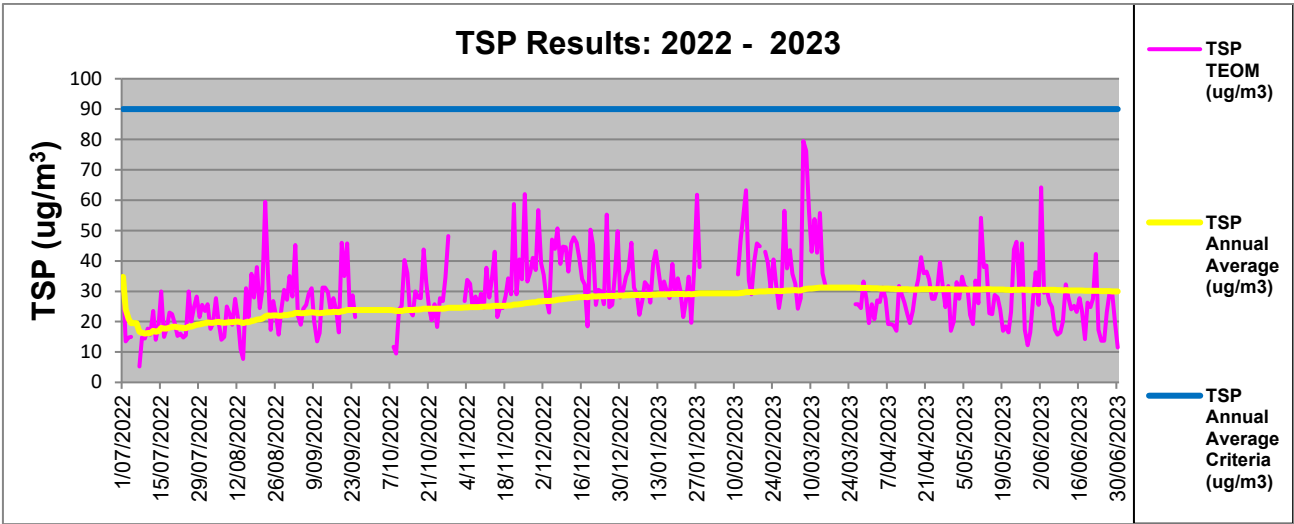


Chart 10: 2022 - 2023 TSP Results and Criteria

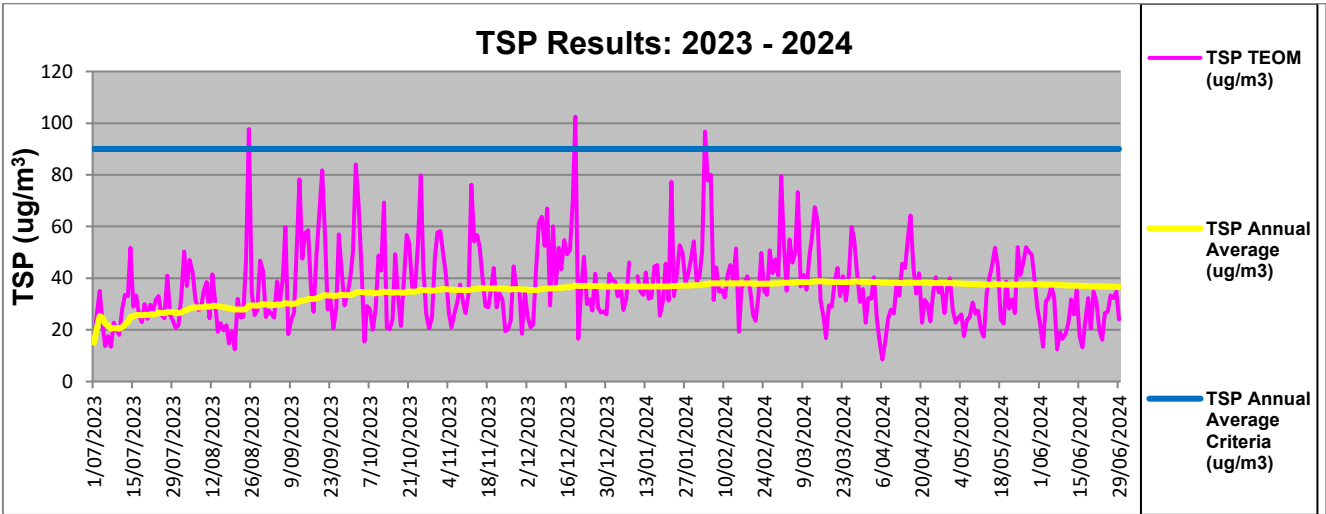


Chart 11: 2023 - 2024 TSP Results and Criteria

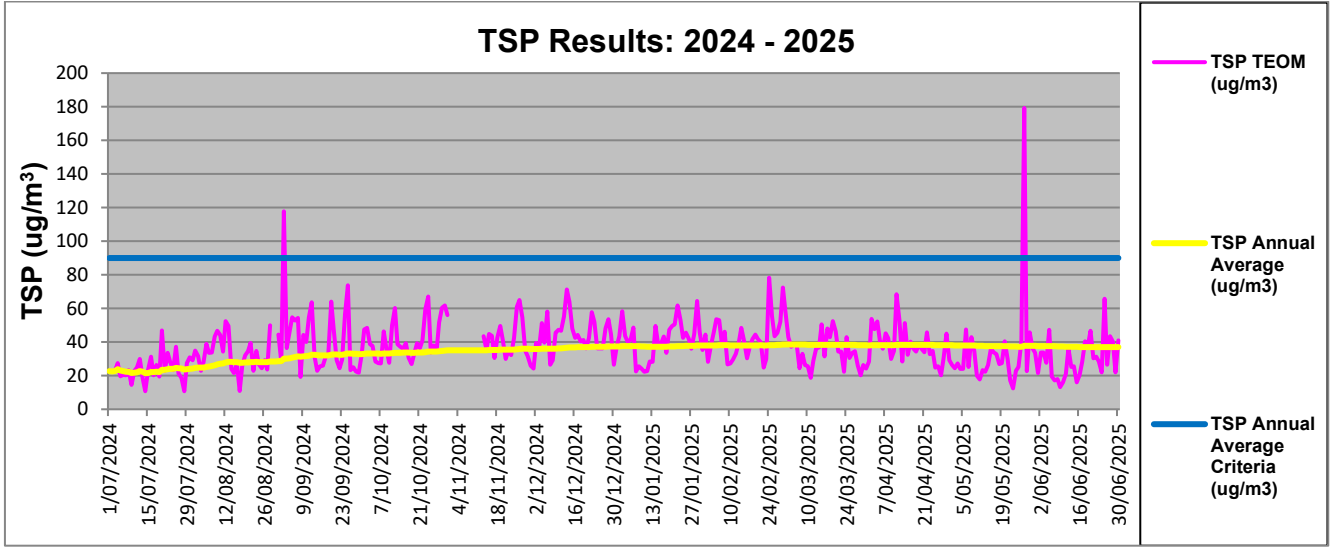


Chart 12: 2024 - 2025 TSP Results and Criteria

5.1.4 Analysis

Dust Deposition

Reporting Period 2024 - 2025

Five dust deposition gauges monitor potential dust impacts from the Old Northern Road quarry.

D1A – Front Gate

Monthly dust deposition results at D1A were exceeded over three monitoring periods.

Rolling annual exceedances at D1A were exceeded for the last two monitoring periods.

D4 – Rehab Area

All monthly and rolling annual average dust deposition results at D4 were in compliant during the reporting period.

D5 – Bund wall

Monthly dust deposition results at D5 were exceeded over two monitoring periods.

The rolling annual average dust deposition results were exceeded over nine monitoring periods.

D6 - School

The monthly dust deposition result at D6 was exceeded during two monitoring period.

All annual average dust deposition results at D6 were in compliant during the reporting period.

D7 – Mulloc Heap

All monthly and rolling annual average dust deposition results at D4 were in compliant during the reporting period.

The EIS prepared for the extension of the quarry on Old Northern Road Lots 1 and 2 (ERM, 2001) predicted dust deposition at the nearest receptors to be between 2.2 and 2.9g/m²/month. The majority of the monthly dust deposition results at Old Northern Road quarry for the reporting period were within the EIS predicted range of dust levels, with the exception of the following:

- D1A (Front Gate) returned five monthly results higher than the predicted range at 3.4 g/m²/month (27 July – 21 August 2024), 7.8 g/m²/month (11 December 2024 – 8 January 2025), 3.2 g/m²/month (8 January – 5 February 2025), 5.2 g/m²/month (5 February – 5 March 2025) and 19.7 g/m²/month (30 April – 28 May 2025). The elevated monthly dust deposition results were attributed to a combination adjacent farming activities and forecasted dust storm.
- D4 (Rehab) returned monthly dust levels below the predicted range for the entire reporting period.
- D5 (Bund Wall) returned four monthly results higher than the predicted range at 4.3 g/m²/month (26 June - 27 July 2024), 12.2 g/m²/month (27 July – 21 August 2024), 3.4 g/m²/month (21 August – 18 September 2024) and 6.3 g/m²/month (6.3 g/m²/month). The elevated monthly dust deposition results which were attributed mainly to adjacent farming activities.
- D6 (School) returned three elevated monthly results at 4.3 g/m²/month (26 June - 27 July 2024), 4.9 g/m²/month (27 July – 21 August 2024) and 3.1 g/m²/month (13 November – 11 December 2024). The elevated monthly dust deposition results were attributed to paddock slashing on private property and the preparation of the adjacent area for the annual Maroota Public School Muster event.
- D7 (Mulloc heap) returned monthly dust levels below the predicted range for the entire reporting period.

Historical Data

It can be seen from Charts 1 to 4 that the majority of the dust deposition results were compliant over the 2021 – 2022 and 2022 – 2023 reporting periods. However, during the current and previous 2023 - 2024 reporting period, the rolling annual dust deposition results at D1A and D5 exceeded the criteria.

Historically, the rolling annual averages for D04 (Rehab), D05 (Bundwall), D06 (School) and D07 (Mulloc Heap) have been consistently compliant over the last four reporting periods.

D01 (front gate) was relocated in September 2016 (renamed D01(A)). During the 2021-2022 and 2022-2023 reporting periods, all monthly and annual average results were generally in compliant, except the anomaly monthly reading of 33.6 g/m²/month in May 2023 which was attributed to adjacent farming activities resulting in vast area of exposed ground. This high monthly reading led to ongoing annual average dust deposition exceedances throughout the 2023 – 2024 reporting period which returned below the criteria from April 2024. The rolling annual average dust deposition at D1A rose above the criteria during the May 2025 monitoring month due to the forecasted dust storm moving across the Greater Sydney region.

During this reporting period, dust results at D4 (Rehab) and D7 (Mulloc Heap) were in compliant.

The rolling annual averages at D5 (Bundwall) were compliant during the 2021 – 2022, 2022 – 2023 and first half of the 2023 – 2024 reporting periods. The rolling annual average dust deposition at D5 exceeded the criteria from January 2024 through to March 2025 which were attributed to Bundwall maintenance works and the neighbouring farming activity occurring in the immediate area of the dust gauge.

PM₁₀**Reporting Period 2024 - 2025**

The EIS predicted a 6th highest PM₁₀ 24-hour average of 42 µg/m³ and a PM₁₀ annual average of 7 µg/m³ (maximum values for 7 discrete receptors modelled). The air quality statement of evidence presented in the Land and Environment Court of NSW for Lots 1 and 2 (ERM, 2003) predicted that the highest 24-hour PM₁₀ ground level concentration would be 37 µg/m³ at receptor 3. Consent DA250-09-01 and the Environment Protection Licence subsequently set a maximum rolling 24-hour average of 42 µg/m³ for the site.

The 24-hour average PM₁₀ levels (dark blue columns on Chart 8) remained below the 24-hour EPL management level of 42 µg/m³ (green line on Chart 8) and the 24-hour NEPM short term criteria level of 50 µg/m³ (yellow line on Chart 8) for the whole duration of this reporting period, except on one day. The 24-hour average PM₁₀ level of 47.1 µg/m³ exceeded the 24-hour EPL management level of 42 µg/m³ on 2 September 2024 due to the forecasted cold front with strong west to south-westerly winds moving over New South Wales. The 24-hour average PM₁₀ level of 71.7 µg/m³ exceeded both the 24-hour EPL management level of 42 µg/m³ and the 24-hour NEPM short term criteria level of 50 µg/m³ on 27 May 2025 due to the forecasted dust storm moving across the Greater Sydney region. These two exceedances are a result of extra-ordinary events as defined by Note d, Table 3, Condition 7, Schedule 3 of DA 250-09-01 which therefore do not constitute non-compliances.

Despite the elevated 24-hour average PM₁₀ recorded on two days, the rolling annual average PM₁₀ values (light blue line on Chart 8) remained below the EPA long term criteria of 30µg/m³ (pink line on Chart 8) for this reporting period.

Table 12: PM₁₀ – EPL and NEPM Management Criteria Exceedance

Event No.	Exceedance Date	24-hour average PM ₁₀	Exceeded criteria	Comment
1	02/09/2024	47.1 µg/m ³	24 hour average PM ₁₀ EPL limit of 42 µg/m ³	This exceedance is attributed to the forecasted cold front generating strong westerly to south-westerly winds across NSW on 2 September 2024. This is considered an extra-ordinary event therefore does not constitute a non-compliance.
2	27/05/2025	71.7 µg/m ³	NEPM 24 hour average PM ₁₀ criteria of 50 µg/m ³ and 24 hour average PM ₁₀ EPL limit of 42 µg/m	This exceedance is attributed to the forecasted dust storm which originated from South Australia moving across the Greater Sydney area on 27 May 2025. This is considered an extra-ordinary event therefore does not constitute a non-compliance.

Historical Data

It can be seen from Charts 5 to 8 that all the annual average PM10 results recorded at the TEOM comply with the annual average PM10 criteria of 30µg/m³ over the previous four years of annual review reporting.

A number of 24-hour average PM10 exceedances were recorded over the last four reporting periods with causes attributed to activities not related to quarry operations. Exceedance during the 2021-2022 period was associated with forecasted warm and windy conditions together with a local bushfire event occurring in Maroota. There were no 24-hour average PM10 exceedances during the 2022-2023 and 2023-2024 reporting periods. One 24-hour average PM10 NEPM criteria exceedance was recorded during this 2024-2025 reporting period which was due to forecasted extreme weather events, and therefore not considered a non-compliance.

The annual PM10 average for the 2024-2025 reporting period is 14.8 µg/m³, which is lower than the EPA criterion of 30µg/m³ but double of the predicted value of 7 µg/m³ in the EIS. This annual average is comparable to the recorded historical values of 14.6 µg/m³ (2023-2024), 12.0 µg/m³ (2022-2023), 12.7 µg/m³ (2021-2022), 13.7 µg/m³ (2020-2021) and much lower than the 21.3 µg/m³ (2019-2020). The cause of the previous higher annual average of recorded 21.3 µg/m³ (2019-2020) is attributed to higher frequency of extraordinary events such bushfire, hazard reduction burns and hot and gusty weather conditions.

Total Suspended Particles**Reporting Period 2024 - 2025**

The Total Suspended Particles (TSP) results are reported in Charts 9 to 12 inclusive. The annual average TSP for this reporting period is 37.0 µg/m³ which is lower than the annual average TSP criteria of 90 µg/m³ set out by the consent and EPL. Elevated TSP values were a reflection of high PM10 values.

Historical Data

Reporting of TSP commenced in December 2017. Historical annual average TSP values were 38.3 µg/m³ (2017-2018), 40.0 µg/m³ (2018-2019), 53.4 µg/m³ (2019-2020), 34.3 µg/m³ (2020-2021), 31.8 µg/m³ (2021-2022), 29.9 µg/m³ (2022-2023) and 36.6 (2023-2024). The higher annual average TSP value recorded in 2019-2020 were attributed to cumulative effects of poor air quality associated with bushfires in the local, and regional and inter-state areas.

5.1.5 Changes to Environmental Procedures

Dixon Sand is currently liaising with the EPA regarding the suitability of a number of dust deposition gauges in the air quality monitoring program.

EPA issued a notice of variation for EPL 3916 which included a Pollution Study and Reduction Programs (EPL 3916, Condition U1 Air Quality Monitoring) in September 2024. Dixon Sand submitted the draft Air Quality Monitoring Plan to the EPA in November 2024. The draft Air Quality Monitoring Plan is currently being reviewed by the EPA.

The outcome of the review will be implemented, and the Air Quality Management Plan revised accordingly.

5.2 Noise Management

5.2.1 Noise Sources and Mitigation Measures

The objectives, criteria limits, procedures, response, reporting and responsibilities of noise management are contained in the Noise Management Plan.

The following potential sources of noise and mitigation measures at the Old Northern Road have been identified in Table 13.

Table 13: Potential sources of Noise and mitigation measures.

Potential Noise Sources	Mitigation Measures
• Extraction by bulldozers and excavators; • Moving of materials and stockpiling by dump trucks and excavators; • Truck haulage including bogie trucks, truck and dogs; • Wet/dry processing of sand; and • Ancillary activities including maintenance undertaken in the workshop • Construction/ maintenance of bund walls • Water transfers using pumps	• Construction of noise bunds in strategic locations as stipulated in the EIS/EAs and consent conditions; • Compliance with approved hours of operation; • Regular maintenance of road surfaces, vehicles and equipment to reduce noise emissions; and • Enforcement of speed limits for trucks and limited use of exhaust brakes in residential and school areas. • Enforcement of a 20km/h speed limit on quarry access road and haul roads. • Switch off plant when not in use and use of automatic idle shutdown.

The Noise Management Plan for Old Northern Road quarry requires attended noise monitoring to be undertaken bi-annually.

5.2.2 Compliance Limits

Noise Criteria

The Old Northern Road noise criteria are listed in Table 14. The approved hours of operation are contained in Table 15. Noise monitoring for the quarry is based on these criteria.

Table 14: Old Northern Road Noise Criteria.

Consent Condition	Conditions												
DA250-09-01, Condition 3 of Schedule 3 and	The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 2 at any residence on privately-owned land or at the Maroota Public School. <i>Table 2: Noise criteria dB(A)</i> <table><tr><th>Receiver</th><th>Averaging Period</th><th>Shoulder (6.00 am to 7.00 am)</th><th>Day (7.00 am to 6.00 pm)</th></tr><tr><td>Any residence on privately owned land</td><td><i>L_{Aeq} (15 minute)</i></td><td>37</td><td>44</td></tr><tr><td>Any classroom at Maroota Public School</td><td><i>L_{Aeq} (1 hour)</i></td><td>-</td><td>45</td></tr></table>	Receiver	Averaging Period	Shoulder (6.00 am to 7.00 am)	Day (7.00 am to 6.00 pm)	Any residence on privately owned land	<i>L_{Aeq} (15 minute)</i>	37	44	Any classroom at Maroota Public School	<i>L_{Aeq} (1 hour)</i>	-	45
Receiver	Averaging Period	Shoulder (6.00 am to 7.00 am)	Day (7.00 am to 6.00 pm)										
Any residence on privately owned land	<i>L_{Aeq} (15 minute)</i>	37	44										
Any classroom at Maroota Public School	<i>L_{Aeq} (1 hour)</i>	-	45										

Consent Condition	Conditions
	Noise generated by the development is to be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy. Appendix 6 sets out the meteorological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria. However, the noise criteria in Table 2 do not apply if the Applicant has an agreement with the relevant landowner to exceed the noise criteria, and the Applicant has advised the Department in writing of the terms of this agreement. <i>Note: Should an agreement with a landowner be terminated for any reason, the Applicant must comply with the noise criteria in Table 2.</i>

Table 15: Old Northern Road Approved Hours of Operation.

Consent Condition	Condition												
DA250-09-01, Condition 1 of Schedule 3	The Applicant must comply with the operating hours set out in Table 1. <i>Table 1: Operating hours</i> <table> <tr> <th>Activity</th><th>Permissible Hours</th></tr> <tr> <td>Quarrying operations (excluding truck arrival, loading and dispatch)</td><td>7.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays</td></tr> <tr> <td>Truck arrival (unladen)</td><td>5.45 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays</td></tr> <tr> <td>Truck loading Truck dispatch Truck arrival (laden)</td><td>6.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays</td></tr> <tr> <td>Bund construction or rehabilitation works within 250 m of Maroota Public School</td><td>7.00 am to 6.00 pm Monday to Friday during school holiday periods unless otherwise approved in writing by the EPA</td></tr> <tr> <td>Maintenance</td><td>May be conducted at any time, provided that these activities are not audible at any privately-owned residence</td></tr> </table>	Activity	Permissible Hours	Quarrying operations (excluding truck arrival, loading and dispatch)	7.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays	Truck arrival (unladen)	5.45 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays	Truck loading Truck dispatch Truck arrival (laden)	6.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays	Bund construction or rehabilitation works within 250 m of Maroota Public School	7.00 am to 6.00 pm Monday to Friday during school holiday periods unless otherwise approved in writing by the EPA	Maintenance	May be conducted at any time, provided that these activities are not audible at any privately-owned residence
Activity	Permissible Hours												
Quarrying operations (excluding truck arrival, loading and dispatch)	7.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays												
Truck arrival (unladen)	5.45 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays												
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Maintenance	May be conducted at any time, provided that these activities are not audible at any privately-owned residence												
DA250-09-01, Condition 2 of Schedule 3	The following activities may be carried out outside the hours specified in condition 1 above: (a) delivery or dispatch of materials as requested by the NSW Police Force or other public authorities; and (b) emergency work to avoid the loss of lives, property or to prevent environmental harm. In such circumstances, the Applicant must notify the Secretary and affected residents prior to undertaking the activities, or as soon as is practical thereafter.												

5.2.3 Results

Attended noise monitoring were undertaken in December 2024 and June 2025. Attended noise monitoring was conducted at receivers (where permission to enter the property was granted) and at-source, in accordance with the requirements of the Noise Management Plan. In instances where ambient noise such as road traffic, birds, insects and tree breezes was found to be the dominant noise sources, noise levels were obtained at alternative locations closer to the quarry. Predicted noise levels are then extrapolated from the near-distance location to the sensitive receiver locations.

Quarry operations in December 2024 fell into three categories for main sources of noise during the monitoring period which were:

- sand processing and truck loading (main plant, front end loaders and trucks),
- extraction of bulk sandstone by triple saw (“log popping”), and
- stockpile management with articulated dump trucks.

Quarry operations in June 2025 fell into three categories for main sources of noise during the monitoring period which were:

- sand processing and truck loading (main plant, front end loaders and trucks),
- extraction of bulk sandstone by triple saw (log popping), and
- stockpile management with articulated dump trucks.

Results for predicted noise impacts for Old Northern Road quarry undertaken in December 2024 and June 2025 are contained in Tables 16 and 17 respectively.

The full noise monitoring reports for December 2024 and June 2025 are contained in Appendix D.

Table 16: Extrapolated noise levels for Old Northern Road Quarry, December 2024.

Receiver	Noise Criteria (dBA)		Extrapolated Day noise level (dBA)
	Shoulder	Day	
OR1	-	45	32
OR2	37	44	36
OR3			36
R2			33
R3			33
R4/R5			32

Table 17: Predicted Noise Impacts for Old Northern Road Quarry, June 2025.

Receiver	Noise Criteria (dBA)		Extrapolated noise level (dBA) Scenario A *	Extrapolated noise level (dBA) Scenario B *
	Shoulder	Day		
OR1	-	45	34	40
OR2	37	44	39	42
OR3			38	42
R2			34	36
R3			36	36
R4/R5			39	39

**Note: Scenarios A and B represent the active or dominant noise sources which varied throughout the attended noise monitoring period, depending on quarry activities across different locations on the quarry premise.*

5.2.4 Analysis

Old Northern Road - Attended Noise Monitoring – December 2024

Attended noise monitoring and modelling results indicate that the Quarry was compliant with the noise criteria for shoulder and daytime operations at all receivers under the meteorological conditions at the time.

Old Northern Road - Attended Noise Monitoring – June 2025

Results of attended monitoring and extrapolated noise levels demonstrate the following:

Results of attended monitoring and extrapolated noise levels demonstrate the observed operations during the day period were compliant with the noise limit at each receiver under the meteorological conditions at the time.

5.2.5 Noise Exceedance and Non-Compliance

No noise exceedance or non-compliance have been recorded during this monitoring period.

5.2.6 Discrepancies between Predicted and Actual Noise Impacts

Table 18 compares the predicted noise levels contained in the EIS (ERM, 2001) during non-adverse weather with quarry operations in Strip 2 and 3 on Lots 1 and 2. The extrapolated noise levels from December 2024 and June 2025 assessment at the receivers are also presented here for comparison.

Modelled noise impacts contained in the EIS (ERM, 2001) show that a maximum external level of LAeq 36 dB(A) has been calculated for the Maroota Public School (the school) and assuming that internal noise levels are 10 dB less than external noise levels (with windows opened), the predicted internal noise level is approximately 26 dB(A).

Extrapolated December 2024 and June 2025 noise monitoring results at the school (external) yielded noise levels of 32 dB(A), 34 dB(A) for Scenario 1 and 40 dB(A) for Scenario 2, respectively. Extrapolated noise monitoring results for residences on Old Northern Road yielded levels between 32 and 42 dB(A) for the biannual monitoring events with all Scenarios 1 and 2 taken into account.

There are minor discrepancies between the predicted and actual noise impacts experienced at the school and residences, with extrapolated noise levels in December 2024 and June 2025 being lower than the noise criteria in all cases, during shoulder and daytime periods.

Dixon Sand is currently operating and extracting materials in Strip 3 which is east of Strip 2 which was the location used to model predicted impacts in the EIS (ERM, 2001). The noise bund located at the 250m buffer to the school has been partially constructed. Despite the operation moving closer towards the school and Old Northern Road residences, the reduced quarry operation together with the attenuation from the noise bund have contributed to lowering the generated noise.

Table 18: Comparison of predicted and actual noise impacts, December 2024 and June 2025.

Receptor	EIS (ERM, 2001) Predicted Daytime Noise Levels LAeq (dB(A))	Daytime Noise Criteria LAeq (dB(A))	December 2024 Daytime Noise Levels	June 2025 Daytime Noise Levels (Scenario A)	June 2025 Daytime Noise Levels (Scenario B)	Compliance with Daytime Noise Criteria
R1	43	44	N/M	N/M	N/M	N/M
R2	40	44	33	34	36	Yes
R3	37	44	33	36	36	Yes
R4	35	44	32	39	39	Yes
R5	34	44	32	39	39	Yes
R6 (OR3)	N/A	44	36	38	42	Yes
OR2						
School Building 1 (OR1)	36 (external) ~26 (internal)	45	32	34	40	Yes
School Building 2	35 (external) ~25 (internal)					

Note: N/A – R6 residential building constructed after the EIS (ERM, 2001)

N/M – R1 noise levels not measured due to existing Noise Agreement between Accurso and Dixon Sand.

5.2.7 Noise Trend

As quarry operations progress eastwards on Lots 1 and 2 towards Maroota Public School and other identified private residences, noise levels are expected to increase as a result of reduced proximity between machinery and noise receivers.

Charts 13 to 18 illustrate the long-term trend in noise monitoring levels for Maroota Public School and residences on Old Northern Road. Noise monitoring was undertaken during the period 2003 to 2007 however data has been omitted from this trending analysis due to the monitoring locations differing from the locations identified in the current Noise Management Plan. Extrapolated noise levels under Scenario B (being higher than Scenario A) during the June 2025 monitoring have been adopted in the long-term trend.

It can be seen from Chart 13 that quarry noise level fluctuations occurred at Maroota Public School over the fifteen-year period, with a general increasing trend with daytime noise level peaking in December 2019 at LAeq15 45 dB(A) and June 2021 at LAeq15 46 dB(A). Since 2021, noise levels measured at the school have been compliant, remaining

below the noise criteria of 45 dB(A). Extrapolated noise monitoring results at the school in December 2024 and June 2025 are LAeq15 of 32 dB(A) and LAeq15 of 34 dB(A) (Scenario A) and LAeq15 of 40 dB(A) (Scenario B), respectively.

Chart 14 provides long-term data for receiver OR2 at 4624 Old Northern Road. Fluctuations in daytime and shoulder noise levels can be observed with reduced daytime noise levels were recorded between December 2011 to May 2014, possibly a consequence of reduced quarry activities on Lots 29 and 196. From December 2014 to June 2021, a general increasing daytime noise levels trend can be observed, with noise levels ranging from LAeq15min 34.1 to 45 dB(A).

Charts 16 and 17 display an increasing trend in quarry noise levels at receivers R2 and R3 from December 2018 to December 2020 (R2) and December 2021 (R3), peaking at LAeq15 44 dB(A).

Chart 15 shows long term trend at receiver OR3 (R6) ranging between LAeq15 35 and 46 dB(A).

Chart 18 shows long term trend at receiver R4/5 with an increasing trend in noise levels from December 2018, peaking at LAeq15 45 dB(A) in June 2021.

Since 2021, there is a declining trend in noise impacts at the majority of the residence and Maroota Public school, with occasional higher results recorded which are compliant.

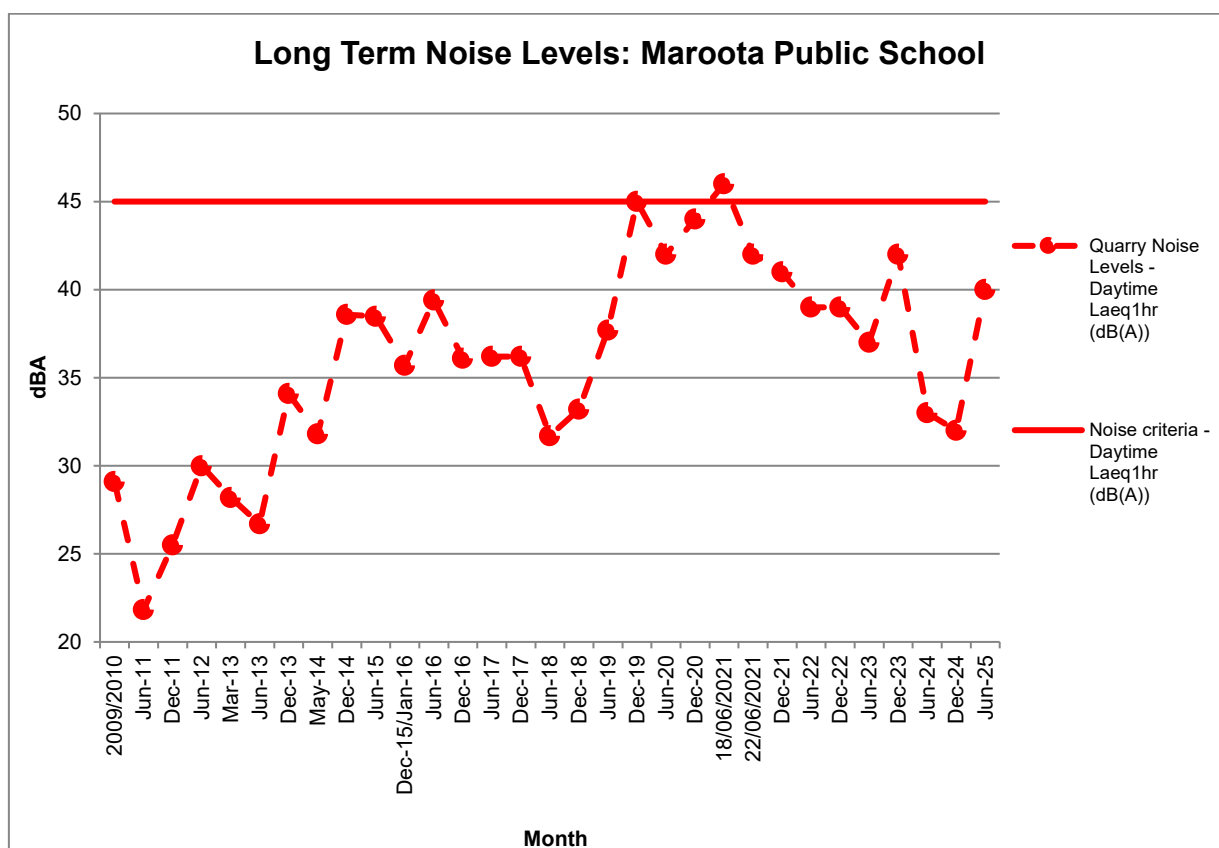


Chart 13: Long term noise trend – Maroota Public School

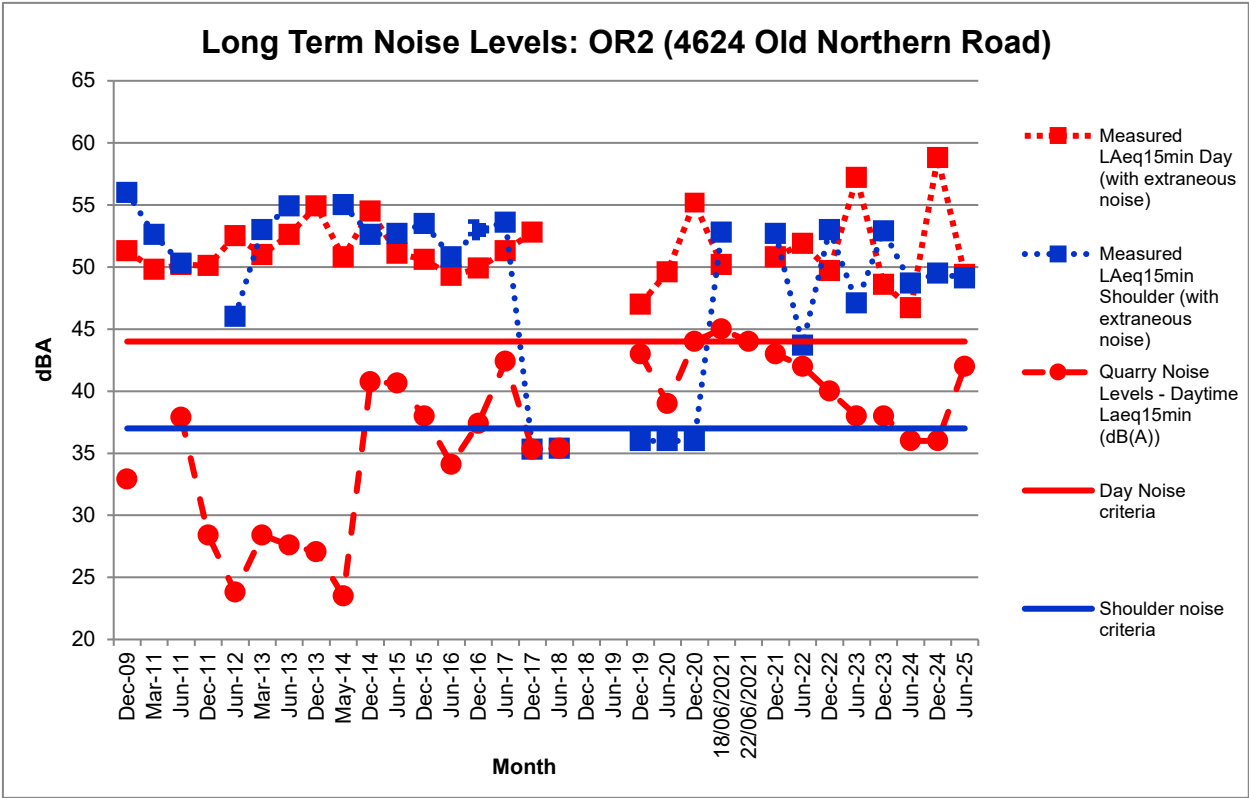


Chart 14: Long term noise trend – OR2 (No. 4624 Old Northern Road)

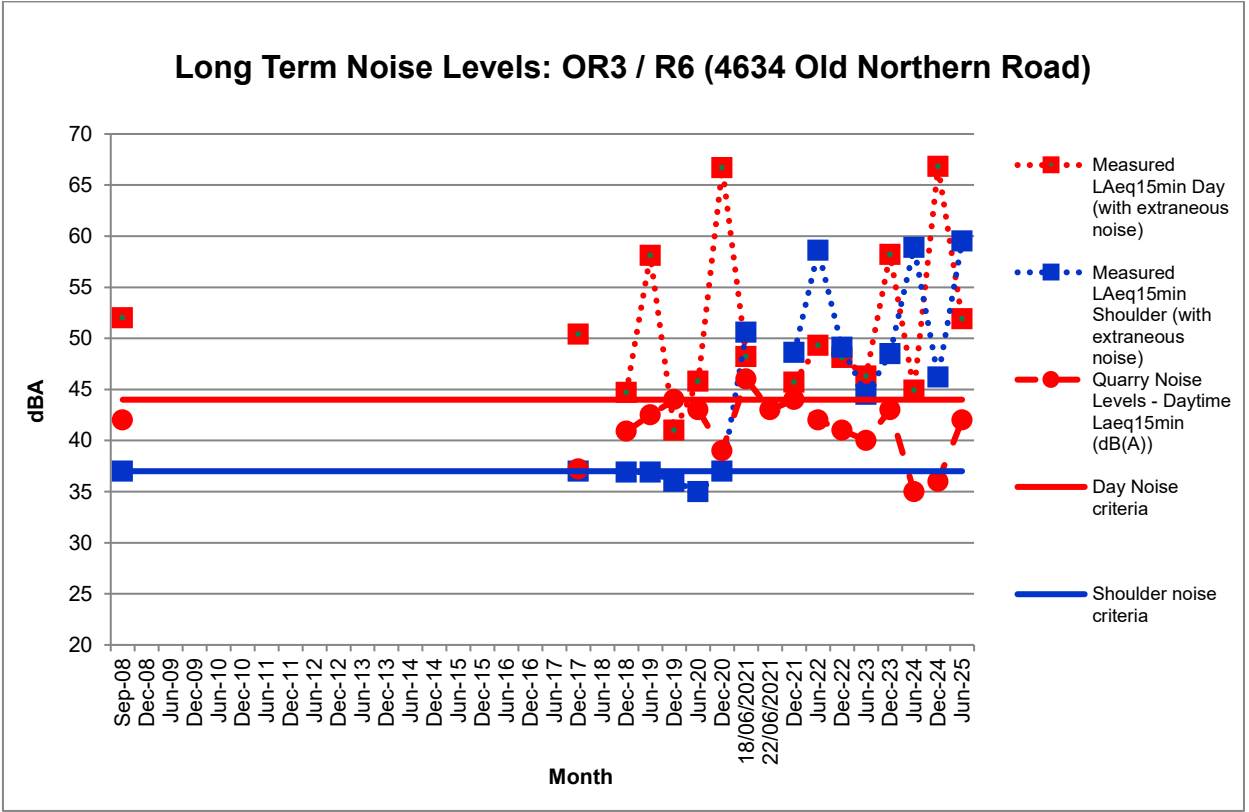


Chart 15: Long term noise trend – OR3/R6 (No. 4634 Old Northern Road)

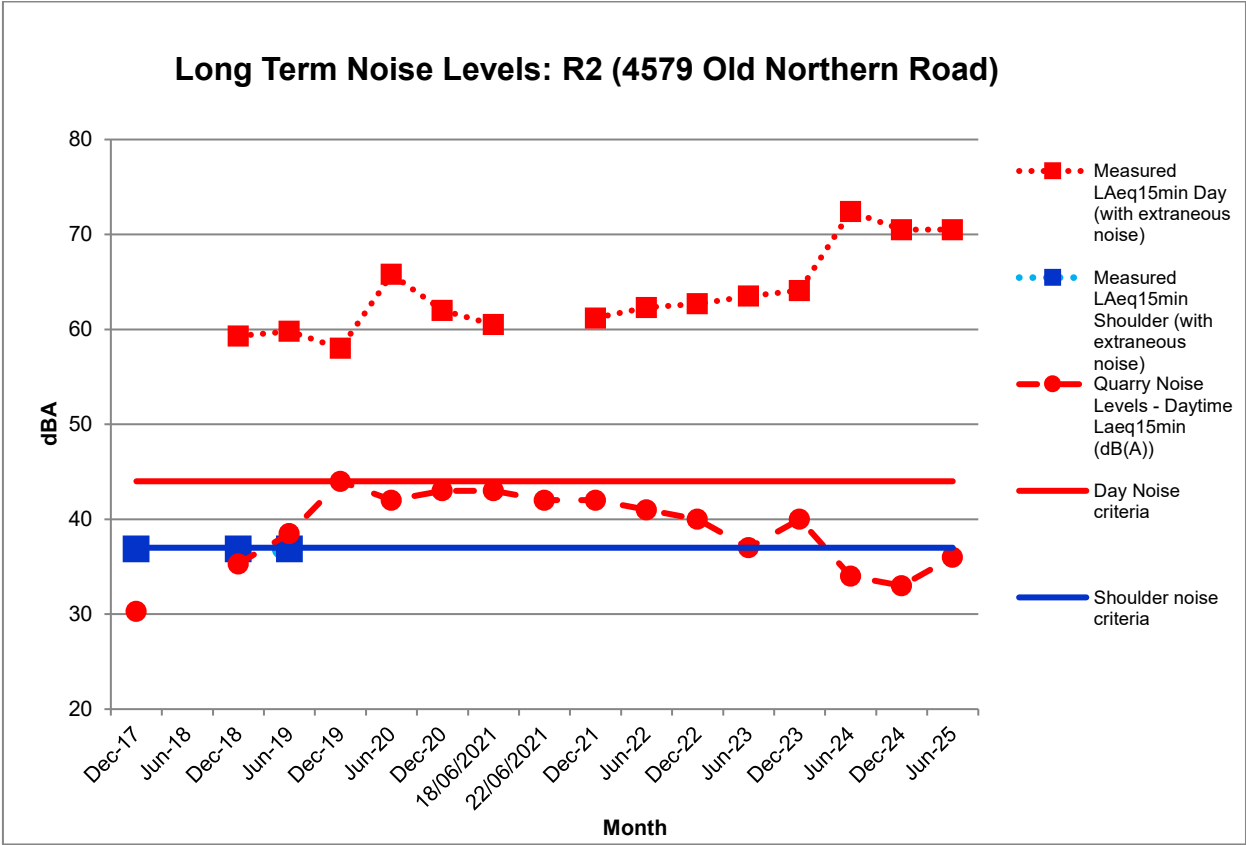


Chart 16: Long term noise trend – R2 (No. 4579 Old Northern Road)

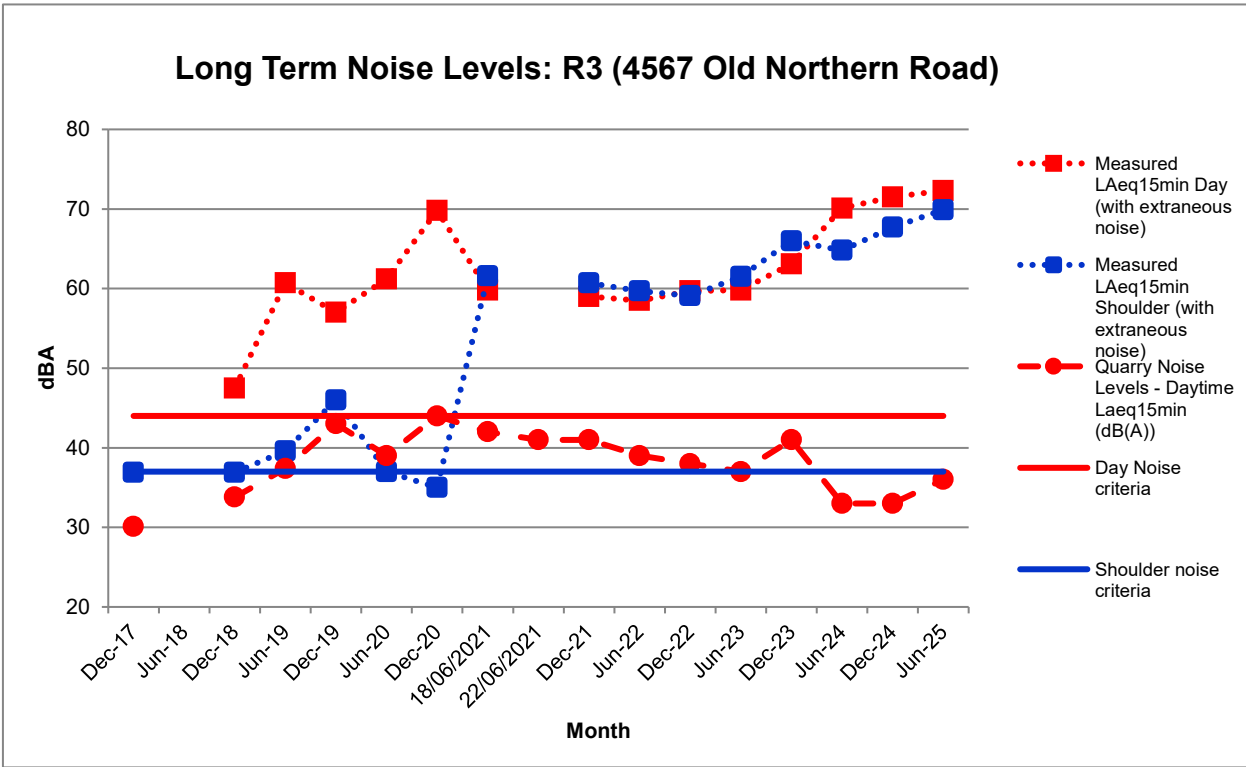


Chart 17: Long term noise trend – R3 (No. 4567 Old Northern Road)

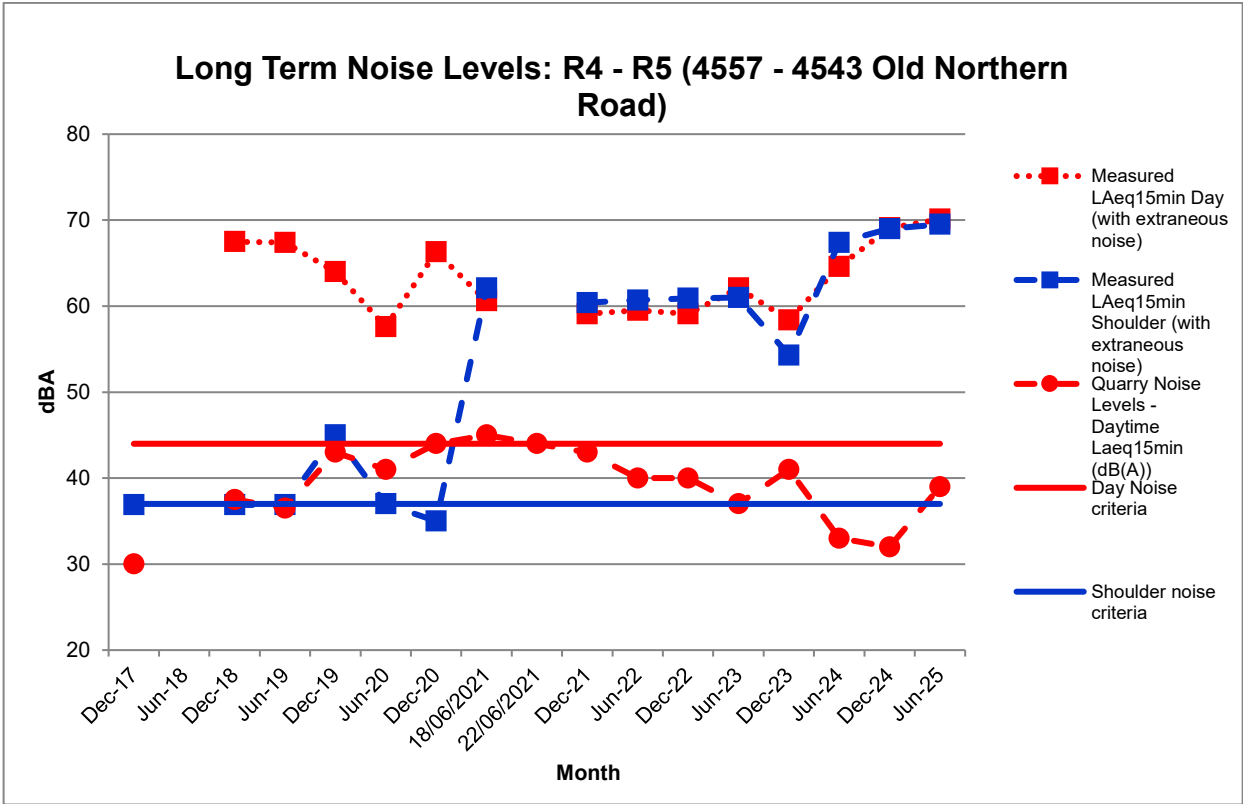


Chart 18: Long term noise trend – R4/R5 (No. 4634 Old Northern Road)

5.2.8 Changes to Environmental Procedures

There are no proposed changes to the noise procedures as a result of noise compliance during this reporting period.

Dixon Sand is required to construct a noise bund within the 250m buffer to the Maroota Public School prior to commencing extraction in Strip 4 on Lots 1 and 2. Any construction or maintenance of noise bund walls are to be carried out in accordance with the strategies outlined in the Old Northern Road Noise Management Plan. The construction of the 250m school buffer noise bund commenced in the previous reporting period and construction was undertaken during school holidays. It is anticipated that the remaining section of the noise bund will be constructed and completed during the next reporting period.

Continue to undertake attended noise monitoring in accordance with the Noise Management Plan.

5.3 Traffic and Transport

5.3.1 Ongoing Management Measures

Vehicle Movements

Vehicle movement records have been sent to Council on a monthly basis and Section 94 Contribution payments made. There were no exceedances of permitted vehicle movements during the reporting period.

Monthly Inspections

Observations of road conditions and maintenance requirements are inclusive in the monthly site inspection checklists. An example of the monthly site inspection checklist is attached in Appendix E.

Community Liaison

Liaison between Dixon Sand and the representative of Maroota Public School is conducted on a regular basis during the Community Consultative Committee meetings which are held bi-annually. Details of the CCC meetings and community engagement and contributions are discussed further in Section 8.

5.3.2 Traffic Related Complaints

No traffic related complaint was received for Old Northern Road Quarry during the 2024 – 2025 reporting period.

Please note that Dixon Sand has no jurisdiction over haulage trucks outside the quarry premise as these are not contracted or owned by Dixon Sand. The enforcement of truck noise compliance rests with TfNSW and the EPA. Dixon Sand is restricted by its legal jurisdiction in prohibiting the use of the trucks’ safety features such as engine braking. Dixon Sand however is committed to assisting in the education campaign through induction, traffic management policies and inter-pit agreement.

A copy of the complaints register containing the complaints summary during the reporting period is attached in Appendix K.

Table 19: Traffic Complaints, recommended action(s) and outcome

Old Northern Road Quarry
Complaint Details
Dixon Sand did not receive any traffic related complaints during this reporting period.

5.3.3 Compliance

Assessment of compliance against the relevant conditions is summarised in Table 20.

Table 20: Road and Traffic Compliance.

DA250-09-01 (Mod 5)	Condition	Compliance	Comments															
Condition 5(b) of Schedule 2	continue to receive and process extractive material from Haerses Road Sand Quarry, and dispatch quarry products from the site, until 14 February 2046.	Yes	Material transported from Haerses Road to Old Northern Road during this reporting period.															
Condition 7 of Schedule 2	Truck movements at the site (i.e. one-way trip, either arrival or dispatch), including truck movements between the site and the Haerses Road Sand Quarry, must not exceed: (a) 180 per day; and (b) 40 between 5.45 am and 7.00 am.	Yes	Maximum recorded daily truck movements were 178 in and out bound . Maximum number of morning trucks was 38 in and out bound															
Condition 12 of Schedule 2	The Applicant must pay Council an annual financial contribution toward the maintenance of local roads used for haulage of quarry products. The contribution must be determined in accordance with The Hills Shire Council Contributions Plan No. 6 Extractive Industries, or any subsequent relevant contributions plan adopted by Council.	Yes	Refer to Appendix I for S.94 summary table															
Condition 1 of Schedule 3	The Applicant must comply with the operating hours set out in Table 1.	Yes	Refer to truck records															
Table 1: Operating hours <table><tr><th>Activity</th><th>Permissible Hours</th></tr><tr><td rowspan="2">Quarrying operations (excluding truck arrival, loading and dispatch)</td><td>7.00 am to 6.00 pm Monday to Saturday</td></tr><tr><td>At no time on Sundays or public holidays</td></tr><tr><td rowspan="2">Truck arrival (unladen)</td><td>5.45 am to 6.00 pm Monday to Saturday</td></tr><tr><td>At no time on Sundays or public holidays</td></tr><tr><td rowspan="2">Truck loading Truck dispatch Truck arrival (laden)</td><td>6.00 am to 6.00 pm Monday to Saturday</td></tr><tr><td>At no time on Sundays or public holidays</td></tr><tr><td>Bund construction or rehabilitation works within 250 m of Maroota Public School</td><td>7.00 am to 6.00 pm Monday to Friday during school holiday periods unless otherwise approved in writing by the EPA</td></tr><tr><td>Maintenance</td><td>May be conducted at any time, provided that these activities are not audible at any privately-owned residence</td></tr></table>				Activity	Permissible Hours	Quarrying operations (excluding truck arrival, loading and dispatch)	7.00 am to 6.00 pm Monday to Saturday	At no time on Sundays or public holidays	Truck arrival (unladen)	5.45 am to 6.00 pm Monday to Saturday	At no time on Sundays or public holidays	Truck loading Truck dispatch Truck arrival (laden)	6.00 am to 6.00 pm Monday to Saturday	At no time on Sundays or public holidays	Bund construction or rehabilitation works within 250 m of Maroota Public School	7.00 am to 6.00 pm Monday to Friday during school holiday periods unless otherwise approved in writing by the EPA	Maintenance	May be conducted at any time, provided that these activities are not audible at any privately-owned residence
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Maintenance	May be conducted at any time, provided that these activities are not audible at any privately-owned residence																	
Condition 2 of Schedule 3	The following activities may be carried out outside the hours specified in condition 1 above: (a) delivery or dispatch of materials as requested by the NSW Police Force or other public authorities; and (b) emergency work to avoid the loss of lives, property or to prevent environmental harm.	Yes	Condition not triggered															

DA250-09-01 (Mod 5)	Condition	Compliance	Comments
Condition 21 of Schedule 3	The Applicant must keep accurate records of all laden truck movements to and from the site (including time of arrival and dispatch) and publish a summary of records on its website every 6 months.	Yes	Refer to Summary Truck Record on Dixon Sand's website: https://dixonquarrygroup.com.au/environment-%26-epl
Condition 22 of Schedule 3	The Applicant must: (a) advise its drivers and its clients not to arrive at the site prior to 5:45 am on any day; (b) ensure that all laden trucks have their loads covered when arriving at or leaving the site; (c) ensure that all laden trucks are cleaned of material that may fall from vehicles, before leaving the site; and (d) use its best endeavours to ensure that appropriate signage is displayed on all trucks used to transport product from the development so they can be easily identified by road users.	Yes	Requirements outlined in the Traffic Management Plan
Condition 2 of Schedule 3	The Applicant must prepare a Traffic Management Plan for the development to the satisfaction of the Secretary. This plan must: (a) be prepared in consultation with the RMS and Council; (b) be submitted to the Secretary for approval within 3 months of the approval of Modification 5, unless otherwise agreed by the Secretary; (c) describe the processes in place to control the arrival and dispatch of trucks; (d) include a Drivers' Code of Conduct that details the safe and quiet driving practices that must be used by drivers travelling to and from the site, particularly in the vicinity of the Maroota Public School; (e) describe the measures to be put in place to ensure compliance with the Drivers' Code of Conduct; (f) include specific measures to minimise the impact of heavy vehicles, including restrictions on routes and times (particularly in relation to peak hours, holiday periods and times immediately before and after school hours, i.e. 8.30 am – 9.00 am and 3.00 pm – 3.30 pm); and (g) propose measures to minimise the transmission of dust and tracking of material onto the surface of the public road from vehicles leaving the quarry. The Applicant must implement the approved Traffic Management Plan as approved by the Secretary.	Yes	Refer to the Traffic Management Plan

5.3.4 Analysis

The production and truck movement data outlined above is evidence that Dixon Sand has operated in compliance with the consent conditions during the 2024 – 2025 reporting period. In addition, the Quarry did not receive any traffic related complaints during this reporting period.

5.3.5 Findings and Effectiveness of Traffic Management

Current traffic management and mitigation measures are being implemented through Old Northern Road Quarry Traffic Management Plan (TMP). The mitigation measures listed in Table 5.1 in the TMP are categorised into three main categories: (1) truck movement measures, (2) site operational control measures and (3) transport related consultation measures.

During the period of this Annual Review, the adopted mitigation measures have been effective in managing traffic on the quarry premise. Restrictions on number of truck movements to and from site during morning and daytime period have been complied with. All haulage truck operators have been inducted onto site and a record maintained.

During induction, the haulage truck operators were provided with a copy of the following documents:

- Site Traffic Management Plan - outlining specific requirements the responsibilities and requirements,
- Quarry Premise Map - showing traffic flow directions,
- Maroota Local Traffic Management Policy - outlining the inter-pit agreement between the three signatories of local quarries, and
- Site Induction Declaration – declaration to be made and signed by haulage truck operators confirming induction requirements.

The implemented mitigation measures and educational campaign increases awareness and emphasises the importance of traffic related compliance. This has proven to be effective as there is a decreasing trend in the number of traffic related complaints over the last five reporting years, as discussed in later Section 8.3.

5.3.6 Additional Management Controls

No additional management controls identified.

5.3.7 Changes to Environmental Procedures

No changes to the environmental procedures are proposed or deemed necessary for road and traffic management.

5.4 Waste Management

5.4.1 Waste Generation, Disposal and Recycling

Dixon Sand manages a number of waste streams at the Old Northern Road Quarry.

During the reporting period, waste oil and grease were removed from the quarry by a licensed contractor for processing and disposal. Scrap metals were transported by a licensed waste transporter and recycled at a licensed metal recycling facility.

Glass, paper, cardboard and plastic (general solid waste – non-putrescible) were recycled via Council's fortnightly scheduled bin collection service. Food waste and other general solid waste (putrescible) were disposed of and collected via Council's weekly scheduled bin collection. Other bulky waste associated with the workshop activities was disposed of in skip bins and transported offsite by a licensed waste transporter. Used printer ink cartridges and batteries were dropped off at the designated collection points at the Post Office or Officeworks. Coffee pods were returned to the manufacturer to be composted and package recycled.

Waste tyres were collected by a licensed tyre transporters and sent to a licensed facility for recycling

No building or putrescible wastes have been disposed of at the site.

The amount of waste transported off site from the Old Northern Road to be recycled, processed and disposed of during the monitoring period is contained in Table 21. The waste tracking register is contained in Appendix F.

Table 21: Old Northern Road – Total waste generated on site, July 2024 to June 2025.

Waste Type	Disposal / Recycling / Processing	Amount of Waste Generated
General Solid Waste - Putrescible	The Hills Shire Council Waste Contractor weekly bin collection (3 x 240L Red bin)	Approx. 37 m ³
General Solid Waste - Recyclables	The Hills Shire Council Waste Contractor fortnightly bin collection (2 x 240L Yellow bin)	Approx. 12 m ³
Scrap Metals	Recycled by Westland Metals	64.07 tonnes
Non-putrescible waste from workshop	Skip Bins provided and picked up by Asquith Mini Skips	38 m ³
Hydrocarbon waste	Collected and transported by Grease Eater	3,900 litres
Liquid Waste (waste oil)	Collected and transported by ABC Waste Oil Collection	6,500 litres
Waste Tyres	Picked up by Marathon Tyres and recycled at licensed facility	12.4 tonnes
Ink Cartridge	Drop off at Post Office or Officeworks collection point	<0.1 m ³
Batteries	Drop off at Post Office or Officeworks collection point	0.1 m ³
Coffee Pods	Returned to supplier for composting and package recycling	< 0.1 m ³
Sewerage waste	Treated by onsite envirocycle unit	As per specification

5.4.2 Waste Importation

DA 250-09-01 does not permit any importation of waste onto the quarry premise.

5.4.3 Changes to Environmental Procedures

No changes to the waste management procedure are proposed for the next 2024 - 2025 reporting period.

Continued efforts to minimise waste generation and maximise recycling and reuse of materials are to be undertaken such as labelling of bins for effective waste segregation, waste reduction posters and toolbox talks to raise awareness.

6. Water Management

6.1 Monitoring and Compliance Limits

DA250-09-01 Modification 4 required Dixon Sand to install and monitor 2 additional monitoring bores. Installation and commencement of monitoring of these two additional bores occurred in September 2015.

6.1.1 Groundwater Levels and Criteria / Trigger Levels

Groundwater levels for the Old Northern Road Quarry have been measured on a monthly basis. The groundwater monitoring system comprised initially of five boreholes in 2003. Five additional boreholes were installed and monitored monthly since June 2011. Borehole MW4 has been decommissioned as the area is now under extraction. Boreholes BH8 and BH9 have been installed on Lot 2 to satisfy Condition 3.25 of Schedule 2, DA250-09-01 (Modification 4). Borehole BH2 was damaged in December 2019 due to vehicle strike and therefore monitoring has been suspended until the monitoring well is rectified.

Borehole locations are listed in Table 22.

Table 22: Boreholes for groundwater monitoring at the Old Northern Road quarry.

Monitoring Bore	Location Reference	Aim of Monitoring
MW1	Quarry Lot 2, southern boundary	Localised perched aquifer
MW2	Quarry Lot 1, west of existing house	Localised perched aquifer
MW3	DS2, northern boundary of Quarry Lot 1	Localised perched aquifer
MW5	Quarry Lot 196, south of main dam	Localised perched aquifer
BH1	Western boundary of Quarry Lot 196	Sydney Basin Central Groundwater Source
BH2	Located in Lot 1, DP204159	Sydney Basin Central Groundwater Source
BH3	Located in Lot 1, DP204159	Sydney Basin Central Groundwater Source
BH6	Northern boundary of Quarry on Lot 1	Sydney Basin Central Groundwater Source
BH7	Southern boundary of Quarry on Lot 2	Sydney Basin Central Groundwater Source
BH8	Within the 100m buffer to MTSGS on Lot 2	Localised perched aquifer
BH9	Within the 100m buffer to MTSGS on Lot 2	Sydney Basin Central Groundwater Source

The baseline groundwater level statistics with the 20th and 80th percentile results are listed in Table 23.

Table 23: Baseline Groundwater Level Statistics and Trigger Values (2003 – 2020)

Monitoring Bore	Minimum	20 th Percentile	50 th Percentile	80 th Percentile	Maximum
MW1	173.1	176.0	177.5	178.3	180.0
MW2	191.2	194.3	199.0	200.3	202.1
MW3	173.6	175.1	177.4	178.4	180.3
MW5	158.4	162.1	162.6	162.9	164.0
BH1	106.1	106.2	106.2	107.1	107.5
BH2	162.1	165.0	165.0	166.7	167.9
BH3	158.1	160.5	161.0	161.7	162.1
BH6	161.7	164.1	164.7	165.5	166.2
BH7	157.0	160.0	160.4	161.2	162.1
BH8	189.2	189.5	189.8	189.9	190.3
BH9	157.8	161.3	163.0	163.8	164.4

6.1.2 Groundwater Quality and Criteria / Trigger Levels

The Soil and Water Management Plan require groundwater quality sampling to be undertaken on a 6-monthly basis. Groundwater quality sampling was undertaken in December 2024 and June 2025. Groundwater samples were obtained and sampled by a NATA qualified laboratory for analysis of electrical conductivity, total suspended solids and turbidity. Table 24 contains that baseline groundwater quality statistics and trigger values.

Table 24: Baseline Groundwater Quality Statistics and Trigger Values (2010 – 2020)

Monitoring Bore	pH			Electrical Conductivity (µS/c)		
	20th Percentile	50th Percentile	80th Percentile	20th Percentile	50th Percentile	80th Percentile
MW1	4.0	4.1	4.6	206	249	271
MW2	3.7	3.9	4.5	239	560	618
MW3	5.2	5.6	6.1	129	141	160
MW5	4.4	5.1	5.4	135	151	213
BH1	6.0	6.1	6.6	161	185	214
BH2	4.9	5.7	7.1	262	293	325
BH3	5.9	6.0	6.9	176	186	269
BH6	5.2	5.5	5.8	120	127	156
BH7	4.4	4.8	5.8	242	252	258
BH8	3.9	4.0	4.1	267	278	291
BH9	5.4	5.5	5.6	262	269	275

6.1.3 Surface Water Monitoring and Discharge Event

Condition M2.3 of EPL 3916 requires Dixon Sand to monitor (by sampling and obtaining results by analysis) the concentration of the pollutants utilising the specified methodology, units of measure and sampling frequency outlined in Table 25. Water discharged at the main storage dam weir must meet these criteria outlined in the EPL 3916. Water sampling at the EPA licensed discharge point is to be obtained and analysed against the criteria in Condition L2.4 of EPL 3916 prior to being discharged from the main water storage dam, as listed Table 26.

Table 25: EPL 3916 Surface water sampling requirement at LDP01.

Pollutant	Units of Measure	Frequency	Sampling Method
pH	pH	Daily during any discharge	Grab sample
Total Suspended Solids	Milligrams per litre	Daily during any discharge	Grab sample
Turbidity	Nephelometric turbidity units	Daily during any discharge	Grab sample

Table 26: EPL 3916 Surface water discharge criteria.

Pollutant	Units of Measure	100 th Percentile concentration limit
pH	pH	4.5 – 6.5
Total Suspended Solids	milligrams per litre	50

6.2 Extraction Limits

Old Northern Road Extraction Limits

Extraction limits for the Old Northern Road quarry are defined by DA250-09-01 and listed in Table 27 below.

Table 27: Old Northern Road Quarry Extraction limits

DA250-09-01 Conditions	Extraction limit
Condition 17 of Schedule 2	Extraction below a depth of 15.24 m below original ground level is restricted to Lot 196 DP 752025 within the hatched area shown in the figure in Appendix 2 and to a depth not greater than 127.5 m AHD.
Condition 18 of Schedule 2	Extraction on Lot 29 DP 752025 is limited to a depth not greater than 15.24 m below original ground level.
Condition 19 of Schedule 2	Extraction on Lots 1 and 2 DP 547255, with the exception of the MTSGS buffer zone, is limited to a depth not greater than 170 m AHD in the east, gradually reducing to 153 m AHD in the west, and as shown conceptually in the figure in Appendix 4.
Condition 20 of Schedule 2	The Applicant must ensure that no extraction occurs with 2 m of the highest recorded wet weather groundwater level within the MTSGS buffer zone.
Condition 21 of Schedule 2	The Applicant must: (a) establish the highest recorded wet weather groundwater level within the MTSGS buffer zone based on all available (and at least 12 months) site specific groundwater monitoring data; (b) engage a suitably qualified and experienced expert to establish the maximum depths to which extraction can be undertaken within the MTSGS buffer zone to comply with condition 20 above; and (c) submit a Maximum Extraction Depth Map (contour map or similar) for the development, which demonstrates compliance with conditions 17 to 20 above (inclusive), to the Secretary for approval within 3 months of the approval of Modification 5.
Condition 22 of Schedule 2	The Applicant must comply with the extraction depths specified in the Maximum Extraction Depth Map to the satisfaction of the Secretary.

Notwithstanding Condition 17 of Schedule 2 of DA250-09-01, Licence 627635 was granted by Department of Planning, Industry and Environment (Crown Lands) and commenced on 4th June 2021 permitting Dixon Sand to undertake extraction of the area hatched on Lot 196 (Appendix 2 of DA 250-09-01) beyond the depth of 15.24 m below original ground level.

6.3 Results

6.3.1 Groundwater Levels

Chart 19 depicts the long term recorded groundwater levels, with monitoring commencing in June 2003. Charts 20 to 30 (inclusive) illustrate the groundwater levels for all monitoring bores for this reporting period.

6.3.2 Groundwater Quality

Chart 31 displays the long-term pH results for all monitoring bores from June 2010 to June 2025. Charts 32 to 42 (inclusive) show the pH results and trigger values for each bore for this reporting period.

Chart 43 presents the long-term electrical conductivity results for all monitoring bores from June 2010 to June 2025. Charts 44 to 54 (inclusive) show the electrical conductivity results and trigger values for each bore for this reporting period.

6.3.3 Surface Water Monitoring

Charts 55 to 58 (inclusive) illustrate the pH, electrical conductivity, turbidity and total suspended solids of the water samples obtained from the surface monitoring location SW19.

6.3.4 Water Discharge Events

No scheduled water discharge at LDP01 occurred during this reporting period.

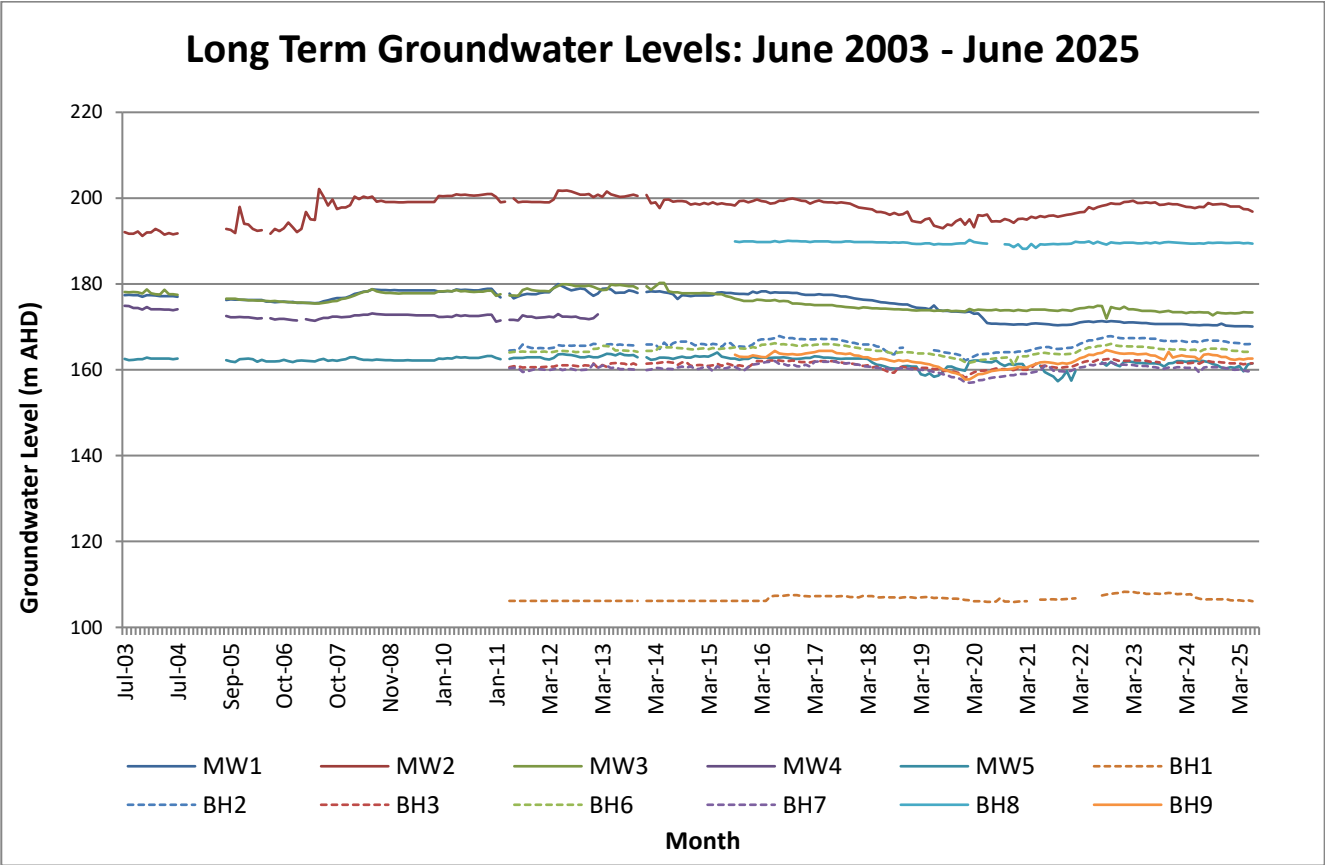


Chart 19: Long Term Groundwater Levels – all Boreholes.

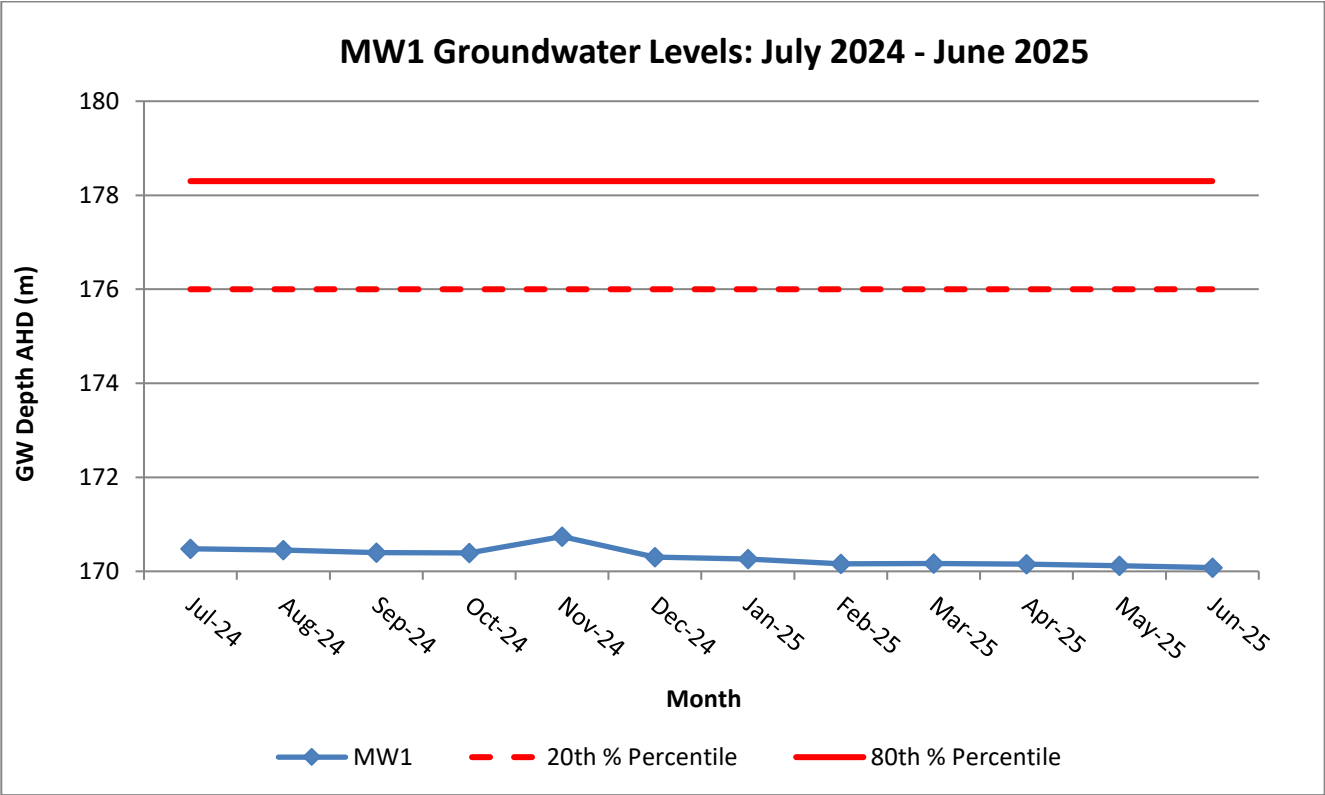


Chart 20: MW1 Groundwater Levels for July 2024 – June 2025.

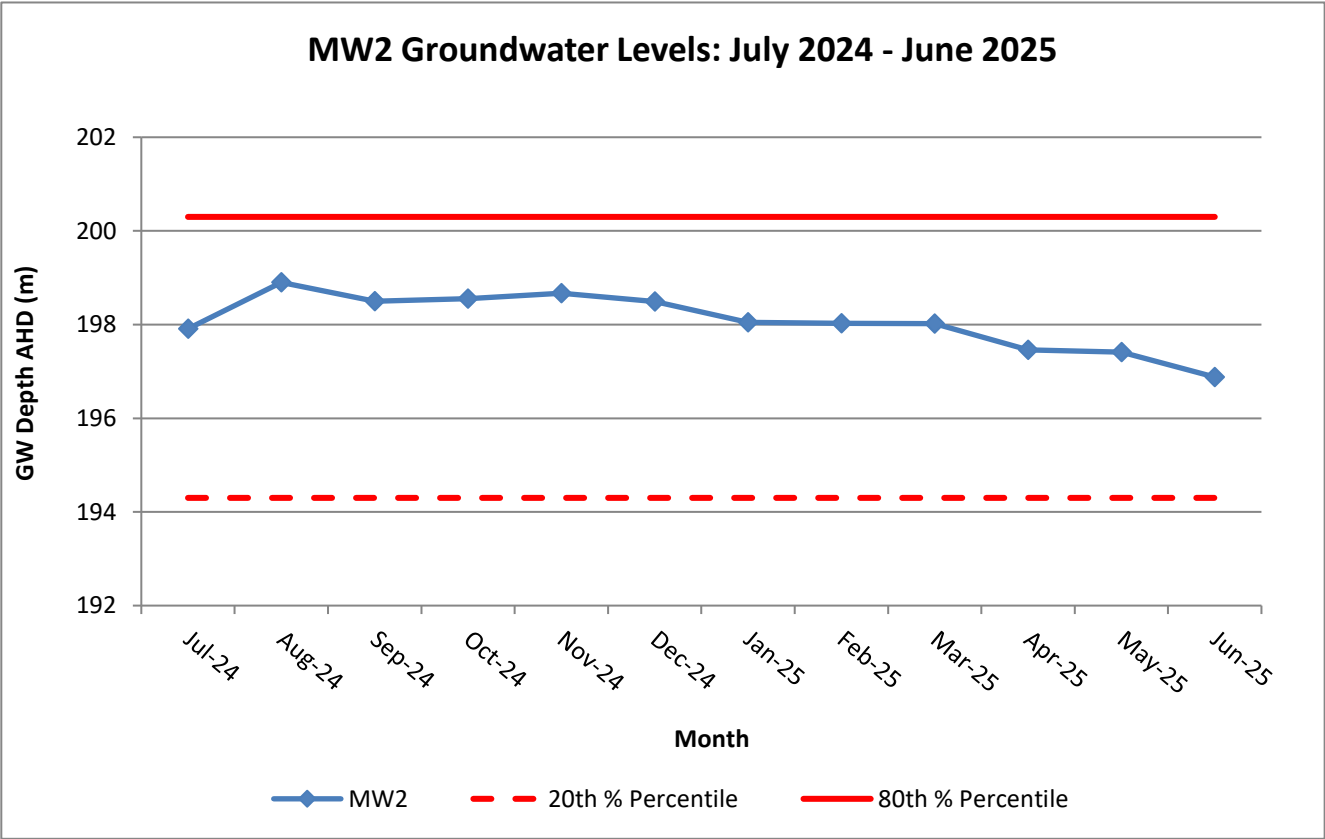


Chart 21: MW2 Groundwater Levels for July 2024 – June 2025.

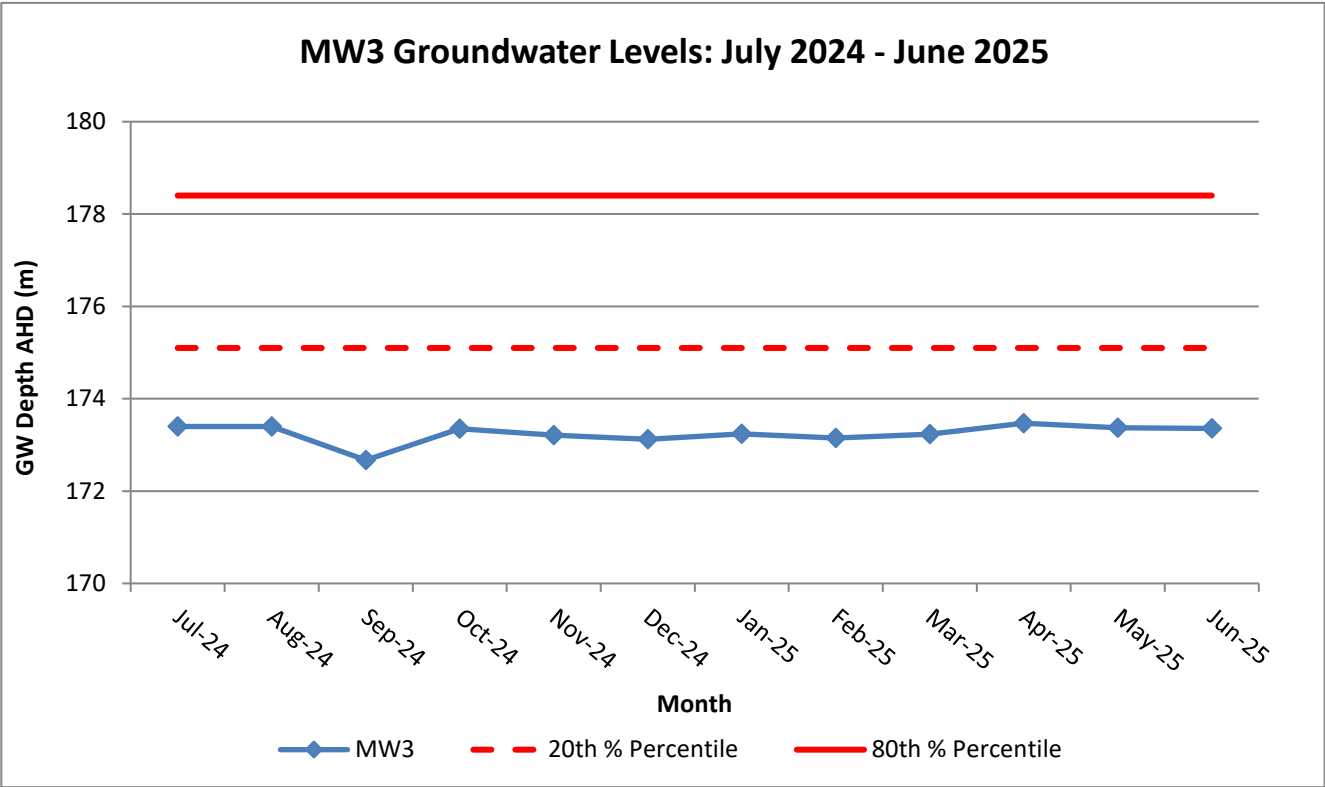


Chart 22: MW3 Groundwater Levels for July 2024 – June 2025.

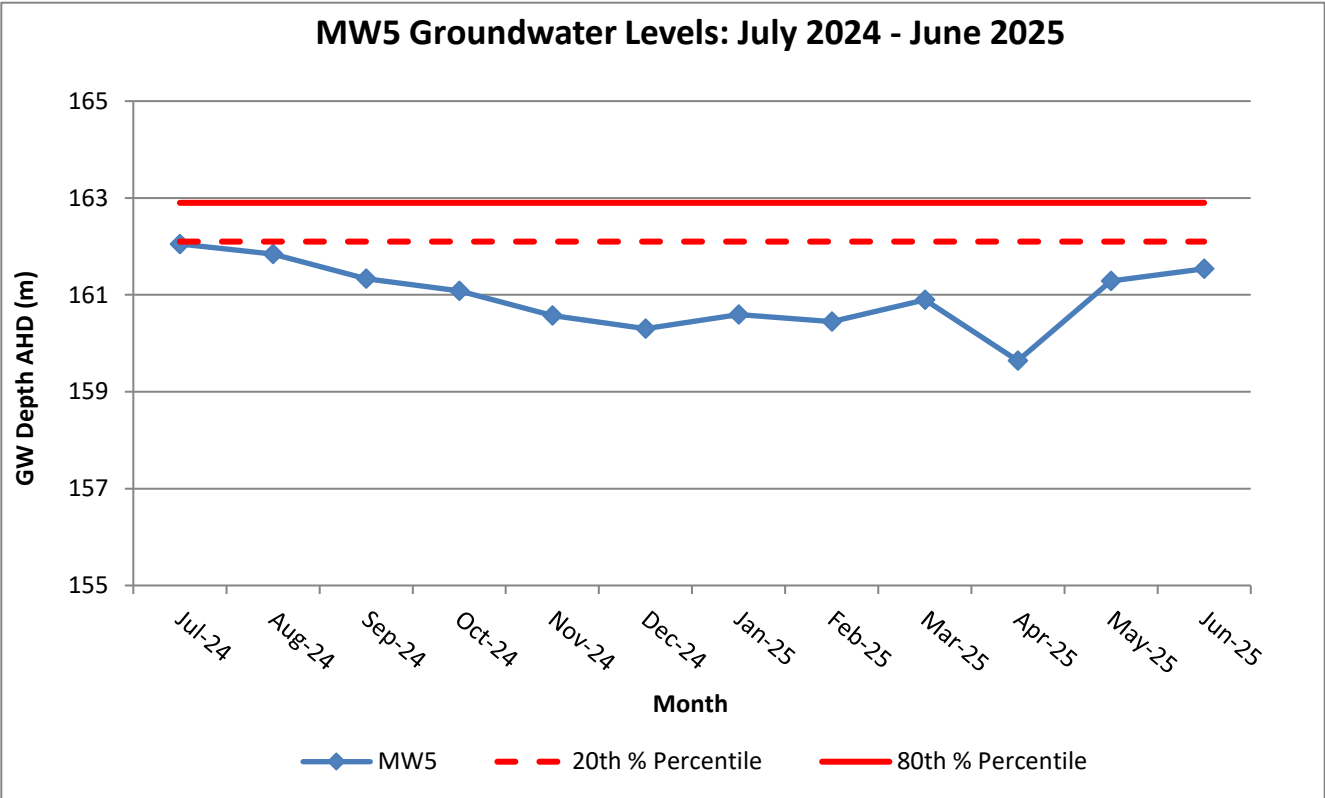


Chart 23: MW5 Groundwater Levels for July 2024 – June 2025.

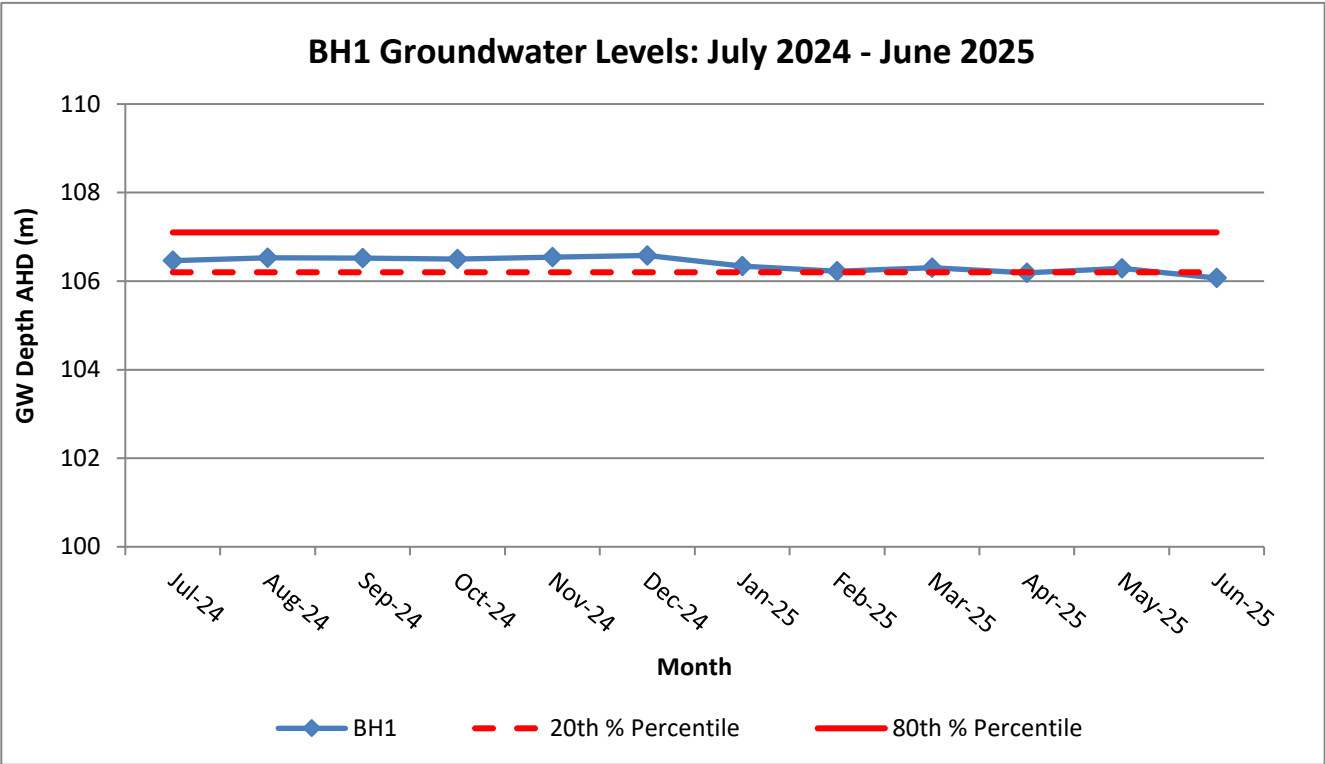


Chart 24: BH1 Groundwater Levels for July 2024 – June 2025.

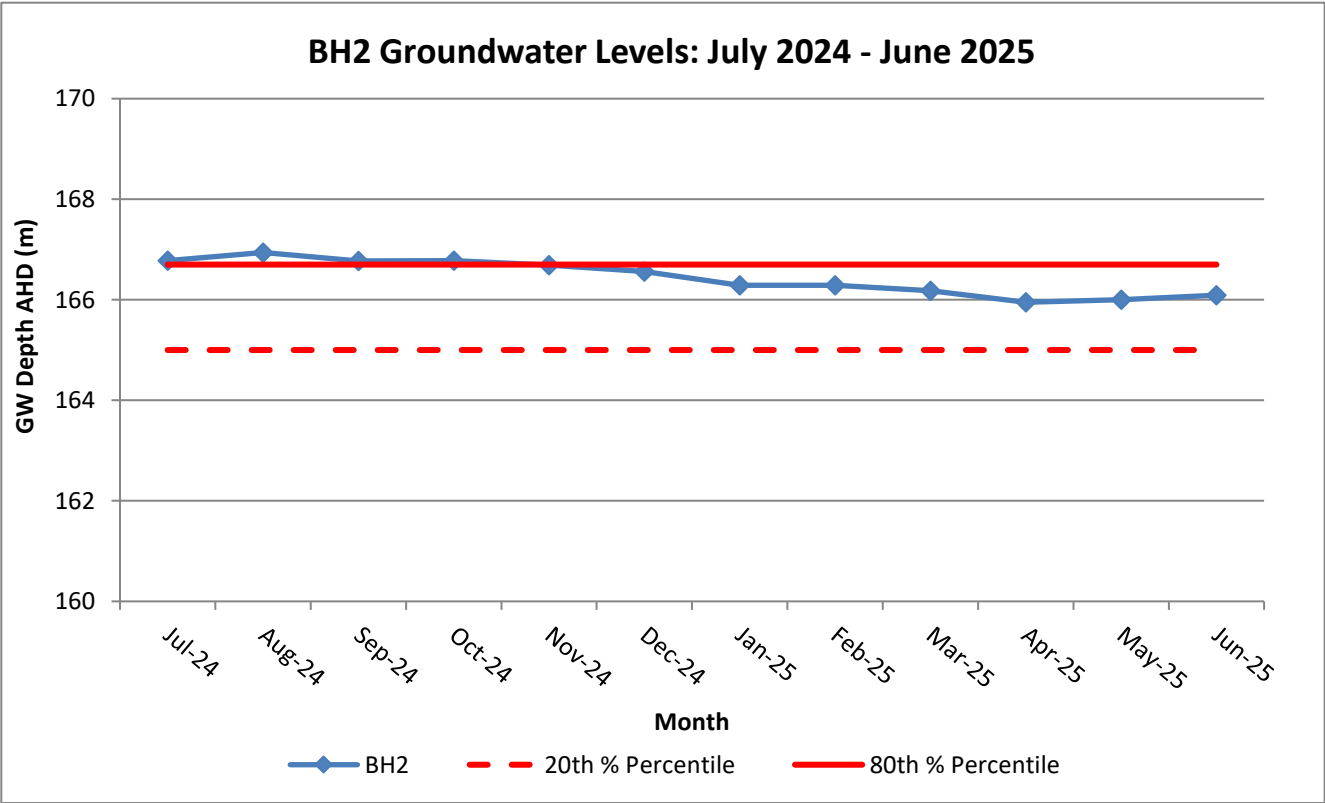


Chart 25: BH2 Groundwater Levels for July 2024 – June 2025.

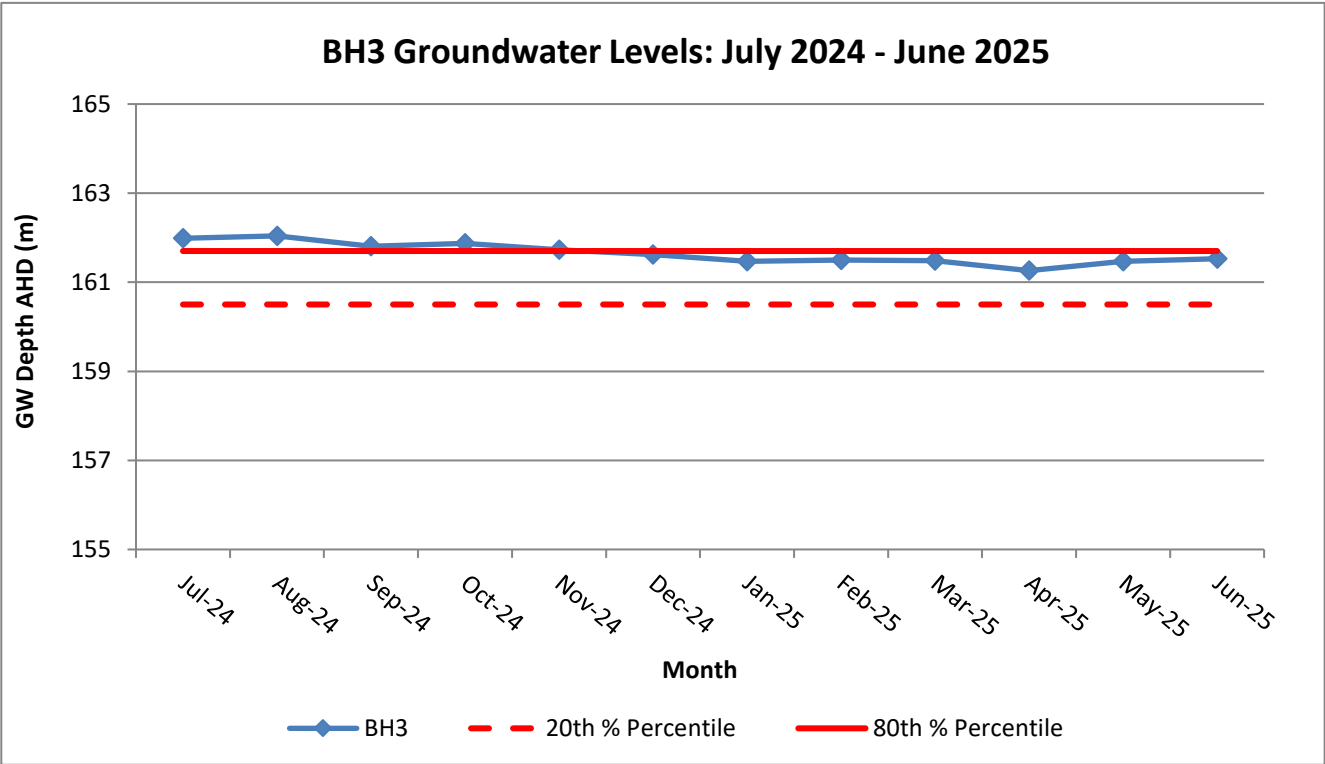


Chart 26: BH3 Groundwater Levels for July 2024 – June 2025.

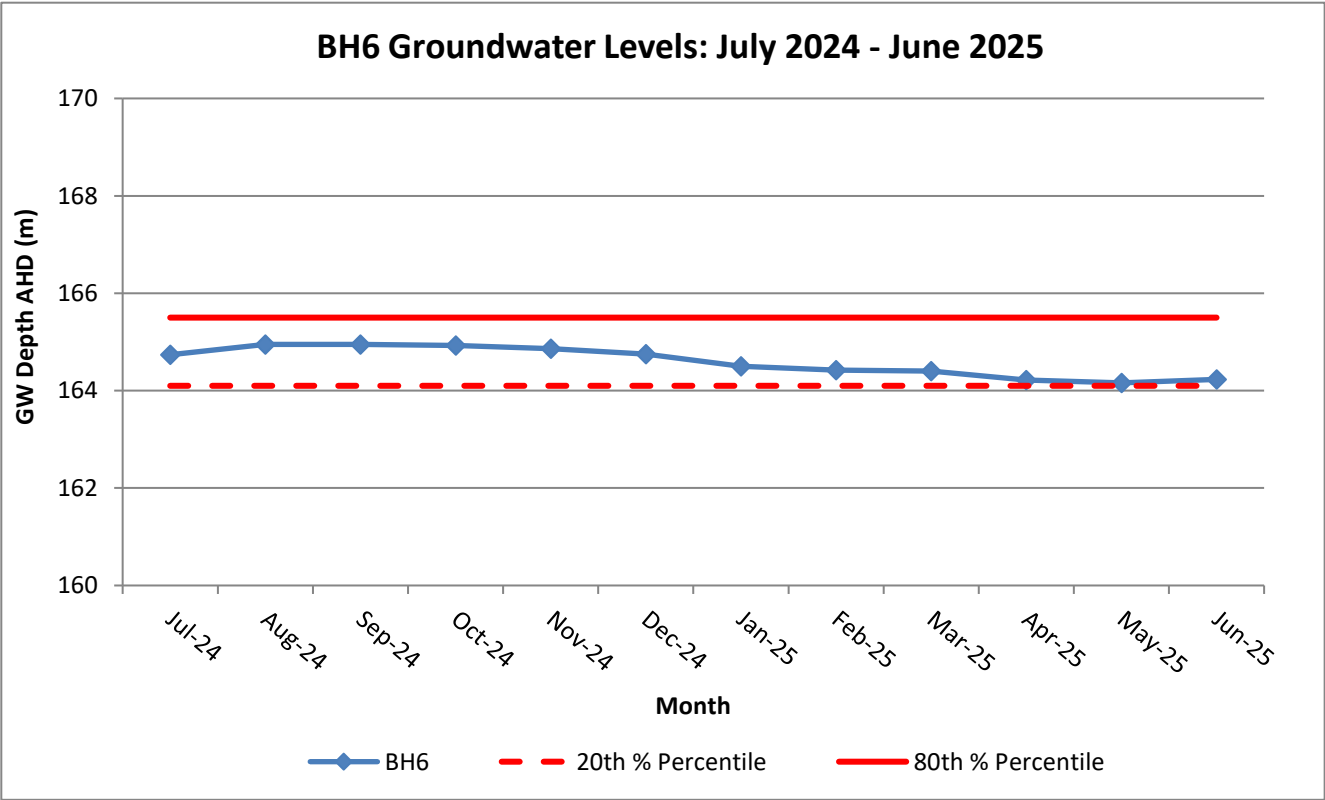


Chart 27: BH6 Groundwater Levels for July 2024 – June 2025.

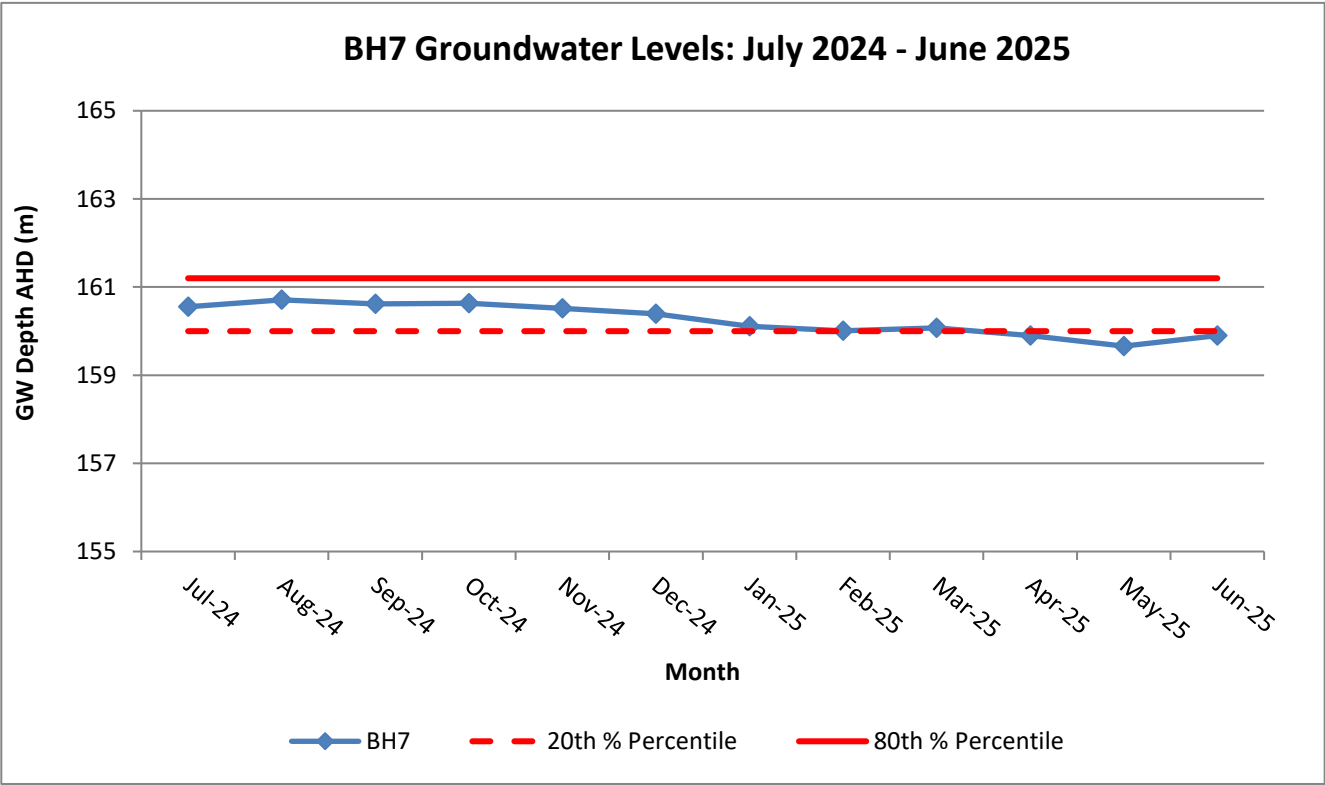


Chart 28: BH7 Groundwater Levels for July 2024 – June 2025.

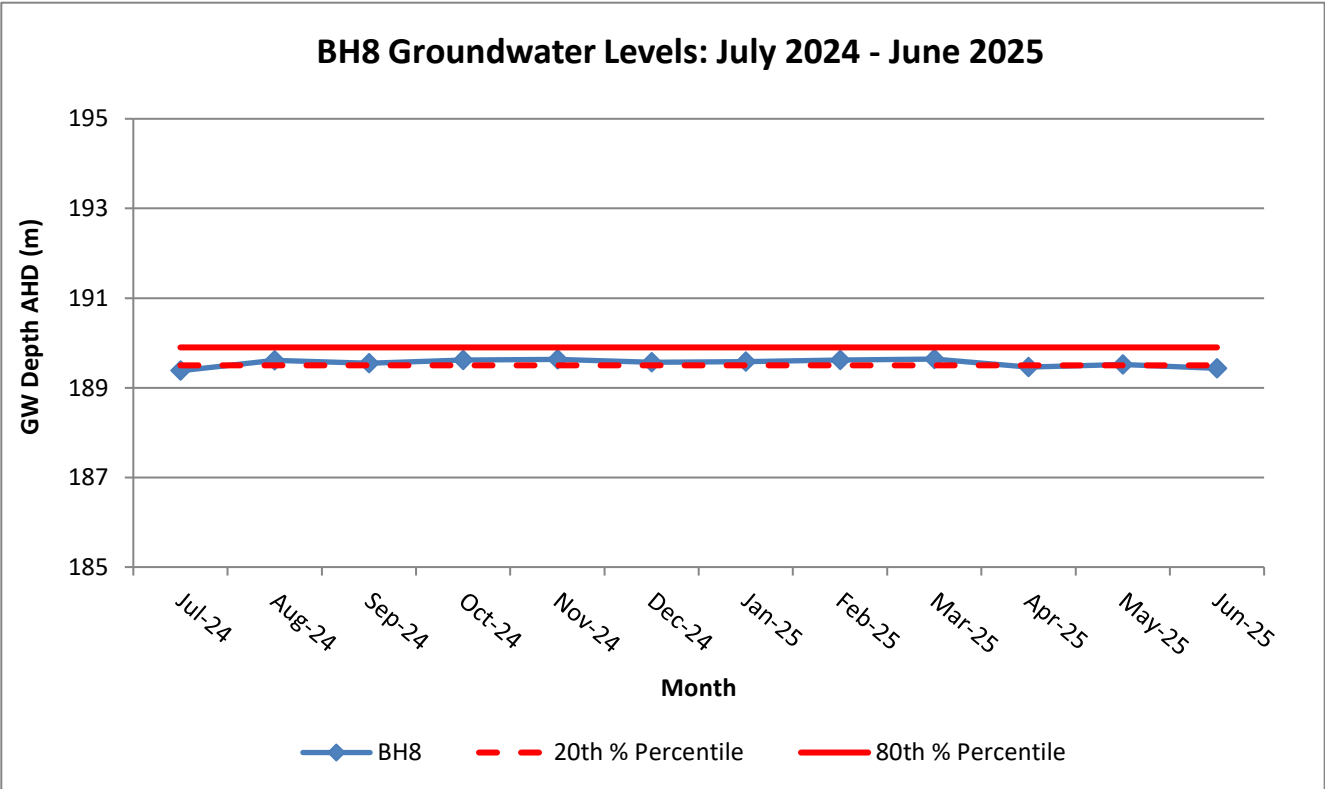


Chart 29: BH8 Groundwater Levels for July 2024 – June 2025.

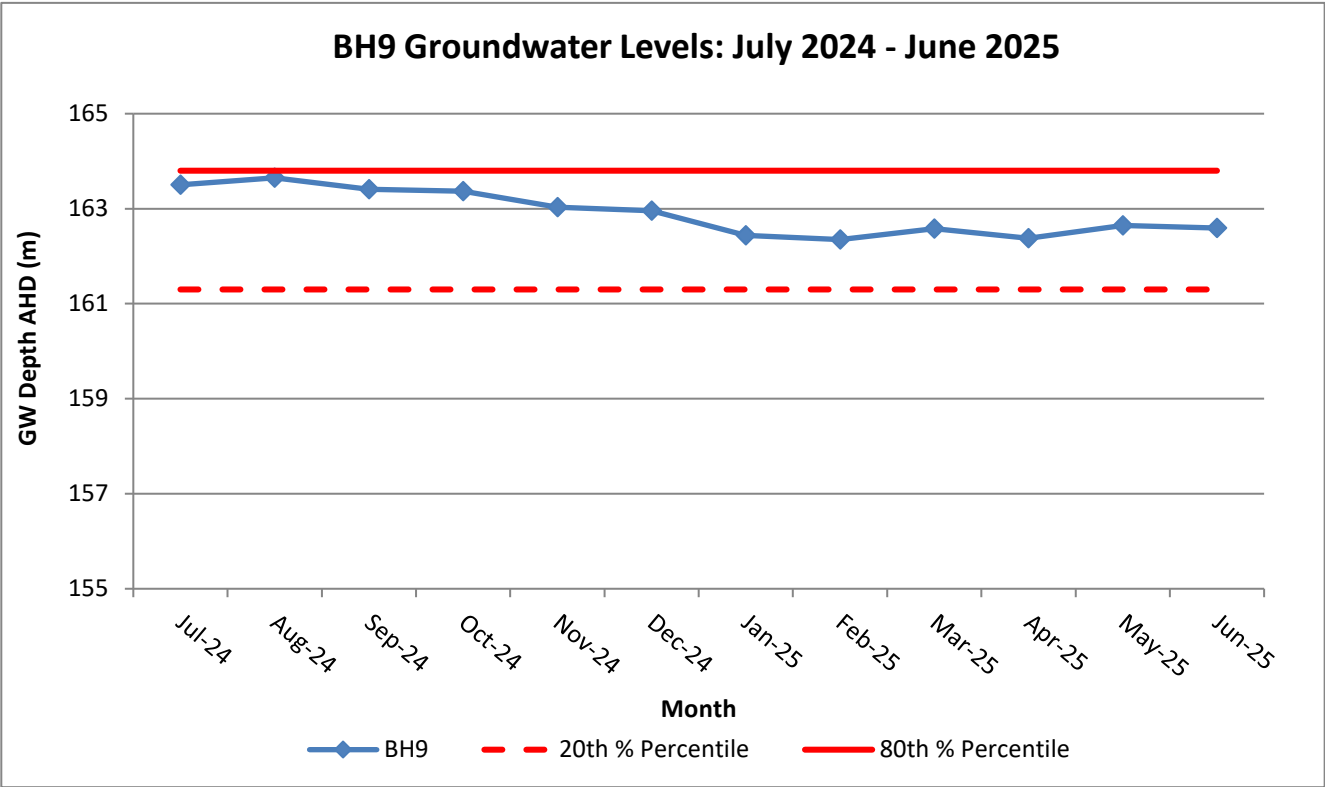


Chart 30: BH9 Groundwater Levels for July 2024 – June 2025.

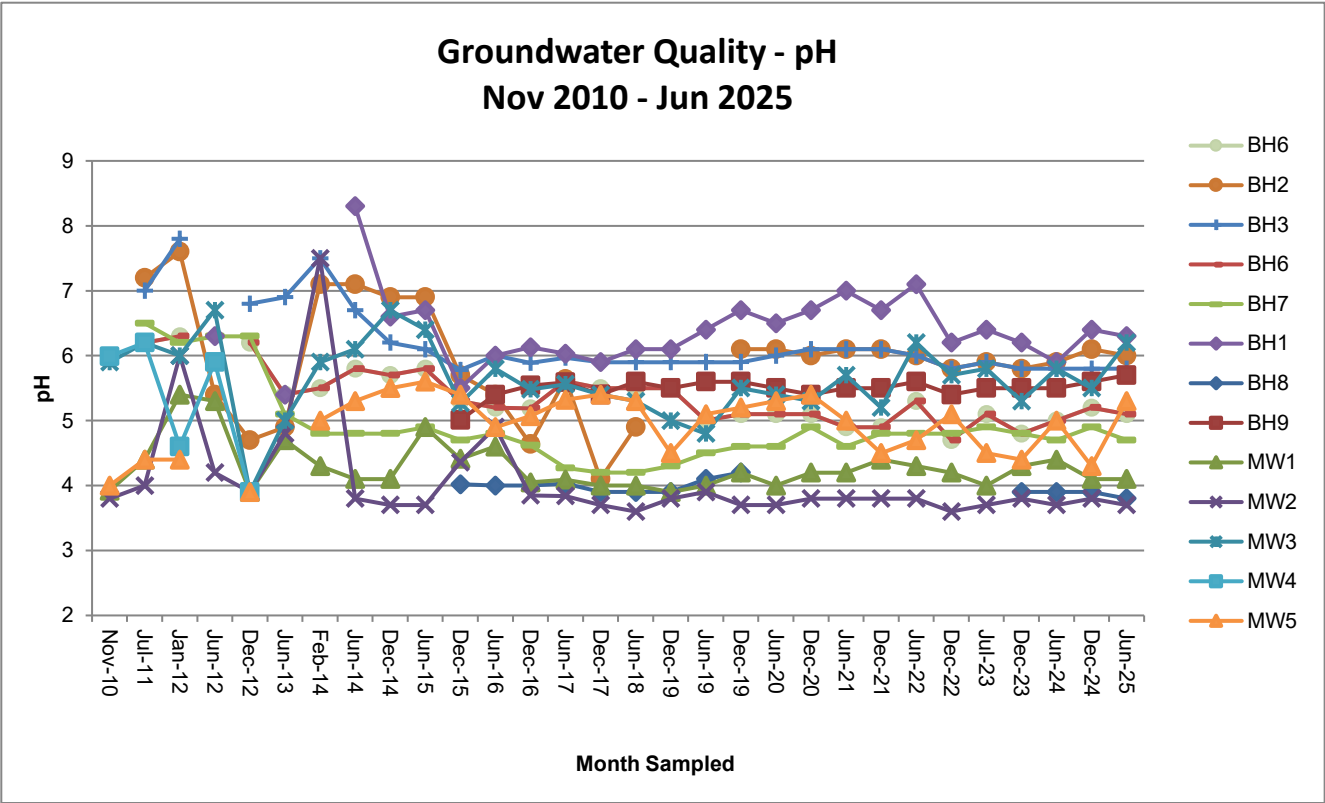


Chart 31: Long term pH results.

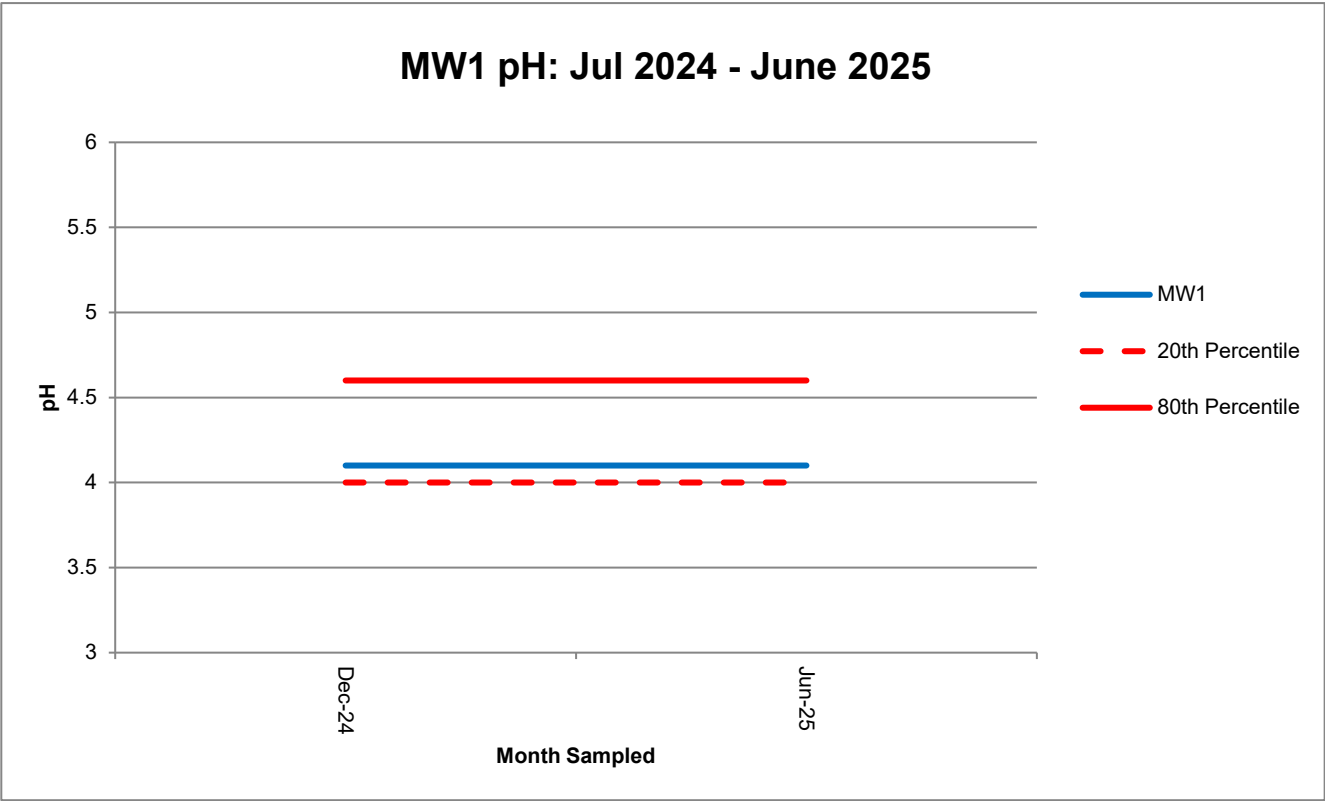


Chart 32: MW1 pH Results July 2024 – June 2025.

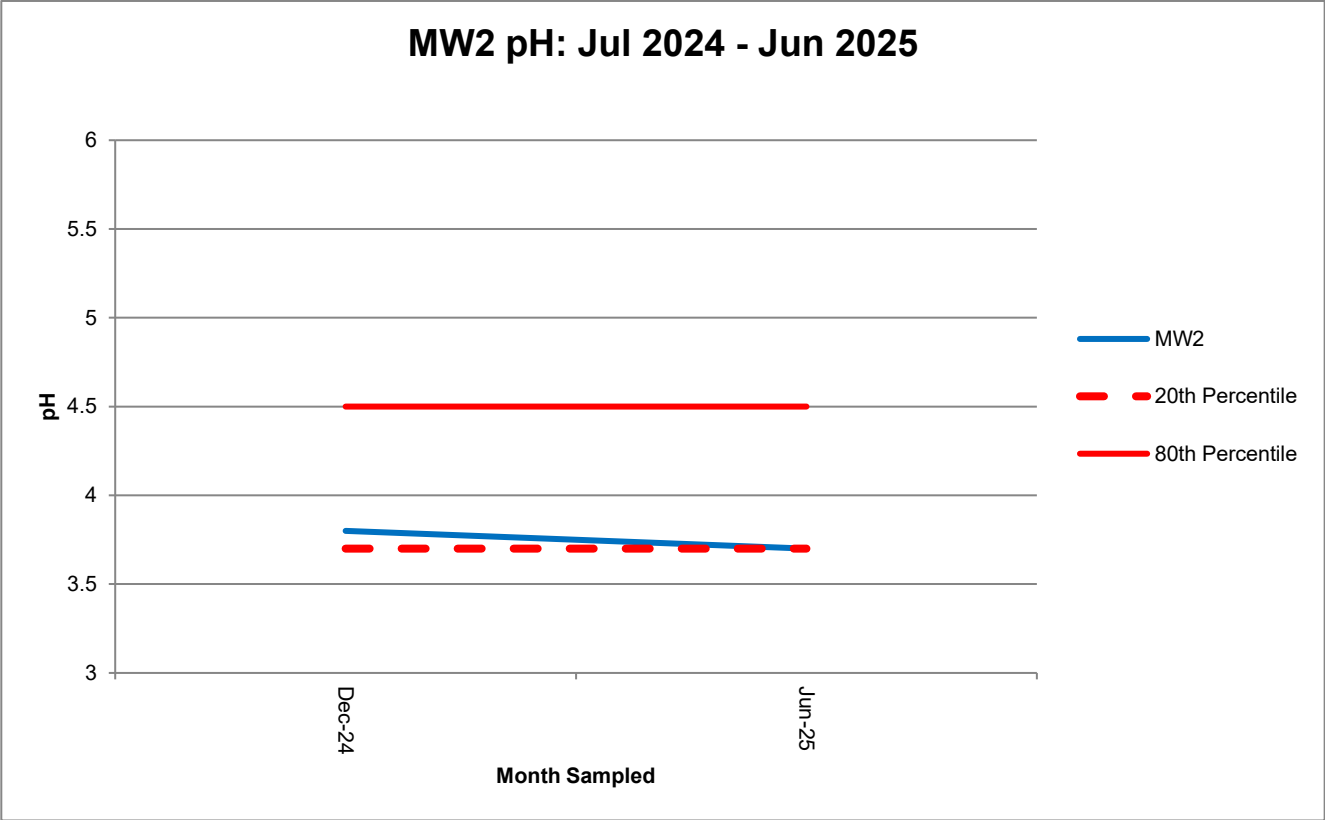


Chart 33: MW2 pH Results July 2024 – June 2025.

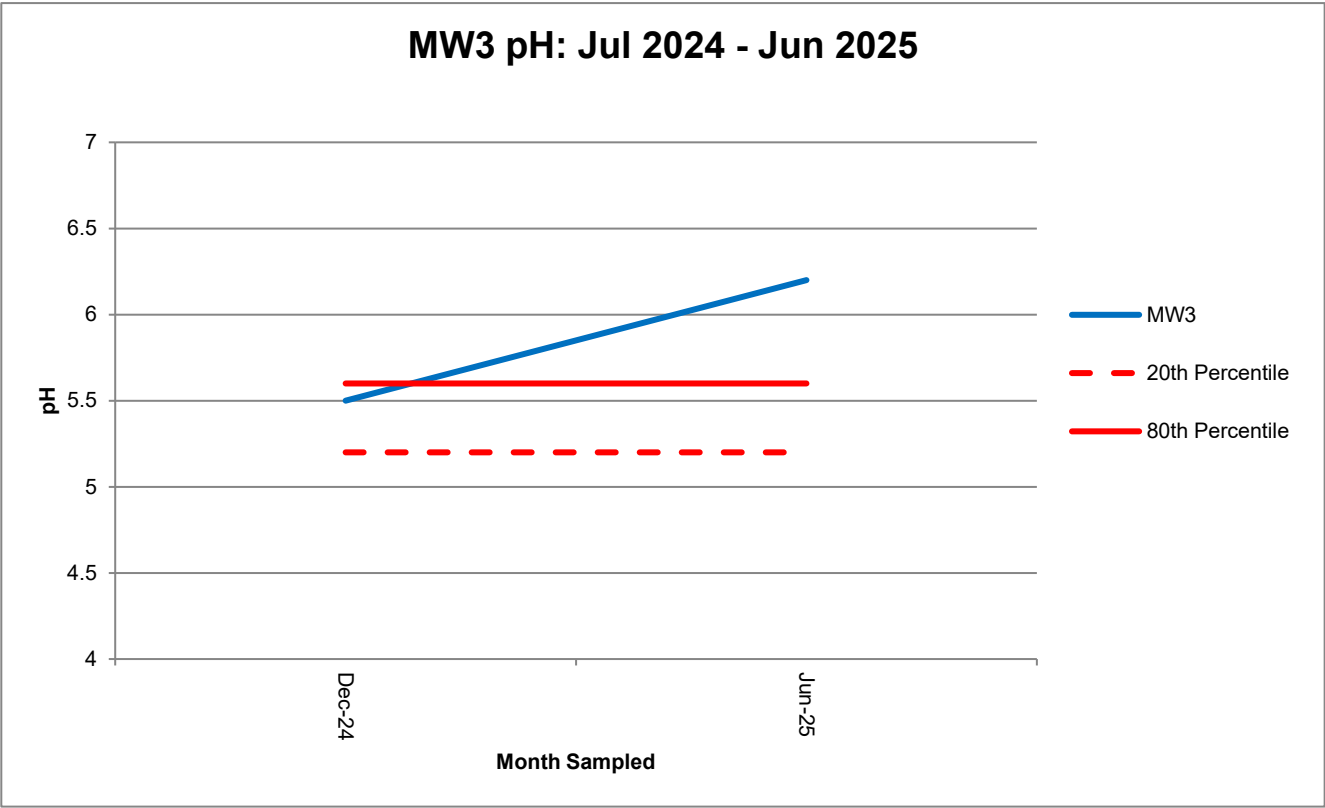


Chart 34: MW3 pH Results July 2024 – June 2025.

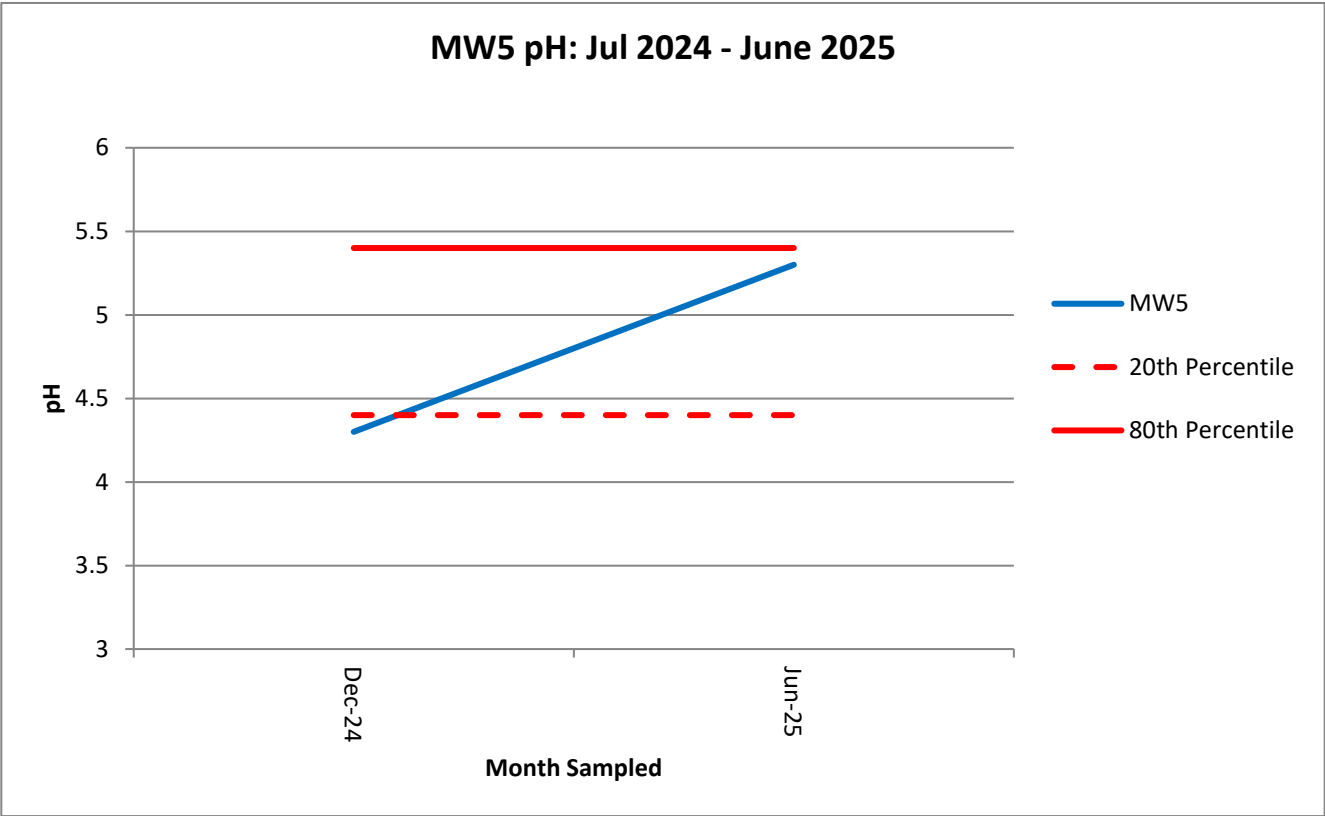


Chart 35: MW5 pH Results July 2024 – June 2025.

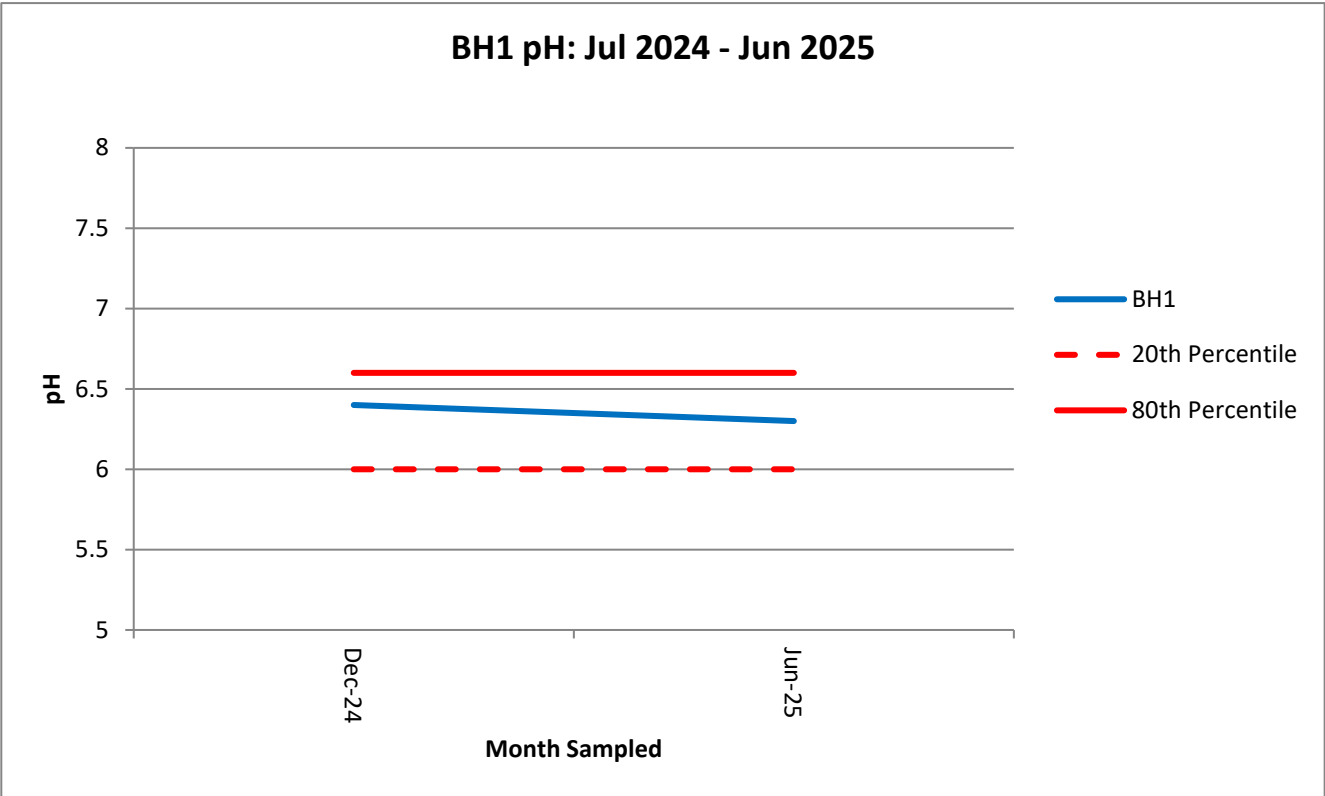


Chart 36: BH1 pH Results July 2024 – June 2025.

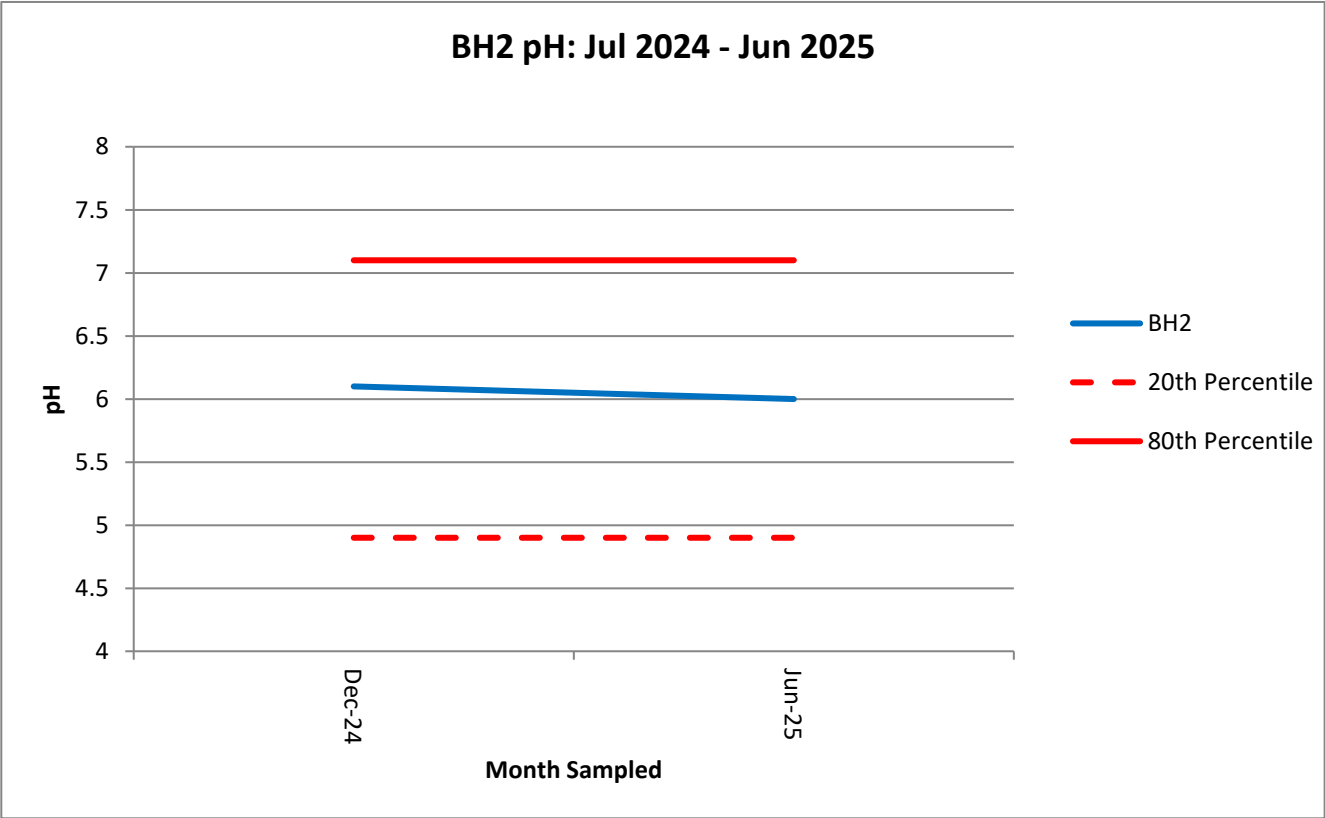


Chart 37: BH2 pH Results July 2024 – June 2025.

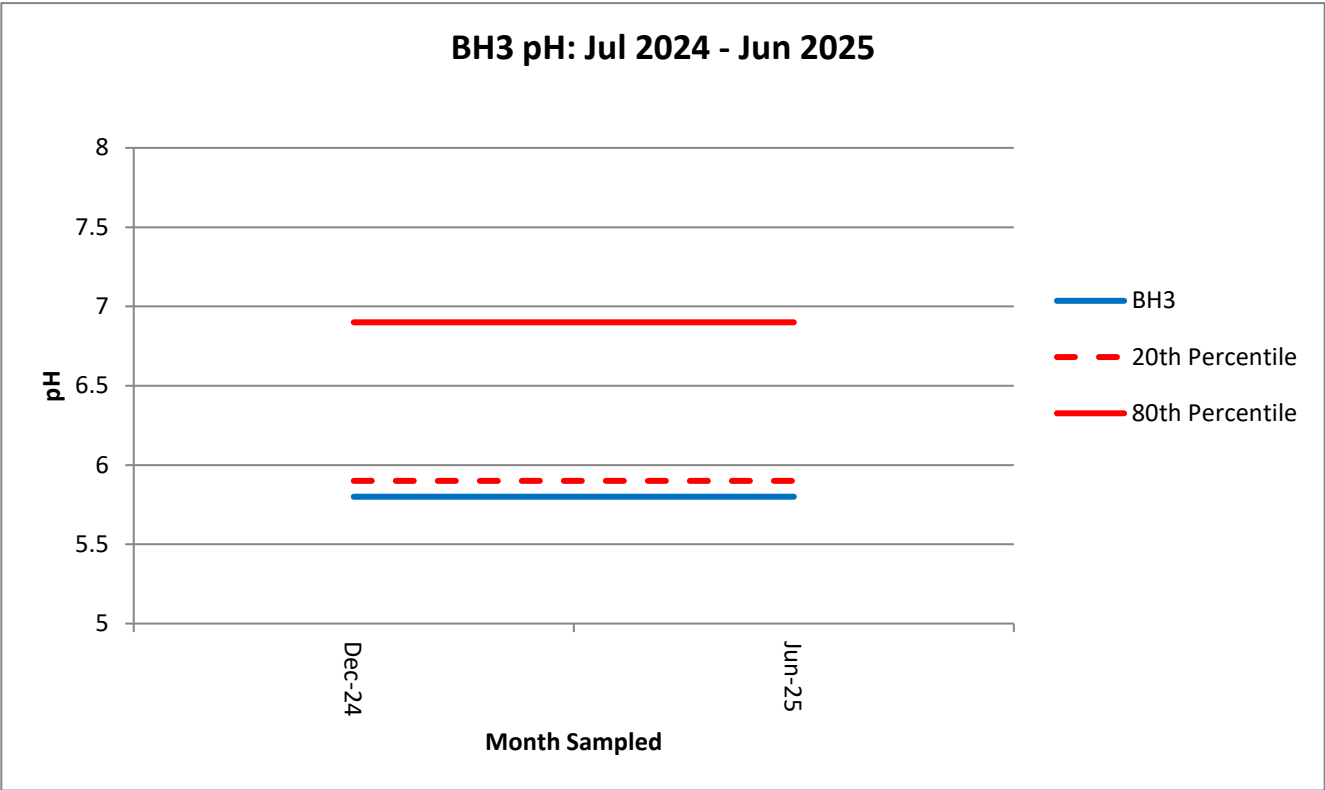


Chart 38: BH3 pH Results July 2024 – June 2025.

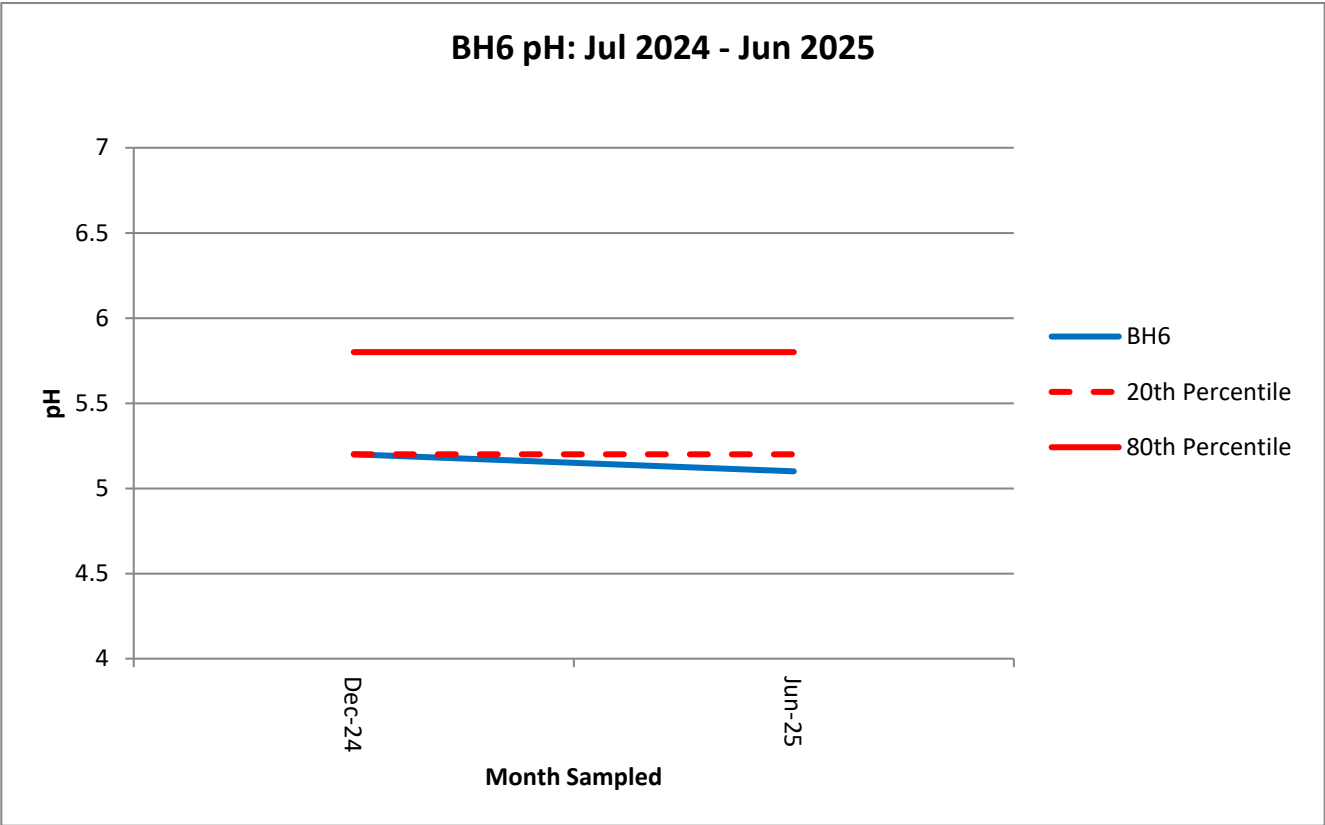


Chart 39: BH6 pH Results July 2024 – June 2025.

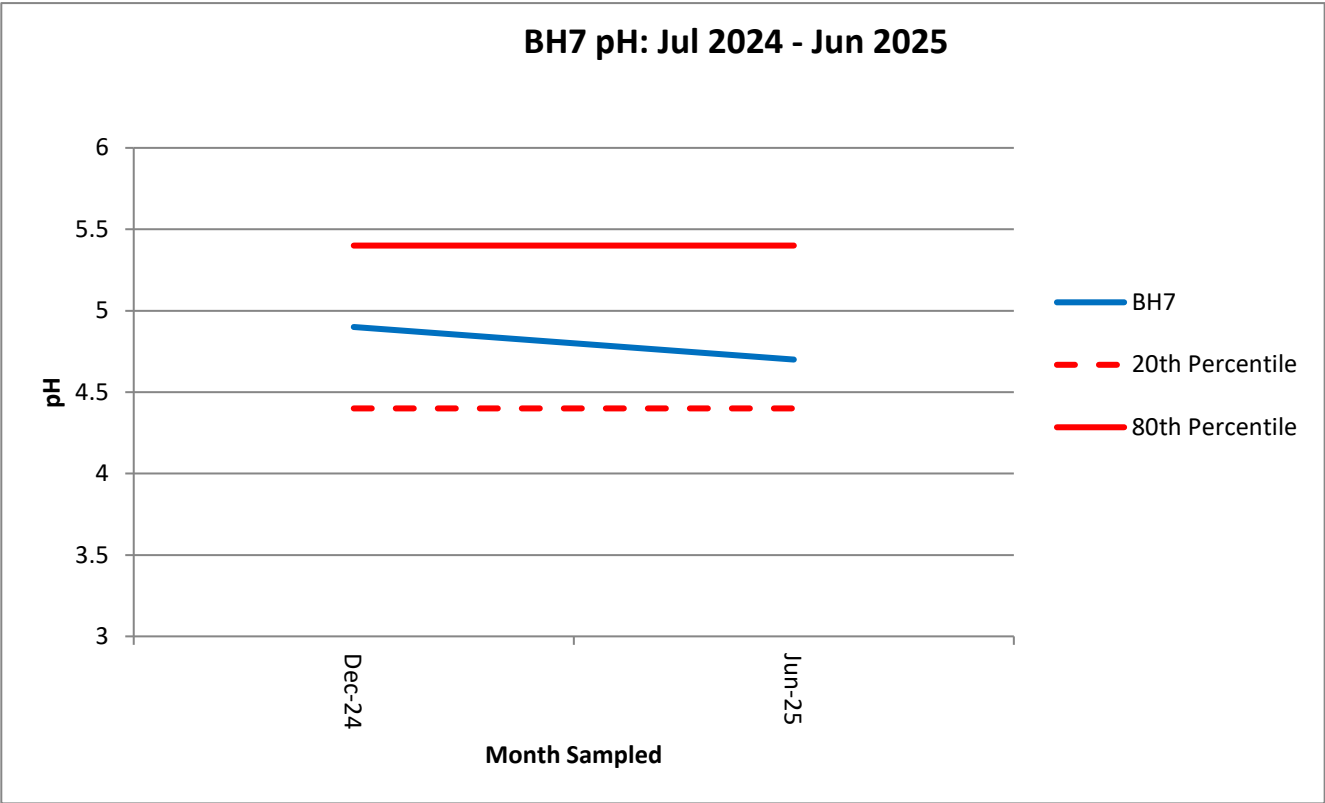


Chart 40: BH7 pH Results July 2024 – June 2025.

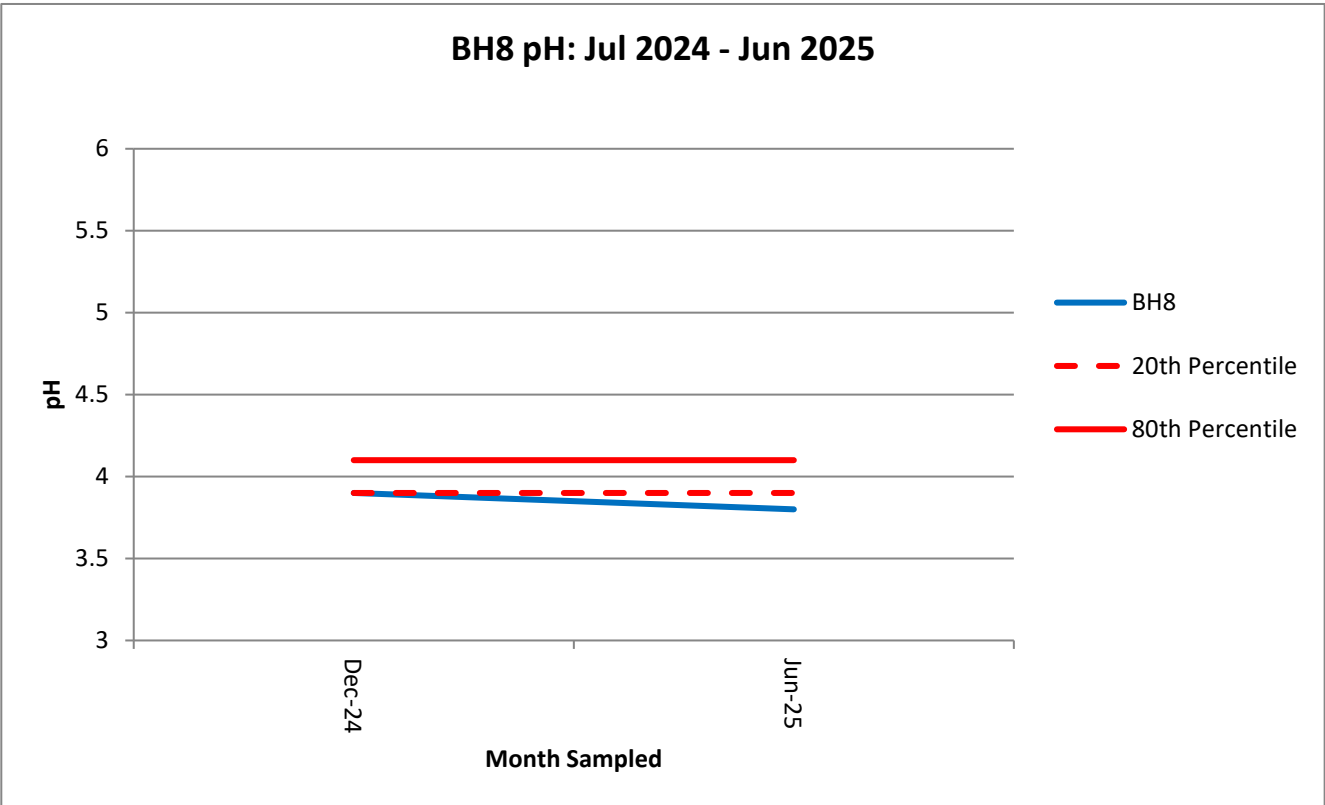


Chart 41: BH8 pH Results July 2024 – June 2025.

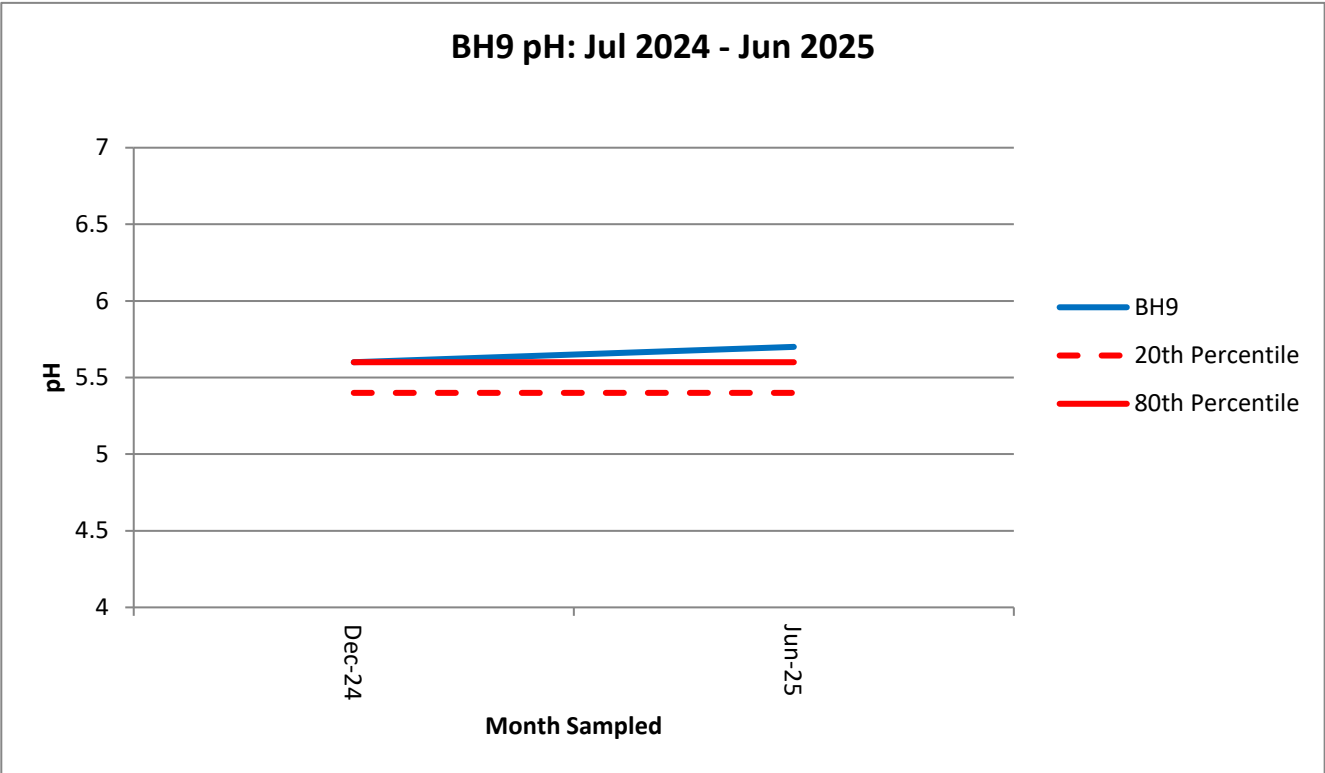


Chart 42: BH9 pH Results July 2024 – June 2025.

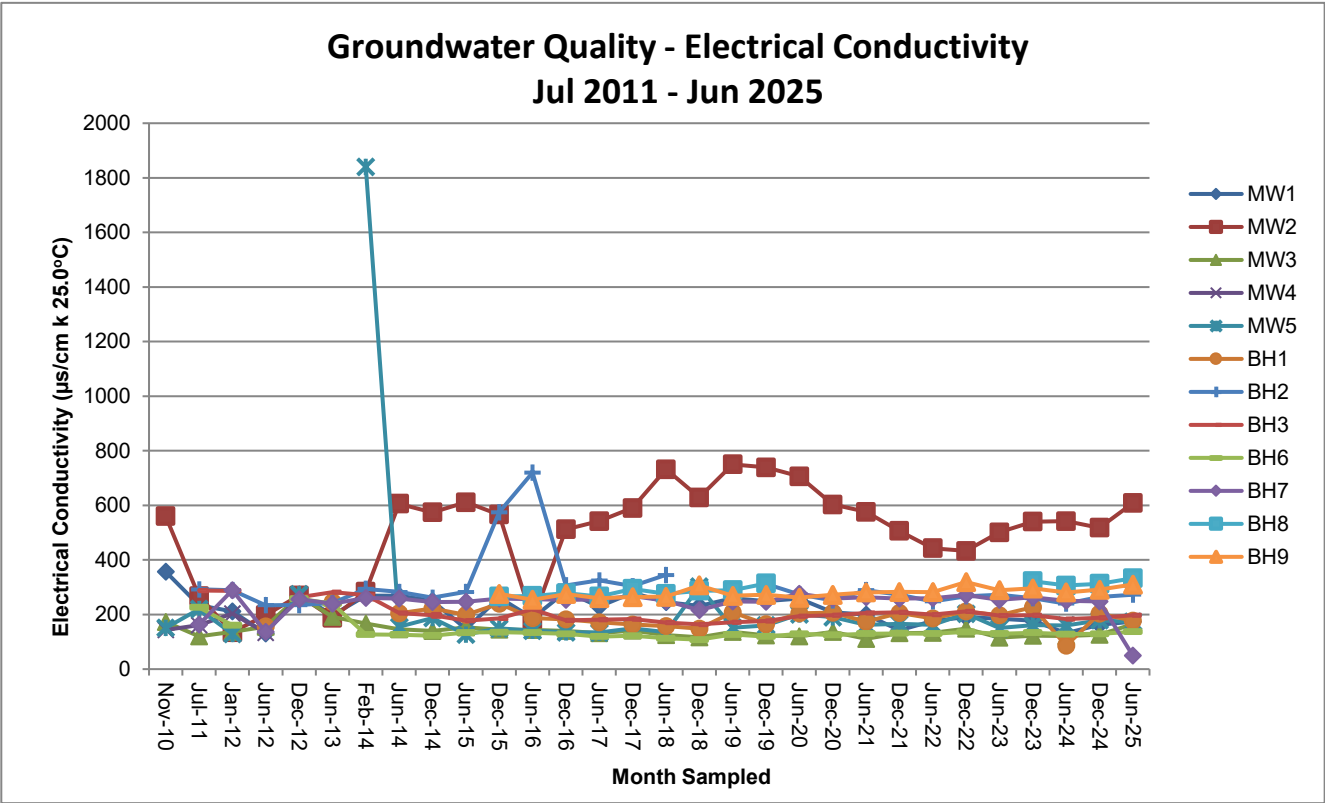


Chart 43: Long term Electrical Conductivity Results.

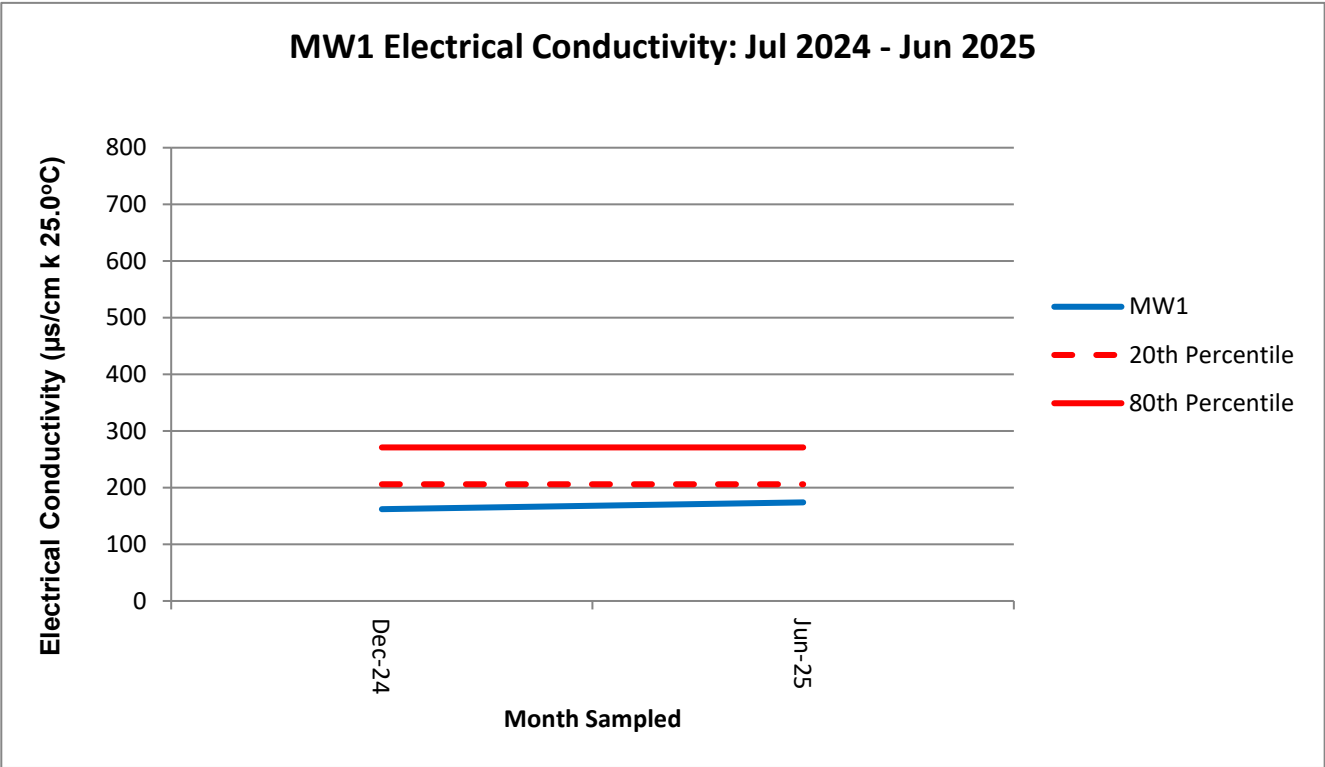


Chart 44: MW1 Electrical Conductivity Results July 2024 – June 2025.

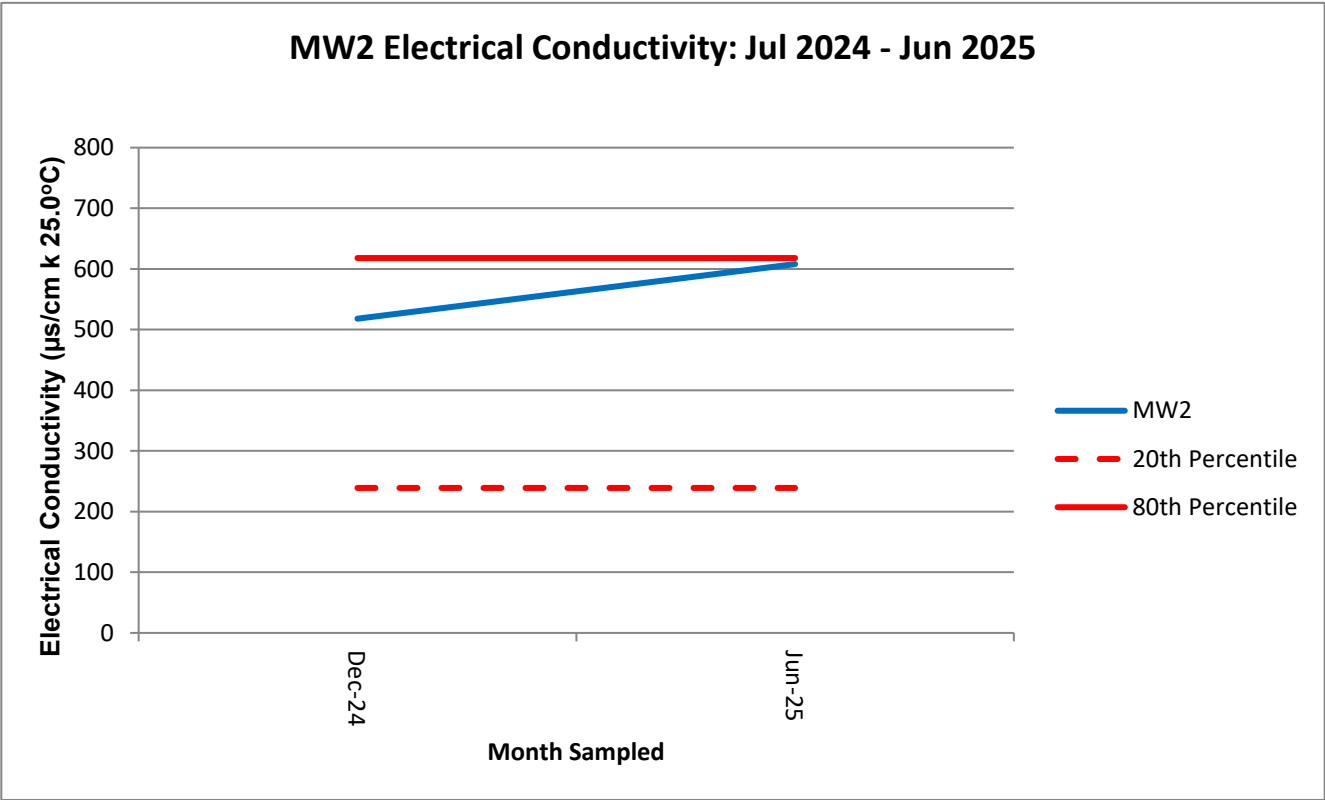


Chart 45: MW2 Electrical Conductivity Results July 2024 – June 2025.

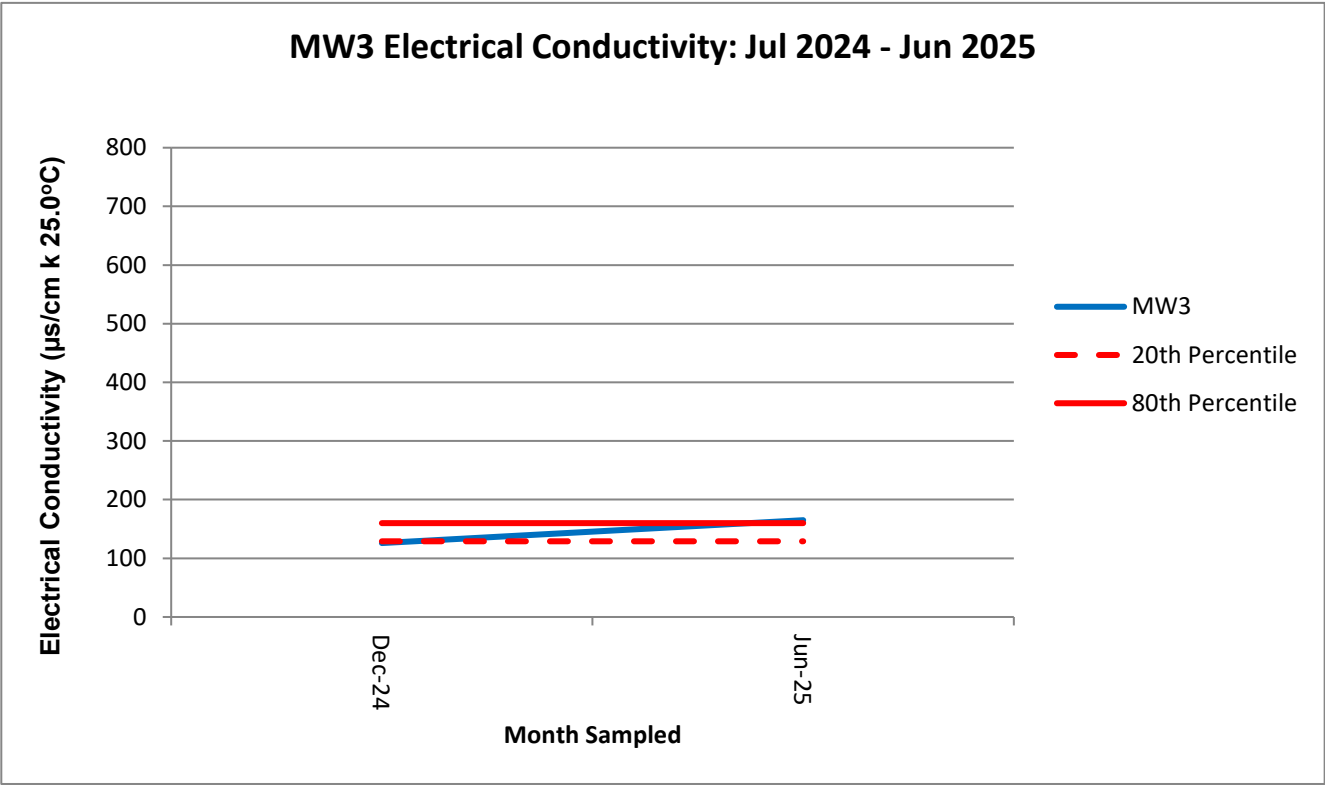


Chart 46: MW3 Electrical Conductivity Results July 2024 – June 2025.

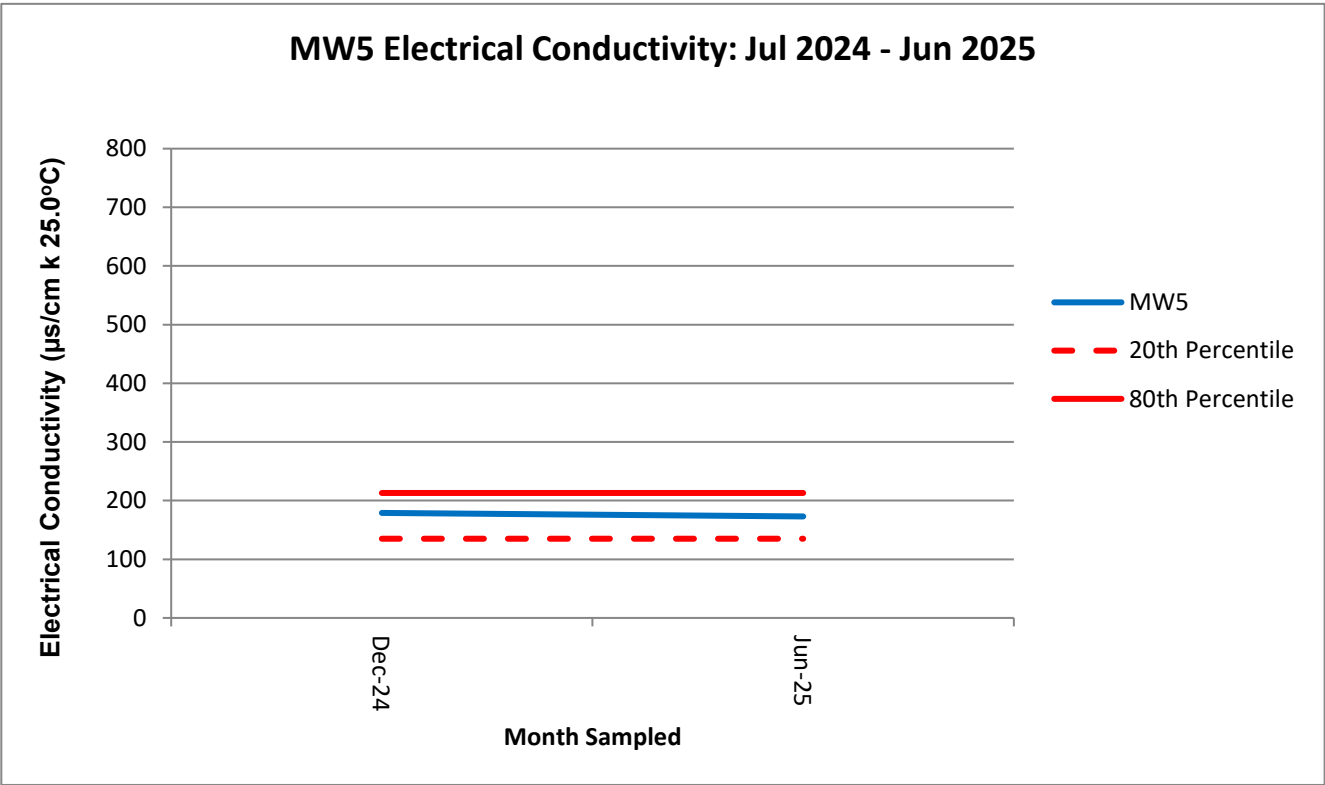


Chart 47: MW5 Electrical Conductivity Results July 2024 – June 2025.

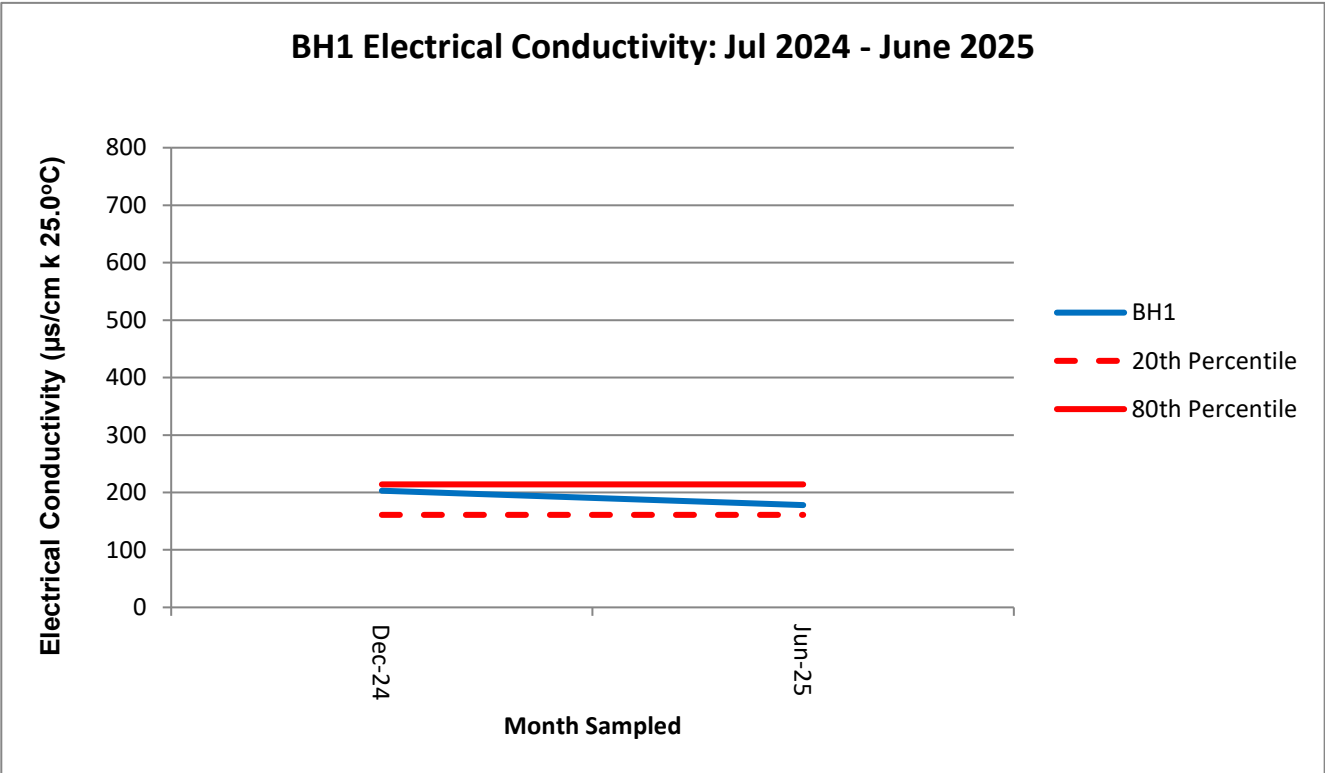


Chart 48: BH1 Electrical Conductivity Results July 2024 - June 2025.

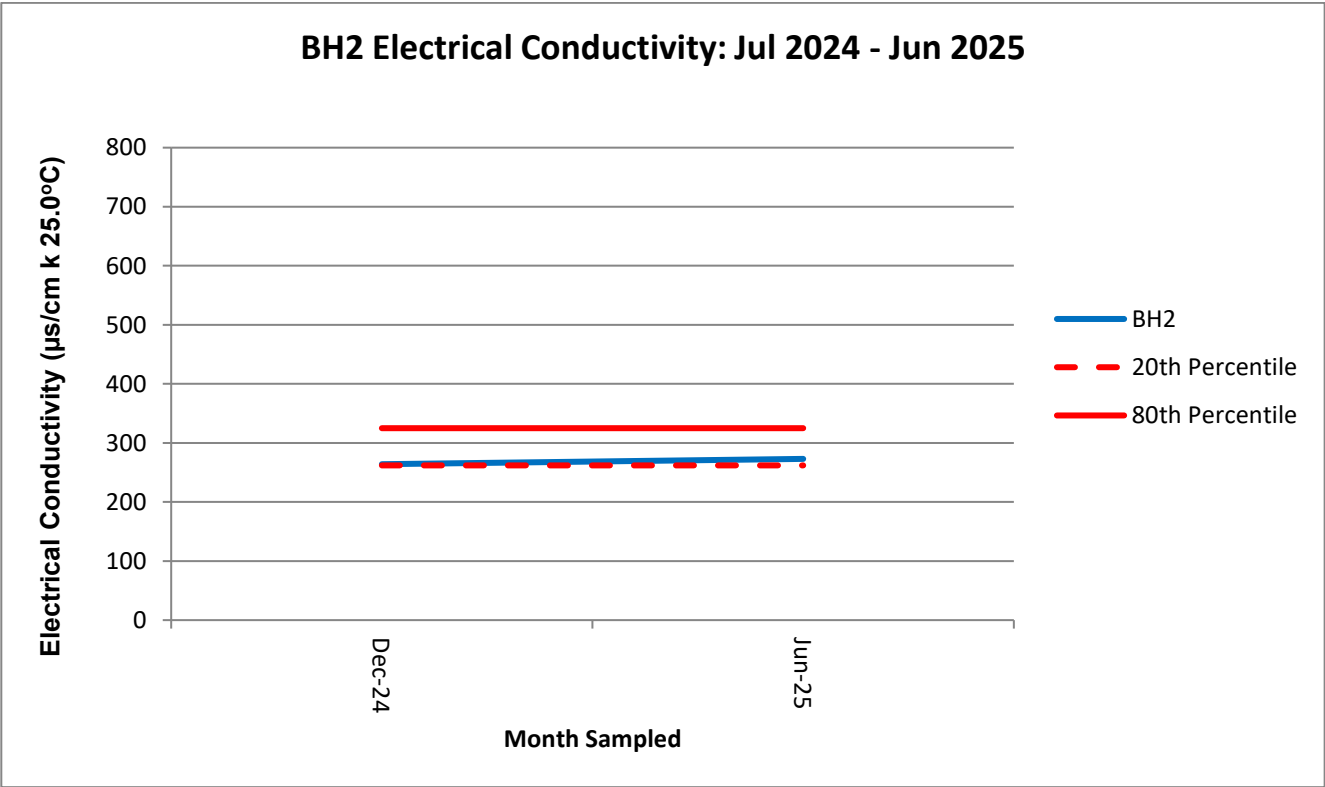


Chart 49: BH2 Electrical Conductivity Results July 2024 – June 2025.

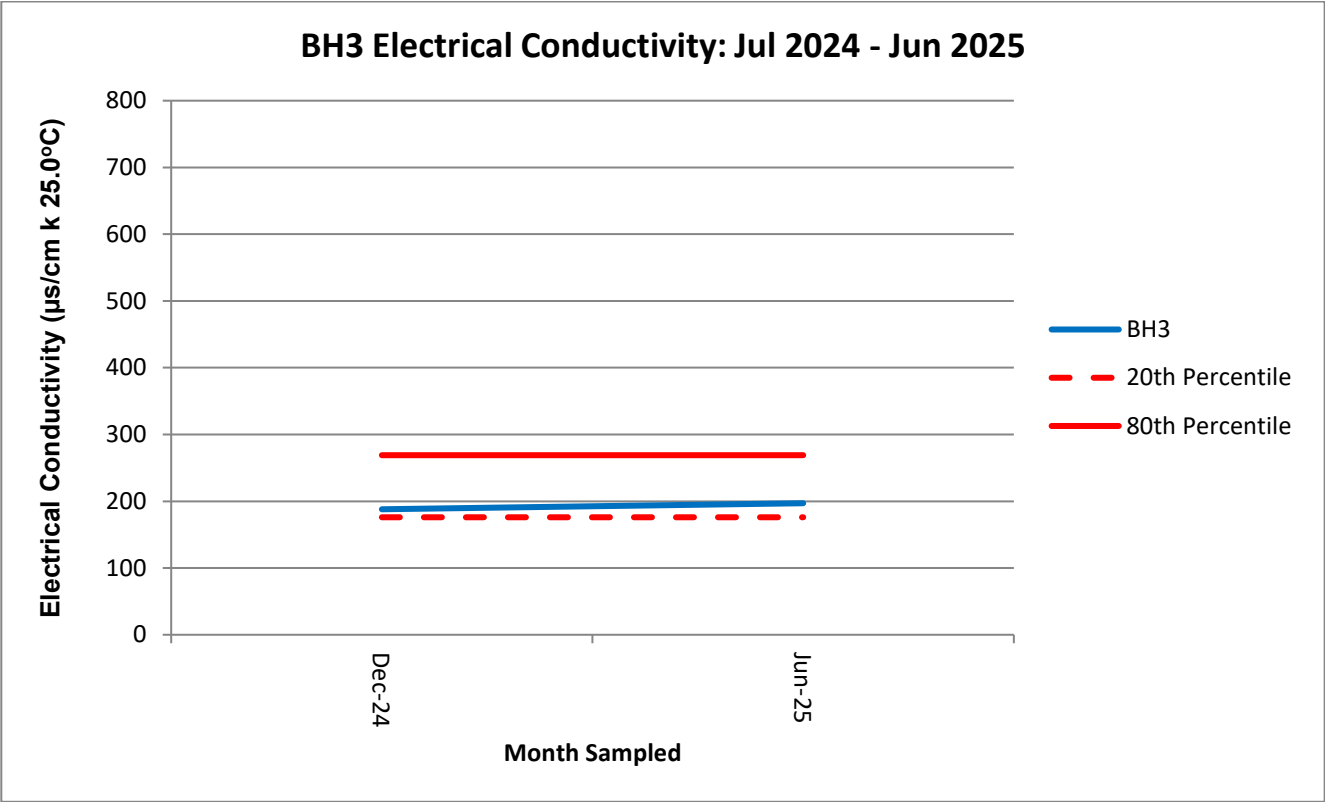


Chart 50: BH3 Electrical Conductivity Results July 2024 – June 2025.

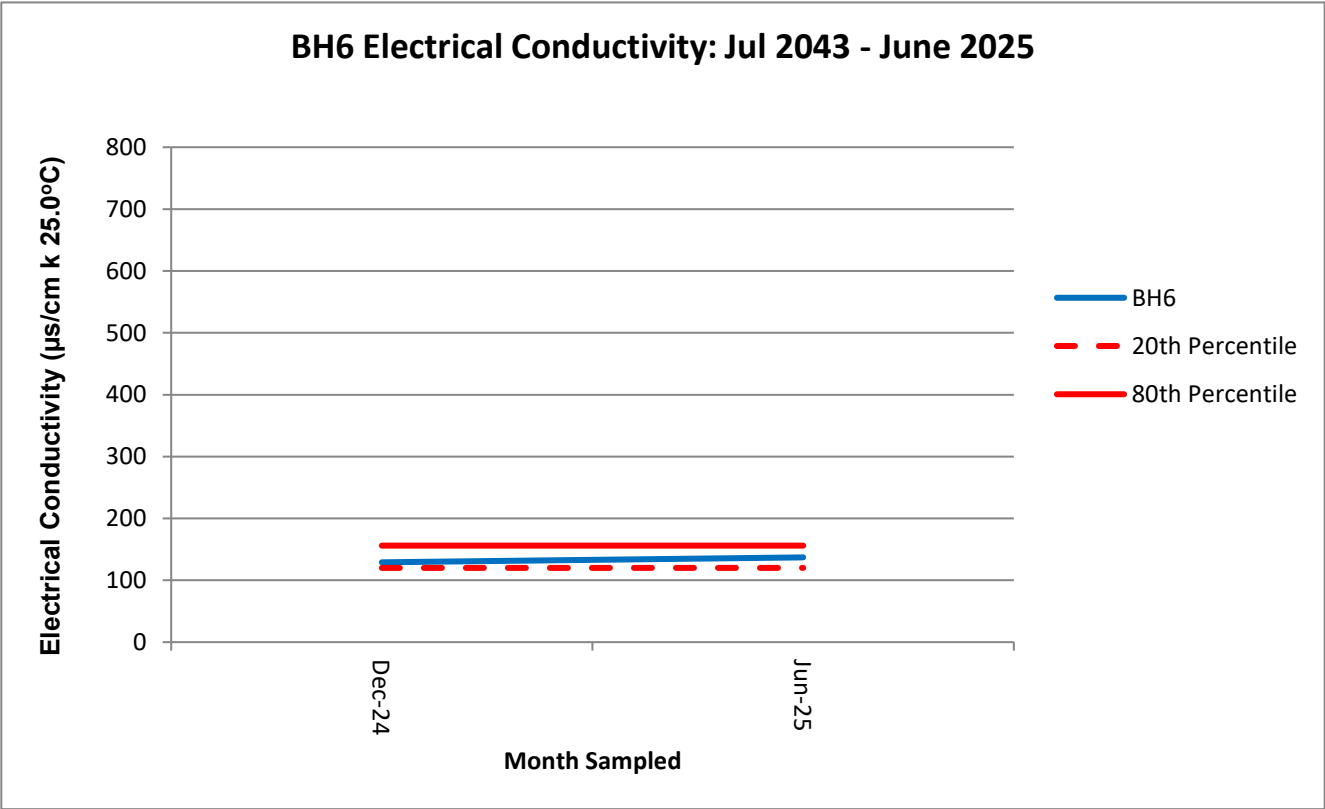


Chart 51: BH6 Electrical Conductivity Results July 2024 – June 2025.

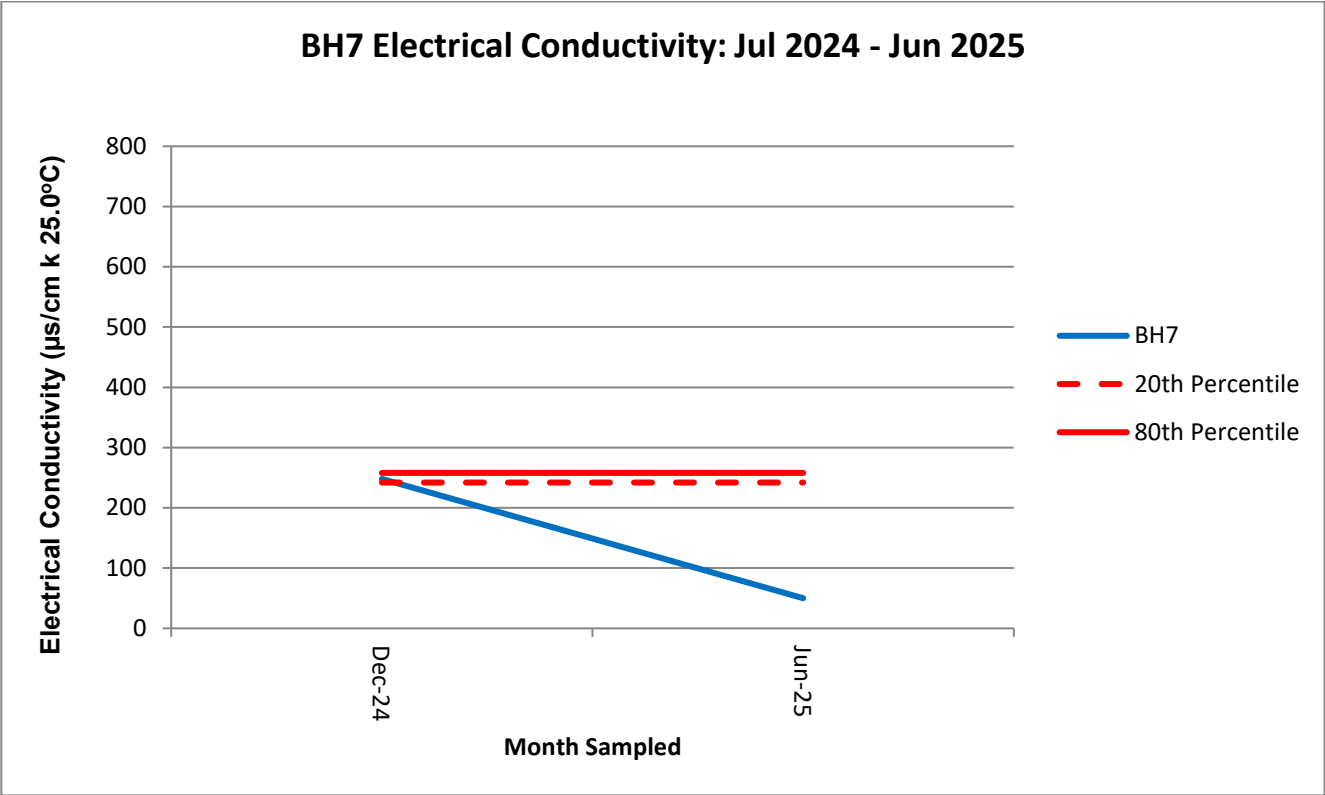


Chart 52: BH7 Electrical Conductivity Results July 2024 – June 2025.

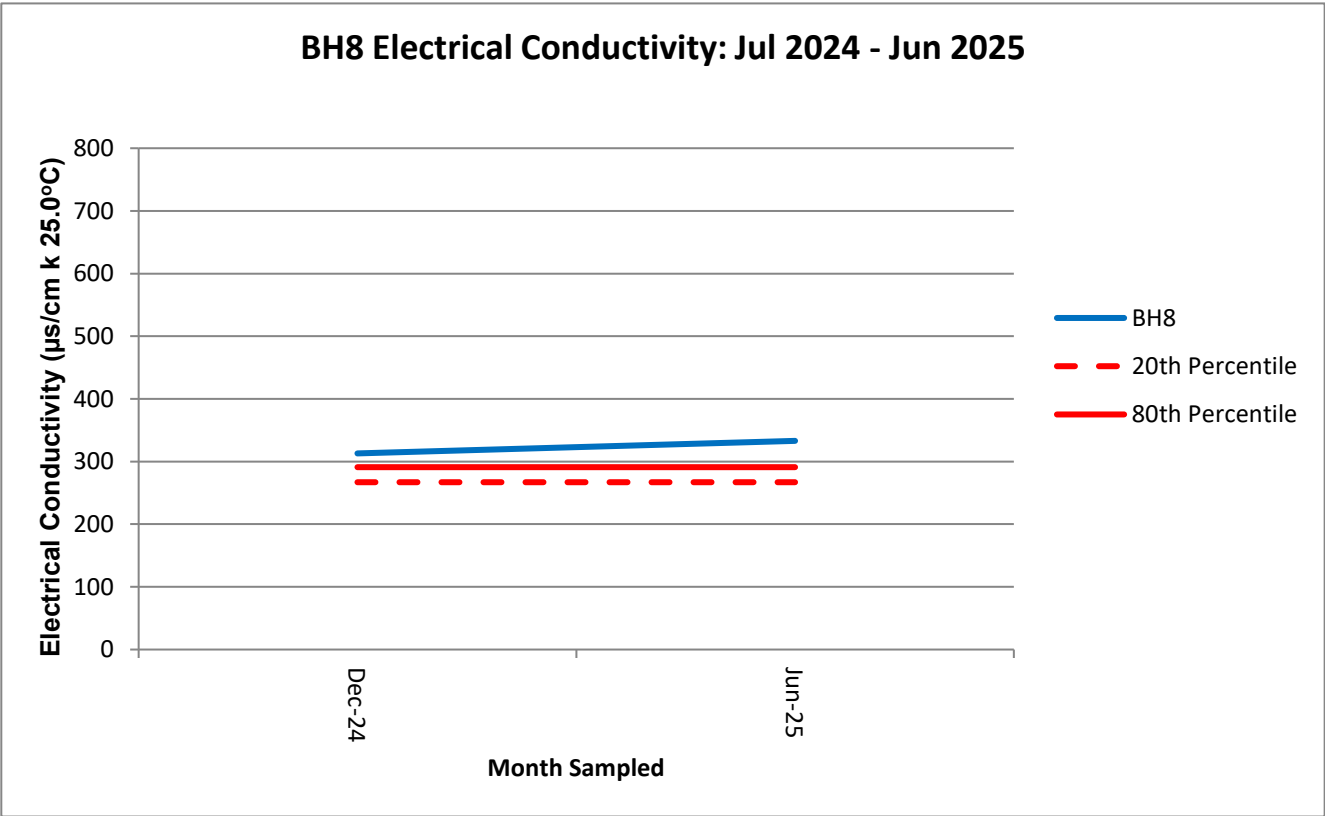


Chart 53: BH8 Electrical Conductivity Results July 2024 – June 2025.

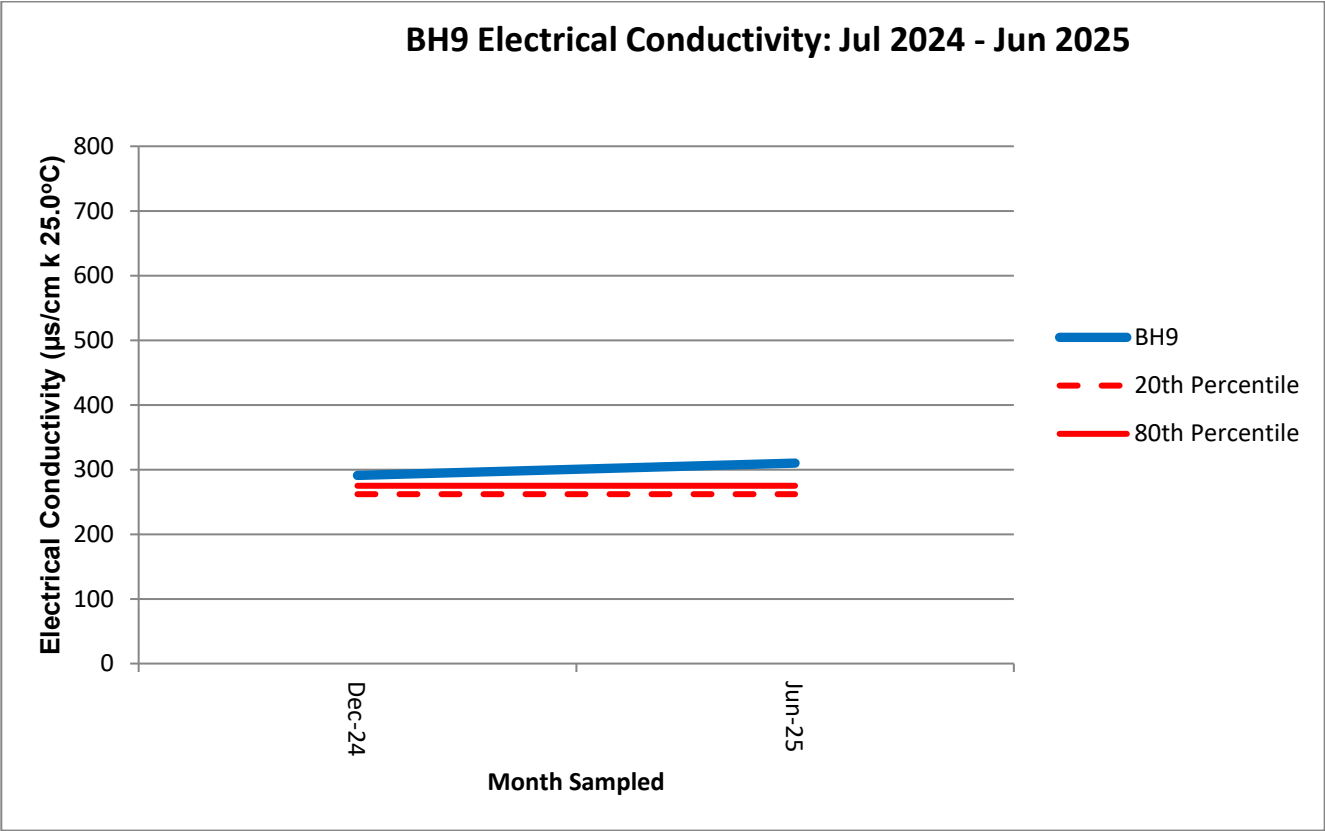


Chart 54: BH9 Electrical Conductivity Results July 2024 – June 2025.

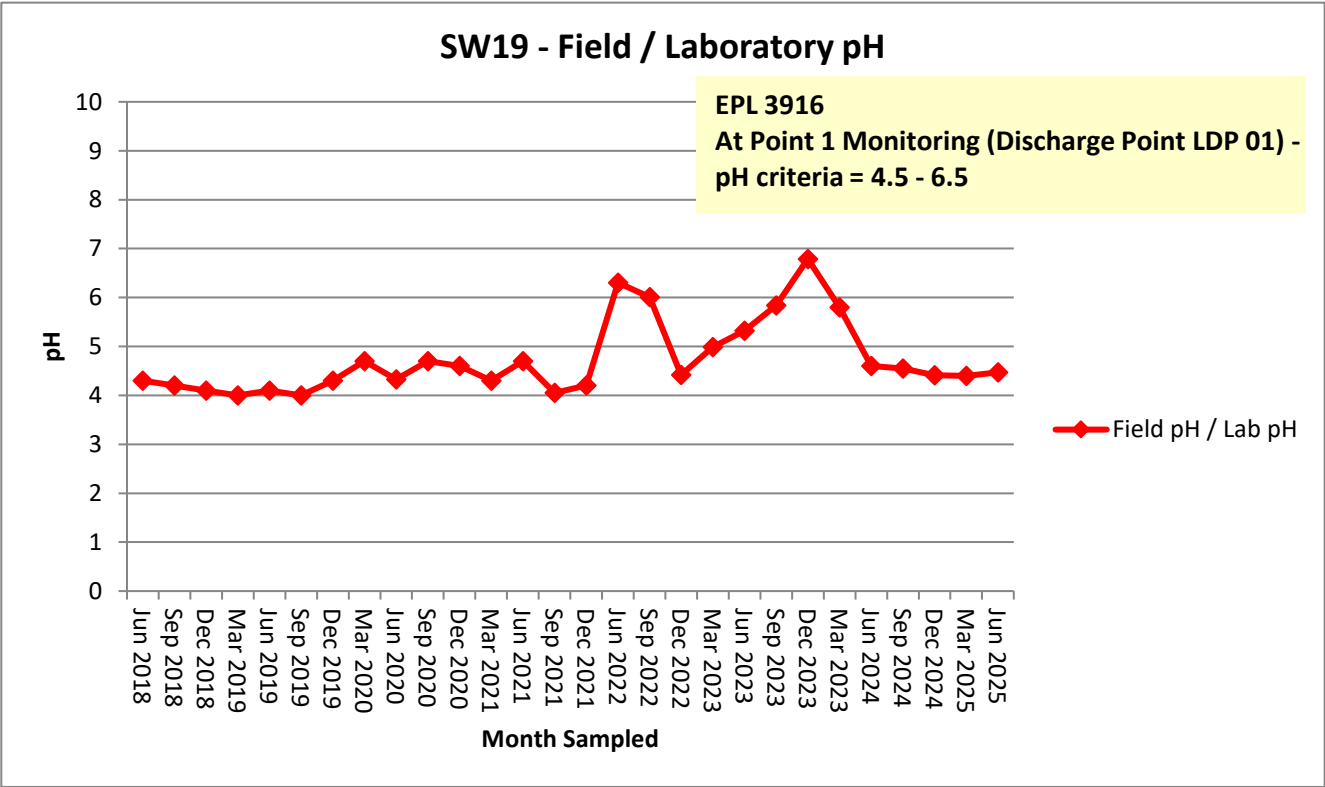


Chart 55: SW19 Field pH June 2018 – June 2025.

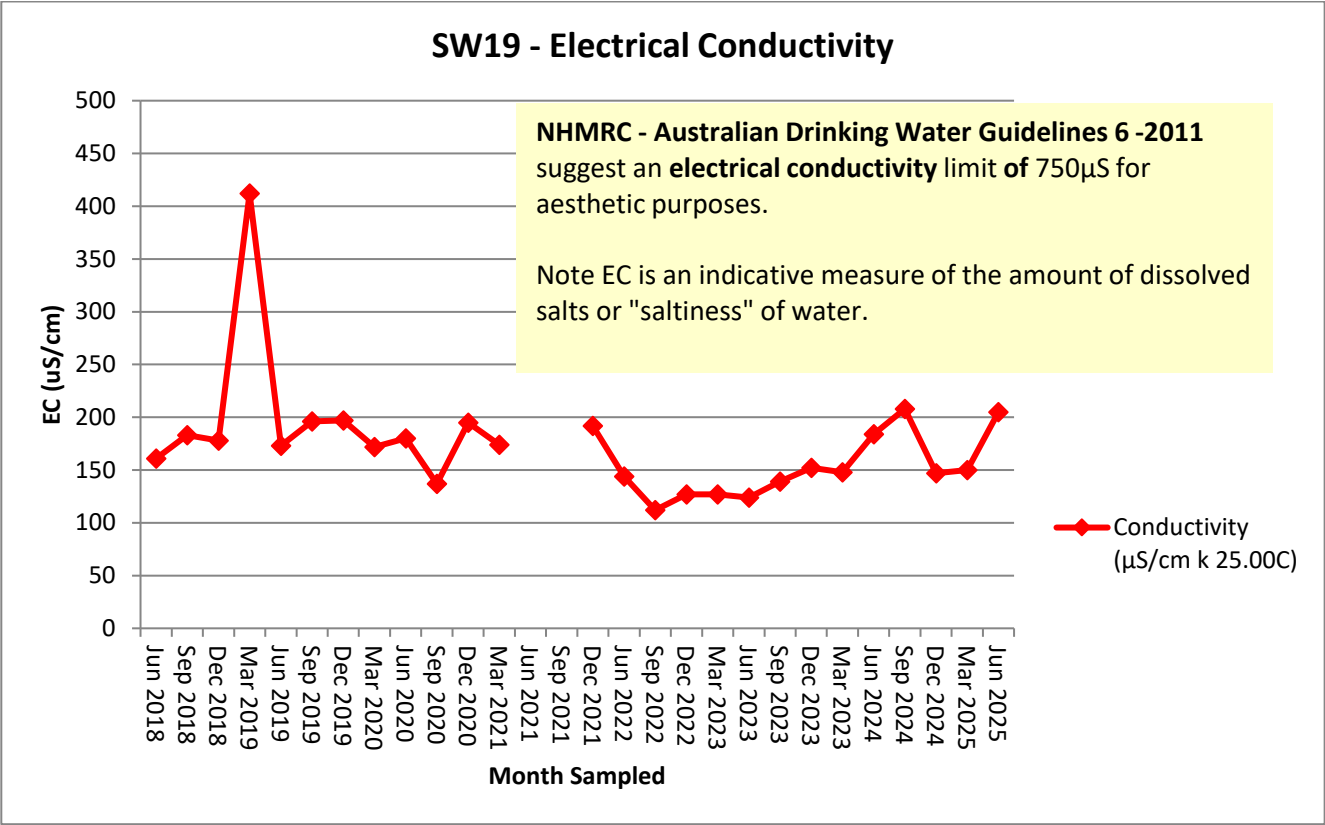


Chart 56: SW19 Electrical Conductivity June 2018 – June 2025.

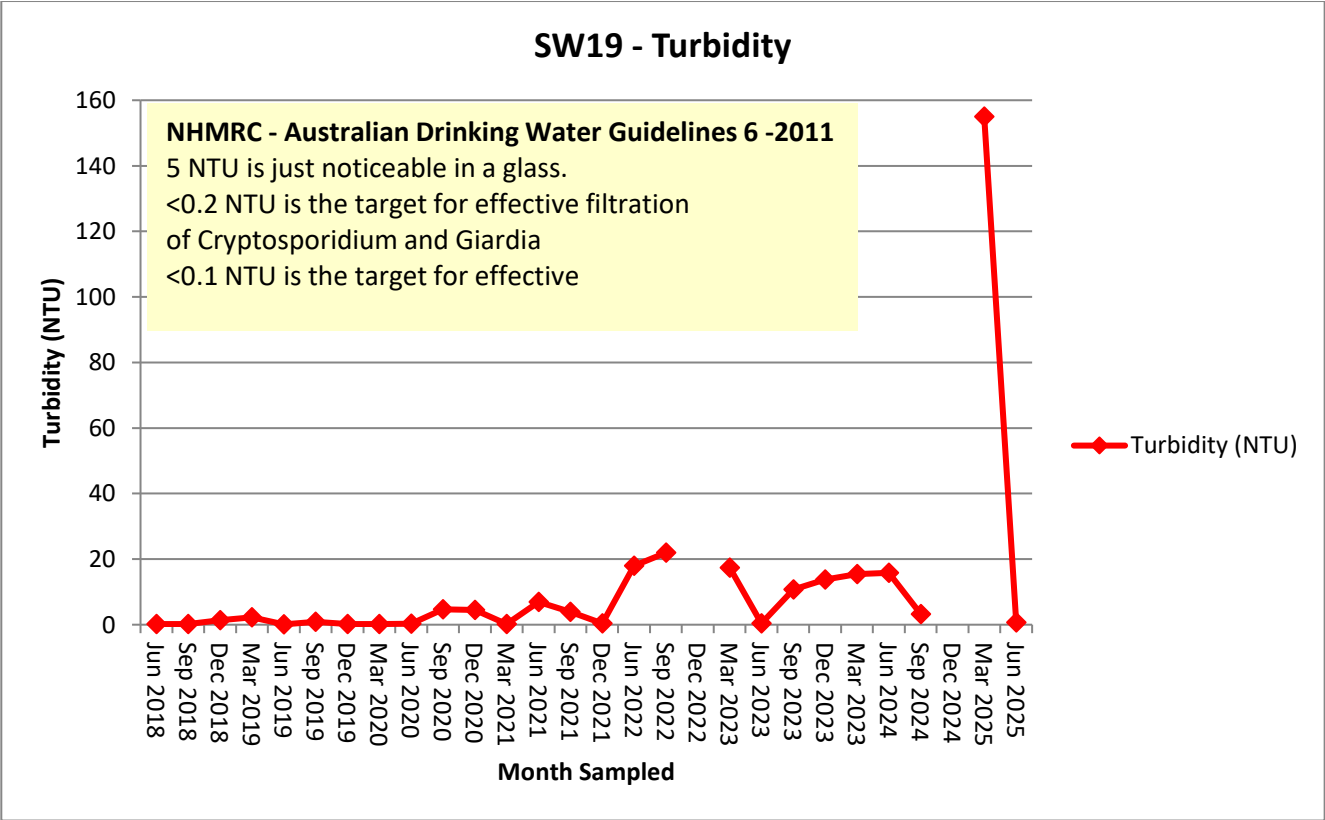


Chart 57: SW19 Turbidity June 2018 – June 2025.

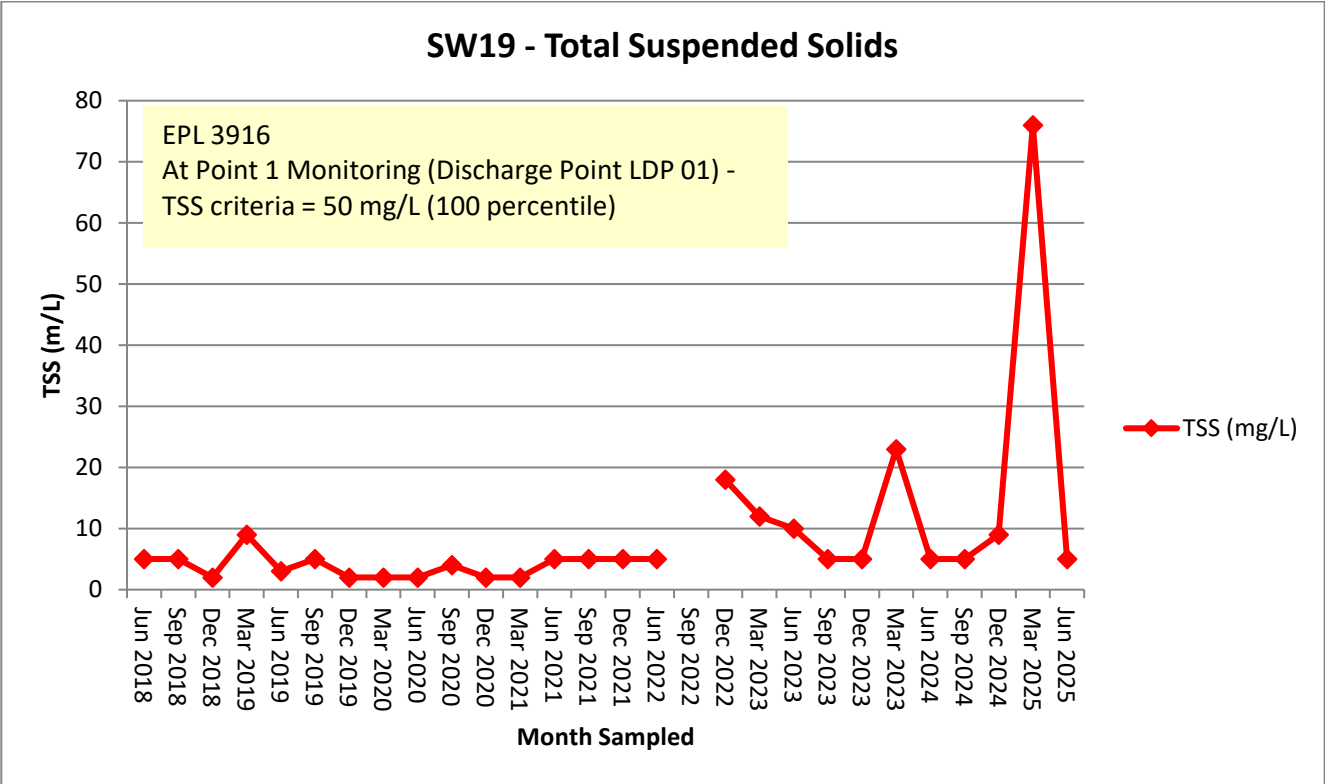


Chart 58: SW19 Total Suspended Solids June 2018 – June 2025.

Table 28: LDP01 laboratory results, relevant water criteria and compliance for discharge.

Sample Date	pH			Total Suspended Solids (mg/L)			Turbidity (NTU)		
	Laboratory Result	EPL Criteria	Criteria met	Laboratory Result	EPL Criteria	Criteria met	Laboratory Result	EPL Criteria	Criteria met
No discharge at LDP01 during this reporting period.									

6.4 Analyses

6.4.1 Groundwater Levels

Groundwater level results for bores which monitor localised perched groundwater aquifers (MW series and BH8) indicate some fluctuations between water levels across the monitoring months. The majority of the measured groundwater levels in perched aquifer bores displaying a trend below the 20th percentiles (except MW2, and BH8) which are the lower limit of the adopted trigger levels in the Soil and Water Management Plan. An investigation into the monitoring results indicate that these water level fluctuations are directly correlated to the amount of aquifer recharge of water through ground infiltration and percolation. Perched aquifers have been shown to be more responsive to surface water infiltration and percolation from rainfall events. With the return of the average rainfall,

water levels in the perched aquifers have declined during this period, in comparison to the previous 2021 – 2022 monitoring period which experienced wetter climatic conditions due to La Nina influences.

Water level results for boreholes which monitor the Sydney Basin Central Groundwater Source aquifer (BH1, BH2, BH3, BH6, BH7 and BH9) depict a strong trend across the monitoring months. Almost all groundwater levels within the BCGS monitoring bores are within the 20th and 80th percentile, with some levels sitting slight above or below the baseline. BH9 during this reporting period fell within the 20th and 80th percentile. The slight reduction in groundwater levels in the SBCGS monitoring bores since the previous 2023 – 2024 reporting period correspond to the slightly less rainfall recorded during this reporting period.

6.4.2 Groundwater Quality

Greater fluctuations of pH values in groundwater were recorded during the 2010 to 2015 period. Relatively more stable pH values were recorded from 2015 to date, with the exception of BH2 which was struck by a vehicle late 2018. BH2 was rectified and groundwater quality monitoring recommenced in December 2019. pH values for MW1, MW2, BH1, BH2 and BH7 fall within the 20th and 80th percentile trigger values during the reporting period. pH values for MW3 and BH9 were within and slightly above the 80th percentile whilst pH for MW5, BH3, BH6 and BH8 were within and slightly below the 20th percentile.

Electrical conductivity (EC) values in groundwater have been relatively stable from 2010 to the current reporting period, showing some fluctuations which were considered anomalies.

Electrical conductivity in MW2 showed greater fluctuations between 2010 and 2015 and started to stabilise from 2016 onwards. Elevated electrical conductivity value in MW5 was recorded in 2014 which then returned to stabilised values thereafter. Electrical conductivity values in BH2 showed greater fluctuations in 2015 to 2016 which subsequently stabilised thereafter. During this reporting period, electrical conductivity values for the majority of boreholes fall within the 20th and 80th percentile trigger values. Electrical conductivity values in MW1 and BH7 were within or below the 20th and 80th percentiles. Electrical conductivity values in BH8 and BH9 were slightly above the 80th percentile.

Other than the impact caused to BH2 due to vehicle struck, the variations in pH and electrical conductivity values over the years were likely to be influenced by climatic conditions with the return of average annual rainfall during this reporting period.

6.4.3 Assessment of Surface Water Quality and Discharge Event

SW19 represents the receiving water downstream of the discharge point (LDP01 which is Monitoring Point 1 of EPL 3916). Quarterly sampling and analysis of surface water quality at SW19 re-commenced in June 2018.

The receiving surface water quality monitoring at SW19 was undertaken on a quarterly basis during this monitoring period in September 2024, December 2024, March 2025 and June 2025.

Greater fluctuations of pH at SW19 have been recorded since the wetter climatic conditions experienced during the previous reporting periods, pH ranged from 4.4 to 4.6 during this reporting period which generally comply with the EPL pH criteria of 4.5 – 6.5

Electrical Conductivity (EC) values fluctuated between 147 and 208 µS/cm during this reporting period. EC at SW19 were well below the *NHMRC - Australian Drinking Water Guidelines 6 - 2011* which suggests an electrical conductivity limit of 750µS for aesthetic purposes.

Turbidity values from SW19 varied between 0.7 and 155 NTU. According to the *NHMRC - Australian Drinking Water Guidelines 6*, a turbidity of 2 NTU implies that water samples were mostly clear to some fine particles being visible whilst 5 NTU will have some visible fine particles and 60 NTU implies the water cannot be see through.

Total suspended solids (TSS) at SW19 varied between 5 and 76 mg/L with the elevated TSS recorded in March 2025 being slightly higher than the EPL 3916 TSS criteria of 50 mg/L.

Table 29 presents the baseline surface water (SW19) quality and trigger values contained in the ***Soil and Water Management Plan (v5, November 2020)*** (SWMP). The trigger values adopted in the SWMP are as follow:

- pH: 20th and 80th percentile
- TSS: 80th percentile
- Turbidity: 80th percentile

Table 30 presents the surface water (SW19) quality results yielded during this monitoring period.

Table 29: Baseline Surface Water (SW19) Quality and Trigger Values (June 2018 to June 2020).

Parameter	Minimum	20 th Percentile	50 th Percentile	80 th Percentile	Maximum
pH	4.0	4.1	4.2	4.3	4.7
TSS (mg/L)	2.0	2.0	3.0	5.0	9.0
Turbidity (NTU)	0.1	0.2	0.2	1.1	2.2

Table 30: Surface Water (SW19) Quality Results 2024 - 2025.

Parameter	Sep 2024	Dec 2024	Mar 2025	Jun 2025
pH	4.6	4.4	4.4	4.5
TSS (mg/L)	5	9	76	5
Turbidity (NTU)	3.2		155	0.7
SW19 quality results fall within the Trigger Values (SWMP, V5, Nov 2020)	No (pH, TSS and Turbidity above 80 th percentile)	No (pH and Turbidity above 80 th percentile)	No (pH, TSS and Turbidity above 80 th percentile)	No (pH and Turbidity above 80 th percentile)

The surface water (SW19) quality results contained in Table 30 indicate that higher readings have been recorded since the June 2023 (previous reporting period). High rainfall events may have resulted in higher creek flows within the creek which would likely to have caused some of the parameters to fall outside the trigger value thresholds of Table 29. The water quality results for this reporting period, although higher than historic results and trigger levels, the majority of the parameters sit below the EPL 3916 criteria. A close monitoring of the water quality at SW19 will continue.

No planned water discharge occurred at the licensed discharge point LDP01 (main water channel) during this reporting period.

6.4.4 Comparison of Surface Water Discharge Volume and Quality with Historical Data

The long-term discharge volumes and analysed water quality at the EPA licensed discharge point LDP01 are shown in Table 31. A total of 1.50 megalitres of water have been discharged during the discharge events since the 2003 – 2004 monitoring period to date. No ‘planned’ water discharge at the license discharge point LDP01 occurred during this reporting period.

Condition M2.3 of EPL lists the limits of water quality criteria to be met for water discharge which are:

- pH: 4.5 – 6.5
- Total suspended solids: 50 mg/L

Historically, laboratory results indicate that all water quality suites have met the EPL discharge criteria since the commencement of monitoring, except for one discharge event in the 2014 – 2015 monitoring period where the total suspended solids were slightly elevated and exceeded the EPL criteria. There was no discharge during the 2024 – 2025 reporting period.

Table 31: Long Term Discharged Water Volume at LDP01 (EPL licensed discharged point)

Annual Review Monitoring Period	Discharge Volume (Megalitre)	pH	Total Suspended Solid (mg/L)	Turbidity (NTU)	EPL Discharge Criteria Met
2003 – 2004	0.062 ^{*1}	4.9 ^{*1}	16 ^{*1}	21 ^{*1}	Yes ^{*1}
	0.034 ^{*2}	5.0 ^{*2}	31 ^{*2}	33 ^{*2}	Yes ^{*2}
2004 – 2005	0.374 ^{*1}	5.9 ^{*1}	33 ^{*1}	60 ^{*1}	Yes ^{*1}
	0.156 ^{*2}	6.3 ^{*2}	22 ^{*2}	6.3 ^{*2}	Yes ^{*2}
2005 – 2006	0	-	-	-	-
2006 – 2007	0	-	-	-	-
2007 – 2008	0	-	-	-	-
2008 – 2009	0	-	-	-	-
2009 – 2010	0	-	-	-	-
2010 – 2011	0	-	-	-	-
2011 – 2012	0	-	-	-	-
2012 – 2013	0	-	-	-	-
2013 – 2014	0	-	-	-	-
2014 – 2015	Not measured ^{*1}	4.7 ^{*1}	64 ^{*1}	40 ^{*1}	No ^{*1}
	Not measured ^{*2}	5.5 ^{*2}	32 ^{*2}	80 ^{*2}	Yes ^{*2}
2015 – 2016	0	-	-	-	-
2016 – 2017	0	-	-	-	-

Annual Review Monitoring Period	Discharge Volume (Megalitre)	pH	Total Suspended Solid (mg/L)	Turbidity (NTU)	EPL Discharge Criteria Met
2017 – 2018	0	-	-	-	-
2018 – 2019	0	-	-	-	-
2019 – 2020	0.350 ^{*1}	5.79 ^{*1}	18 ^{*1}	24.1 ^{*1}	Yes ^{*1}
	0.520 ^{*2}	4.60 ^{*2}	2 ^{*2}	4.2 ^{*2}	Yes ^{*2}
	0.005 ^{*3}	no sample ^{*3}	no sample ^{*3}	no sample ^{*3}	No ^{*3}
2020 – 2021	0	-	-	-	-
2021 – 2022	Not measured ^{*4}	-	-	-	-
2022 – 2023	0	-	-	-	-
2023 – 2024	0	-	-	-	-
2024 – 2025	0	-	-	-	-
TOTAL Volume Discharged (Megalitre)	1.500				

Note: ^{*1} denotes to discharge event number 1 within the monitoring period

^{*2} denotes to discharge event number 2 within the monitoring period

^{*3} denotes to discharge event number 3 within the monitoring period

^{*4} denotes to discharge event number 3 within the monitoring period

6.5 Maximum Extraction Depth Map

The Maximum Extraction Depth Map (MEDM) is based on the wet weather groundwater elevation and is determined by the quarry groundwater monitoring network.

An Independent Environmental Audit (IEA) was completed, and the report submitted in January 2023. Condition 23 of Schedule 2 of DA 250-09-01 states that a review and update of the MEDM for the Quarry is to be undertaken within 3 months of the completion of the IEA, to the satisfaction of the Secretary. A review of the MEDM was undertaken by WSP Golder and the reviewed document was submitted to the DPHI on 11 January 2023 for review and approval. The revised MEDM was approved by DPHI on 17 March 2023.

The next revision and update of the MEDM will be undertaken within 3 months of the next IEA which is scheduled to occur late 2025.

6.6 Water Access License Usage

The Annual Returns for Water Access License (WAL) 24341 for the 2024 - 2025 reporting period were submitted to WaterNSW in July 2025. The total water usage for the WAL is listed in Table 32 below.

Table 32: Water usage for Water Access Licences

Water Access License Number	Annual Water Usage (Megalitres)
WAL 24341	0

6.7 Chages to Environmental Procedures

Current groundwater management measures are considered adequate. No changes to environmental procedures are proposed.

Monitoring of the extraction limit will continue in order to ensure compliance. The Maximum Extraction Map for Old Northern Road quarry will require review following the next Independent Environmental Audit scheduled in late 2025.

Continue to monitor groundwater levels and quality, together with observations of any environmental or land use changes.

Any planned surface water discharge at LDP01 main water channel (Monitoring Point 1 of EPL 3916) will require grab samples prior to discharge for laboratory analysis to ensure pH, TSS and turbidity are within the specified EPL concentration limits. Dixon Sand staff to implement the Permit to Discharge procedure which outlines the steps required leading up to the allowable water discharge.

Quarterly sampling of surface water at SW19 to continue as normal.

7. Ecological Monitoring and Rehabilitation

7.1 Vegetation Clearing

No vegetation clearing was undertaken during this reporting period.

7.2 Bush Regeneration and Weed Management

Rehabilitation and weed management at Old Northern Road quarry were undertaken by a bush regeneration contractor with multiple visits each month throughout the reporting period.

A total of 371.5 hours was spent on bush regeneration works at Old Northern Road Quarry, equating to approximately 58% of the time spent between Old Northern Road Quarry and Haerses Road Quarry scope of works.

Bush regeneration, native vegetation planting and weed management were carried at the following locations:

- Vegetated areas on Lots 1 and 2 excluding areas in the extraction pit and sediment ponds,
- Native Vegetation Corridor on Lot 29,
- Southern border of extraction pit on Lot 196,
- Front embankment along the quarry entrance, and
- Biodiversity Offset Area located at Haerses Road (Lots 176 and 177 DP 752039).

Bush regeneration works involved mechanical and chemical methodologies.

Figures 3 to 6 (inclusive) show the locations where bush regeneration and weed management works have been undertaken at the Old Northern Road Quarry and Biodiversity Offset Area (located at Haerses Road) during this reporting period.

The Annual Bush Regeneration Report provided by the contractor for the 2024 – 2025 reporting period is attached as Appendix G.



Figure 3: Work areas subjected to bush regeneration and weed management at Old Northern Road Quarry (source: BushIT 2025).

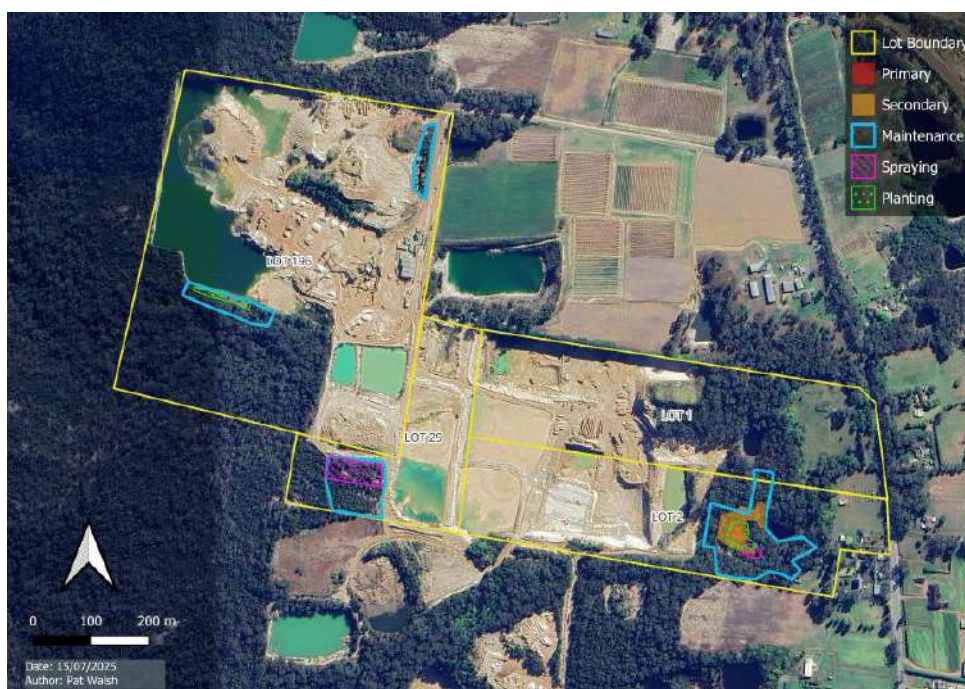


Figure 4: Types of work undertaken at Old Northern Road Quarry (source: BushIT 2025).



Figure 5: Work areas subjected to bush regeneration and weed management within the Biodiversity Offset Area, located at Haerses Road (source: BushIT 2025).



Figure 6: Types of work undertaken at the Biodiversity Offset Area, located at Haerses Road (source: BushIT 2025).

7.3 Biodiversity and Rehabilitation

Dixon Sand engaged South East Environmental to undertake the annual biodiversity and rehabilitation monitoring and reporting for Old Northern Road Quarry. Progress assessments were made against the commitments in Old Northern Road Quarry Biodiversity and Rehabilitation Management Plan (BRMP). The Biodiversity and Rehabilitation Management Report (South East Environmental, 2025) aimed to:

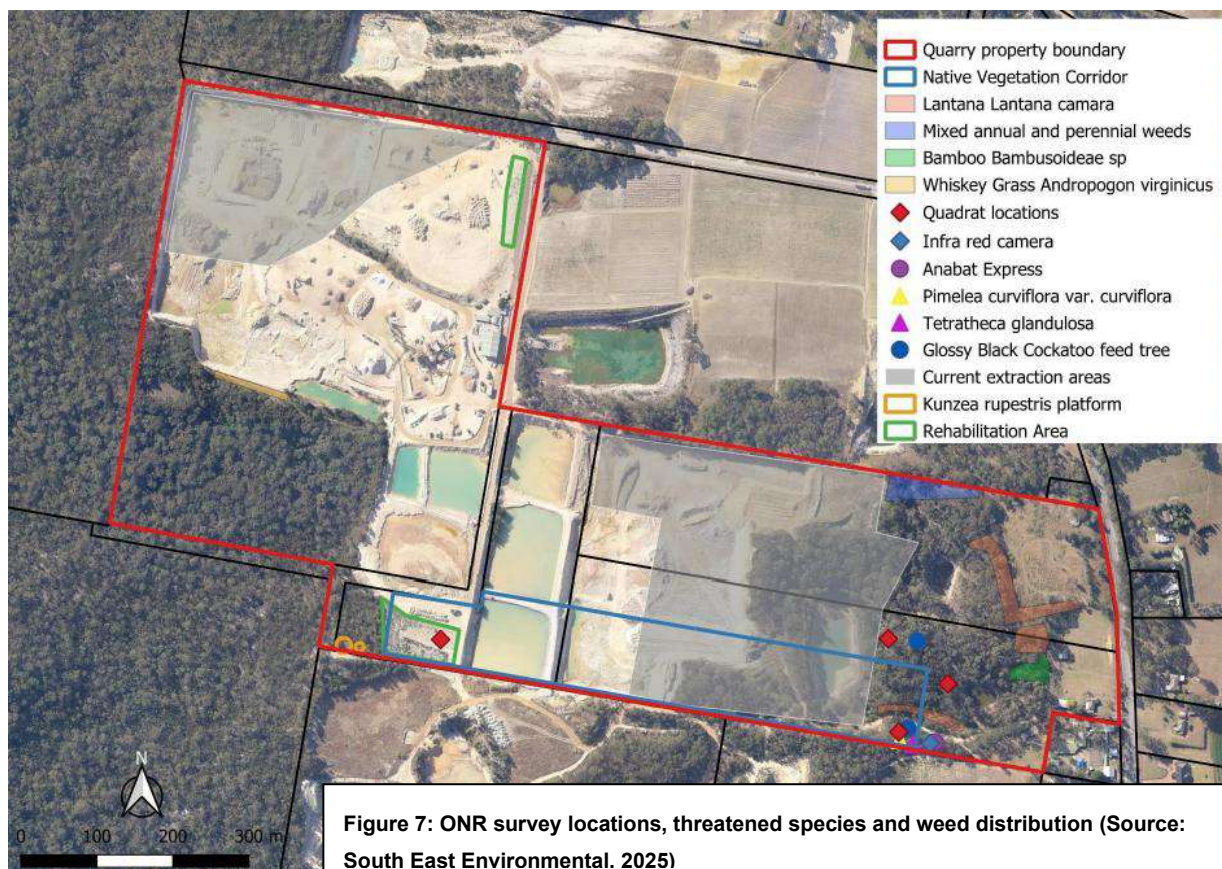
- Identify native flora and fauna species, populations and ecological communities known to or likely to occur within the Native Vegetation Corridor (NVC) and Haerses Road Biodiversity Offset Area (HRBOA),
- describe the native vegetation and habitats within the NVC and HRBOA,
- describe the current condition of the threatened flora and its habitat found outside of the NVC at Old Northern Road,
- discuss the ongoing monitoring of threatened flora and fauna previously recorded at both ONR and HRBOA,
- determine the legislative and conservation significance of species, populations and ecological communities known or likely to occur within the NVC and HRBOA with reference to the Commonwealth *EPBC Act 1999* and the *NSW BC Act 2016*,
- recommend appropriate biodiversity and environmental management measures that should be implemented to reach criteria for monitoring success set by the Old Northern Road Quarry Biodiversity and Rehabilitation Management Plan (2018), and
- provide an independent monitoring report for inclusion as part of the external reporting for the quarry Annual Review.

Field surveys were conducted over June and July 2025 throughout the established monitoring sites across the quarry. Specific survey methodologies were adopted including the 20m x 50m quadrats, 2m x 20m subplot, 1m x 1m line plots and random meandering. Fauna survey methods included general searches for indirect evidence of native fauna including scratches, scats, nests, hollows in use, camps, roosts, den sites etc. in the study area, including diurnal and nocturnal call identifications. Opportunistic sightings of all fauna species were recorded throughout the survey period. Early morning dedicated bird surveys undertaken. Unbaited motion detection infra-red digital camera for 30 nights and Anabat recording device for 30 nights were also utilised for the fauna survey.

It was noted that the flora survey was conducted over a short timeframe during winter and therefore some plant species may have been undetected and not identified due to their dormancy or lack of flower status. The study was limited by the timing and frequency of survey.

Sections 7.3.1 to 7.3.10 describe the findings at each nominated rehabilitation and monitoring area, assessment against completion criteria, together with discussion and recommendations. The full Biodiversity and Rehabilitation Management Report (South East Environmental, 2025) is contained in Appendix H.

The locations survey quadrats, fauna survey, weed species and threatened species monitoring are depicted in Figure 7.



7.3.1 Native Vegetation Corridor

The Native Vegetation Corridor (NVC) comprises an area of 6.83 hectares, extending from the south-western corner of Lot 29 and extending along the southern boundary of Lot 2 to the area located between the 250m buffer and the Maroota Public School.

Five out of nine vegetation monitoring sites are located within the NVC.

The location of the NVC and vegetation monitoring sites are shown in Figure 8.

Rehabilitation of native vegetation in the NVC commenced in late 2017 on the south-western boundary of Lot 29, comprising an area of approximately 0.8 hectares and utilising three rehabilitation methods. Parts of the current NVC are utilised as haul road, sediment ponds and active extraction area. The remaining area are existing areas containing native vegetation and disturbed areas which are remnants of orchard plantation, grazing land and farm dams.

Rehabilitation Area – Planted

The planted area in the NVC is approximately 0.4 hectares in size. One vegetation monitoring site, as specified by the BRMP, is located in this area. Native nursery tube stocks were planted in this location. Two of the species, *Melaleuca deanei* (vulnerable) and *Darwinia fascicularis* ssp. *oligantha* (endangered population) under the *Biodiversity Conservation Act 2016*, were propagated from onsite specimens, grown in commercial nurseries and replanted in the NVC.

A total of 47 native species has been planted in this area, including the abovementioned propagated threatened species. The ecological survey during this monitoring period identified an 49 native species which were not recorded as planted and have emerged from seed bank storage from the sub-soil, including the vulnerable species *Tetratheca glandulosa*. A decrease in 16 species has been recorded since the survey undertaken last year, mainly forbs and ferns species. The decrease in number of species recorded is likely to be attributed to the return of average climatic conditions resulting in the short lived and moisture dependant small forbs and ferns being outcompeted by the hardier grasses and shrubs. In addition, it may be possible that some species not recorded during this year's survey were not actively growing or flowering during the survey period and therefore, not easily identifiable.

One weed species being Whiskey Grass (*Andropogon virginicus*) was identified and present within this planted rehabilitation area in very low density.

There were 14 live specimens of *Melaleuca deanei*, 10 *Darwinia fascicularis* ssp. *oligantha* and 6 *Tetratheca glandulosa* located this reporting period. No *Acacia bynoeana* was identified during this period which is likely due to wet conditions in 2020-2022 causing unfavourable condition for the species to grow.

Plates 1 and 2 shows the view of the planted rehabilitation area from the north-west corner looking east by comparing images from 2024 and 2025.

Plates 3 and 4 shows the view of the planted rehabilitation area from the south-east corner looking west by comparing images from 2024 and 2025.

Plates 5 and 6 contains the current status of one of the propagated *Melaleuca deanei* and *Darwinia fascicularis* ssp. *oligantha* cuttings planted in 2017.

Plate 7 shows the *Tetratheca glandulosa* within the planted rehabilitation area.

The annual survey indicates that the overall condition of the planted rehabilitation area is very good with canopy trees reaching reproductive maturity with flowering buds present during the survey event in July 2025. It appears that species diversity within the planted NVC has reached its peak with the noted slight reduction in forbs and ferns. Native mammals observed include macropods, bandicoots and possums. Ten bird species was recorded which remain the same as the previous year's.

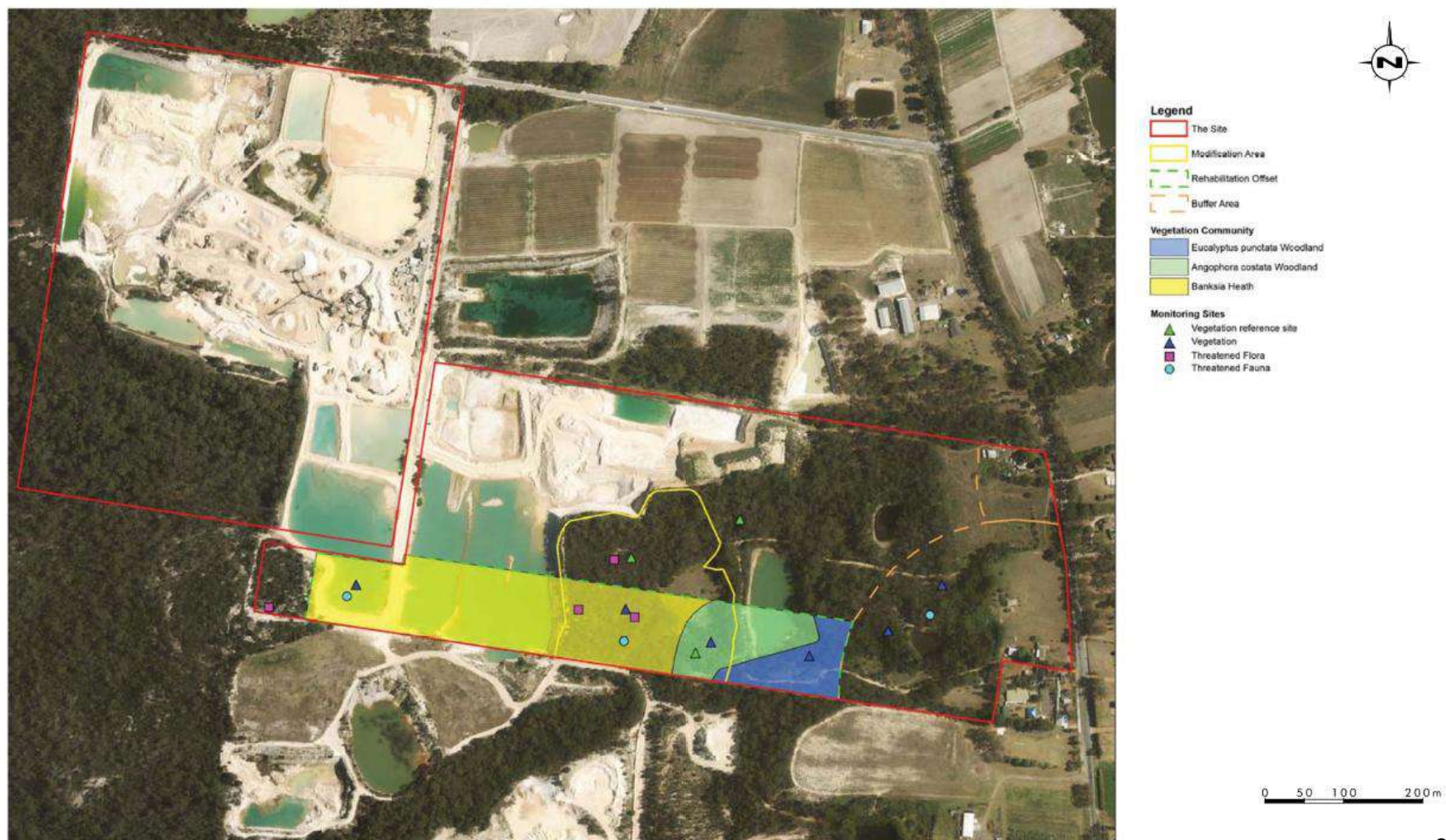


Figure 8

Location of Ecological Monitoring Sites
Old Northern Road Quarry

Image Source: Cumberland Ecology (2015)

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Plate 1: View of planted rehabilitation area from north-west corner looking east, 2024 (source: South East Environmental, 2025).



Plate 2: View of planted rehabilitation area from north-west corner looking east, 2025 (source: South East Environmental, 2025).



Plate 3: View of planted rehabilitation area from south-east corner looking west, 2024 (source: South East Environmental, 2025).



Plate 4: View of planted rehabilitation area from south-east corner looking west, 2025 (source: South East Environmental, 2025).



Plate 5: *Melaleuca deanei* planted in 2017 within the planted rehabilitation area 2025 (source: South East Environmental, 2025).



Plate 6: *Darwinia fascicularis* ssp *oligantha* planted in 2017 within the planted rehabilitation area 22025 (source: South East Environmental, 2025).



Plate 7: *Tetratheca glandulosa* within the planted rehabilitation area 2025 (source: South East Environmental, 2025).

Rehabilitation Area – Translocated

This area involved direct translation of material from Lots 1 and 2 vegetation clearing. Continued recruitment from seed bank storage were observed to continue to be ample. All age classes ranging from small seedlings to adult shrubs were observed from small seedlings to adult shrubs which had limited flower during the survey. Shrubs and ground cover species were reasonably abundant throughout the area. The canopy stratum is yet to fully establish however, *Eucalyptus sp.*, *Corymbia sp.* and *Angophora hispida* recruits were observed.

Translocated *Darwinia fascicularis* ssp. *oligantha* is numerous, particularly on the western section of the area however, there were some evidence of losses due to shading from nearby trees and shrubs. One single translocated *Tetradlea glandulosa* were observed to be in a healthy state with flowers present during July 2025 survey suggesting that flowering will continue over the coming months.

Three *Melaleuca deanei* which were planted in 2017 are still present and observed to be in a healthy state. A further 32 *M. deanei* individuals have been planted within this area during the 2020 – 2022 reporting period. Only 18 of the specimens were located due to plant guards being removed however it is likely that the unlocated specimens are healthy given the 18 specimens showing signs of active growth. The parent plant was translocated to this area after the 2:1 targeted species offset ratio was achieved. The mother plant was translocated using a loader with a large bucket with the aim of collecting as much soil and root ball as possible. Unfortunately, the main tap root was broken during the process causing the plant material died back. At the location of this translocated parent plant, two single seedlings of *M. deanei* were observed to have emerged from the two soil mounds in the last reporting period. Unfortunately, these two seedlings were not present during this reporting period possibly as they have not survived or being predated by the herbivores in the NVC.

Plate 8 shows the translocated *Tetradlea glandulosa* flowering within the translocation area in 2025. Plate 9 contains a specimen of *M. deanei* which was planted in the translocation area in 2017. Plate 10 shows another *Darwinia fascicularis* ssp *oligantha* specimen within this area. Plate 11 shows a specimen of *M. deanei* which was planted in the translocation area in 2021.



Plate 8: Translocated *Tetradlea glandulosa* flowering within the translocation area 2025 (source: South East Environmental, 2025)

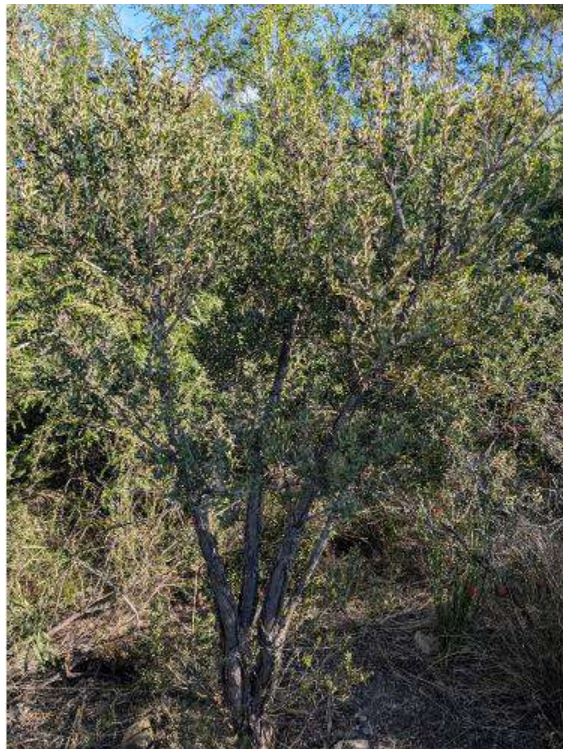


Plate 9: *M. deanei* planted in 2017 within the translocation area 2025 (source: South East Environmental, 2025).



Plate 10: *Darwinia fascicularis ssp oligantha* within the translocation area 2025 (source: South East Environmental, 2025).

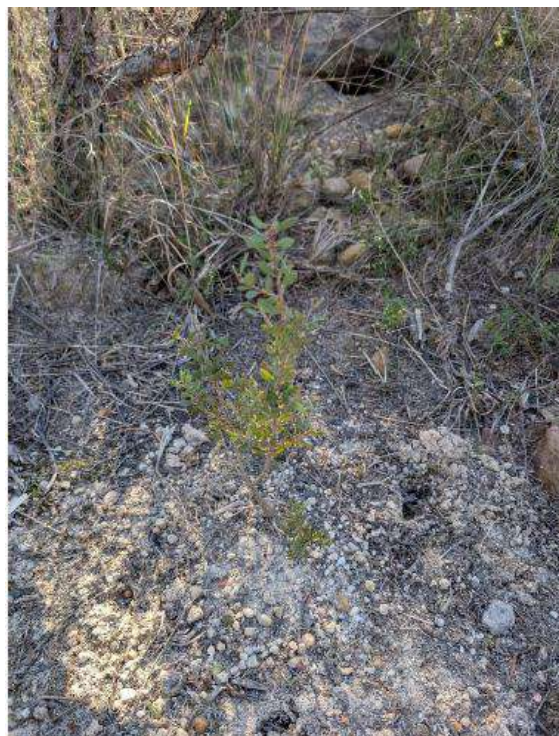


Plate 11: *M. deanei* planted in 2021 within the translocation area 2025 (source: South East Environmental, 2025).

Rehabilitation Area – Soil Seed Bank

Ample natural recruitment of native species was observed in this area, including *Darwinia fascicularis* ssp. *oligantha* recruitment. Ground cover and shrub species are present throughout. The emerging canopy stratum comprising *Eucalyptus* sp. and *Corymbia* sp. is recorded. *Banksia ericifolia* is becoming more dominant with recovering shrub layer containing *Grevillea buxifolia* and *Acacia suaveolens* being widespread. Previously *Acacia suaveolens* had dominated this layer however the *Banksia* has outgrown most of the other species present. Groundcover species are present throughout the area but due to the density of the shrub layer the groundcover is found to be sporadically distributed.

Altogether 20 *Darwinia fascicularis* ssp. *oligantha* have been identified and are scattered throughout the site, some observed to have new recruits. A single planted *Melaleuca deanei* was relocated during this survey period which now stands approximately 2 metres in height. The density of the shrub regrowth is suspected to be impeding on the efforts to locate other individuals. All the surviving threatened species which were located was observed to be in a healthy state.

Plates 12 and 13 compare the same view of the translocated rehabilitation area from south-west looking east in 2024 and 2025.

Plates 14 and 15 compare the same view of the soil seed bank rehabilitation area from north looking south in 2024 and 2025.

Plates 16 and 17 compare the same view of the soil seed bank rehabilitation area from south looking north in 2024 and 2025.

Front Gate Rehabilitation

The area around the front gate of the quarry underwent initial rehabilitation in 2017 with supplementary planting of native species. However, hot dry conditions in 2017 and 2020 have resulted in a number of losses and slow growth of the surviving plants, despite regular watering and maintenance. Since the return of more regular rainfall, vegetation in the area has thrived with many shrubs flowering well and new recruitments observed, although weed density has increased. Previous gaps in vegetation are being filled with natural recruitment and regeneration. Two *M. deanei* propagated from cuttings were planted in this area in 2023 however both did not survive due to compact ground and lack of water.

Plate 18 shows the status of the front gate rehabilitation.



Plate 12: View of translocated rehabilitation area from south-west looking east, 2024 (source: South East Environmental, 2025).



Plate 13: View of translocated rehabilitation area from south-west looking east, 2025 (source: South East Environmental, 2025).



Plate 14: View of soil seed bank rehabilitation area from north looking south, 2024 (source: South East Environmental, 2025).



Plate 15: View of soil seed bank rehabilitation area from north looking south, 2025 (source: South East Environmental, 2025).



Plate 16: View of soil seed bank rehabilitation area from south looking north, 2024 (source: South East Environmental, 2025).



Plate 17: View of soil seed bank rehabilitation area from south looking north, 2025 (source: South East Environmental, 2025).



Plate 18: Front gate rehabilitation area 2025 (source: South East Environmental, 2025)

Vegetation Monitoring within NVC

Out of the nine vegetation monitoring sites across the whole Old Northern Road Quarry site, five vegetation monitoring sites are located within the NVC including one site within the planted rehabilitation area previously discussed. From the remaining four sites, one site could be safely accessed for monitoring as the three remaining sites are currently in active quarry extraction area.

The overall health of the vegetation and biodiversity within the NVC is moderate. Historic disturbance was observed in this area and likely to be due to livestock grazing and timber removal. Recent continued rainfall in the local area has assisted in the recovery of vegetation from previous drought and wet conditions.

The remaining areas throughout the NVC are impacted by the presence of *Lantana camara*. An effort to remove and control has been undertaken for a number of years however due to the distribution and density, long term management is required to completely remove the species across the entire site. Where Lantana has been removed and controlled, the area is shown to be recovering well with the establishment and presence of ground cover grasses and forbes species.

During the 2021-2022 reporting period, it was determined that the required number of cloned *Melaleuca deanei* specimens to offset vegetation clearing under DA250-09-01 Modification 4 had been achieved and determined successful, meeting the 2:1 offset ratio. This enabled the parent plant to be removed from the original site on Lot 2

Strip 2. An attempt to translocation the parent plant was made via digging around the root ball and carrying the plant with the attached root ball using a loader bucket. However, the root system of the parent plant was found to be extensive and had coiled around large sandstone boulders and throughout the cracks of others. The parent plant was translocated and planted in the NVC with the root ball and immediate surrounding soil. Two seedlings have been observed to emerge at the root ball locations where the parent plant was translocated during the previous monitoring period. Unfortunately, these two seedlings in the root ball appeared to have perished during this monitoring period.

Vegetation Monitoring outside NVC

Four vegetation monitoring sites are located outside the NVC. Access to two of the monitoring sites are located in the current extraction areas and therefore cannot be accessed. Access to one other monitoring site was restricted by the presence of *Lantana camara*.

The first accessible survey site is located outside the NVC within the 250m buffer to the Maroota Public School with vegetation determined to be *Smooth barked Apple – Red Bloodwood – Sydney Peppermint heathy open forest on slopes of dry sandstone gullies of western and southern Sydney, Sydney Basin Bioregion*. This area was subjected to historic disturbance, most likely from timber harvesting. Survey indicated there is abundance *Eucalyptus piperita* regenerating within the survey quadrat, all being around the same age which indicates that the area had been previously cleared. Diversity within the survey site was categorised as reasonable and biodiversity values moderate. This survey site will not be subjected to future vegetation clearing for the quarry and therefore presents a good opportunity to monitor the effects of sand extraction in nearby retained vegetation.

The additional survey site is also classified as *Smooth barked Apple – Red Bloodwood – Sydney Peppermint heathy open forest on slopes of dry sandstone gullies of western and southern Sydney, Sydney*. This survey location is located just within the 250m buffer to the Maroota Public School and will not be subjected to future vegetation clearing. Vegetation within this survey plot appears to have had very little disturbance and contains no exotic weeds. This survey location will also provide good baseline data for future reference for rehabilitation.

Lantana camara have some impacts on the remaining area outside the NVC. The third survey quadrat could not be accessed due to this. Removal and control of the species have commenced within this section however more efforts are required as progress is slow and favourable conditions for weed growth have affected weed management progress. Survey at this site can commence once *Lantana* thickets are removed or reduced in density.

It was observed that vegetation within the two survey areas have slightly reduced during this monitoring period, mainly shrub, forb and grass species. This is likely to be attributed to stabilisation of competing species post favourable growing season over 2021 – 2023. Wet and dry period which occurred during this reporting period were likely to have contributed to the loss and reduction of species which prefer more stable climatic conditions. Despite the reduction in certain species within the quadrats, the species that are present are well established with increased density noted.



Figure 9
Location of Ecosystem Monitoring Sites
Haerses Road Biodiversity Offset Area

Image Source: Cumberland Ecology (2015)
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7.3.2 Haerses Road Biodiversity Offset Area

The Haerses Road Biodiversity Offset Area (HRBOA) has a minimum area of 8.70 hectares and is located east of Stage 2 extraction at the Haerses Road quarry. Five vegetation monitoring sites are located within the HRBOA. The HRBOA and locations of the monitoring sites are depicted in Figure 9.

Overall, there was a stabilisation to foliage cover and structure cover in most stratus at most survey sites. Grass and groundcover species appear to have responded to the previous wet conditions and decreased slightly in density following the return to average conditions. An increase in forbs density has been observed this year, in comparison to the lower density during last year's survey. Extensive Long-nosed Bandicoot digs were noted in an area close to Quadrat 1, similar to previous years. Bird presence and density have remained consistent from the last survey period, likely due to favourable weather conditions.

7.3.3 Threatened Flora Monitoring

Four threatened flora species are being monitored at the Old Northern Road quarry.

Kunzea rupestris* and *Darwinia fascicularis* ssp. *oligantha

Kunzea rupestris population are located on two distinct area within the far western area of Lot 29, growing on two rock platforms (eastern and western) which are also occupied by *Darwinia fascicularis* ssp. *oligantha*.

The eastern rock platform contains four individual patches of *Kunzea rupestris* with the presence of *Darwinia fascicularis* ssp. *oligantha*. Much of the surrounding vegetation has suffered die back including *Banksia ericifolia* and *Calytrix tetragona*, likely attributed to the dry conditions during the 2017 – 2019 which then followed by extreme wet conditions from 2020-2022 however, new seedlings have been observed.

The western rock platform contains five patches of *Kunzea rupestris* which was observed to be growing within a vegetation community with far more flora diversity than what is present on the eastern platform with shrubs growing in deeper soil profile in more protected conditions.

The overall health of the *Kunzea rupestris* population is good following the ideal weather conditions in the local area over the past 12 months. New growth on most plants was observed again during this survey period with flower buds present on much of the population. Mosses and lichens were present on both rock platforms.

The *Darwinia fascicularis* ssp. *oligantha* was observed to be plentiful in these locations with plants in flower and new recruits evident throughout the area. This species is also very well represented throughout the rehabilitation areas in the NVC.

***Melaleuca deanei* (propagated and plated specimens)**

Since 2017, 52 propagated and planted *Melaleuca deanei* plants are alive and are thriving in various locations around the Old Northern Road quarry premise. Locations include different areas in the NVC and front gate rehabilitation area.

In June 2022, the parent plant of *Melaleuca deanei* located in the Banksia heath plant community on Lot 2 strip 2 had been translocated to the NVC following the success of the 2:1 offset of propagation and planting. The translocated parent plant suffered damaged to the main tap root which caused a die back. New recruit or possibly regrowth have

been observed growing from the translocated root stock. However, these new recruits have perished during this reporting period.

The 2:1 offset ratio requires 36 plants to be propagated and planted. This offset ratio has been achieved and currently, a total of 52 propagated *Melaleuca deanei* specimens are present on site and showing signs of active growth.

Tetratheca glandulosa

Several *Tetratheca glandulosa* plants have been identified in Quadrat 2 during this period including an abundance of flowering *Pimelea curviflora* var *curviflora*.

7.3.4 Threatened Fauna Monitoring

Old Northern Road Quarry

Feed trees for Glossy Black Cockatoo are confirmed to be present in transect 2 of the NVC and within the 250m buffer to the Maroota Public School. It is common for this species to return to the same stand of feed trees repetitively. However, there were no birds observed feeding in these trees during this reporting period. However, the Glossy Black Cockatoos have been noted flying overhead at other times throughout the year.

The AnaBat Express sound recorder and infra-red motion detection camera were installed and left in place for 30 survey days and nights in April/May 2025. Five microchiropteran bat species were recorded with confidence within the survey period including the *Mormopterus norfolkensis* (Eastern Coastal Free-tailed Bat, listed as vulnerable under the *Biodiversity Conservation Act*, 2016). In addition, four other species that may be present, but not confidently identified include *Falsistrellus tasmaniensis* (Eastern Falsistrelle Bat), *Scoteanax rueppellii* (*Greater Broad-nosed Bat*), *Miniopterus australis* (Little Bent-winged Bat), and *Vespadelus troughtoni* (Eastern Cave Bat, listed as vulnerable under the *Biodiversity Conservation Act*, 2016). Despite the bat survey being undertaken slightly outside ideal survey period, Anabat results indicate a strong presence of microchiropteran bat in the NVC and 250m buffer to the Maroota Public School.

A pair of resident Wedge-tailed eagles were again observed flying over the site several times during this monitoring period. A White Breasted Sea Eagle was also observed flying over the quarry during this reporting period. A deceased brown goshawk was observed in the NVC which suspected have died from eating a baited rodent. Diggings from long-nosed bandicoots within the 250m buffer to the school have increased which also suggests the population number is on the increase.

The full list of fauna observed on site during this reporting period is contained in Appendix H.

Haerses Road Biodiversity Offset Area

There is a historic Bionet record of a Koala and Glossy Black Cockatoo sighting to the north of HRBOA towards Hitchcock Road.

A search for Koala scat under *Eucalyptus punctata* within all survey quadrats at the HRBOA were undertaken and no scats were present. However, Koala sightings in the local area, particularly in Glenorie, have increased since the Wollemi/Yengo mega bushfire over the spring-summer of 2019 – 2020.

Glossy Black Cockatoo feed trees were recorded in Quadrat 1.

Several Brown Treecreepers were again observed foraging at various locations which indicate their permanent presence and residents within the site.

Infra-red motion detection camera was installed within the HRBOA for 30 days and nights. Images of the Swamp Wallaby were again captured during this survey period.

Survey utilising AnaBat Express sound recorder was undertaken in February 2025 for 30 nights which identified the presence of seven species which include *Mormopterus norfolkensis* (Eastern Coastal Free-tailed Bat) and *Chalinolobus dwyeri* (Large-eared Pied Bat, listed as vulnerable under the *EPBC Act* and *BC Act*). AnaBat results also indicated the potential occurrence of the following 6 bat species, all of which are listed as Vulnerable under the *BC Act*. These are: *Falsistrellus tasmaniensis* (Eastern Falsistrelle), *Scoteanax rueppellii* (Greater Broad-nosed Bat), *Myotis Macropus* (Southern Myotis), *Miniopterus orianae* (Large Bent-winged Bat), *Miniopterus australis* (Little Bent-winged Bat), and *Vespadelus troughtoni* (Eastern Cave Bat). The presence of a large number of bat species being detected during this reporting period is consistent with previous survey years which suggests that quarry activities in the nearby area do not appear to impact upon local distribution of bats.

The Dural Land Snail (*Pommerhelix duralensis*) was identified during the previous 2019 and 2024 survey within the HRBOA, suggesting that the species population is present and inhabiting in the immediate area. No specimens of Dural Land Snail were identified during this reporting period. It is expected that the species remain present as there has been no environmental change or disturbance to the HRBOA during this reporting period.

7.3.5 Exotic Flora

The weed distribution map has been reviewed during this reporting period which is contained in Figure 7. Weed species identified on this map will be the focus of weed management priority over the next reporting period. The map will continue to be reviewed and revised as required on an annual basis. There has been a slight change to the weed density from the previous year, with a reduction in Lantana on Lot 2 and a reduction in mixed annual and perennial weeds on Lot 1.

The following weed species were identified within the 250m buffer area, NVC and Lot 196 at the Old Northern Road Quarry:

- *Ageratina adenophora* (Crofton Weed),
- *Andropogon virginicus* (Whiskey Grass),
- *Bidens Pilosa* (Cobblers Pegs),
- *Paspalum dilatatum* (Paspalum Grass),
- *Senecio madagascariensis* (Fireweed), and
- *Lantana camara* (Lantana)

Fireweed and Lantana are listed as Weeds of National Significance (WoNS) under the NSW *Biosecurity Act* 2015 and a weed management program is currently put in place for these species throughout the life of the rehabilitation plan.

One High Threat Weed (HTW) has been identified within the HRBOA, Whiskey Grass (*Andropogon virginicus*).

Current progress of rehabilitation corresponds to the 'Mid stage 2016 – 2023' staging of rehabilitation and rehabilitation strategy contained in Table 7.1 of the BRMP which includes:

- completion of rehabilitation on selected extracted areas on Lots 196 and 29,
- commencement of rehabilitation on strip 1,
- continual extraction on strips 2 and 3, and
- maintenance of previous revegetation, setbacks, buffer zones and bunds.

7.3.6 Pest Species Monitoring and Control

Feral pest species monitoring was undertaken by South East Environmental utilising infrared cameras, sand plots, direct observation of prints and burrows, scat identification and digs.

The following feral pest species were identified to be present on the quarry premise:

- European Red Fox – identified through sand plot prints
- Noisy Minor – identified through on-site observation,
- Dog – identified through prints
- European Rabbit – identified through scats

European rabbit scats were observed in several locations within the NVC and 250m school buffer in low density. Carnivore scats observed on site were highly likely to be those of European Red Fox. No rabbits were observed to be feeding during the day, scats were not in high density and warrens were not observed. The population of rabbits is therefore, considered to be low, and likely to be kept under control by biological means such as predation from foxes, dogs, cats and birds of preys such as Wedge-tailed Eagle that are present nearby. Should the number of rabbits become problematic, it may be necessary to engage in a control program to reduce or eliminate the population.

Noisy minors were observed in lower numbers within the NVC and the 250m buffer area compared to the previous years. Noisy minors are considered a pest if present in high density and is a key threatening process to a number of threatened native species of small birds such as the Brown Tree Creeper which is present in the HRBOA. The population of the Noisy Minor was considered to be small and lower than those recorded in the previous years. This is possibly due to Lantana being managed and controlled in the area. Noisy Minors favours habitats within open understory or an understory of one dominant species, enabling them to intimidate other bird species. The management of Lantana allows restoration of understory species diversity which allows a broader range of bird species to inhabit. Several small and medium bird species have been observed within the NVC and 250m school buffer during this period. Nevertheless, the population of the Noisy Minor will continued to be monitored over time and management strategy to be implemented to prevent the species from becoming dominant which can lead to elimination and displacement of other native bird species.

Overall, occurrences of fauna pest species are not at a level considered to require active management and on-going monitoring will be undertaken to determine appropriate dynamic management strategy.

7.3.7 Progressive Rehabilitation

Progressive rehabilitation of the quarry during this reporting period included:

- Continued capping and compaction of the silt ponds located on Lot 196 directly north of the current Native Vegetation Corridor (NVC). Part of the silt pond will form the northern boundary of the NVC, and the remainder will be revegetated to Class 4 Agriculture.
- Continued capping and compaction of the silt pond located on Lot 29 directly east of the current haul road separating Lots 29 and 196. Once optimal status is obtained, stockpiled windrows of material and topsoil will be applied to this area for rehabilitation of Banksia Heath Community, extending east from the current NVC on Lot 29.

The locations of the silt ponds undergoing capping and compaction are shown in Figure 10 below.

No revegetation was able to be carried out for rehabilitation of the silt ponds during this reporting period as further settlement, stabilisation and compaction of the silt ponds are required in order to support top dressing of topsoil and revegetation material.

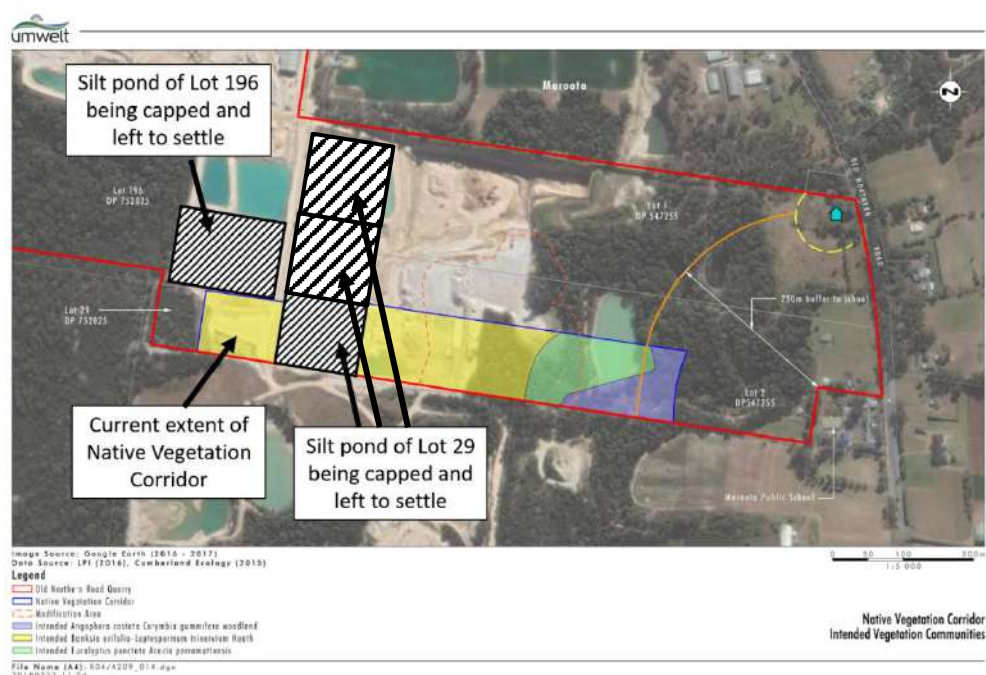


Figure 10: Locations of silt ponds undergoing capping and compaction in 2025, in preparation for future rehabilitation.

7.3.8 Progressive Achievement of Completion Criteria

Section 5.2 of the BRMP contains the preliminary rehabilitation performance and completion criteria. The status of targets being achieved against the preliminary rehabilitation performance and completion criteria are contained in Table 33.

Table 33: Assessment against criteria to monitor success of rehabilitation.

Aspect	Preliminary Rehabilitation Performance and Completion Criteria	Target Achieved	Comments
Decommissioning	All surface infrastructure will be decommissioned and removed.	N/A	Noted – completion criteria not yet triggered
Soil	Rehabilitated slopes are stable	Yes	Complied with – managed through a combination of weekly and monthly inspections by Quarry Managers and Environmental Officer, or Delegates. Aspects managed through mitigation measures contained in the Soil and Water Management.
	No significant erosion is present that would constitute a safety hazard or compromise the capability of supporting the end land use.		
	Contour banks are stable and there is no evidence of overtopping or significant scouring as a result of runoff.		
	Surface layer is free of any hazardous materials.		
Water	Runoff water quality from the site does not pose a threat to downstream water quality.	Yes	Complied with - aspect managed through downstream surface water monitoring, and other mitigation measures contained in the Soil and Water Management.
Native Vegetation	Revegetation areas contain flora species assemblages characteristic of the desired native vegetation communities.	N/A	At this stage it is too early in the rehabilitation process to determine if the desired vegetation community is being established. Species planted in the NVC have been specifically chosen to recreate a Banksia Heath community.
	Second generation tree seedlings are present or likely to be, based on monitoring in comparable older rehabilitation sites (i.e., evidence of fruiting of native species observed).	N/A	It is too early in the rehabilitation process for second generation tree seedlings. Fruiting of tree species has only just commenced therefore this KPI is likely to be achieved within the next 2-3 years.
	More than 75 per cent of trees are healthy and growing as indicated by long term monitoring.	Yes	More than 75% of the native vegetation within the active rehabilitation area is healthy and is growing as expected for long term survival. All shrub and ground cover species have reached maturity with flowering and seed production observed. Some species have begun self-propagation within rehabilitation sites. <i>Eucalyptus</i> , <i>Angophora</i> and <i>Corymbia</i> species have now reached maturity and observed to be flowering.

Aspect	Preliminary Rehabilitation Performance and Completion Criteria	Target Achieved	Comments
	More than 50 per cent of translocated or propagated threatened flora species survive as indicated by long term monitoring.	Yes	More than 50% of translocated and planted propagated threatened flora species has survived despite the extreme weather conditions of the past reporting periods to date, at least 45 propagated <i>Darwinia fascicularis subsp. Oligantha</i> and at least 52 propagated <i>Melaleuca deanei</i> have survived transplanting in the rehabilitation area. A complete count of translocated <i>Darwinia fascicularis subsp. Oligantha</i> was not undertaken at the time of relocation however it appears that any losses that may have occurred were minimal and new recruits are now visible throughout much of the area.
	There is no significant weed infestation such that weeds do not comprise a significant proportion of species in any stratum.	Yes	There is no significant weed infestation within the rehabilitation area. Significant weed infestations are located within the future area designated for NVC rehabilitation. These areas are being actively addressed by weed management contractors.
Stream and Riparian Zone Restoration	Drainage line stable displaying no signs of erosion Weed species densities no greater than surrounding vegetation Access to riparian zone is restricted Riparian zone established to a width of 20 metres Riparian zone is considered self-sustaining and exhibits 60% or more of the control site scores for each riparian condition monitoring attribute	N/A	Noted – aspect not yet triggered.
Weed and Pests	Regular inspections indicate a decline weed diversity, density and abundance and a decline in signs of feral animal activity.	Yes	There were very few weed species identified within the rehabilitation area. There are no signs of feral animal activity.
	There is no significant weed infestation such that weeds do not comprise a significant proportion of species in any stratum.	Yes	There is no significant weed infestation within the rehabilitation area. Significant weed infestations are located within the future area designated for NVC rehabilitation. These areas are being actively addressed by weed management contractors.

Aspect	Preliminary Rehabilitation Performance and Completion Criteria	Target Achieved	Comments
	There is no evidence of significant damage resulting from feral animal activity	Yes	There is no evidence of significant damage caused from feral animal activity within the rehabilitation area.
Bushfire Hazard	Appropriate bushfire hazard controls have been implemented.	Yes	Complied with – bushfire hazards are managed through the Bushfire Management Plan (Parts 1 and 2).
Ongoing Public Safety	Appropriate mechanisms are established to control access and manage public safety post-closure.	N/A	Noted – aspect not yet triggered

7.3.9 Stream Restoration

Riparian stream restoration has not commenced. The areas where the riparian stream was to be reinstated are either still being extracted or yet to be extracted.

7.3.10 Discussion and Recommendations

The annual biodiversity monitoring and rehabilitation management report undertaken by South East Environmental for this reporting period marks the eighth year of monitoring and reporting for the quarry. The above average rainfall over this reporting period provided on-going ideal growing conditions for the rehabilitation areas of the NVC. Vegetation within all strata continue to show an increase in size, maturity and density over the last twelve months. New juvenile recruits can be observed within the shrub layer but a slight decline in groundcover species diversity. This may be attributed to species richness having reached its peak where the more dominating species out-compete other species for resources. Canopy species are growing well and have reached reproductive maturity during this reporting period, evident with some larger trees flowering.

Other vegetation within the Old Northern Road quarry have shown to recovered well from previous drought conditions from the 2017-2019. The above average rainfall over the past 12 months continued to provide ideal growing conditions for native vegetation. Resilience has been observed in native vegetation within areas of no weedy growth, with no new weed growth or establishment of weed following the return of regular and above rainfall events.

Vegetation changes within the HRBOA are observed to be minimal which provides a good demonstration of the hardiness of native vegetation stand with minimal historic disturbances. Similarly, a slight decrease in shrub and groundcover species density since the previous reporting period has been observed, likely attributed to above average rainfall during this reporting period. This slight decline in species is expected to have reached its peak with returning average climatic condition.

The threatened *Kunzea rupestris* located west of the NVC have been affected by the prolonged drought conditions of 2017 to 2019. The *Kunzea rupestris* was adversely impacted by the drought, particularly from radiant heat reflection from the surrounding sandstone outcrop. New juvenile recruits have been recorded since the return of regular and above average rainfall.

Other threatened species previously recorded on site were located and appear to be in a healthy state.

Management of Lantana within the NVC and 250m school buffer area at the Old Northern Road Quarry will be continuing to be the priority for bush regeneration contractors to prohibit the spread of the weed into new areas which can form potential habitat for exotic fauna such as the European Red Fox and European Rabbit.

A silt pond directly east of the NVC rehabilitation area is the designated area for continuing the NVC rehabilitation. Rehabilitation was scheduled to commence this reporting period however due to the prolonged wet weather conditions experienced previously, there has been a delay in the silt pond final capping, sufficient evaporation and stabilisation. It is anticipated that rehabilitation in this area can commence during the next reporting period. Rehabilitation will also focus on the western embankment at the front entrance to the quarry site.

The other two silt ponds located on Lot 29 are also reaching their final stages of capping and will be rehabilitated to Class 4 Agriculture when optimal compaction and stabilisation are achieved.

Continue with supplementary planting within the rehabilitation area and locations within the NVC and 250m buffer to the school where Lantana has been removed.

7.4 Change in Environmental Procedures

Old Northern Road NVC Rehabilitation Area

- Continue to monitor and manage competitive native species and trees by culling to optimise growth of native species including the planted and translocated threatened species.
- Continue with routine weed control (particularly perennial grass such as *Cynodon dactylon* – Couch grass) and monitoring of regenerating native species,
- Supplementary planting on the southern boundary to create a buffer to prevent weed encroachment due to blown in seeds from adjacent land, and
- Re-marking of the planted *Melaleuca deanei*

Old Northern Road Lots 1 and 2

- Continued management of *Lantana camera* and review techniques recommended in the Ecological Monitoring Report (South East Environmental, 2025),
- Continued management of other weed species including exotic grasses, and
- Supplementary planting or similar treatment in identified areas as required.

Old Northern Road other areas

- Continue with routine weed management along the southern boundary of Cons Hill (Lot 196) and carry out direct seeding or supplementary planting of remnant canopy species and competitive native grasses (such as *Imperata cylindrica*) to revegetate compacted areas, exposed areas and edge areas as required.

Haerses Road Biodiversity Offset Area

- Continue with management of invasive grass and annual species along the western border of the HRBOA.

Front Gate Embankment

- Ongoing maintenance of exotic grassed utilising brush cut, manual removal and spot spraying before setting seed methodology.

8. Community and Social Impacts

8.1 Compliance

Dixon Sand is required to adhere to the following community related consent conditions:

Table 34: Community related consent conditions

Development Consent	Consent Condition	Requirement	Compliance
DA250-09-01	Condition 8 of Schedule 5	The Applicant must establish and operate a Community Consultative Committee (CCC) for the development to the satisfaction of the Secretary. The CCC must be established by 10 October 2018 and operated in general accordance with the Department's Community Consultative Committee Guidelines, November 2016 (or later version). Notes: • The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Applicant complies with this consent. • In accordance with the guidelines, the Committee should comprise an independent chair and appropriate representation from the Applicant, Council and the local community. • The CCC established and operated prior to the approval of Modification 5 must continue to be operated in accordance with the procedures required by the consent prior to the approval of Modification 5 until such time as the CCC required by this condition is established.	The current CCC members were re-appointed by the DP&E on 1st March 2018 (note joint CCC for the Old Northern Road and Haerses Road quarries). Additional members have been endorsed by the Chair Person after this date.
DA250-09-01	Condition 1(e) of Schedule 5	describe the procedures to be implemented to: • keep the local community and relevant agencies informed about the operation and environmental performance of the development. • receive, record, handle and respond to complaints. • resolve any disputes that may arise during the course of the development. • respond to any non-compliance. • respond to emergencies; and	Refer to the Environmental Management Systems
DA165-7-2005	Condition 1(e) of Schedule 5		
DA250-09-01	Condition 1(f) of Schedule 5	include a Community Relations Plan, developed in consultation with Council, the CCC, and the Maroota Public School, which includes:	The Community Relations Plan is included as Appendix 11 of the Environmental Management System

Development Consent	Consent Condition	Requirement	Compliance
		• identification of stakeholders potentially affected by the development. • detailed strategies to ensure open communication between the Applicant, the community and Maroota Public School. • detailed strategies to monitor and evaluate social impacts of the development on the local community and Maroota Public School; and • measures to improve community relations including: ○ quarry open days and education sessions to promote better understanding of quarry operations in the wider community. ○ participation in community activities; and ○ strategies involving in-kind exchanges of expertise and resources for activities such as bush regeneration, Landcare, Streamwatch, and other community-based environmental programs.	
DA165-7-2005	Condition 8 of Schedule 5	The Applicant must establish and operate a Community Consultative Committee (CCC) for the development to the satisfaction of the Secretary. The CCC must be established by 30 June 2018 and operated in general accordance with the Department's Community Consultative Committee Guidelines, November 2016 (or later version). Notes: • The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Applicant complies with this consent. • In accordance with the guidelines, the Committee should comprise an independent chair and appropriate • representation from the Applicant, Council and the local community. • The CCC established and operated prior to the approval of Modification 1 must continue to be operated in accordance with the procedures required by the consent prior to the approval of Modification 1 until such time as the CCC required by this condition is established.	The current CCC members were re-appointed by the DP&E on 1st March 2018 (note joint CCC for the Old Northern Road and Haerses Road quarries). Additional members have been endorsed by the Chair Person after this date.

Development Consent	Consent Condition	Requirement	Compliance
		The Applicant may, with the approval of the Secretary, combine the function of this CCC with the functions of other CCCs in the area.	

8.2 Complaints and Follow-up Actions

One complaint was received for the Old Northern Road Quarry during the 2024 – 2025 reporting period.

Table 35: Complaint received during the reporting period

Complaint	
Date complaint received	31 March 2025
Issue	EPA received a complaint from the public regarding sediment from the Quarry tracking onto Old Northern Road
Recommended Action(s)	Carry out an inspection of the access road, intersection and Old Northern Road immediately to assess the source of the sediment. Take photographic evidence and respond to EPA.
Outcome	- Inspection determined no sand debris is found on the quarry access road and existing inadequate drainage and maintenance along Old Northern Road. - Confirmed all trucks are required to cover their load prior to leaving the quarry, to be complied with in accordance with the Traffic Management Plan and Truck Driver Induction. - Undertake a re-education campaign for the haulage truck drivers throughout the month of April 2025 (at both Old Northern Road and Haerses Road Quarries), highlighting the key compliance requirements - EPA responded to the Complainant and no further action is required.
Close out Date	1 April 2025

A copy of the complaints register for this reporting period is contained in Appendix K.

8.3 Long Term Complaints Trend

Long term complaints monitoring data commencing since the 2003 – 2004 monitoring period is depicted in Chart 59 below. It must be noted that complaints were recorded for the Old Northern Road and Haerses Road quarries combined from the 2006 – 2007 to 2017 – 2018 monitoring periods, with complaints recorded separately for individual quarries from hereon.

A total of twenty-five complaints have been received by Dixon sand since the 2003 – 2004 monitoring period to date.

The number complaints were between nil and up to three from the 2003 - 2004 to 2007 – 2008 monitoring periods, all of which were associated with haulage trucks driving in a dangerous manner or exceeding the speed limit.

During the 2008 – 2009 monitoring period, the number of complaints increased to six, with the majority associated with trucks driving in a dangerous manner or exceeding the school zone speed limit. One complaint was in regards to excessive noise generation where the source of noise was identified to be caused by a different operation.

From 2009 – 2010 to 2016 – 2017 monitoring periods, the number of complaints were minimal and fluctuated between nil and two. These complaints were associated with haulage trucks driving in a dangerous manner or exceeding the speed limit.

The 2016 – 2017 monitoring period recorded an increase in number of complaints to eight complaints which were associated with haulage trucks driving in a dangerous manner, excessive noise generation, operation outside of approved hours and excessive dust generation.

From this point, a downward trend in number of complaints was observed. The number of complaints received reduced to five haulage truck related complaints during the 2018 – 2019 monitoring period. The number of complaints further reduced to two truck related complaints (exceedance of speed limit) during this 2019 – 2020 monitoring period. One haulage truck complaint (dangerous driving) was received during the 2019 - 2020 monitoring period.

Three complaints were received during the 2020 - 2021 reporting period which were related to noise, sediment and haulage truck.

The majority of the complaints were made by residents of Maroota, residents of neighbouring suburbs or local road users. One complaint was made by Dixon Sand Quarry Manager. Timing of events leading to complaints were mainly during quarry operation hours with the exception of complaints associated with operations outside of consented hours.

The locations of haulage trucks driving in a dangerous manner, exceeding the speed limit or excessively using engine brakes were mainly on Old Northern Road and Wisemans Ferry Road in the local areas.

All complaints have been closed out.

Dixon Sand did not receive any complaints during the 2022 - 2023 and 2023 – 2024 reporting periods.

Dixon Sand received one complaint in relation to tracking of sediment offsite during the 2024 – 2025 reporting period.

Dixon Sand implemented the steps to identify the validity of the complaints received and employed appropriate actions outlined in the complaints procedure and the Maroota Local Traffic Management Policy (inter-pit policy).

Several complaints were identified to have been associated with other operations within or outside the local areas.

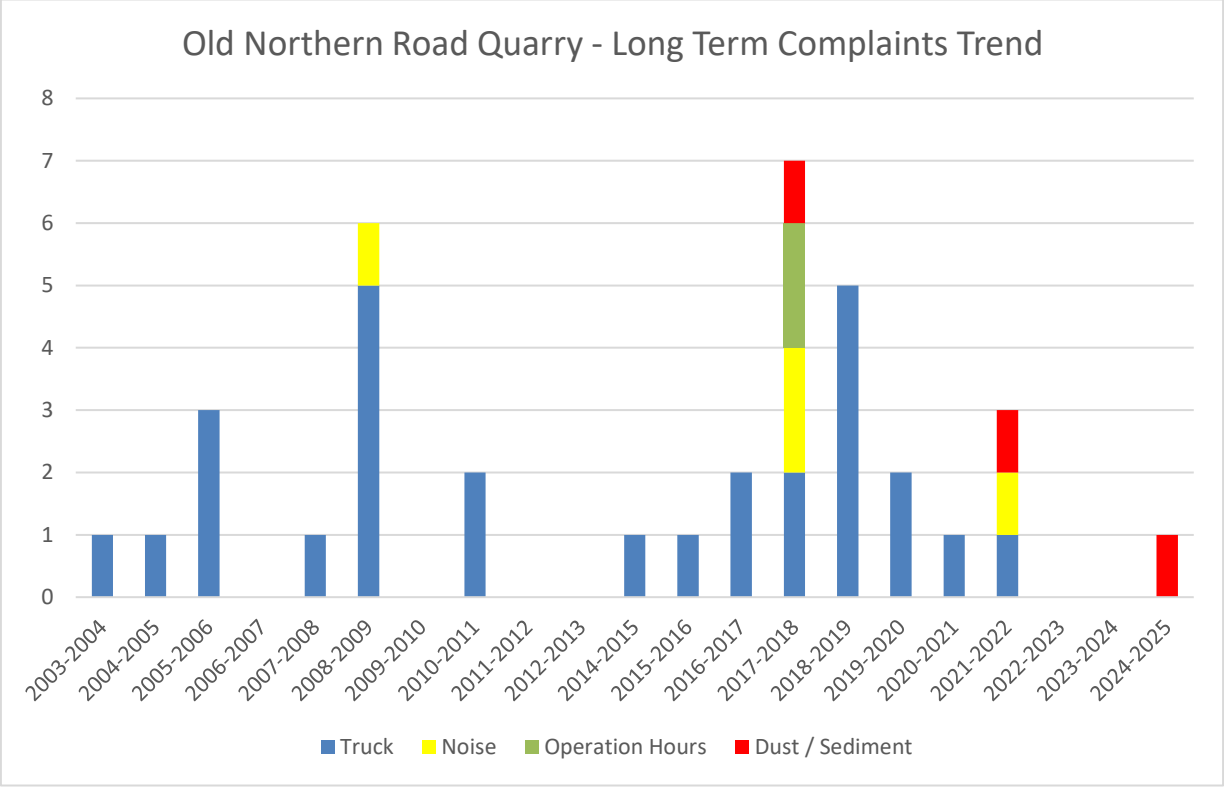


Chart 59: Long term complaints trend.

8.4 Community Consultative Committee, Meetings and Guidelines

Two CCC meetings were held in the 2024 - 2025 reporting period, in accordance with the consent conditions and CCC Guidelines (2023). The ordinary bi-annual CCC meetings were held on 6th November 2024 and 7th May 2025. The minutes from the ordinary CCC meetings are provided in Appendix J.

8.5 Community and Stakeholder Liaison

In addition to engaging with the Community Representatives of the CCC, the local community is provided with an opportunity to comment on Dixon Sand's environmental performance through direct contact with quarry staff or through the contact portal via the company's website.

Stakeholder Liaison and Correspondences

Dixon Sand staff made contact with local community members on a number of occasions. These include:

- Notifying the Maroota Public School regarding noise monitoring undertaken in December 2024 and June 2025 and other matters relating to ground maintenance on school ground or in proximity to the school,
- Liaising with the neighbouring property owner to the Old Northern Road quarry regarding general maintenance, and
- Bi-annual CCC meetings in November 2024 and May 2025

Local Initiatives and Community Contributions

Dixon Sand regularly makes monetary and resource contributions to a number of community initiatives and charities such as:

- monetary donation and participation in the Maroota Public School's Annual Maroota Muster Festival,
- monetary donation to Cattai Public School,
- monetary donation to Royal Flying Doctor Service,
- monetary donation to Last Post @ Wisemans Ferry for Anzac Day
- monetary donation to Castlereagh Christian Conference Centre
- monetary sponsorship of Nepean Area Disabilities Organisation
- monetary sponsorship of Sporting Individuals, teams and associations
- Anzac Day Memorial – Tribute Display
- Christmas appeal for the Salvation Army
- monetary donation to Glenorie Progress Association, and
- publication of environmental monitoring data, and provision of all current consents and site management plans for public viewing on the Dixon Sand website.

8.6 Ecologically Sustainable Development

Ecologically Sustainable Development (ESD) can be defined as “using, conserving and enhancing the community’s resources so that the ecological processes, on which life depends, are maintained and the total quality of life, now and in the future, can be increased” (Commonwealth of Australia, 1992).

The four principles of ESD are listed in Schedule 2 of the *Environmental Planning and Assessment Regulation 2021* as follows:

- the precautionary principle;
- inter-generational equity;
- conservation of biological diversity and ecological integrity; and
- Improved valuation, pricing and incentive mechanisms.

Dixon Sand’s Old Northern Road Quarry continue to manage all potential threats to the quality of the environment, determined with a reasonable degree of certainty through the use of scientific investigation and analysis of the individual and cumulative environmental impacts of the proposal.

Long-term environmental fluctuations have been, and will continue to be, monitored for the duration of extraction such as groundwater levels and quality, noise, air quality and threatened flora and fauna.

Threatened flora and fauna present on site are monitored annually to ensure they are not impacted by quarry activities. Similarly, noise and air quality monitoring will continue throughout the life of the developments. Mitigation measures are in place to minimise the potential adverse impacts likely to affect social and intergenerational equity. These measures relate to erosion and sediment control, surface and groundwater management, air quality control, and noise and waste management. Continual community relation strategies will ensure the community is well informed and has an effective means of voicing concerns and receiving feedback.

Dixon Sand aims to protect the biological diversity and ecological integrity of the sites through;

- progressive rehabilitation of the extracted areas using agricultural and native species;
- monitoring and maintenance of buffer areas to ecologically sensitive sites;
- establishment of native vegetation offset areas, biodiversity offset area and native rehabilitation areas to maximise native fauna habitats and enhance vegetation corridor for flora and fauna migration, and
- providing a final landform that integrates elements of the local area.

The value placed on environmental resources by Dixon Sand is represented as costs associated with the implementation of monitoring and mitigation measures throughout the life of the development consents.

8.7 Changes to Social Monitoring Procedures

No changes are proposed for the social management procedures.

9. Bushfire Management

9.1 Compliance

DA250-09-01 requires Dixon Sand to ensure that the Quarry is suitably equipped to respond to any fires on site. The Quarry is to assist the Rural Fire Service and emergency services to the extent practicable if there is a fire in the vicinity of the site.

A Bushfire Management Plan has been prepared for the Quarry.

10. Competency, Training and Awareness

The quarry management team is responsible for ensuring all personnel, including contractors, are provided with appropriate environmental training and awareness to ensure they understand their environmental awareness, responsibilities and how to mitigate the impacts. Training is undertaken using the following avenues:

- Compulsory site environmental induction for employees and contractors,
- Truck driver induction training,
- Pollution Incident Response Management Plan (PIRMP) and mock scenario training,
- Two-stage pre-clearing procedures and fauna handling and rescue procedures training,
- Permit to discharge protocols,
- Job Safety and Environmental Analysis,
- Environmental hazard identification workshop,
- Regular toolbox talks, and
- Emergency evacuation training.

11. Incidents and Non-Compliances

11.1 Environmental Incidents and Non-Compliances

Details of incidents and non-compliance are listed in Table 36 below.

Table 36: Incidents and Non-compliances

Date of Incident	Applicable Condition(s)	Details, Cause and Mitigation of Incident
Submission of 2023 - 2024 Annual Review after March 2024	Condition 12 of Schedule 5 of DA 250-09-01	Dixon Sand is required to submit the Annual Review for the Quarry by the end of March each year. The submission of this Annual Review at the end of September is technically non-compliant with the deadline required by the consent condition. However, Dixon Sand requested approval from the DPHI for the submission deadline of the Annual Review to be adjusted to reflect the financial year reporting. Approval was granted by the DPHI on 9 February 2018 to submit the Annual Review by the end of September each year. DPHI determined no breach of consent condition.
26 June 2024 - 24 July 2024	Condition 7 of Schedule 3 of DA 250-09-01	DPHI Notification and Reporting: DA-250-09-01-PA-45 Dust deposition gauge D5 (Bundwall): - Monthly dust deposition = 4.3 g/m²/month - Rolling annual average dust deposition = 5.7 g/m²/month The exceeded monthly and rolling annual average dust deposition at D5 were not due to quarry operations but attributed to neighbouring farming activities. Note: D5 is located on Quarry owned land, not on private residence. No consent breached. No further action required by DPHI. Incident closed out.
24 July 2024 - 21 August 2024	Condition 7 of Schedule 3 of DA 250-09-01	DPHI Notification and Reporting: DA-250-09-01-PA-46 Dust deposition gauge D5 (Bundwall): - Monthly dust deposition = 12.2 g/m²/month - Rolling annual average dust deposition = 6.6 g/m²/month The exceeded monthly and rolling annual average dust at D5 were not due to quarry operations but attributed to neighbouring farming activities. Note: D5 is located on Quarry owned land, not on private residence. No consent breached. No further action required by DPHI. Incident closed out.

Date of Incident	Applicable Condition(s)	Details, Cause and Mitigation of Incident
21 August 2024 - 18 September 2024	Condition 7 of Schedule 3 of DA 250-09-01	DPHI notification and reporting not required as monthly dust deposition is compliant. Dust deposition gauge D5 (Bundwall): - Monthly dust deposition = 3.4 g/m²/month - Rolling annual average dust deposition = 6.8 g/m²/month No consent breached. No further action required by DPHI. Incident closed out.
18 September 2024 - 16 October 2024	Condition 7 of Schedule 3 of DA 250-09-01	DPHI Notification and Reporting: DA-250-09-01-PA-48 Dust deposition gauge D5 (Bundwall): - Monthly dust deposition = 6.3 g/m²/month - Rolling annual average dust deposition = 7.0 g/m²/month The exceeded monthly and rolling annual average dust at D5 were not due to quarry operations but attributed to windy conditions and neighbouring farming activities. Note: D5 is located on Quarry owned land, not on private residence. No consent breached. No further action required by DPHI. Incident closed out.
16 October 2024 - 13 November 2024	Condition 7 of Schedule 3 of DA 250-09-01	DPHI notification and reporting not required as monthly dust deposition is compliant. Dust deposition gauge D5 (Bundwall): - Monthly dust deposition = 1.3 g/m²/month - Rolling annual average dust deposition = 6.8 g/m²/month No consent breached. No further action required by DPHI. Incident closed out.
13 November 2024 - 11 December 2024	Condition 7 of Schedule 3 of DA 250-09-01	DPHI notification and reporting not required as monthly dust deposition is compliant. Dust deposition gauge D5 (Bundwall): - Monthly dust deposition = 2.0 g/m²/month - Rolling annual average dust deposition = 6.1 g/m²/month No consent breached. No further action required by DPHI. Incident closed out.
11 December 2024 - 8 January 2025	Condition 7 of Schedule 3 of DA 250-09-01	DPHI Notification and Reporting: DA-250-09-01-PA-50 Dust deposition gauge (Front Gate – Access Road): Monthly dust deposition = 7.8 g/m²/month

Date of Incident	Applicable Condition(s)	Details, Cause and Mitigation of Incident
		- Rolling annual average dust deposition = 2.5 g/m²/month Dust deposition gauge D5 (Bundwall): - Monthly dust deposition = 2.6 g/m²/month - Rolling annual average dust deposition = 4.5 g/m²/month The exceeded monthly dust deposition at D1A and is attributed to neighbouring farming activities. The quarry was not operating for 16 days out of the 28 monitoring days due to the Christmas holiday period. No consent breached. No further action required by DPHI. Incident closed out.
8 January 2025 - 5 February 2025	Condition 7 of Schedule 3 of DA 250-09-01	DPHI notification and reporting not required as monthly dust deposition is compliant. Dust deposition gauge D5 (Bundwall): - Monthly dust deposition = 3.2 g/m²/month - Rolling annual average dust deposition = 4.12g/m²/month No consent breached. No further action required by DPHI. Incident closed out.
5 February 2025 - 5 March 2025	Condition 7 of Schedule 3 of DA 250-09-01	DPHI Notification and Reporting: DA-250-09-01-PA-51 Dust deposition gauge D1A (Front Gate – Access Road): - Monthly dust deposition = 5.2 g/m²/month - Rolling annual average dust deposition = 2.8 g/m²/month Dust deposition gauge D5 (Bundwall): - Monthly dust deposition = 2.2 g/m²/month - Rolling annual average dust deposition = 4.1 g/m²/month The exceeded monthly dust deposition at D1A is attributed to neighbouring farming activities. No consent breached. No further action required by DPHI. Incident closed out.
30 April 2025 - 28 May 2025	Condition 7 of Schedule 3 of DA 250-09-01	In accordance with Note d of Table 3 of Condition 7, the elevated monthly dust deposition at D1A was due to the forecasted dust storm which is considered an extraordinary event. Therefore, DPHI notification and reporting are not required. Dust deposition gauge D1A (Front Gate – Access Road): Monthly dust deposition = 19.7 g/m²/month

Date of Incident	Applicable Condition(s)	Details, Cause and Mitigation of Incident
		Rolling annual average dust deposition = 4.3 g/m²/month The exceeded monthly and annual average dust deposition at D1A are attributed to the forecasted dust storm which moved across the Greater Sydney region on 27th May 2025. No consent breached. No further action required by DPHI. Incident closed out.
27 May 2025	Condition 7 of Schedule 3 of DA 250-09-01	DPHI not notified. The 24-hour average PM10 level reached 71.7 µg/m³ which exceeded the 50 NEPM µg/m³ maximum criteria, as required in Table 3 of Condition 7 of Schedule 3 of the DA. The elevated PM10 was attributed to the forecasted dust storm moving across the western Sydney region. Elevated dust results were also recorded at other dust monitoring stations located at Penrith, Prospect and Richmond. At the time, quarry grounds were saturated from rainfall events over the past week. EPA was notified and no further action required. The dust storm is considered an extra-ordinary event as defined in Note d of Table 3. Therefore, no consent condition has been breached. No further action required. Incident closed out.
29 May 2025 - 26 June 2025	Condition 7 of Schedule 3 of DA 250-09-01	DPHI notification and reporting not required as monthly dust deposition is compliant. Dust deposition gauge D1A (Front Gate – Access Road): - Monthly dust deposition = 2.1 g/m²/month - Rolling annual average dust deposition = 4.3 g/m²/month No consent breached. No further action required by DPHI. Incident closed out.

11.2 Notices issued by DPIRD

Dixon Sand received four notices under the *Work Health and Safety Act 2011* from DPIRD (Resources Regulator) as detailed in Table 37 below.

Table 37: Notices issued by DPIRD (Resources Regulator)

Date Issued	Notice Reference	Issues	Status
5 July 2024	NTCE0016412 - Section 191 Improvement Notice	Mechanical Engineering Control Plan does not include the requirement or frequency of pre-start inspections or regular maintenance of the processing plant. All features of the safety devices to be included in the pre-start inspection	Closed out
19 February 2025	NTCE0016412 - Section 191 Improvement Notice	Forklift inspection and operator and various items in the Workshop with safety concerns	Closed out
26 February 2025	NTCE0016420 - Section 191 Improvement Notice	Electrical Engineering Control Plan – maintenance, inspection and testing of portable electric plant	Closed out

12. Independent Environmental Audit

12.1 Independent Environmental Audit Requirement

Condition 14 of Schedule 5 of DA 250-09-01 requires:

Within 12 weeks of commencing this audit, or as otherwise agreed by the Secretary, the Applicant must submit a copy of the audit report to the Secretary and any other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of these recommendations as required. The Applicant must implement these recommendations, to the satisfaction of the Secretary.

The appointment of R.W. Corkery and Co Pty Ltd (RWC) to carry out the Independent Environmental Audit (IEA) for Old Northern Road Quarry was approved by DPHI on 8th September 2022.

The IEA commenced on 18 October 2022 which covers the 3-year audit period between 23 October 2019 and 18 October 2022. The *Independent Environmental Audit: Old Northern Road Report* (RW Corkery & Co, December 2022, Document No. 1021/02) was issued to Dixon Sand on 14th December 2022.

The *Response and Action Plan for the Independent Environmental Audit 2022, Old Northern Road Quarry* document was prepared to provide Dixon Sand's response and proposed actions addressing the IEA findings, recommendations for non-compliances and suggested improvements as identified in the *Independent Environmental Audit: Old Northern Road Report* (RW Corkery & Co, December 2022, Document No. 1021/02).

The IEA report and Response and Action Plan report were submitted to the DPHI on 16th January 2023. The CCC members were provided a link to the reports published on Dixon Sand's website.

All proposed actions from the 2022 IEA have been implemented and closed out except for one item as is listed in Table 37 below. The matter of application to enact the Positive Public Covenant for the Haerses Road Biodiversity Offset Area is still on-going and terms of agreement still in negotiation between Dixon Sand and the DPHI.

The next IEA is scheduled to be undertaken late 2025.

Table 38: Outstanding non-compliance item identified during the 2022 IEA.

Consent Condition	Conditional Requirement	Compliance Status	IEA Comments and Recommendations	IEA Recommendation, Dixon Sand's Proposed Action and Implementation Timeframe
3(25)(c)	provide appropriate long term security for the Haerses Road Biodiversity Offset Area; and	Non-compliant	Proposed terms for a Public Positive Covenant were submitted by Dixon Sand to DPIE on 24 August 2019. However, confirmation of these terms is awaited and once confirmed, Dixon Sand will seek to register the Haerses Road Biodiversity Offset Area under this arrangement. See Recommendation ONR R9/22.	Recommendation ONR R9/22 Continue to follow up with the DPE to ensure that the Positive Public Covenant to provide long-term security of the Haerses Road Biodiversity Offset Area is fully processed to enable it to be implemented. <i>Dixon Sand has submitted all required information regarding the Positive Public Covenant to DPE and awaits the Department's response in order for this matter to be finalised.</i> Proposed Action: Dixon Sand will contact DPE to continue with the review of the proposed draft conditions in order to finalise the Positive Public Covenant registration. Status Open – Dixon Sand contacted DPE (now DPHI) on 31 January 2023, awaiting response. Dixon recently contact DPHI and submitted the draft terms of the Public Positive Covenant instrument (DA-250-09-01-PA-44). The matter is subject on on-going liaison between Dixon Sand and DPHI.

13. Proposed Actions to be completed in the next Reporting Period

13.1 Air Quality Monitoring

The air quality monitoring program and Air Quality Management Plan will be revised in accordance with the outcome of the ongoing consultation with the EPA.

13.2 Vegetation Clearing and Extraction

Vegetation clearing will be undertaken in accordance with the Pre-clearing procedures.

13.3 Rehabilitation and Bush Regeneration

Old Northern Road NVC Rehabilitation Area

- Continue to monitor and manage competitive native species and trees by culling to optimise growth of native species including the planted and translocated threatened species.
- Continue with routine weed control (particularly perennial grass such as *Cynodon dactylon* – Couch grass) and monitoring of regenerating native species,
- Supplementary planting on the southern boundary to create a buffer to prevent weed encroachment due to blown in seeds from adjacent land, and
- Re-marking of the planted *Melaleuca deanei*

Old Northern Road Lots 1 and 2

- Continued management of *Lantana camera* and review techniques recommended in the Ecological Monitoring Report (South East Environmental, 2025),
- Continued management of other weed species including exotic grasses, and
- Supplementary planting or similar treatment in identified areas as required.

Old Northern Road other areas

- Continue with routine weed management along the southern boundary of Cons Hill (Lot 196) and carry out direct seeding or supplementary planting of remnant canopy species and competitive native grasses (such as *Imperata cylindrica*) to revegetate compacted areas, exposed areas and edge areas as required.

Haerses Road Biodiversity Offset Area

- Continue with management of invasive grass and annual species along the western border of the HRBOA.

Front Gate Embankment

- Ongoing maintenance of exotic grassed utilising brush cut, manual removal and spot spraying before setting seed methodology.

14. Conclusion

A number of recommendations and change in environmental procedures have been proposed throughout this Annual Review covering the 2024 - 2025 reporting period.

In general, Dixon Sand has maintained acceptable environmental performance outcomes throughout the reporting period. The company has committed to ongoing endeavours to minimise environmental impacts and potential exceedances related to quarry operations.

Appendix A – Dust Deposition Reports

Report Number: 16572

Date Issued: 30/07/2024

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following Dust Deposition sample(s) were received on 24/07/2024

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	26/06/2024 11:39	24/07/2024 11:41	16572/1	Dust	
D10 Hearses Rd	26/06/2024 12:54	24/07/2024 12:07	16572/2	Dust	
D06 School	26/06/2024 10:26	24/07/2024 10:37	16572/3	Dust	
D05 Bund	26/06/2024 10:43	24/07/2024 10:53	16572/4	Dust	
D04 Rehab	26/06/2024 11:12	24/07/2024 11:17	16572/5	Dust	
D07 Mullock	26/06/2024 11:26	24/07/2024 11:29	16572/6	Dust	
D01(A) Front Gate	26/06/2024 10:57	24/07/2024 11:05	16572/7	Dust	
D11 Goldstien	26/06/2024 12:23	24/07/2024 13:02	16572/8	Dust	
D12 Ram	26/06/2024 12:01	24/07/2024 11:54	16572/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)

Liane Peyra
Technical Officer

Authorised by:

Anthony Crane
Laboratory Manager

Results have been approved and report finalised on 30/07/2024.

Test Report Number: 16572

Date Issued: 30/07/2024

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	16572/1 24/07/2024 D08&9 Hitchcock Rd Olive Grove	16572/2 24/07/2024 D10 Hearses Rd	16572/3 24/07/2024 D06 School	16572/4 24/07/2024 D05 Bund	16572/5 24/07/2024 D04 Rehab
	Method	Units					
Date Tested	AS 3580.10.1	--	25/07/2024	25/07/2024	25/07/2024	25/07/2024	25/07/2024
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.5	2.6	4.3	4.3	0.2
Ash	AS 3580.10.1	g/m2/mth	0.3	1.1	1.3	2.8	<0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.2	1.5	3.0	1.5	0.2
Calculated Rain	AS 3580.10.1	mm	47	45	44	39	43

Deposited Matter		Lab ID Sample Date Sample ID	16572/6 24/07/2024 D07 Mullock	16572/7 24/07/2024 D01(A) Front Gate	16572/8 24/07/2024 D11 Goldstien	16572/9 24/07/2024 D12 Ram
	Method	Units				
Date Tested	AS 3580.10.1	--	25/07/2024	25/07/2024	25/07/2024	25/07/2024
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.2	2.2	1.2	1.1
Ash	AS 3580.10.1	g/m2/mth	<0.1	1.9	0.4	0.7
Combustible Matter	AS 3580.10.1	g/m2/mth	0.2	0.3	0.8	0.4
Calculated Rain	AS 3580.10.1	mm	41	45	44	46



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 16572

Date Issued: 30/07/2024

Revision No: 00

Sampling Conditions: Fine, 13 °- 19 °C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
16572/1	D08&9 Hitchcock Rd Olive Grove		T & D.Walker	24/07/2024 11:41	AS3580.10.1	CuSO4
16572/2	D10 Hearses Rd		T & D.Walker	24/07/2024 12:07	AS3580.10.1	CuSO4
16572/3	D06 School		T & D.Walker	24/07/2024 10:37	AS3580.10.1	CuSO4
16572/4	D05 Bund		T & D.Walker	24/07/2024 10:53	AS3580.10.1	CuSO4
16572/5	D04 Rehab		T & D.Walker	24/07/2024 11:17	AS3580.10.1	CuSO4
16572/6	D07 Mullock		T & D.Walker	24/07/2024 11:29	AS3580.10.1	CuSO4
16572/7	D01(A) Front Gate		T & D.Walker	24/07/2024 11:05	AS3580.10.1	CuSO4
16572/8	D11 Goldstien		T & D.Walker	24/07/2024 13:02	AS3580.10.1	CuSO4
16572/9	D12 Ram		T & D.Walker	24/07/2024 11:54	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
16572/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
16572/2	D10 Hearses Rd	312538	6294576	Minor sand, major bird droppings, algae
16572/3	D06 School	313518	6296537	Minor sand, minor insects, vegetation. - Paddock slashed
16572/4	D05 Bund	313160	6296838	Minor sand, bird droppings. - Adjacent bare earth field ploughed
16572/5	D04 Rehab	312385	6296932	
16572/6	D07 Mullock	312579	6296676	
16572/7	D01(A) Front Gate	313290	6297176	
16572/8	D11 Goldstien	312034	6294213	Minor bird droppings
16572/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 30/07/2024.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 16688

Date Issued: 27/08/2024

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following Dust Deposition sample(s) were received on 21/08/2024

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	24/07/2024 11:41	21/08/2024 11:50	16688/1	Dust	
D10 Hearses Rd	24/07/2024 12:07	21/08/2024 12:24	16688/2	Dust	
D06 School	24/07/2024 10:37	21/08/2024 10:38	16688/3	Dust	Vegetation
D05 Bund	24/07/2024 10:53	21/08/2024 10:54	16688/4	Dust	Minor dust, bird droppings, insects, vegetation. Crop farming adjacent to dust gauge.
D04 Rehab	24/07/2024 11:17	21/08/2024 11:20	16688/5	Dust	
D07 Mullock	24/07/2024 11:29	21/08/2024 11:36	16688/6	Dust	
D01(A) Front Gate	24/07/2024 11:05	21/08/2024 11:06	16688/7	Dust	
D11 Goldstien	24/07/2024 13:02	21/08/2024 13:18	16688/8	Dust	
D12 Ram	24/07/2024 11:54	21/08/2024 12:08	16688/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)

Liane Peyra
Technical OfficerAnthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 27/08/2024.

Test Report Number: 16688

Date Issued: 27/08/2024

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	16688/1 21/08/2024 D08&9 Hitchcock Rd Olive Grove	16688/2 21/08/2024 D10 Hearses Rd	16688/3 21/08/2024 D06 School	16688/4 21/08/2024 D05 Bund	16688/5 21/08/2024 D04 Rehab
	Method	Units					
Date Tested	AS 3580.10.1	--	22/08/2024	22/08/2024	22/08/2024	22/08/2024	22/08/2024
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.6	1.2	4.9	12.2	0.3
Ash	AS 3580.10.1	g/m2/mth	0.5	0.9	0.7	7.0	<0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.1	0.3	4.2	5.2	0.3
Calculated Rain	AS 3580.10.1	mm	34	29	34	32	34

Deposited Matter		Lab ID Sample Date Sample ID	16688/6 21/08/2024 D07 Mullock	16688/7 21/08/2024 D01(A) Front Gate	16688/8 21/08/2024 D11 Goldstien	16688/9 21/08/2024 D12 Ram
	Method	Units				
Date Tested	AS 3580.10.1	--	22/08/2024	22/08/2024	22/08/2024	22/08/2024
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.4	3.4	0.6	0.6
Ash	AS 3580.10.1	g/m2/mth	0.1	3.1	0.3	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	0.3	0.3	0.3	0.4
Calculated Rain	AS 3580.10.1	mm	34	33	29	31



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 16688

Date Issued: 27/08/2024

Revision No: 00

Sampling Conditions: Fine, 22 °- 26 °C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
16688/1	D08&9 Hitchcock Rd Olive Grove		T & D.Walker	21/08/2024 11:50	AS3580.10.1	CuSO4
16688/2	D10 Hearses Rd		T & D.Walker	21/08/2024 12:24	AS3580.10.1	CuSO4
16688/3	D06 School		T & D.Walker	21/08/2024 10:38	AS3580.10.1	CuSO4
16688/4	D05 Bund		T & D.Walker	21/08/2024 10:54	AS3580.10.1	CuSO4
16688/5	D04 Rehab		T & D.Walker	21/08/2024 11:20	AS3580.10.1	CuSO4
16688/6	D07 Mullock		T & D.Walker	21/08/2024 11:36	AS3580.10.1	CuSO4
16688/7	D01(A) Front Gate		T & D.Walker	21/08/2024 11:06	AS3580.10.1	CuSO4
16688/8	D11 Goldstien		T & D.Walker	21/08/2024 13:18	AS3580.10.1	CuSO4
16688/9	D12 Ram		T & D.Walker	21/08/2024 12:08	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
16688/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
16688/2	D10 Hearses Rd	312538	6294576	Minor insects, algae. Bird droppings in funnel.
16688/3	D06 School	313518	6296537	Vegetation
16688/4	D05 Bund	313160	6296838	Minor dust, bird droppings, insects, vegetation. Crop farming adjacent to dust gauge.
16688/5	D04 Rehab	312385	6296932	
16688/6	D07 Mullock	312579	6296676	
16688/7	D01(A) Front Gate	313290	6297176	Minor sand/dust
16688/8	D11 Goldstien	312034	6294213	
16688/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 27/08/2024.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 16807

Date Issued: 25/09/2024

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following Dust Deposition sample(s) were received on 20/09/2024

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	21/08/2024 11:50	18/09/2024 10:39	16807/1	Dust	
D10 Hearses Rd	21/08/2024 12:24	18/09/2024 11:10	16807/2	Dust	
D06 School	21/08/2024 10:38	18/09/2024 09:29	16807/3	Dust	
D05 Bund	21/08/2024 10:54	18/09/2024 09:44	16807/4	Dust	
D04 Rehab	21/08/2024 11:20	18/09/2024 10:10	16807/5	Dust	
D07 Mullock	21/08/2024 11:36	18/09/2024 10:24	16807/6	Dust	
D01(A) Front Gate	21/08/2024 11:06	18/09/2024 09:55	16807/7	Dust	
D11 Goldstien	21/08/2024 13:18	18/09/2024 12:16	16807/8	Dust	
D12 Ram	21/08/2024 12:08	18/09/2024 10:54	16807/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Liane Peyra

Authorised by: Technical Officer

Results have been approved and report finalised on 25/09/2024.

Test Report Number: 16807

Date Issued: 25/09/2024

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	16807/1 18/09/2024 D08&9 Hitchcock Rd Olive Grove	16807/2 18/09/2024 D10 Hearses Rd	16807/3 18/09/2024 D06 School	16807/4 18/09/2024 D05 Bund	16807/5 18/09/2024 D04 Rehab
	Method	Units					
Date Tested	AS 3580.10.1	--	23/09/2024	23/09/2024	23/09/2024	23/09/2024	23/09/2024
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.9	0.7	0.8	3.4	0.4
Ash	AS 3580.10.1	g/m2/mth	0.5	0.4	0.6	3.1	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	0.4	0.3	0.2	0.3	0.2
Calculated Rain	AS 3580.10.1	mm	3	2	3	6	2

Deposited Matter		Lab ID Sample Date Sample ID	16807/6 18/09/2024 D07 Mullock	16807/7 18/09/2024 D01(A) Front Gate	16807/8 18/09/2024 D11 Goldstien	16807/9 18/09/2024 D12 Ram
	Method	Units				
Date Tested	AS 3580.10.1	--	23/09/2024	23/09/2024	23/09/2024	23/09/2024
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.3	1.2	0.3	0.3
Ash	AS 3580.10.1	g/m2/mth	0.2	1.2	0.1	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	0.1	<0.1	0.2	0.1
Calculated Rain	AS 3580.10.1	mm	2	4	2	2



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 16807

Date Issued: 25/09/2024

Revision No: 00

Sampling Conditions: Fine, 16 - 24 °C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
16807/1	D08&9 Hitchcock Rd Olive Grove		T.Walker	18/09/2024 10:39	AS3580.10.1	CuSO4
16807/2	D10 Hearses Rd		T.Walker	18/09/2024 11:10	AS3580.10.1	CuSO4
16807/3	D06 School		T.Walker	18/09/2024 09:29	AS3580.10.1	CuSO4
16807/4	D05 Bund		T.Walker	18/09/2024 09:44	AS3580.10.1	CuSO4
16807/5	D04 Rehab		T.Walker	18/09/2024 10:10	AS3580.10.1	CuSO4
16807/6	D07 Mullock		T.Walker	18/09/2024 10:24	AS3580.10.1	CuSO4
16807/7	D01(A) Front Gate		T.Walker	18/09/2024 09:55	AS3580.10.1	CuSO4
16807/8	D11 Goldstien		T.Walker	18/09/2024 12:16	AS3580.10.1	CuSO4
16807/9	D12 Ram		T.Walker	18/09/2024 10:54	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
16807/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	Minor insects
16807/2	D10 Hearses Rd	312538	6294576	Insects, algae
16807/3	D06 School	313518	6296537	Minor vegetation
16807/4	D05 Bund	313160	6296838	Minor sand, minor insects
16807/5	D04 Rehab	312385	6296932	Minor vegetation
16807/6	D07 Mullock	312579	6296676	
16807/7	D01(A) Front Gate	313290	6297176	Minor insects
16807/8	D11 Goldstien	312034	6294213	Minor vegetation
16807/9	D12 Ram	311750	6294159	Minor insects

Sampling procedures have been approved and report finalised on 25/09/2024.

Where method is "unknown" sampling procedures are not endorsed



Report Number: 16895

Date Issued: 24/10/2024

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd
Address: PO Box 4019
PITT TOWN NSW 2756
Contact: David Dixon

The following Dust Deposition sample(s) were received on 16/10/2024

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	18/09/2024 10:39	16/10/2024 11:28	16895/1	Dust	
D10 Hearses Rd	18/09/2024 11:10	16/10/2024 11:56	16895/2	Dust	
D06 School	18/09/2024 9:29	16/10/2024 10:23	16895/3	Dust	
D05 Bund	18/09/2024 9:44	16/10/2024 10:38	16895/4	Dust	
D04 Rehab	18/09/2024 10:10	16/10/2024 11:06	16895/5	Dust	
D07 Mullock	18/09/2024 10:24	16/10/2024 11:18	16895/6	Dust	
D01(A) Front Gate	18/09/2024 9:55	16/10/2024 10:50	16895/7	Dust	
D11 Goldstien	18/09/2024 12:16	16/10/2024	16895/8	Dust	
D12 Ram	18/09/2024 10:54	16/10/2024 11:43	16895/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Liane Peyra

Authorised by: Technical Officer

Results have been approved and report finalised on 24/10/2024.

Test Report Number: 16895

Date Issued: 24/10/2024

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	16895/1 16/10/2024 D08&9 Hitchcock Rd Olive Grove	16895/2 16/10/2024 D10 Hearses Rd	16895/3 16/10/2024 D06 School	16895/4 16/10/2024 D05 Bund	16895/5 16/10/2024 D04 Rehab
	Method	Units					
Date Tested	AS 3580.10.1	--	22/10/2024	22/10/2024	22/10/2024	22/10/2024	22/10/2024
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.1	2.0	1.2	6.3	0.5
Ash	AS 3580.10.1	g/m2/mth	0.7	0.8	0.6	5.7	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	0.4	1.2	0.6	0.6	0.3
Calculated Rain	AS 3580.10.1	mm	107	88	117	101	102

Deposited Matter		Lab ID Sample Date Sample ID	16895/6 16/10/2024 D07 Mullock	16895/7 16/10/2024 D01(A) Front Gate	16895/8 16/10/2024 D11 Goldstien	16895/9 16/10/2024 D12 Ram
	Method	Units				
Date Tested	AS 3580.10.1	--	22/10/2024	22/10/2024	22/10/2024	22/10/2024
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.0	2.9	0.6	0.8
Ash	AS 3580.10.1	g/m2/mth	0.4	2.5	0.2	0.4
Combustible Matter	AS 3580.10.1	g/m2/mth	0.6	0.4	0.4	0.4
Calculated Rain	AS 3580.10.1	mm	107	105	85	89



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 16895

Date Issued: 24/10/2024

Revision No: 00

Sampling Conditions: 100% Cloudcover, 17 - 19 °C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
16895/1	D08&9 Hitchcock Rd Olive Grove		T & D.Walker	16/10/2024 11:28	AS3580.10.1	CuSO4
16895/2	D10 Hearses Rd		T & D.Walker	16/10/2024 11:56	AS3580.10.1	CuSO4
16895/3	D06 School		T & D.Walker	16/10/2024 10:23	AS3580.10.1	CuSO4
16895/4	D05 Bund		T & D.Walker	16/10/2024 10:38	AS3580.10.1	CuSO4
16895/5	D04 Rehab		T & D.Walker	16/10/2024 11:06	AS3580.10.1	CuSO4
16895/6	D07 Mullock		T & D.Walker	16/10/2024 11:18	AS3580.10.1	CuSO4
16895/7	D01(A) Front Gate		T & D.Walker	16/10/2024 10:50	AS3580.10.1	CuSO4
16895/8	D11 Goldstien		T & D.Walker	16/10/2024	AS3580.10.1	CuSO4
16895/9	D12 Ram		T & D.Walker	16/10/2024 11:43	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
16895/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	Insects
16895/2	D10 Hearses Rd	312538	6294576	Minor insects, algae
16895/3	D06 School	313518	6296537	Minor insects
16895/4	D05 Bund	313160	6296838	Minor sand, minor insects
16895/5	D04 Rehab	312385	6296932	Minor insects
16895/6	D07 Mullock	312579	6296676	Spider
16895/7	D01(A) Front Gate	313290	6297176	Minor sand, insects
16895/8	D11 Goldstien	312034	6294213	
16895/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 24/10/2024.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 17075

Date Issued: 19/11/2024

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following Dust Deposition sample(s) were received on 13/11/2024

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	16/10/2024 11:28	13/11/2024 11:35	17075/1	Dust	
D10 Hearses Rd	16/10/2024 11:56	13/11/2024 12:08	17075/2	Dust	
D06 School	16/10/2024 10:23	13/11/2024 10:29	17075/3	Dust	
D05 Bund	16/10/2024 10:38	13/11/2024 10:46	17075/4	Dust	
D04 Rehab	16/10/2024 11:06	13/11/2024 11:09	17075/5	Dust	
D07 Mullock	16/10/2024 11:18	13/11/2024 11:21	17075/6	Dust	
D01(A) Front Gate	16/10/2024 10:50	13/11/2024 10:55	17075/7	Dust	
D11 Goldstien	16/10/2024 13:02	13/11/2024 13:20	17075/8	Dust	
D12 Ram	16/10/2024 11:43	13/11/2024 11:53	17075/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)

Liane Peyra
Technical OfficerAnthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 19/11/2024.

Test Report Number: 17075

Date Issued: 19/11/2024

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	17075/1 13/11/2024 D08&9 Hitchcock Rd Olive Grove	17075/2 13/11/2024 D10 Hearses Rd	17075/3 13/11/2024 D06 School	17075/4 13/11/2024 D05 Bund	17075/5 13/11/2024 D04 Rehab
	Method	Units					
Date Tested	AS 3580.10.1	--	14/11/2024	14/11/2024	14/11/2024	14/11/2024	14/11/2024
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.0	0.7	0.9	1.3	0.6
Ash	AS 3580.10.1	g/m2/mth	0.8	0.4	0.4	0.9	0.3
Combustible Matter	AS 3580.10.1	g/m2/mth	0.2	0.3	0.5	0.4	0.3
Calculated Rain	AS 3580.10.1	mm	27	23	24	23	26

Deposited Matter		Lab ID Sample Date Sample ID	17075/6 13/11/2024 D07 Mullock	17075/7 13/11/2024 D01(A) Front Gate	17075/8 13/11/2024 D11 Goldstien	17075/9 13/11/2024 D12 Ram
	Method	Units				
Date Tested	AS 3580.10.1	--	14/11/2024	14/11/2024	14/11/2024	14/11/2024
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.7	1.6	0.7	0.6
Ash	AS 3580.10.1	g/m2/mth	0.3	1.2	0.3	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	0.4	0.4	0.4	0.4
Calculated Rain	AS 3580.10.1	mm	25	28	27	29



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Where applicable, results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 17075

Date Issued: 19/11/2024

Revision No: 00

Sampling Conditions: Cloudy, 22°C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
17075/1	D08&9 Hitchcock Rd Olive Grove		T & D.Walker	13/11/2024 11:35	AS3580.10.1	CuSO4
17075/2	D10 Hearses Rd		T & D.Walker	13/11/2024 12:08	AS3580.10.1	CuSO4
17075/3	D06 School		T & D.Walker	13/11/2024 10:29	AS3580.10.1	CuSO4
17075/4	D05 Bund		T & D.Walker	13/11/2024 10:46	AS3580.10.1	CuSO4
17075/5	D04 Rehab		T & D.Walker	13/11/2024 11:09	AS3580.10.1	CuSO4
17075/6	D07 Mullock		T & D.Walker	13/11/2024 11:21	AS3580.10.1	CuSO4
17075/7	D01(A) Front Gate		T & D.Walker	13/11/2024 10:55	AS3580.10.1	CuSO4
17075/8	D11 Goldstien		T & D.Walker	13/11/2024 13:20	AS3580.10.1	CuSO4
17075/9	D12 Ram		T & D.Walker	13/11/2024 11:53	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
17075/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
17075/2	D10 Hearses Rd	312538	6294576	Paddock slashed
17075/3	D06 School	313518	6296537	Minor insects
17075/4	D05 Bund	313160	6296838	Minor sand, minor insects
17075/5	D04 Rehab	312385	6296932	Minor insects
17075/6	D07 Mullock	312579	6296676	Minor insects
17075/7	D01(A) Front Gate	313290	6297176	Minor insects
17075/8	D11 Goldstien	312034	6294213	Minor insects
17075/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 19/11/2024.

Where method is "unknown" sampling procedures are not endorsed



Report Number: 17198

Date Issued: 18/12/2024

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following Dust Deposition sample(s) were received on 11/12/2024

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	13/11/2024 11:35	11/12/2024 10:53	17198/1	Dust	
D10 Hearses Rd	13/11/2024 12:08	11/12/2024 11:27	17198/2	Dust	
D06 School	13/11/2024 10:29	11/12/2024 09:43	17198/3	Dust	
D05 Bund	13/11/2024 10:46	11/12/2024 09:57	17198/4	Dust	
D04 Rehab	13/11/2024 11:09	11/12/2024 10:24	17198/5	Dust	
D07 Mullock	13/11/2024 11:21	11/12/2024 10:38	17198/6	Dust	
D01(A) Front Gate	13/11/2024 10:55	11/12/2024 10:09	17198/7	Dust	
D11 Goldstien	13/11/2024 13:20	11/12/2024 11:54	17198/8	Dust	
D12 Ram	13/11/2024 11:53	11/12/2024 11:08	17198/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)

Liane Peyra
Technical OfficerAnthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 18/12/2024.

Test Report Number: 17198

Date Issued: 18/12/2024

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	17198/1 11/12/2024 D08&9 Hitchcock Rd Olive Grove	17198/2 11/12/2024 D10 Hearses Rd	17198/3 11/12/2024 D06 School	17198/4 11/12/2024 D05 Bund	17198/5 11/12/2024 D04 Rehab
	Method	Units					
Date Tested	AS 3580.10.1	--	16/12/2024	16/12/2024	16/12/2024	16/12/2024	16/12/2024
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	3.8	2.2	3.1	2.0	0.7
Ash	AS 3580.10.1	g/m2/mth	1.9	0.9	1.4	1.2	0.4
Combustible Matter	AS 3580.10.1	g/m2/mth	1.9	1.3	1.7	0.8	0.3
Calculated Rain	AS 3580.10.1	mm	70	60	69	60	53

Deposited Matter		Lab ID Sample Date Sample ID	17198/6 11/12/2024 D07 Mullock	17198/7 11/12/2024 D01(A) Front Gate	17198/8 11/12/2024 D11 Goldstien	17198/9 11/12/2024 D12 Ram
	Method	Units				
Date Tested	AS 3580.10.1	--	16/12/2024	16/12/2024	16/12/2024	16/12/2024
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.3	2.4	1.1	0.5
Ash	AS 3580.10.1	g/m2/mth	0.8	1.9	0.3	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	0.5	0.5	0.8	0.3
Calculated Rain	AS 3580.10.1	mm	57	63	61	59

Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Where applicable, results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 17198

Date Issued: 18/12/2024

Revision No: 00

Sampling Conditions: Cloudy, 22 - 26 °C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
17198/1	D08&9 Hitchcock Rd Olive Grove		T.Walker	11/12/2024 10:53	AS3580.10.1	CuSO4
17198/2	D10 Hearses Rd		T.Walker	11/12/2024 11:27	AS3580.10.1	CuSO4
17198/3	D06 School		T.Walker	11/12/2024 09:43	AS3580.10.1	CuSO4
17198/4	D05 Bund		T.Walker	11/12/2024 09:57	AS3580.10.1	CuSO4
17198/5	D04 Rehab		T.Walker	11/12/2024 10:24	AS3580.10.1	CuSO4
17198/6	D07 Mullock		T.Walker	11/12/2024 10:38	AS3580.10.1	CuSO4
17198/7	D01(A) Front Gate		T.Walker	11/12/2024 10:09	AS3580.10.1	CuSO4
17198/8	D11 Goldstien		T.Walker	11/12/2024 11:54	AS3580.10.1	CuSO4
17198/9	D12 Ram		T.Walker	11/12/2024 11:08	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
17198/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	Insects
17198/2	D10 Hearses Rd	312538	6294576	Algae. Cicada & seeds in funnel
17198/3	D06 School	313518	6296537	Insects. Bird droppings in funnel
17198/4	D05 Bund	313160	6296838	Minor insects
17198/5	D04 Rehab	312385	6296932	Minor insects
17198/6	D07 Mullock	312579	6296676	Minor insects
17198/7	D01(A) Front Gate	313290	6297176	Minor insects
17198/8	D11 Goldstien	312034	6294213	Minor vegetation
17198/9	D12 Ram	311750	6294159	Minor insects

Sampling procedures have been approved and report finalised on 18/12/2024.

Where method is "unknown" sampling procedures are not endorsed



Report Number: 17298

Date Issued: 15/01/2025

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following Dust Deposition sample(s) were received on 8/01/2025

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	11/12/2024 10:53	8/1/2025 11:30	17298/1	Dust	
D10 Hearses Rd	11/12/2024 11:27	8/1/2025 11:58	17298/2	Dust	
D06 School	11/12/2024 9:43	8/1/2025 10:27	17298/3	Dust	
D05 Bund	11/12/2024 9:57	8/1/2025 10:39	17298/4	Dust	
D04 Rehab	11/12/2024 10:24	8/1/2025 11:04	17298/5	Dust	
D07 Mullock	11/12/2024 10:38	8/1/2025 11:18	17298/6	Dust	
D01(A) Front Gate	11/12/2024 10:09	8/1/2025 10:51	17298/7	Dust	
D11 Goldstien	11/12/2024 11:54	8/1/2025 13:10	17298/8	Dust	
D12 Ram	11/12/2024 11:08	8/1/2025 11:43	17298/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)

Anthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 15/01/2025.

Test Report Number: 17298

Date Issued: 15/01/2025

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	17298/1 8/01/2025 D08&9 Hitchcock Rd Olive Grove	17298/2 8/01/2025 D10 Hearses Rd	17298/3 8/01/2025 D06 School	17298/4 8/01/2025 D05 Bund	17298/5 8/01/2025 D04 Rehab
	Method	Units					
Date Tested	AS 3580.10.1	--	13/01/2025	13/01/2025	13/01/2025	13/01/2025	13/01/2025
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.0	3.7	1.8	2.6	0.6
Ash	AS 3580.10.1	g/m2/mth	0.5	1.9	0.9	1.2	0.3
Combustible Matter	AS 3580.10.1	g/m2/mth	0.5	1.8	0.9	1.4	0.3
Calculated Rain	AS 3580.10.1	mm	34	32	35	32	32

Deposited Matter		Lab ID Sample Date Sample ID	17298/6 8/01/2025 D07 Mullock	17298/7 8/01/2025 D01(A) Front Gate	17298/8 8/01/2025 D11 Goldstien	17298/9 8/01/2025 D12 Ram
	Method	Units				
Date Tested	AS 3580.10.1	--	13/01/2025	13/01/2025	13/01/2025	13/01/2025
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.6	7.8	1.6	0.7
Ash	AS 3580.10.1	g/m2/mth	0.3	6.8	0.6	0.4
Combustible Matter	AS 3580.10.1	g/m2/mth	0.3	1.0	1.0	0.3
Calculated Rain	AS 3580.10.1	mm	32	31	34	38



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Where applicable, results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 17298

Date Issued: 15/01/2025

Revision No: 00

Sampling Conditions: 100% Cloudcover, 20 - 22 °C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
17298/1	D08&9 Hitchcock Rd Olive Grove		T & D.Walker	8/1/2025 11:30	AS3580.10.1	CuSO4
17298/2	D10 Hearses Rd		T & D.Walker	8/1/2025 11:58	AS3580.10.1	CuSO4
17298/3	D06 School		T & D.Walker	8/1/2025 10:27	AS3580.10.1	CuSO4
17298/4	D05 Bund		T & D.Walker	8/1/2025 10:39	AS3580.10.1	CuSO4
17298/5	D04 Rehab		T & D.Walker	8/1/2025 11:04	AS3580.10.1	CuSO4
17298/6	D07 Mullock		T & D.Walker	8/1/2025 11:18	AS3580.10.1	CuSO4
17298/7	D01(A) Front Gate		T & D.Walker	8/1/2025 10:51	AS3580.10.1	CuSO4
17298/8	D11 Goldstien		T & D.Walker	8/1/2025 13:10	AS3580.10.1	CuSO4
17298/9	D12 Ram		T & D.Walker	8/1/2025 11:43	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
17298/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
17298/2	D10 Hearses Rd	312538	6294576	Minor sand, insects, vegetation, algae
17298/3	D06 School	313518	6296537	Minor insects
17298/4	D05 Bund	313160	6296838	Minor sand, insects, minor vegetation
17298/5	D04 Rehab	312385	6296932	Minor insects
17298/6	D07 Mullock	312579	6296676	
17298/7	D01(A) Front Gate	313290	6297176	Sand. Adjacent farming crop paddocks turned over to bare earth
17298/8	D11 Goldstien	312034	6294213	Minor vegetation
17298/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 15/01/2025.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 17491

Date Issued: 12/02/2025

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd
Address: PO Box 4019
PITT TOWN NSW 2756
Contact: David Dixon

The following Dust Deposition sample(s) were received on 5/02/2025

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	8/01/2025 11:30	5/02/2025 11:53	17491/1	Dust	
D10 Hearses Rd	8/01/2025 11:58	5/02/2025 12:26	17491/2	Dust	
D06 School	8/01/2025 10:27	5/02/2025 10:43	17491/3	Dust	
D05 Bund	8/01/2025 10:39	5/02/2025 10:58	17491/4	Dust	
D04 Rehab	8/01/2025 11:04	5/02/2025 11:29	17491/5	Dust	
D07 Mullock	8/01/2025 11:18	5/02/2025 11:41	17491/6	Dust	
D01(A) Front Gate	8/01/2025 10:51	5/02/2025 11:13	17491/7	Dust	
D11 Goldstien	8/01/2025 13:10	5/02/2025 13:12	17491/8	Dust	
D12 Ram	8/01/2025 11:43	5/02/2025 12:03	17491/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Liane Peyra
Technical Officer

Authorised by:



Anthony Crane
Laboratory Manager

Results have been approved and report finalised on 12/02/2025.

Test Report Number: 17491

Date Issued: 12/02/2025

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	17491/1 5/02/2025 D08&9 Hitchcock Rd Olive Grove	17491/2 5/02/2025 D10 Hearses Rd	17491/3 5/02/2025 D06 School	17491/4 5/02/2025 D05 Bund	17491/5 5/02/2025 D04 Rehab
	Method	Units					
Date Tested	AS 3580.10.1	--	11/02/2025	11/02/2025	11/02/2025	11/02/2025	11/02/2025
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.6	6.5	2.9	1.9	1.6
Ash	AS 3580.10.1	g/m2/mth	1.0	3.0	1.4	1.4	0.9
Combustible Matter	AS 3580.10.1	g/m2/mth	0.6	3.5	1.5	0.5	0.7
Calculated Rain	AS 3580.10.1	mm	132	137	134	135	120

Deposited Matter		Lab ID Sample Date Sample ID	17491/6 5/02/2025 D07 Mullock	17491/7 5/02/2025 D01(A) Front Gate	17491/8 5/02/2025 D11 Goldstien	17491/9 5/02/2025 D12 Ram
	Method	Units				
Date Tested	AS 3580.10.1	--	11/02/2025	11/02/2025	11/02/2025	11/02/2025
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.8	3.2	1.8	1.3
Ash	AS 3580.10.1	g/m2/mth	1.1	2.6	0.7	0.7
Combustible Matter	AS 3580.10.1	g/m2/mth	0.7	0.6	1.1	0.6
Calculated Rain	AS 3580.10.1	mm	129	115	120	127



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Guideline applied - EPL Dust Limits.

Results in **bold** indicate an exceedance of the applied guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 17491

Date Issued: 12/02/2025

Revision No: 00

Sampling Conditions: Fine, 31 - 35 °C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
17491/1	D08&9 Hitchcock Rd Olive Grove		T & D.Walker	5/02/2025 11:53	AS3580.10.1	CuSO4
17491/2	D10 Hearses Rd		T & D.Walker	5/02/2025 12:26	AS3580.10.1	CuSO4
17491/3	D06 School		T & D.Walker	5/02/2025 10:43	AS3580.10.1	CuSO4
17491/4	D05 Bund		T & D.Walker	5/02/2025 10:58	AS3580.10.1	CuSO4
17491/5	D04 Rehab		T & D.Walker	5/02/2025 11:29	AS3580.10.1	CuSO4
17491/6	D07 Mullock		T & D.Walker	5/02/2025 11:41	AS3580.10.1	CuSO4
17491/7	D01(A) Front Gate		T & D.Walker	5/02/2025 11:13	AS3580.10.1	CuSO4
17491/8	D11 Goldstien		T & D.Walker	5/02/2025 13:12	AS3580.10.1	CuSO4
17491/9	D12 Ram		T & D.Walker	5/02/2025 12:03	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
17491/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
17491/2	D10 Hearses Rd	312538	6294576	Minor sand, insects - Paddock mowed
17491/3	D06 School	313518	6296537	Minor insects, minor vegetation
17491/4	D05 Bund	313160	6296838	Minor insects
17491/5	D04 Rehab	312385	6296932	
17491/6	D07 Mullock	312579	6296676	
17491/7	D01(A) Front Gate	313290	6297176	Full, minor sand
17491/8	D11 Goldstien	312034	6294213	Minor insects, minor vegetation
17491/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 12/02/2025.

Where method is "unknown" sampling procedures are not endorsed



Report Number: 17589

Date Issued: 12/03/2025

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following Dust Deposition sample(s) were received on 5/03/2025

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	5/02/2025 11:53	5/03/2025 11:57	17589/1	Dust	
D10 Hearses Rd	5/02/2025 12:26	5/03/2025 12:31	17589/2	Dust	
D06 School	5/02/2025 10:43	5/03/2025 10:49	17589/3	Dust	
D05 Bund	5/02/2025 10:58	5/03/2025 11:03	17589/4	Dust	
D04 Rehab	5/02/2025 11:29	5/03/2025 11:28	17589/5	Dust	
D07 Mullock	5/02/2025 11:41	5/03/2025 11:41	17589/6	Dust	
D01(A) Front Gate	5/02/2025 11:13	5/03/2025 11:13	17589/7	Dust	
D11 Goldstien	5/02/2025 13:12	5/03/2025 13:31	17589/8	Dust	
D12 Ram	5/02/2025 12:03	5/03/2025 12:17	17589/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 12/03/2025.

Test Report Number: 17589

Date Issued: 12/03/2025

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	17589/1 5/03/2025 D08&9 Hitchcock Rd Olive Grove	17589/2 5/03/2025 D10 Hearses Rd	17589/3 5/03/2025 D06 School	17589/4 5/03/2025 D05 Bund	17589/5 5/03/2025 D04 Rehab
	Method	Units					
Date Tested	AS 3580.10.1	--	10/03/2025	10/03/2025	10/03/2025	10/03/2025	10/03/2025
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.7	8.7	1.9	2.2	1.3
Ash	AS 3580.10.1	g/m2/mth	0.4	3.9	1.3	1.8	0.6
Combustible Matter	AS 3580.10.1	g/m2/mth	0.3	4.8	0.6	0.4	0.7
Calculated Rain	AS 3580.10.1	mm	75	68	54	43	54

Deposited Matter		Lab ID Sample Date Sample ID	17589/6 5/03/2025 D07 Mullock	17589/7 5/03/2025 D01(A) Front Gate	17589/8 5/03/2025 D11 Goldstien	17589/9 5/03/2025 D12 Ram
	Method	Units				
Date Tested	AS 3580.10.1	--	10/03/2025	10/03/2025	10/03/2025	10/03/2025
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.9	5.2	0.9	2.9
Ash	AS 3580.10.1	g/m2/mth	0.6	4.5	0.4	1.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.3	0.7	0.5	1.8
Calculated Rain	AS 3580.10.1	mm	55	44	64	66



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Guideline applied - EPL Dust Limits.

Results in **bold** indicate an exceedance of the applied guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 17589

Date Issued: 12/03/2025

Revision No: 00

Sampling Conditions: Cloudy, 26 - 28 °C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
17589/1	D08&9 Hitchcock Rd Olive Grove		T & D.Walker	5/03/2025 11:57	AS3580.10.1	CuSO4
17589/2	D10 Hearses Rd		T & D.Walker	5/03/2025 12:31	AS3580.10.1	CuSO4
17589/3	D06 School		T & D.Walker	5/03/2025 10:49	AS3580.10.1	CuSO4
17589/4	D05 Bund		T & D.Walker	5/03/2025 11:03	AS3580.10.1	CuSO4
17589/5	D04 Rehab		T & D.Walker	5/03/2025 11:28	AS3580.10.1	CuSO4
17589/6	D07 Mullock		T & D.Walker	5/03/2025 11:41	AS3580.10.1	CuSO4
17589/7	D01(A) Front Gate		T & D.Walker	5/03/2025 11:13	AS3580.10.1	CuSO4
17589/8	D11 Goldstien		T & D.Walker	5/03/2025 13:31	AS3580.10.1	CuSO4
17589/9	D12 Ram		T & D.Walker	5/03/2025 12:17	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
17589/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
17589/2	D10 Hearses Rd	312538	6294576	Minor sand, bird droppings, vegetation, algae. - Paddock slashed
17589/3	D06 School	313518	6296537	Minor sand, minor insects
17589/4	D05 Bund	313160	6296838	Minor sand, minor insects
17589/5	D04 Rehab	312385	6296932	
17589/6	D07 Mullock	312579	6296676	Very minor sand
17589/7	D01(A) Front Gate	313290	6297176	Sand
17589/8	D11 Goldstien	312034	6294213	Minor vegetation
17589/9	D12 Ram	311750	6294159	Insects

Sampling procedures have been approved and report finalised on 12/03/2025.

Where method is "unknown" sampling procedures are not endorsed



Report Number: 17710

Date Issued: 8/04/2025

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following Dust Deposition sample(s) were received on 2/04/2025

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	5/03/2025 11:57	2/04/2025 11:40	17710/1	Dust	
D10 Hearses Rd	5/03/2025 12:31	2/04/2025 12:20	17710/2	Dust	
D06 School	5/03/2025 10:49	2/04/2025 10:28	17710/3	Dust	
D05 Bund	5/03/2025 11:03	2/04/2025 10:44	17710/4	Dust	
D04 Rehab	5/03/2025 11:28	2/04/2025 11:08	17710/5	Dust	
D07 Mullock	5/03/2025 11:41	2/04/2025 11:21	17710/6	Dust	
D01(A) Front Gate	5/03/2025 11:13	2/04/2025 10:53	17710/7	Dust	
D11 Goldstien	5/03/2025 13:31	2/04/2025 13:14	17710/8	Dust	
D12 Ram	5/03/2025 12:17	2/04/2025 12:01	17710/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)

Anthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 8/04/2025.

Test Report Number: 17710

Date Issued: 8/04/2025

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	17710/1 2/04/2025 D08&9 Hitchcock Rd Olive Grove	17710/2 2/04/2025 D10 Hearses Rd	17710/3 2/04/2025 D06 School	17710/4 2/04/2025 D05 Bund	17710/5 2/04/2025 D04 Rehab
	Method	Units					
Date Tested	AS 3580.10.1	--	07/04/2025	07/04/2025	07/04/2025	07/04/2025	07/04/2025
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.5	5.3	2.6	1.2	0.3
Ash	AS 3580.10.1	g/m2/mth	0.3	2.7	1.8	0.9	0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.2	2.6	0.8	0.3	0.2
Calculated Rain	AS 3580.10.1	mm	112	105	112	107	115

Deposited Matter		Lab ID Sample Date Sample ID	17710/6 2/04/2025 D07 Mullock	17710/7 2/04/2025 D01(A) Front Gate	17710/8 2/04/2025 D11 Goldstien	17710/9 2/04/2025 D12 Ram
	Method	Units				
Date Tested	AS 3580.10.1	--	07/04/2025	07/04/2025	07/04/2025	07/04/2025
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.6	2.6	0.9	0.5
Ash	AS 3580.10.1	g/m2/mth	0.2	2.2	0.3	<0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.4	0.4	0.6	0.5
Calculated Rain	AS 3580.10.1	mm	114	112	105	108



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Guideline applied - EPL Dust Limits.

Results in **bold** indicate an exceedance of the applied guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 17710

Date Issued: 8/04/2025

Revision No: 00

Sampling Conditions: Cloudy, 17 - 23 °C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
17710/1	D08&9 Hitchcock Rd Olive Grove		T & D.Walker	2/04/2025 11:40	AS3580.10.1	CuSO4
17710/2	D10 Hearses Rd		T & D.Walker	2/04/2025 12:20	AS3580.10.1	CuSO4
17710/3	D06 School		T & D.Walker	2/04/2025 10:28	AS3580.10.1	CuSO4
17710/4	D05 Bund		T & D.Walker	2/04/2025 10:44	AS3580.10.1	CuSO4
17710/5	D04 Rehab		T & D.Walker	2/04/2025 11:08	AS3580.10.1	CuSO4
17710/6	D07 Mullock		T & D.Walker	2/04/2025 11:21	AS3580.10.1	CuSO4
17710/7	D01(A) Front Gate		T & D.Walker	2/04/2025 10:53	AS3580.10.1	CuSO4
17710/8	D11 Goldstien		T & D.Walker	2/04/2025 13:14	AS3580.10.1	CuSO4
17710/9	D12 Ram		T & D.Walker	2/04/2025 12:01	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
17710/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	Minor insects
17710/2	D10 Hearses Rd	312538	6294576	Minor sand, minor bird droppings, minor algae
17710/3	D06 School	313518	6296537	Minor sand, minor insects, minor vegetation
17710/4	D05 Bund	313160	6296838	Very minor sand, minor insects
17710/5	D04 Rehab	312385	6296932	
17710/6	D07 Mullock	312579	6296676	
17710/7	D01(A) Front Gate	313290	6297176	Minor sand
17710/8	D11 Goldstien	312034	6294213	Minor vegetation
17710/9	D12 Ram	311750	6294159	Minor insects

Sampling procedures have been approved and report finalised on 8/04/2025.

Where method is "unknown" sampling procedures are not endorsed



Report Number: 17892

Date Issued: 8/05/2025

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following Dust Deposition sample(s) were received on 30/04/2025

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	2/04/2025 11:40	30/04/2025 11:41	17892/1	Dust	
D10 Hearses Rd	2/04/2025 12:20	30/04/2025 12:08	17892/2	Dust	
D06 School	2/04/2025 10:28	30/04/2025 10:42	17892/3	Dust	
D05 Bund	2/04/2025 10:44	30/04/2025 10:54	17892/4	Dust	
D04 Rehab	2/04/2025 11:08	30/04/2025 11:17	17892/5	Dust	
D07 Mullock	2/04/2025 11:21	30/04/2025 11:29	17892/6	Dust	
D01(A) Front Gate	2/04/2025 10:53	30/04/2025 11:05	17892/7	Dust	
D11 Goldstien	2/04/2025 13:14	30/04/2025 13:05	17892/8	Dust	
D12 Ram	2/04/2025 12:01	30/04/2025 11:55	17892/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
Laboratory Manager



Liane Peyra
Technical Officer

Authorised by:

Results have been approved and report finalised on 8/05/2025.

Test Report Number: 17892

Date Issued: 8/05/2025

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	17892/1 30/04/2025 D08&9 Hitchcock Rd Olive Grove	17892/2 30/04/2025 D10 Hearses Rd	17892/3 30/04/2025 D06 School	17892/4 30/04/2025 D05 Bund	17892/5 30/04/2025 D04 Rehab
	Method	Units					
Date Tested	AS 3580.10.1	--	7/05/2025	7/05/2025	7/05/2025	7/05/2025	7/05/2025
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.6	5.4	0.9	1.2	0.3
Ash	AS 3580.10.1	g/m2/mth	0.4	4.8	0.5	1.0	0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.2	0.6	0.4	0.2	0.2
Calculated Rain	AS 3580.10.1	mm	77	78	88	82	81

Deposited Matter		Lab ID Sample Date Sample ID	17892/6 30/04/2025 D07 Mullock	17892/7 30/04/2025 D01(A) Front Gate	17892/8 30/04/2025 D11 Goldstien	17892/9 30/04/2025 D12 Ram
	Method	Units				
Date Tested	AS 3580.10.1	--	7/05/2025	7/05/2025	7/05/2025	7/05/2025
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.4	1.6	0.7	0.3
Ash	AS 3580.10.1	g/m2/mth	0.2	1.2	0.2	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	0.2	0.4	0.5	0.1
Calculated Rain	AS 3580.10.1	mm	86	82	86	91

Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Guideline applied - EPL Dust Limits.

Results in **bold** indicate an exceedance of the applied guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 17892

Date Issued: 8/05/2025

Revision No: 00

Sampling Conditions: 100% Cloudcover, 17 - 19 °C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
17892/1	D08&9 Hitchcock Rd Olive Grove		T & D.Walker	30/04/2025 11:41	AS3580.10.1	CuSO4
17892/2	D10 Hearses Rd		T & D.Walker	30/04/2025 12:08	AS3580.10.1	CuSO4
17892/3	D06 School		T & D.Walker	30/04/2025 10:42	AS3580.10.1	CuSO4
17892/4	D05 Bund		T & D.Walker	30/04/2025 10:54	AS3580.10.1	CuSO4
17892/5	D04 Rehab		T & D.Walker	30/04/2025 11:17	AS3580.10.1	CuSO4
17892/6	D07 Mullock		T & D.Walker	30/04/2025 11:29	AS3580.10.1	CuSO4
17892/7	D01(A) Front Gate		T & D.Walker	30/04/2025 11:05	AS3580.10.1	CuSO4
17892/8	D11 Goldstien		T & D.Walker	30/04/2025 13:05	AS3580.10.1	CuSO4
17892/9	D12 Ram		T & D.Walker	30/04/2025 11:55	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
17892/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	Minor insects
17892/2	D10 Hearses Rd	312538	6294576	Sand, minor bird droppings, minor algae
17892/3	D06 School	313518	6296537	Minor insects
17892/4	D05 Bund	313160	6296838	Minor sand
17892/5	D04 Rehab	312385	6296932	Minor insects
17892/6	D07 Mullock	312579	6296676	
17892/7	D01(A) Front Gate	313290	6297176	Minor insects
17892/8	D11 Goldstien	312034	6294213	Vegetation
17892/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 8/05/2025.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 18057

Date Issued: 2/06/2025

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following Dust Deposition sample(s) were received on 28/05/2025

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	30/04/2025 11:41	28/05/2025 11:58	18057/1	Dust	
D10 Hearses Rd	30/04/2025 12:08	28/05/2025 12:27	18057/2	Dust	
D06 School	30/04/2025 10:42	28/05/2025 10:49	18057/3	Dust	
D05 Bund	30/04/2025 10:54	28/05/2025 11:04	18057/4	Dust	
D04 Rehab	30/04/2025 11:17	28/05/2025 11:32	18057/5	Dust	
D07 Mullock	30/04/2025 11:29	28/05/2025 11:46	18057/6	Dust	
D01(A) Front Gate	30/04/2025 11:05	28/05/2025 11:14	18057/7	Dust	
D11 Goldstien	30/04/2025 13:05	28/05/2025 13:31	18057/8	Dust	
D12 Ram	30/04/2025 11:55	28/05/2025 12:13	18057/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 2/06/2025.

Test Report Number: 18057

Date Issued: 2/06/2025

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	18057/1 28/05/2025 D08&9 Hitchcock Rd Olive Grove	18057/2 28/05/2025 D10 Hearses Rd	18057/3 28/05/2025 D06 School	18057/4 28/05/2025 D05 Bund	18057/5 28/05/2025 D04 Rehab
	Method	Units					
Date Tested	AS 3580.10.1	--	30/05/2025	30/05/2025	30/05/2025	30/05/2025	30/05/2025
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	2.2	1.8	0.6	1.1	0.3
Ash	AS 3580.10.1	g/m2/mth	2.2	1.3	0.4	1.1	0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	<0.1	0.5	0.2	<0.1	0.2
Calculated Rain	AS 3580.10.1	mm	239	230	242	214	220

Deposited Matter		Lab ID Sample Date Sample ID	18057/6 28/05/2025 D07 Mullock	18057/7 28/05/2025 D01(A) Front Gate	18057/8 28/05/2025 D11 Goldstien	18057/9 28/05/2025 D12 Ram
	Method	Units				
Date Tested	AS 3580.10.1	--	30/05/2025	30/05/2025	30/05/2025	30/05/2025
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	2.4	19.7	2.7	0.6
Ash	AS 3580.10.1	g/m2/mth	1.9	19.1	1.4	0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.5	0.6	1.3	0.5
Calculated Rain	AS 3580.10.1	mm	230	116	149	231



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Guideline applied - EPL Dust Limits.

Results in **bold** indicate an exceedance of the applied guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 18057

Date Issued: 2/06/2025

Revision No: 00

Sampling Conditions: Fine, 18 - 20 °C. Recent dust storm. Recent heavy

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
18057/1	D08&9 Hitchcock Rd Olive Grove		T & D.Walker	28/05/2025 11:58	AS3580.10.1	CuSO4
18057/2	D10 Hearses Rd		T & D.Walker	28/05/2025 12:27	AS3580.10.1	CuSO4
18057/3	D06 School		T & D.Walker	28/05/2025 10:49	AS3580.10.1	CuSO4
18057/4	D05 Bund		T & D.Walker	28/05/2025 11:04	AS3580.10.1	CuSO4
18057/5	D04 Rehab		T & D.Walker	28/05/2025 11:32	AS3580.10.1	CuSO4
18057/6	D07 Mullock		T & D.Walker	28/05/2025 11:46	AS3580.10.1	CuSO4
18057/7	D01(A) Front Gate		T & D.Walker	28/05/2025 11:14	AS3580.10.1	CuSO4
18057/8	D11 Goldstien		T & D.Walker	28/05/2025 13:31	AS3580.10.1	CuSO4
18057/9	D12 Ram		T & D.Walker	28/05/2025 12:13	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
18057/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	Minor sand. Major dust storm 27/5/25.
18057/2	D10 Hearses Rd	312538	6294576	Minor bird droppings, minor algae
18057/3	D06 School	313518	6296537	Insects, minor vegetation
18057/4	D05 Bund	313160	6296838	
18057/5	D04 Rehab	312385	6296932	
18057/6	D07 Mullock	312579	6296676	Sand, minor insects. Major dust storm 27/5/25.
18057/7	D01(A) Front Gate	313290	6297176	Full, major sand. Major dust storm 27/5/25.
18057/8	D11 Goldstien	312034	6294213	Full, minor vegetation
18057/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 2/06/2025.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 18291

Date Issued: 7/07/2025

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following Dust Deposition sample(s) were received on 25/06/2025

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	28/05/2025 11:58	25/06/2025 12:38	18291/1	Dust	
D10 Hearses Rd	28/05/2025 12:27	25/06/2025 13:05	18291/2	Dust	
D06 School	28/05/2025 10:49	25/06/2025 11:27	18291/3	Dust	
D05 Bund	28/05/2025 11:04	25/06/2025 11:41	18291/4	Dust	
D04 Rehab	28/05/2025 11:32	25/06/2025 12:03	18291/5	Dust	
D07 Mullock	28/05/2025 11:46	25/06/2025 12:17	18291/6	Dust	
D01(A) Front Gate	28/05/2025 11:14	25/06/2025 11:49	18291/7	Dust	
D11 Goldstien	28/05/2025 13:31	25/06/2025 13:22	18291/8	Dust	
D12 Ram	28/05/2025 12:13	25/06/2025 12:51	18291/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 7/07/2025.

Test Report Number: 18291

Date Issued: 7/07/2025

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	18291/1 25/06/2025 D08&9 Hitchcock Rd Olive Grove	18291/2 25/06/2025 D10 Hearses Rd	18291/3 25/06/2025 D06 School	18291/4 25/06/2025 D05 Bund	18291/5 25/06/2025 D04 Rehab
	Method	Units					
Date Tested	AS 3580.10.1	--	3/07/2025	3/07/2025	3/07/2025	3/07/2025	3/07/2025
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.4	6.6	1.0	1.2	0.1
Ash	AS 3580.10.1	g/m2/mth	0.3	2.6	0.5	0.8	<0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.1	4.0	0.5	0.4	0.1
Calculated Rain	AS 3580.10.1	mm	10	7	8	7	7

Deposited Matter		Lab ID Sample Date Sample ID	18291/6 25/06/2025 D07 Mullock	18291/7 25/06/2025 D01(A) Front Gate	18291/8 25/06/2025 D11 Goldstien	18291/9 25/06/2025 D12 Ram
	Method	Units				
Date Tested	AS 3580.10.1	--	3/07/2025	3/07/2025	3/07/2025	3/07/2025
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.2	2.1	0.5	0.2
Ash	AS 3580.10.1	g/m2/mth	0.2	2.0	0.2	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	<0.1	0.1	0.3	<0.1
Calculated Rain	AS 3580.10.1	mm	7	9	6	8



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Guideline applied - EPL Dust Limits.

Results in **bold** indicate an exceedance of the applied guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 18291

Date Issued: 7/07/2025

Revision No: 00

Sampling Conditions: Strong NW wind @ 50kph. 16 - 17 °C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
18291/1	D08&9 Hitchcock Rd Olive Grove		T & D.Walker	25/06/2025 12:38	AS3580.10.1	CuSO4
18291/2	D10 Hearses Rd		T & D.Walker	25/06/2025 13:05	AS3580.10.1	CuSO4
18291/3	D06 School		T & D.Walker	25/06/2025 11:27	AS3580.10.1	CuSO4
18291/4	D05 Bund		T & D.Walker	25/06/2025 11:41	AS3580.10.1	CuSO4
18291/5	D04 Rehab		T & D.Walker	25/06/2025 12:03	AS3580.10.1	CuSO4
18291/6	D07 Mullock		T & D.Walker	25/06/2025 12:17	AS3580.10.1	CuSO4
18291/7	D01(A) Front Gate		T & D.Walker	25/06/2025 11:49	AS3580.10.1	CuSO4
18291/8	D11 Goldstien		T & D.Walker	25/06/2025 13:22	AS3580.10.1	CuSO4
18291/9	D12 Ram		T & D.Walker	25/06/2025 12:51	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
18291/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
18291/2	D10 Hearses Rd	312538	6294576	Major bird droppings, major algae, funnel blocked with bird droppings
18291/3	D06 School	313518	6296537	Minor bird droppings, minor vegetation
18291/4	D05 Bund	313160	6296838	
18291/5	D04 Rehab	312385	6296932	
18291/6	D07 Mullock	312579	6296676	
18291/7	D01(A) Front Gate	313290	6297176	Minor sand
18291/8	D11 Goldstien	312034	6294213	Minor vegetation
18291/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 7/07/2025.

Where method is "unknown" sampling procedures are not endorsed

Appendix B – PM10, TSP and Weather Station Reports



**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

JULY 2024

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date 29 August 2024

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for July 2024 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average PM₁₀ results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average PM₁₀ results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The PM₁₀ annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in green indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in red indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2024 for TEOM's coinciding with the Dixon Sand project year.

Approximately 100% of valid meteorological data was recorded for July 2024.

Approximately 100% of valid TEOM data was available for July 2024.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or NSW EPA approved methods. The following Australian Standards were used:

- AS3580.9.8 - *“Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser”*; and
- AS/NZS 3580.1.1 - *“Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment”*.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³ and the Dixon Sand Quarry EPL limit of 42ug/m³.

Approximately 100% of valid TEOM data was available for July 2024.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2024.

The quarterly TEOM calibration was conducted in May 2024 (for June). The next calibration is due to be completed in September 2024. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for July 2024 from AQMS and Annual Average PM₁₀ calculated from 1 July 2024.

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/07/2024	9.1	9.1	22.8	22.8
2/07/2024	8.9	9.0	22.3	22.5
3/07/2024	9.2	9.1	23.0	22.7
4/07/2024	11.0	9.6	27.5	23.9
5/07/2024	7.9	9.2	19.8	23.1
6/07/2024	8.2	9.1	20.5	22.6
7/07/2024	8.1	8.9	20.3	22.3
8/07/2024	9.3	9.0	23.3	22.4
9/07/2024	5.8	8.6	14.5	21.5
10/07/2024	9.2	8.7	23.0	21.7
11/07/2024	9.9	8.8	24.8	22.0
12/07/2024	12.0	9.1	30.0	22.6
13/07/2024	7.3	8.9	18.3	22.3
14/07/2024	4.3	8.6	10.8	21.5
15/07/2024	9.5	8.6	23.8	21.6
16/07/2024	12.5	8.9	31.3	22.2
17/07/2024	8.1	8.8	20.3	22.1
18/07/2024	10.5	8.9	26.3	22.3
19/07/2024	7.8	8.9	19.5	22.2
20/07/2024	18.8	9.4	47.0	23.4
21/07/2024	9.2	9.4	23.0	23.4
22/07/2024	13.4	9.5	33.5	23.9
23/07/2024	11.2	9.6	28.0	24.0
24/07/2024	9.3	9.6	23.3	24.0
25/07/2024	14.9	9.8	37.3	24.5
26/07/2024	8.5	9.8	21.3	24.4
27/07/2024	7.5	9.7	18.8	24.2
28/07/2024	4.3	9.5	10.8	23.7
29/07/2024	11.0	9.5	27.5	23.9
30/07/2024	12.4	9.6	31.0	24.1
31/07/2024	11.7	9.7	29.3	24.3

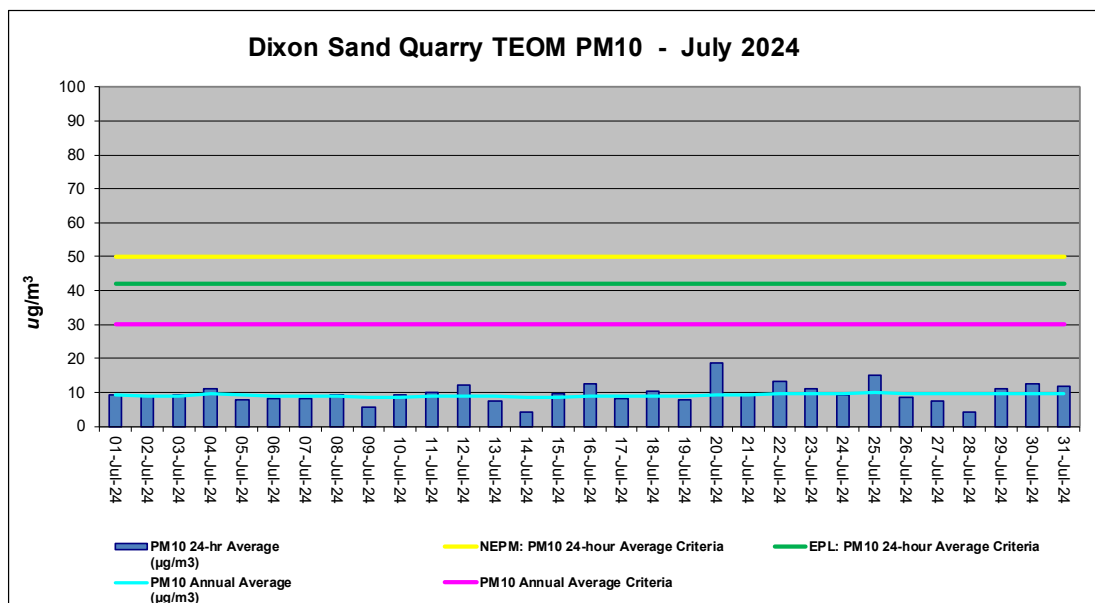


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

A 6-monthly physical screening and system check of the meteorological station was conducted in March 2024 and is next due in September 2024. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 100% of valid meteorological data was recorded for July 2024.

Dixon Sand Quarry Environmental Monitoring Project – July 2024

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/07/2024	5.5	9.1	13.7	0.4	0.2	4.8	13.7	65.1	84.4	100.0	1000.6	1004.3	1007.6
2/07/2024	7.5	9.1	11.6	10.8	0.5	4.3	11.9	92.6	99.8	100.0	1007.3	1009.7	1012.3
3/07/2024	7.5	10.0	15.4	3.0	1.0	5.1	11.3	60.8	93.7	100.0	1011.8	1013.0	1014.4
4/07/2024	8.4	11.2	15.7	1.8	0.3	4.0	11.1	53.2	90.0	100.0	1013.1	1014.2	1015.5
5/07/2024	9.0	11.2	14.6	5.2	0.5	3.6	10.4	81.3	98.0	100.0	1014.5	1016.7	1018.7
6/07/2024	8.4	10.9	14.9	6.0	0.2	3.2	12.0	63.1	91.7	100.0	1016.0	1017.5	1019.5
7/07/2024	8.6	11.3	15.1	0.2	0.0	2.0	9.5	81.4	97.1	100.0	1009.9	1012.9	1016.2
8/07/2024	11.1	12.4	15.4	1.2	0.1	2.3	7.8	83.0	97.4	100.0	1001.5	1005.5	1010.1
9/07/2024	10.8	13.3	17.6	1.4	0.1	4.1	15.6	65.2	87.8	100.0	998.5	1000.1	1001.4
10/07/2024	9.0	12.5	16.9	0.2	0.1	3.0	7.9	58.6	77.1	91.5	1000.1	1001.4	1003.3
11/07/2024	7.3	11.3	14.9	0.0	0.1	2.5	11.6	64.3	82.4	100.0	997.8	1000.8	1003.4
12/07/2024	7.0	10.7	16.5	0.0	0.0	2.6	8.8	46.7	82.9	100.0	991.4	993.9	997.8
13/07/2024	8.2	11.4	15.2	0.0	0.0	4.5	19.6	51.3	68.5	88.1	990.7	991.7	993.0
14/07/2024	6.2	9.7	15.3	0.0	0.0	2.8	12.4	44.9	64.1	78.6	989.5	991.3	992.7
15/07/2024	5.0	8.7	13.3	0.0	0.4	5.1	19.4	36.5	57.6	77.7	984.1	987.6	990.1
16/07/2024	7.3	9.8	12.4	0.0	1.0	6.1	20.7	53.0	61.7	69.4	981.4	983.0	985.3
17/07/2024	9.2	12.3	16.5	0.0	0.2	3.9	16.5	45.5	66.2	88.7	984.7	987.1	991.8
18/07/2024	6.1	11.1	16.2	0.0	0.1	2.7	17.6	40.3	66.6	88.8	991.5	993.2	996.3
19/07/2024	5.6	9.8	14.9	0.0	0.3	4.9	26.9	39.2	54.7	68.0	990.3	994.3	996.6
20/07/2024	10.4	12.2	14.9	0.0	0.3	8.3	32.7	35.3	52.7	69.6	985.1	987.7	991.2
21/07/2024	8.2	11.6	17.1	0.0	0.0	3.8	14.3	27.9	49.4	63.3	990.9	997.8	1003.7
22/07/2024	7.3	11.8	16.7	0.0	0.2	2.6	8.8	49.1	64.2	78.1	1003.5	1005.3	1007.1
23/07/2024	7.6	12.4	18.7	0.0	0.2	2.9	8.3	34.4	61.6	81.7	1004.7	1006.1	1008.1
24/07/2024	7.1	13.0	18.7	0.0	0.8	5.7	16.3	48.4	63.4	86.4	999.9	1002.6	1005.3
25/07/2024	11.3	15.8	20.4	0.0	0.6	7.3	17.6	48.6	56.6	63.9	995.9	998.3	1000.7
26/07/2024	9.8	14.1	19.6	5.4	0.2	4.0	13.4	43.4	73.9	100.0	996.6	999.6	1002.2
27/07/2024	8.0	11.1	15.5	6.4	0.1	2.9	13.0	80.9	95.2	100.0	995.6	998.4	1001.4
28/07/2024	5.8	9.5	13.0	0.2	0.3	5.0	23.0	33.0	57.8	88.0	995.3	998.2	1001.4
29/07/2024	3.8	8.6	13.6	0.0	0.1	5.4	23.6	38.9	55.3	80.1	1001.3	1005.1	1010.1
30/07/2024	6.0	9.3	14.5	0.0	0.6	5.7	18.1	47.9	61.9	72.2	1010.1	1011.9	1013.4
31/07/2024	6.9	9.9	13.6	0.0	0.9	5.1	21.7	56.2	65.5	73.8	1012.3	1013.2	1014.5
Monthly	3.8	11.1	20.4	42.2	0.0	4.2	32.7	27.9	73.5	100.0	981.4	1001.4	1019.5

Table 3: Meteorological Data Summary for July 2024

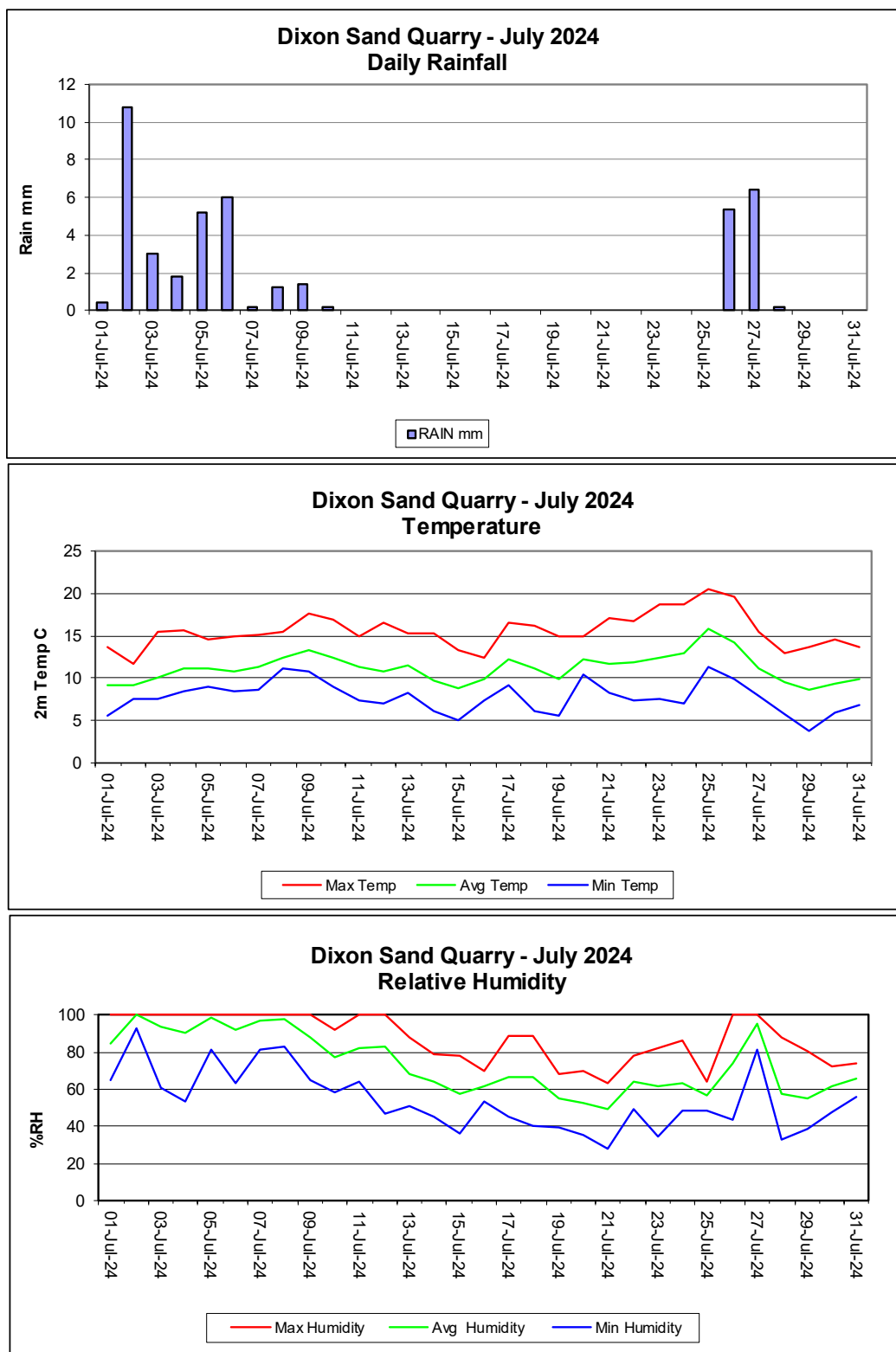


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

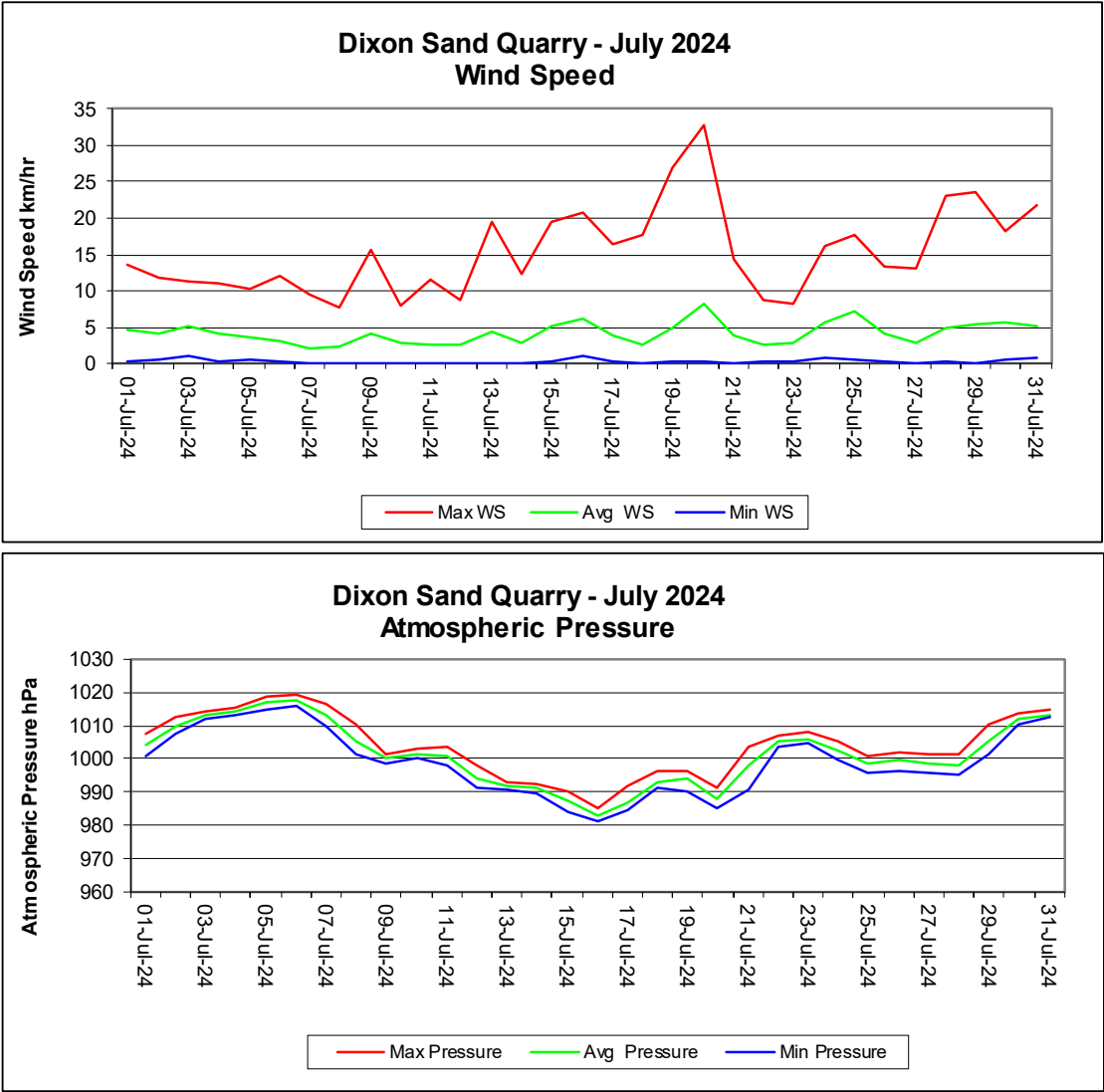


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose JULY 2024

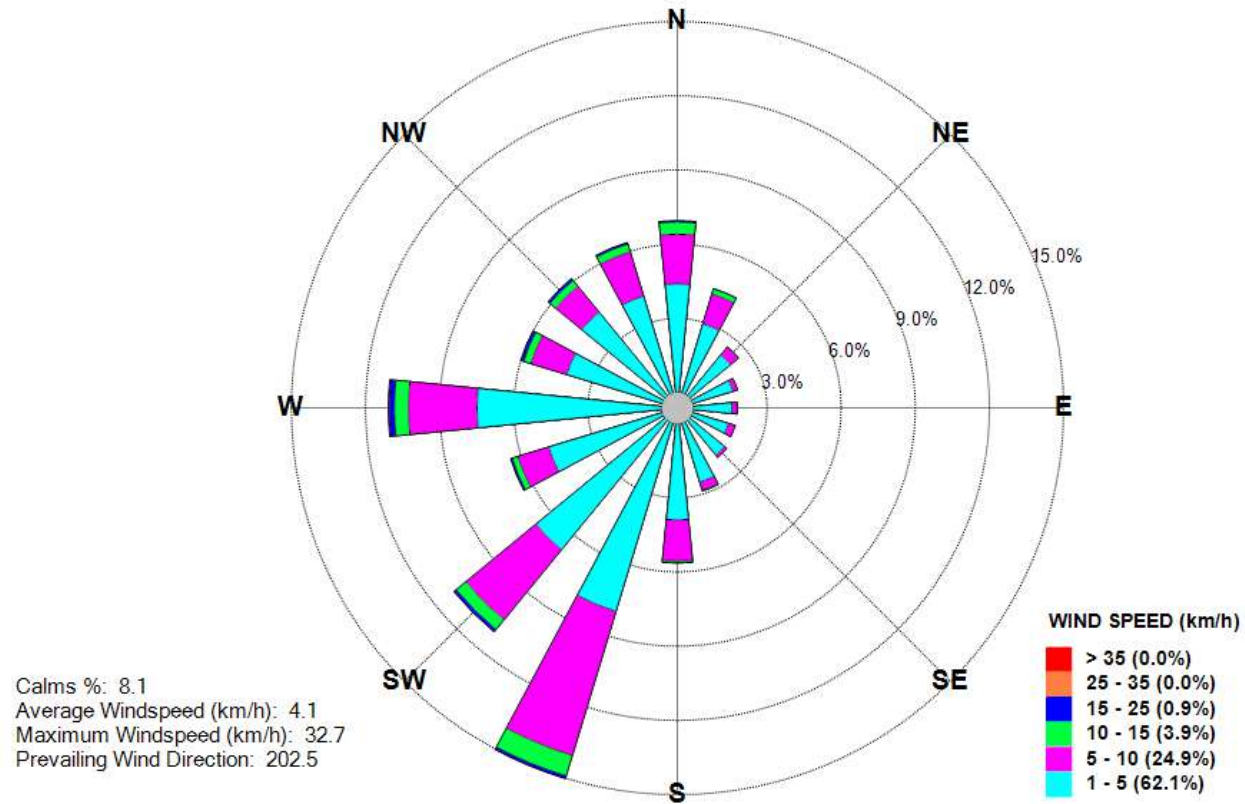


Figure 4: *Monthly Windrose*



**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

AUGUST 2024

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date 30 September 2024

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for August 2024 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average PM₁₀ results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average PM₁₀ results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The PM₁₀ annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in **green** indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in **red** indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2024 for TEOM's coinciding with the Dixon Sand project year.

Approximately 100% of valid meteorological data was recorded for August 2024.

Approximately 97% of valid TEOM data was available for August 2024.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or NSW EPA approved methods. The following Australian Standards were used:

- AS3580.9.8 - *“Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser”*; and
- AS/NZS 3580.1.1 - *“Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment”*.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³ and the Dixon Sand Quarry EPL limit of 42ug/m³.

Approximately 97% of valid TEOM data was available for August 2024 due to power outages.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2024 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted in May 2024 (for June). The next calibration is due to be completed in September 2024. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for August 2024 from AQMS and Annual Average PM₁₀ calculated from 1 July 2024.

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/08/2024	14.0	9.8	35.0	24.6
2/08/2024	12.7	9.9	31.8	24.8
3/08/2024	9.2	9.9	23.0	24.8
4/08/2024	11.2	9.9	28.0	24.9
5/08/2024	15.6	10.1	39.0	25.2
6/08/2024	13.4	10.2	33.5	25.5
7/08/2024	13.5	10.3	33.8	25.7
8/08/2024	17.3	10.5	43.3	26.1
9/08/2024	18.7	10.7	46.8	26.7
10/08/2024	17.7	10.8	44.3	27.1
11/08/2024	13.7	10.9	34.3	27.3
12/08/2024	21.0	11.1	52.5	27.8
13/08/2024	19.8	11.3	49.5	28.3
14/08/2024	9.6	11.3	24.0	28.2
15/08/2024	8.6	11.2	21.5	28.1
16/08/2024	10.9	11.2	27.3	28.1
17/08/2024	4.4	11.1	11.0	27.7
18/08/2024	10.4	11.1	26.0	27.7
19/08/2024	12.8	11.1	32.0	27.8
20/08/2024	13.8	11.2	34.5	27.9
21/08/2024	15.8	11.2	39.5	28.1
22/08/2024	9.2	11.2	23.0	28.0
23/08/2024	13.9	11.3	34.8	28.1
24/08/2024	10.7	11.2	26.8	28.1
25/08/2024	9.8	11.2	24.5	28.1
26/08/2024	11.7	11.2	29.3	28.1
27/08/2024	9.5	11.2	23.8	28.0
28/08/2024	20.0	11.4	50.0	28.4
29/08/2024	ND	11.4	ND	28.4
30/08/2024	ND	11.4	ND	28.4
31/08/2024	17.8	11.5	44.5	28.6

*Calculated from PM10

**Calculated from PM10 Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 ug/m³ are highlighted in yellow

No Data (ND) - <18hrs hour of valid data to calculate a 24hr average

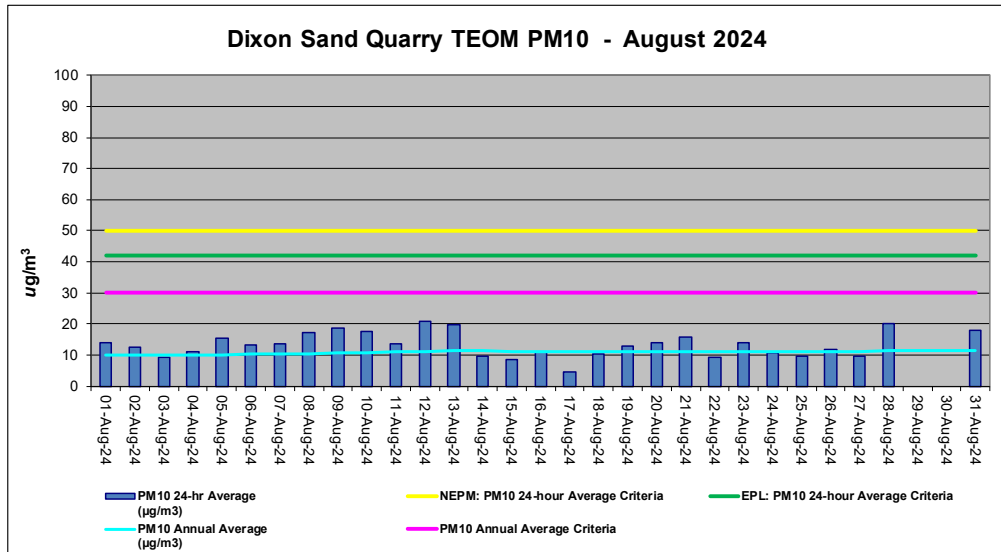


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

A 6-monthly physical screening and system check of the meteorological station was conducted in March 2024 and is next due in September 2024. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 100% of valid meteorological data was recorded for August 2024.

Dixon Sand Quarry Environmental Monitoring Project – August 2024

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/08/2024	7.3	10.2	13.9	0.0	0.6	4.9	14.0	61.5	71.1	83.6	1010.1	1011.5	1013.1
2/08/2024	7.4	10.3	15.6	1.6	0.2	3.8	12.2	58.2	86.3	100.0	1008.5	1009.7	1011.0
3/08/2024	6.1	11.2	16.8	0.2	0.2	3.2	13.2	34.5	77.2	100.0	1007.0	1008.6	1010.6
4/08/2024	5.7	10.4	14.7	0.0	0.1	2.1	7.2	50.4	76.0	99.9	1006.4	1007.6	1009.5
5/08/2024	7.7	10.6	13.6	0.0	0.2	2.6	11.9	69.4	86.7	100.0	1001.0	1003.9	1007.2
6/08/2024	7.9	11.7	17.1	0.0	0.0	2.9	10.9	43.9	78.9	100.0	1001.1	1002.8	1004.3
7/08/2024	6.1	11.0	17.1	0.0	0.0	2.4	7.4	33.5	69.5	93.3	1003.7	1006.0	1008.3
8/08/2024	5.7	11.9	18.8	0.0	0.2	2.7	14.9	46.5	77.9	100.0	1004.9	1007.3	1009.4
9/08/2024	9.7	13.8	20.3	0.0	0.2	3.0	10.1	44.7	77.4	99.9	1004.6	1006.1	1007.6
10/08/2024	9.3	12.9	18.5	0.0	0.0	3.2	13.6	65.9	90.3	100.0	1006.6	1008.4	1010.5
11/08/2024	10.2	12.5	17.2	6.6	0.1	2.3	10.2	70.7	96.4	100.0	1010.0	1011.1	1012.4
12/08/2024	10.6	12.3	13.9	1.2	0.1	1.8	7.0	99.9	99.9	99.9	1010.3	1011.7	1013.7
13/08/2024	12.2	14.5	16.9	1.8	0.0	2.0	7.0	98.9	99.9	100.0	1004.6	1007.7	1010.4
14/08/2024	14.0	14.6	15.8	6.8	0.0	1.9	7.0	99.9	99.9	100.0	999.3	1001.6	1004.6
15/08/2024	12.8	14.1	15.8	0.0	0.1	3.1	9.4	99.9	99.9	100.0	997.3	998.6	1000.1
16/08/2024	13.0	15.4	19.8	0.2	0.1	2.8	10.3	70.4	88.9	99.9	989.8	993.4	997.8
17/08/2024	11.8	14.9	19.7	0.0	0.0	4.8	17.8	33.9	60.9	85.3	985.7	988.2	990.0
18/08/2024	10.2	12.8	16.4	0.0	0.1	3.4	17.1	58.3	71.6	83.9	989.3	995.7	1002.3
19/08/2024	9.5	12.5	17.3	0.0	0.1	2.9	14.5	54.0	80.2	100.0	1002.3	1004.6	1006.5
20/08/2024	10.0	14.9	20.8	0.0	0.0	3.4	15.6	52.8	80.8	100.0	996.8	1001.6	1005.6
21/08/2024	14.5	19.0	24.7	0.0	0.1	6.3	30.4	29.3	57.4	82.8	993.4	995.5	998.6
22/08/2024	13.0	16.3	21.3	0.0	0.0	2.9	10.7	38.2	56.2	72.9	997.3	999.3	1002.9
23/08/2024	9.9	14.9	20.5	0.0	0.1	3.6	13.4	37.1	61.1	83.0	1001.2	1003.4	1006.0
24/08/2024	12.6	18.4	25.0	0.8	0.5	7.5	21.1	39.3	61.6	88.9	993.9	997.5	1001.2
25/08/2024	16.6	18.8	20.4	0.0	0.7	6.3	26.7	54.8	68.7	85.7	990.8	994.9	996.9
26/08/2024	13.2	18.8	24.6	0.0	0.3	3.8	14.6	21.3	43.6	80.7	989.4	995.7	1000.8
27/08/2024	9.4	16.8	24.5	0.0	0.2	4.7	18.1	19.6	46.4	78.3	993.7	998.5	1002.8
28/08/2024	16.9	21.7	27.2	0.0	0.2	6.4	24.8	20.4	30.4	43.2	987.2	990.5	993.7
29/08/2024	12.4	16.4	21.4	0.0	0.0	3.6	11.8	26.1	38.1	56.4	990.6	993.2	995.7
30/08/2024	14.0	21.5	28.5	0.0	0.4	6.7	32.2	22.7	36.0	46.7	980.7	984.8	991.0
31/08/2024	15.6	19.1	22.8	0.0	0.6	6.5	25.2	23.1	35.3	48.5	982.3	987.8	991.7
Monthly	5.7	14.7	28.5	19.2	0.0	3.8	32.2	19.6	71.1	100.0	980.7	1000.9	1013.7

Table 3: Meteorological Data Summary for August 2024

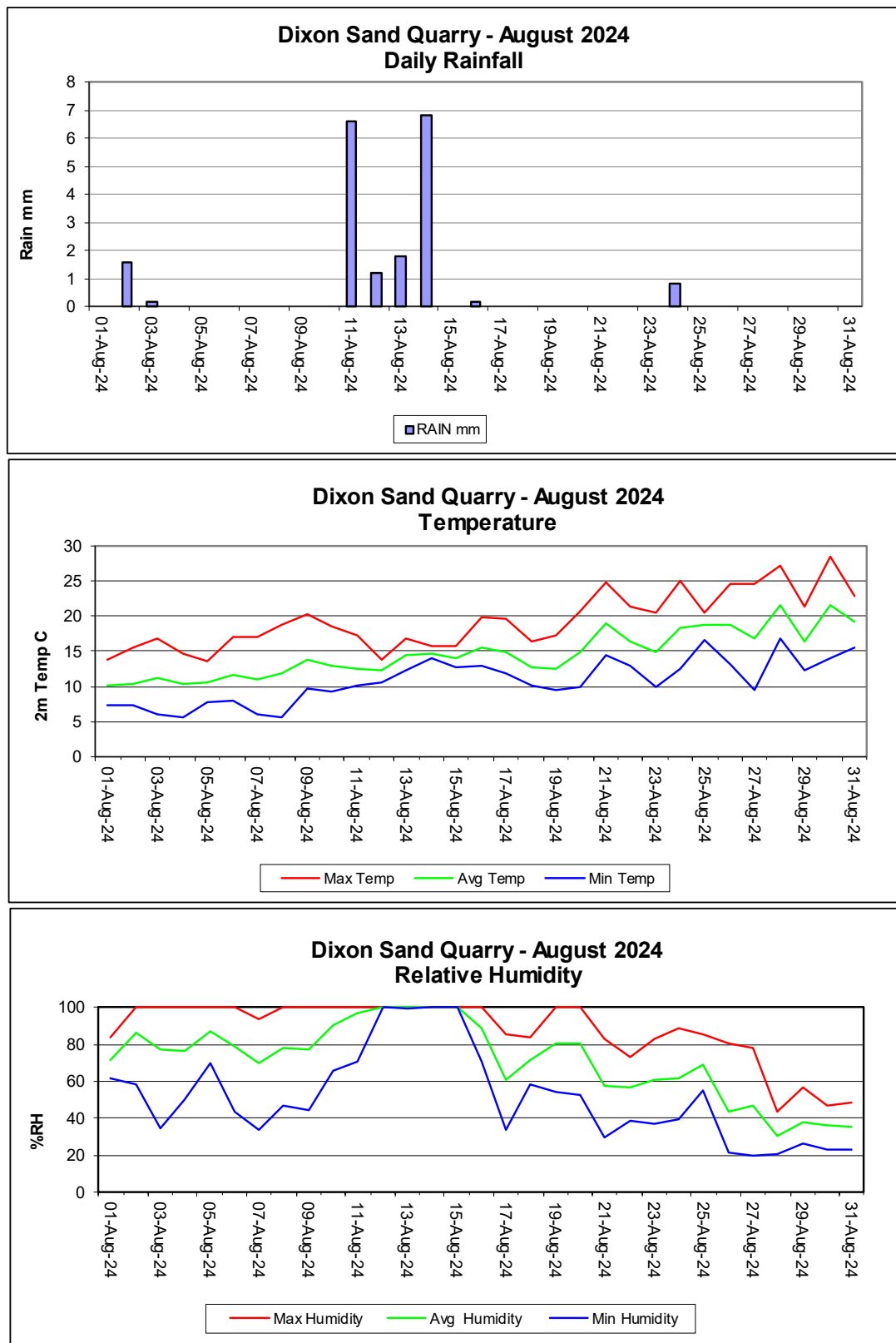


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

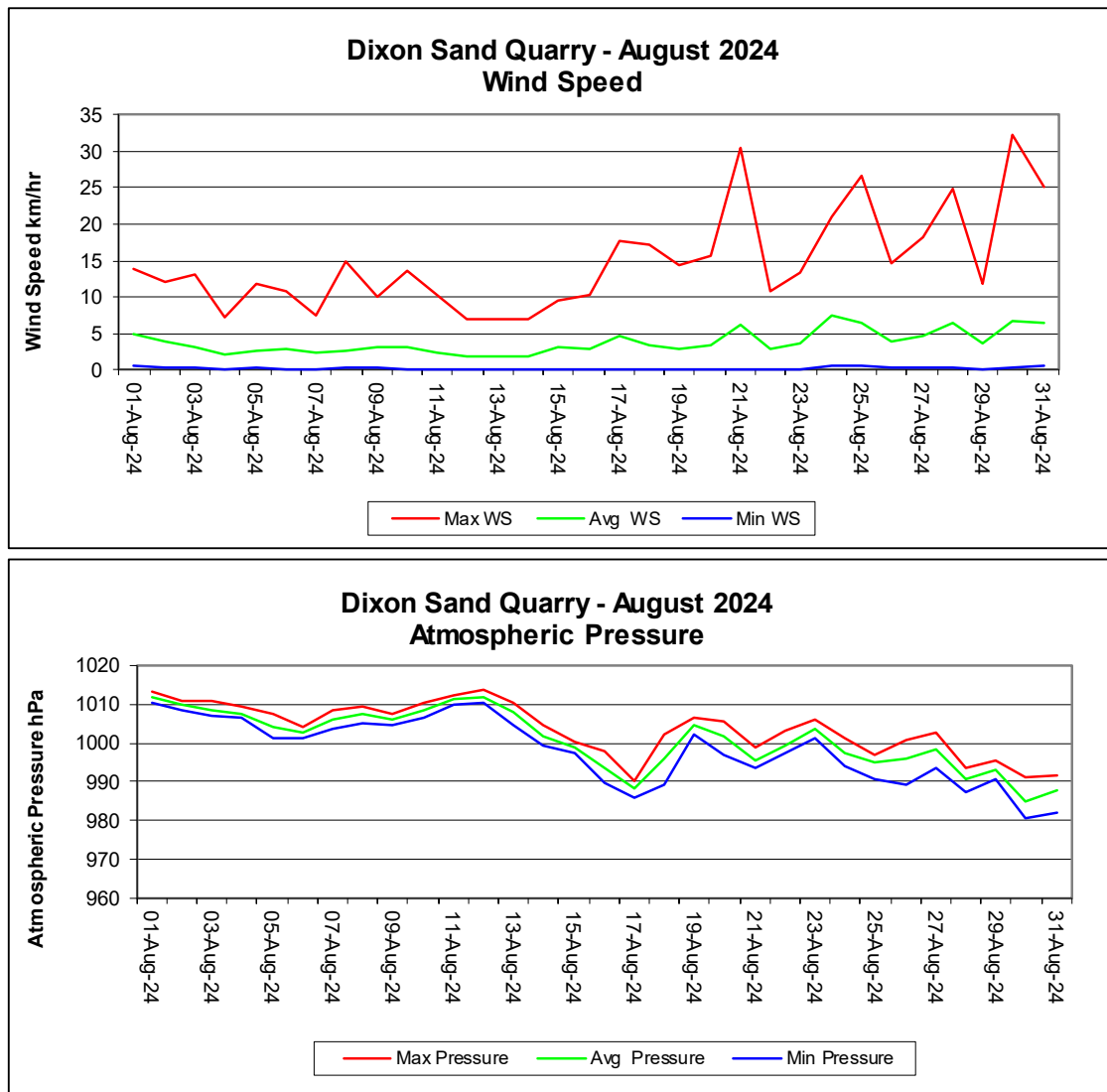


Figure 3: *Wind Speed and Atmospheric Pressure Charts*

Dixon Sand Quarry - Windrose

AUGUST 2024

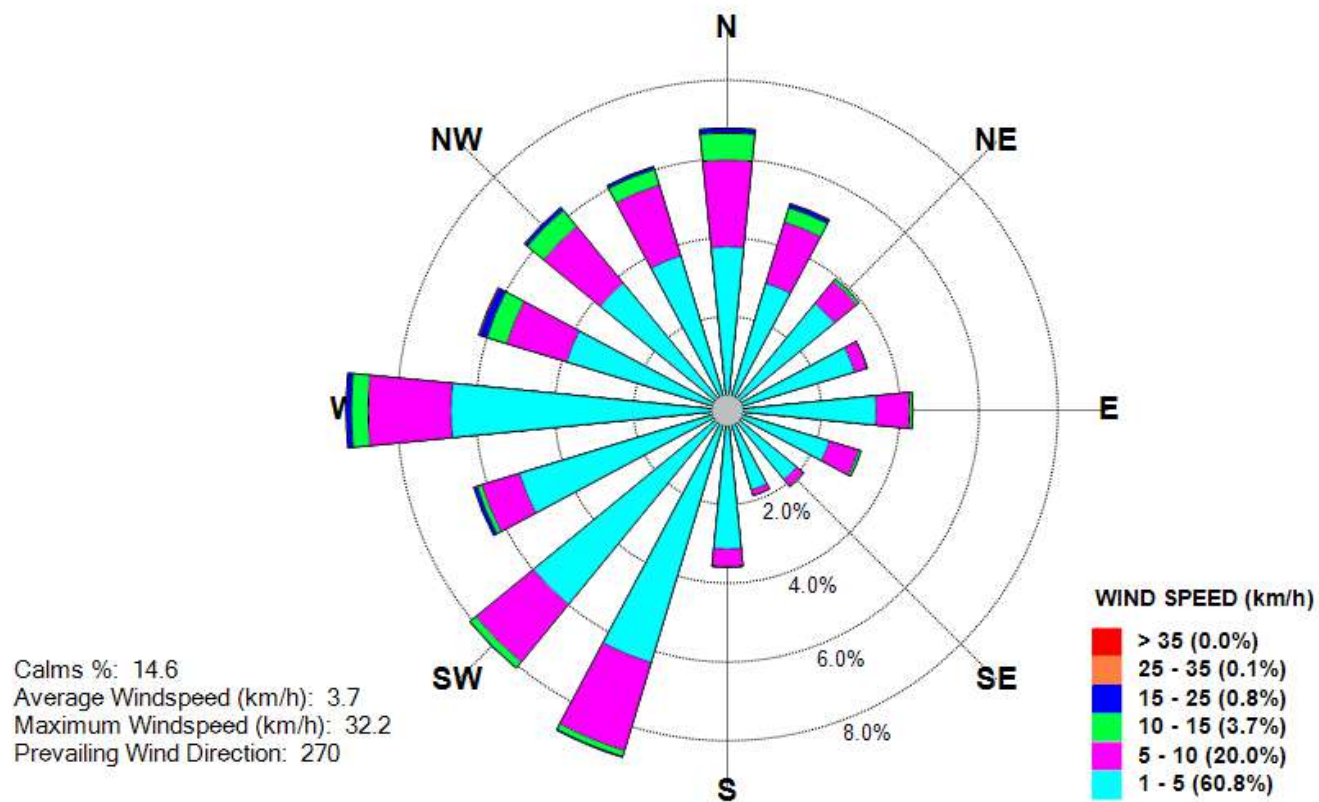


Figure 4: Monthly Windrose



**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

SEPTEMBER 2024

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date 28 October 2024

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for September 2024 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average PM₁₀ results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average PM₁₀ results were below the Dixon Sand Quarry EPL limit of 42ug/m³; with the exception of 1 occurrence on the 2/09/2024 (47.1)
- The PM₁₀ annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in green indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in red indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2024 for TEOM's coinciding with the Dixon Sand project year.

Approximately 100% of valid meteorological data was recorded for September 2024.

Approximately 100% of valid TEOM data was available for September 2024.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or NSW EPA approved methods. The following Australian Standards were used:

- AS3580.9.8 - *“Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser”*; and
- AS/NZS 3580.1.1 - *“Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment”*.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³.

All TEOM PM₁₀ results were also below the Dixon Sand Quarry EPL limit of 42ug/m³ with the exception of one occurrence (2/09/2024) highlighted yellow in Table 2.

Approximately 100% of valid TEOM data was available for September 2024.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2024 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted on 10 September 2024. The next calibration is due to be completed in December 2024. The calibration certificate is provided in **Appendix 1** (when required).

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/09/2024	11.2	11.5	28.0	28.6
2/09/2024	47.1	12.0	117.8	30.1
3/09/2024	14.6	12.1	36.5	30.2
4/09/2024	18.5	12.2	46.3	30.4
5/09/2024	21.9	12.3	54.8	30.8
6/09/2024	21.1	12.5	52.8	31.1
7/09/2024	21.7	12.6	54.3	31.5
8/09/2024	7.7	12.5	19.3	31.3
9/09/2024	17.7	12.6	44.3	31.5
10/09/2024	16.0	12.6	40.0	31.6
11/09/2024	21.8	12.8	54.5	31.9
12/09/2024	25.5	12.9	63.8	32.4
13/09/2024	12.5	12.9	31.3	32.4
14/09/2024	9.2	12.9	23.0	32.2
15/09/2024	10.2	12.9	25.5	32.1
16/09/2024	10.4	12.8	26.0	32.1
17/09/2024	12.4	12.8	31.0	32.0
18/09/2024	13.3	12.8	33.3	32.1
19/09/2024	25.6	13.0	64.0	32.5
20/09/2024	18.8	13.1	47.0	32.6
21/09/2024	11.7	13.0	29.3	32.6
22/09/2024	9.8	13.0	24.5	32.5
23/09/2024	11.8	13.0	29.5	32.5
24/09/2024	22.6	13.1	56.5	32.8
25/09/2024	29.5	13.3	73.8	33.2
26/09/2024	9.3	13.2	23.3	33.1
27/09/2024	10.0	13.2	25.0	33.0
28/09/2024	9.0	13.2	22.5	32.9
29/09/2024	8.7	13.1	21.8	32.8
30/09/2024	13.0	13.1	32.5	32.8

*Calculated from PM10

**Calculated from PM10 Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 ug/m³ are highlighted in yellow

No Data (ND) - <18hrs hour of valid data to calculate a 24hr average

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for September 2024 from AQMS and Annual Average PM₁₀ calculated from 1 July 2024.

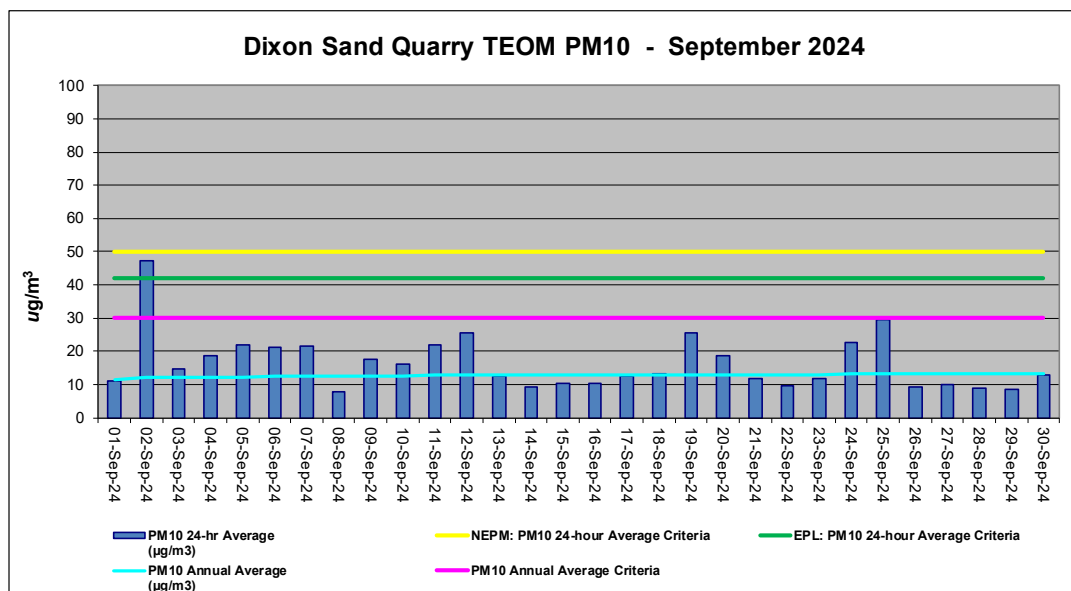


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

A 6-monthly physical screening and system check of the meteorological station was conducted on 10 September 2024 and is next due in March 2025. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 100% of valid meteorological data was recorded for September 2024.

Dixon Sand Quarry Environmental Monitoring Project – September 2024

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/09/2024	14.5	19.7	25.4	0.0	0.2	5.7	24.2	12.2	28.7	39.7	990.2	991.9	993.7
2/09/2024	11.6	17.6	23.4	0.0	1.0	7.7	34.5	18.0	28.7	35.0	989.4	994.4	1004.5
3/09/2024	7.4	11.9	17.3	0.0	0.1	3.2	11.3	24.9	42.7	64.1	1004.5	1008.6	1011.3
4/09/2024	6.7	14.2	21.5	0.0	0.4	5.3	17.7	26.7	49.3	79.4	1002.6	1006.9	1010.9
5/09/2024	14.1	19.6	25.7	0.0	0.0	6.4	29.8	27.6	39.2	55.7	1000.7	1003.0	1005.4
6/09/2024	15.5	21.2	27.3	0.0	0.5	7.1	22.8	25.2	43.7	60.8	999.0	1001.7	1004.3
7/09/2024	15.1	19.7	27.4	0.0	0.0	6.1	24.9	31.6	63.9	100.0	999.9	1001.7	1003.7
8/09/2024	13.9	15.6	19.5	0.0	0.0	2.5	12.0	36.7	76.7	99.9	996.6	999.5	1002.0
9/09/2024	12.3	16.4	23.0	0.0	0.3	3.8	14.4	31.4	45.9	58.6	995.9	998.4	1001.8
10/09/2024	10.6	15.2	21.8	0.0	0.2	3.7	17.9	47.1	67.3	92.6	1001.8	1004.7	1006.3
11/09/2024	10.7	18.2	25.6	0.0	0.3	3.4	16.3	30.5	63.2	98.6	1000.1	1002.8	1005.9
12/09/2024	11.3	15.3	19.8	1.4	0.2	5.7	16.7	51.8	75.9	100.0	999.0	1002.3	1006.6
13/09/2024	9.2	12.7	18.2	0.0	0.0	5.7	18.9	40.0	69.2	93.8	1004.9	1006.6	1008.2
14/09/2024	8.2	14.8	23.1	0.0	0.2	4.4	15.0	18.8	60.5	100.0	998.2	1002.3	1006.2
15/09/2024	6.7	10.5	15.9	0.0	0.2	6.9	22.2	30.2	52.1	76.6	1003.2	1006.2	1008.8
16/09/2024	5.2	11.5	20.4	0.0	0.1	3.8	15.9	15.0	55.3	79.2	1002.2	1005.8	1008.5
17/09/2024	7.2	13.4	20.6	0.0	0.0	3.1	11.4	33.0	57.7	84.3	1001.0	1004.0	1006.9
18/09/2024	8.8	16.9	25.2	0.0	0.2	4.7	14.6	9.2	31.1	55.2	993.2	996.9	1001.9
19/09/2024	14.6	19.3	25.7	0.0	0.2	6.4	27.2	9.6	22.6	33.5	986.3	989.8	993.7
20/09/2024	11.3	16.9	24.0	0.0	0.1	4.4	13.9	13.3	32.0	53.1	987.6	990.1	992.0
21/09/2024	11.5	16.6	22.4	0.0	0.4	5.0	22.9	22.0	36.7	51.3	989.2	991.4	994.8
22/09/2024	10.6	17.6	24.5	0.0	0.1	4.5	15.5	20.8	38.0	58.0	994.3	996.2	999.1
23/09/2024	13.0	19.7	27.9	0.0	0.1	4.0	15.2	18.8	37.9	56.7	996.1	998.9	1000.7
24/09/2024	11.7	19.1	24.5	0.0	0.1	4.4	17.2	32.2	48.1	75.4	996.2	999.3	1002.5
25/09/2024	16.4	21.5	28.0	1.6	0.4	4.7	24.4	26.5	46.4	86.3	990.4	994.0	996.8
26/09/2024	8.5	11.0	18.1	34.0	0.1	6.5	17.3	70.6	95.8	99.9	992.2	999.1	1004.4
27/09/2024	8.6	11.2	15.6	6.8	0.0	5.3	25.0	64.9	92.2	100.0	1003.9	1006.7	1009.4
28/09/2024	9.4	12.9	17.5	2.0	0.2	5.1	29.2	57.8	89.7	100.0	1005.2	1007.4	1009.6
29/09/2024	11.0	14.7	18.1	0.8	0.1	3.0	9.7	84.2	98.4	100.0	998.8	1002.0	1006.0
30/09/2024	11.3	15.4	20.3	4.6	0.1	4.3	18.5	58.7	85.4	100.0	997.0	1000.3	1003.6
Monthly	5.2	16.0	28.0	51.2	0.0	4.9	34.5	9.2	55.8	100.0	986.3	1000.4	1011.3

Table 3: Meteorological Data Summary for September 2024

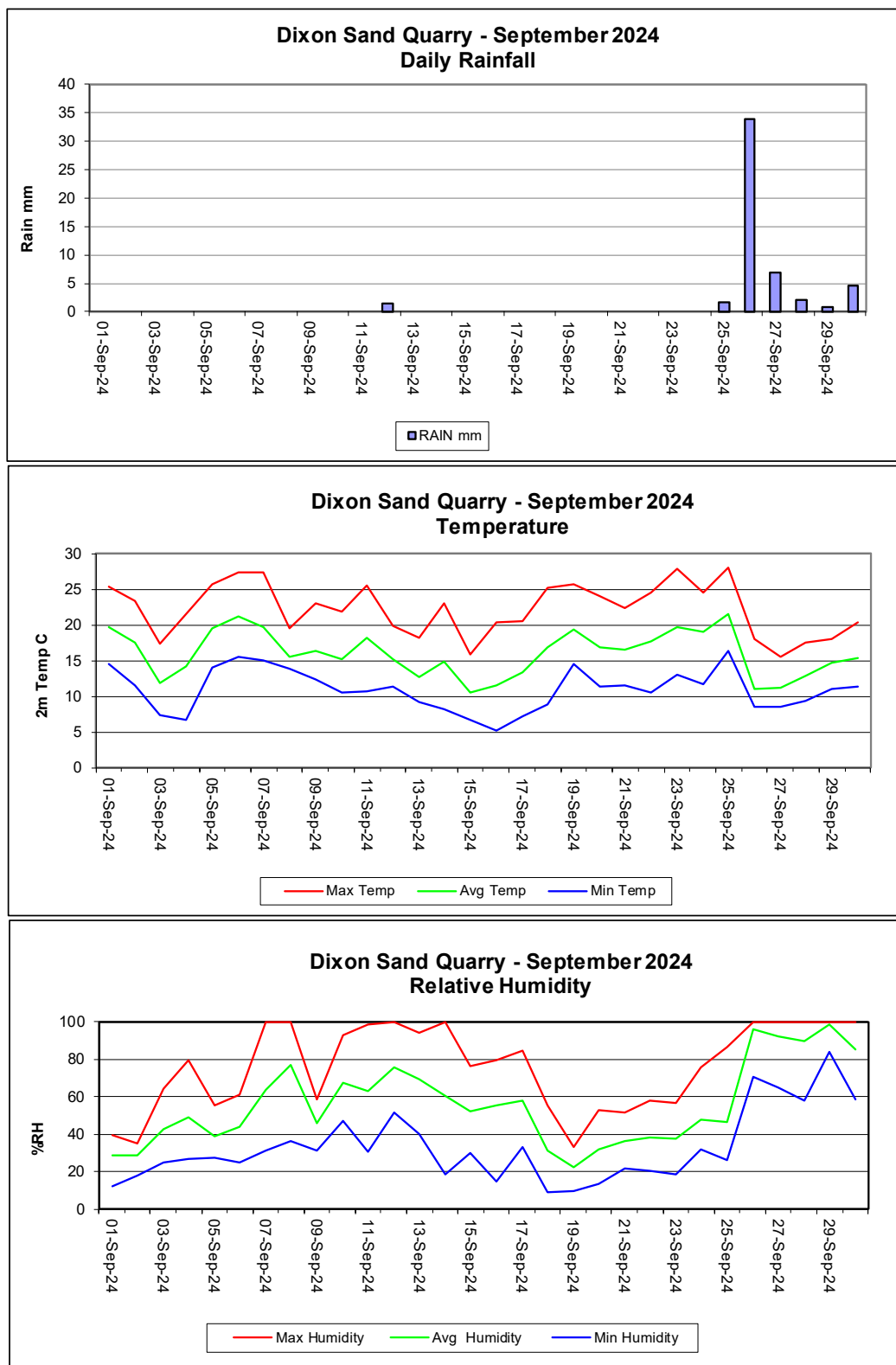


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

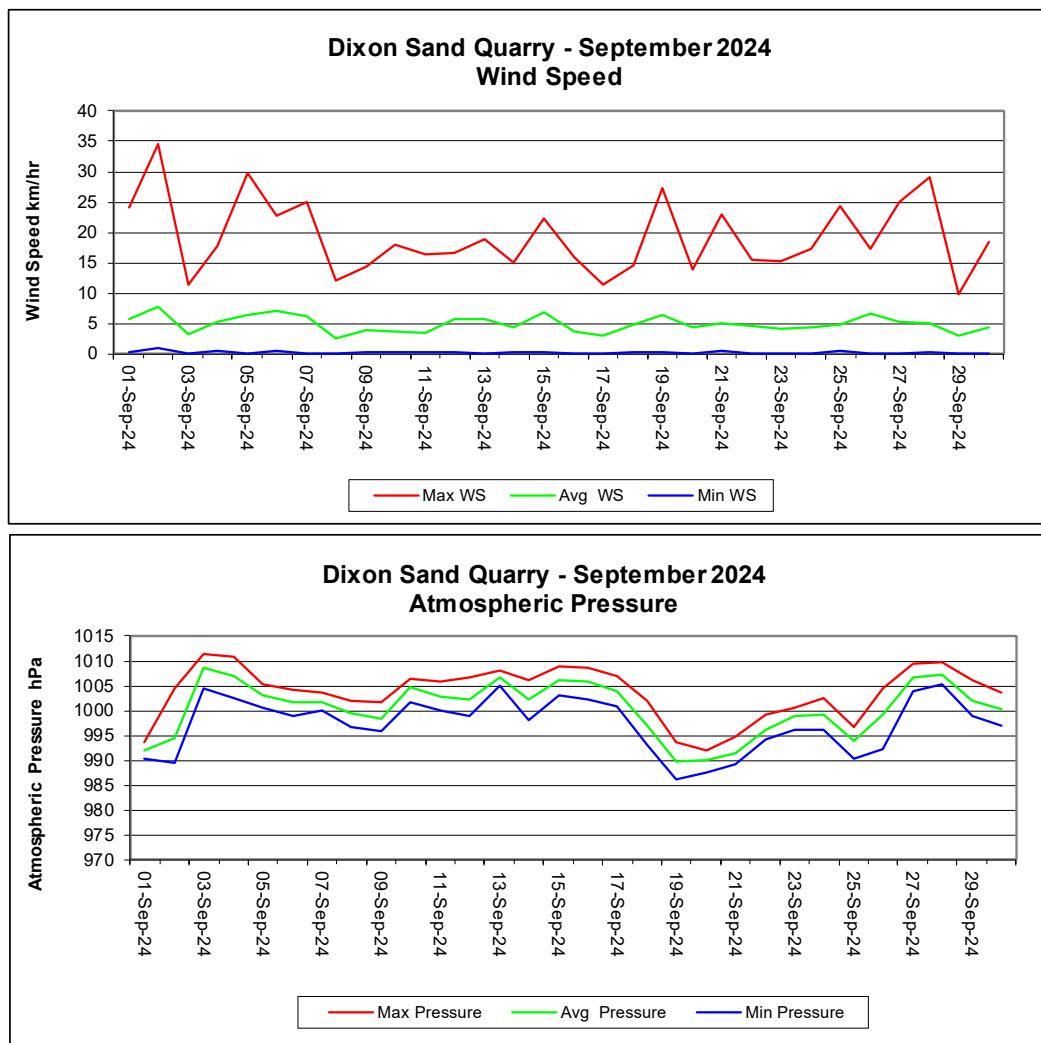


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose

SEPTEMBER 2024

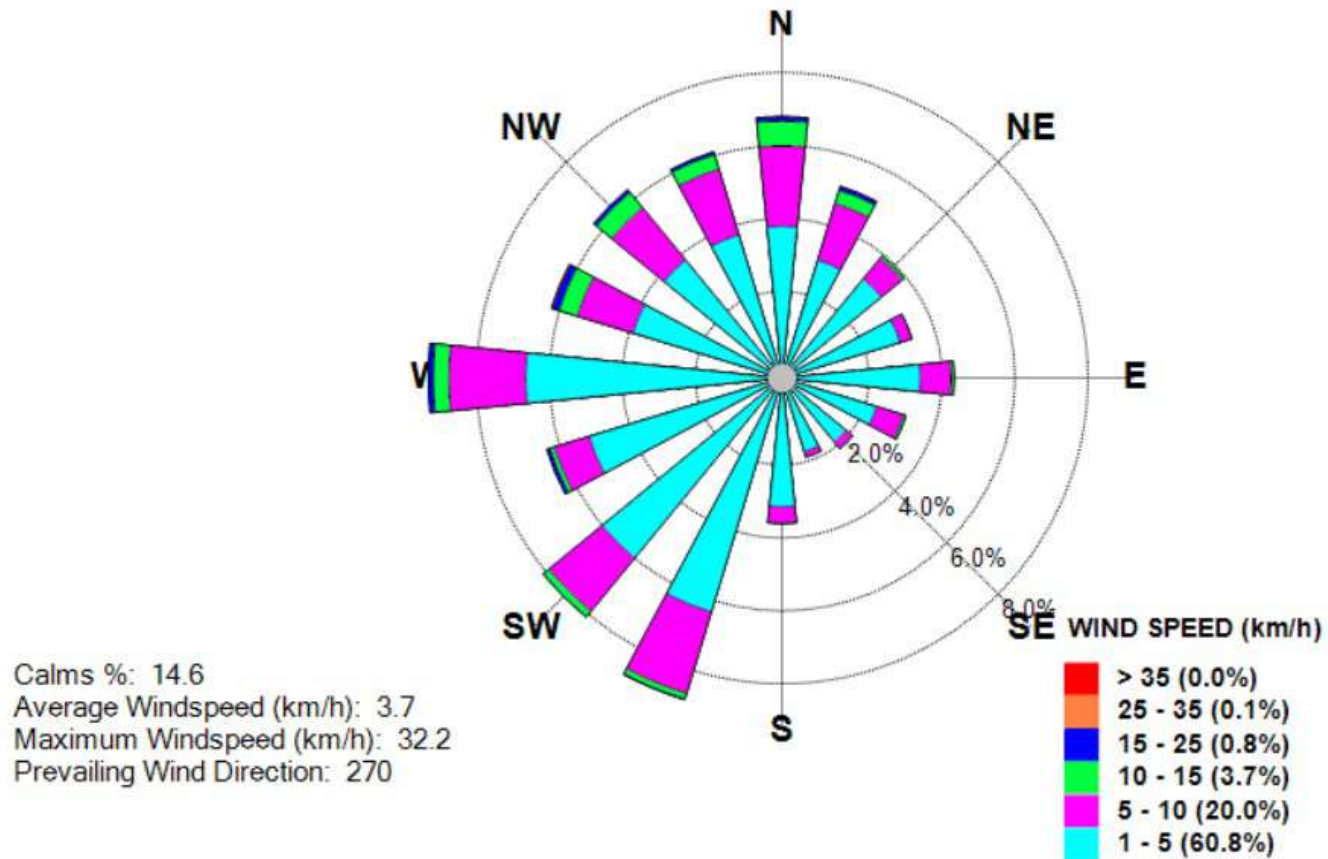


Figure 4: Monthly Windrose

Appendix 1

Calibration Documents (when required)

**CBased Environmental Pty Limited**

ABN 62 611 924 264

Weather Station Field CheckSite: Dixon SandsDate/Time: 10/09/2024 12:50**Measured Against Reference Sensors**

Parameter	Units	Site	Reference	Difference	Pass/Fail	Reference Description
Temperature 10m	°C	20.2	20.2	0.0	Pass	Ref Thermometer
Humidity	%RH	51.7	53.7	-2.0	Pass	Ref RH sensor
Rainfall	mm	3.0	3.2	-0.2	Pass	Glass Pipette
Wind Speed	km/hr	5.0	4.8	0.2	Pass	Ref Anemometer
Wind Direction	Degrees	115	117	-2.0	Pass	Sighting compass

Reference Instruments Specifications:

*Calibration expires:

10/02/2025

Sensor	Serial Number	Specifications	Accuracy
*Temperature	230210N04	-40 to 65°C	+/- 0.3°C
*Barometer	BF230207001	20 to 30" Hg	+/- 1.1hPa
*Humidity	230210N04	10 to 90%RH	+/- 2%RH
*Anemometer	230210N06	0 to 64km/hr	+/- 3.6km/hr or 5%
**Rainfall	Standard number of tips	3.2mm	+/- 0.2mm
Compass	Sighting Compass	0 to 360 degrees	+/- 5 Deg

** 100mL used.

Reference sensors were certified by Davis Instruments USA using a reference traceable to National Institute of Standards and Technology (NIST) and were "in calibration" when used.

Comments:

The weatherstation was in conformance with the reference instruments at the monitored levels. Wind direction is referenced to true north. The calibration check of the raingauge involved adding water to the raingauge. Rain total of 3.0mm should be deleted from site records on the 10/9/2024.

NA=Not Available

The meteorological station meets the requirements of the Approved Methods for the Sampling and Analysis of Air Pollutants in NSW.

The weather station has Passed the field check. Next annual field check due:

Mar-25

Checked by: Colin Davies

7/10/2024

CBased Environmental Pty Limited

Unit 3, 2 Enterprise Crescent

SINGLETON NSW 2330

P: 65 713 334

**CBased Environmental Pty Limited**

ABN 62 611 924 264

Weather Station Physical Screening Field CheckClient DIXON SANDSSite Name: Dixon Sand TEOMDate: 10/9/24Time: 12:50 - 13:50

	Yes (Pass)	No (Fail)	Comments
Grass / Vegetation Impacts			
Compound Grass height <10cm	✓		
No objects within impact area (10 x height of object)		✓	Trees/buildings nearby
Ground Anchor / Guy Wires / Mast Condition			
Bottom guy wires tight (correct tension = 35-50mm deflection, with only moderate hand force at 1.5 metres up the guy wire)	NA		Freestanding Mast
Top Guy wires tensioned (correct tension = 60-75mm deflection, with only moderate hand force at 1.5 metres up the guy wire)	NA		" "
Mast Vertical and in good condition	✓		Freestanding Mast
Ground anchors/star pickets tight in ground	NA		" "
Guy Wires insignificant corrosion	NA		" "
Ground anchors/D shackles/ winders insignificant corrosion	NA		" "
Bolts/hinge points in mast are secure	NA		" "
Cables / Connectors / Logger Cabinet / Solar Panel			
Cables attached to mast/guy wires via ties are secure	✓		
Insignificant corrosion to plugs/connectors	✓		
No water ingress in logger/battery cabinet	✓		
Wiring/plugs in cabinet OK, Logger OK	✓		
Battery terminals and condition OK	NA		Battery Volts = 240V System
Battery volts (charging >13V, not charging >12V)	NA		" "
Solar panel undamaged and clean	NA		" "
Sensor shields clean	✓		
Sensor Check			
Wind direction aligned True North/Magnetic North (strike out N/A)	✓		Compass Bearing: 350 degrees
Rain gauge cleaned, working OK (1 tip check) or 100ml Cal	✓		100ml 3.0 mm rain OK
Rain gauge level OK	✓		
Anemometer/wind vane moving freely (analogue sensors)	NA		kill ultrasonic
Other sensors visually checked and OK	✓		
Last months data checked and OK / Logging data OK	✓		

Checked By: Name COLIN DANIELSigned [Signature]

CBased Environmental Pty Limited

Unit 3, 2 Enterprise Crescent

SINGLETON NSW 2330

P: (02) 6571 3334



Continuous Air Quality Monthly/Quarterly/Six Monthly/Annual TEOM Maintenance and Calibration – 1400AB

TEOM Client/Site: Dixon Sands/TEOMDate: 10/9/20241. TEOM Data Screen SERIAL No: 140AB255700503 Firmware: _____

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	OK 4	Green - Normal	✓	
Date/time	TEOM: 13:56 12th Sept Actual: 13:03	Current Date/time correct within 5 minutes	✓	
PM-10 24hr av	19.9	Positive values	✓	
Filter loading PM10	87	<80 %	✓	
Frequency PM-10	253.17016	200-300 Hz	✓	
Noise PM-10	0.052	<0.100ug	✓	

Comment: If filter load >80% but <90% and if flows Ok then data is OK

Comments:

Arrived to bad/dieing pump, changed as first task

2. System Status

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Vacuum pump pressure	-28.1 inch mmHg	<0.50 atm	✓	
Warnings	Nil	No Warnings	✓	
If any warnings list:				

Comments:

Data Downloaded: YES/NO (circle)

Technician Name : Conrad Peilardt Signed [Signature]

3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	24.4	-10 to 50 C	✓	
Ambient Dew Point	NA	-10 to 50 C	✓	
Ambient Pressure	0.980	0.9-1.1 atm	✓	
Ambient Relative Humidity	NA	10-100 %RH		
Cap temperature	50.00	50.00 +/- 0.10 C	✓	
Case temperature	50.00	50.00 +/- 0.10 C	✓	
Main (PM-10) Air Tube temp	50.01	50.00 +/- 0.10 C	✓	

Comments:**4. Instrument Conditions – Flows**

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Main (PM-10) Flow rate	3.00 1.06adj	2.82 – 3.18 lpm	✓	
Bypass Flow rate	13.88 1.02adj	12.95 – 14.39 lpm	✓	
Total Flow rate	16.68	15.67 – 17.67 lpm	✓	

Comments:**Results: (Tick box)**

- ☒ **There were NO equipment faults found. No action required – (file report)**
- ☐ **There were faults found (Fails) – Were these fixed on site: YES/NO (circle)**
Any Fails that cannot be repaired on site must be reported to CBased:
Office: 65713334 or email cbased@bigpond.com
Date faults notified to CBased: _____

Comments/Action Required:

Pump was replaced before calls



Calibration/Maintenance

1. 1405A: Were Filters replaced YES/NO
 2. PM10 Inlet head cleaned YES/NO
 3. If measurement filters were replaced, confirm stable results after change. Stable particulate results confirmed YES/NO

Channel	Filter Load %	Frequency Hz initial	Frequency check 1min	Frequency check 3min	Frequency check 5min
PM10	17	255.97546	.97552	.97562	.97570

Frequency should not drift by more than 0.0010 between readings (if instrument is thermodynamically stable)
 Pass/Fail – if Fail – install new filter and redo stability test.

4. Instrument clock verified (Refer Section 1) YES/NO.
 If Time changed – clock reset OK YES/NO or NA (not changed)

Comments:

clock set 2 days into future

5. Were TEOM in line and rear TEOM filters checked for cleanliness and replaced if necessary. YES/NO.

Comments if changed:

6. TEOM Cleaned and Air Conditioner checked YES/NO. Air Conditioner settings or operational status: Good

Tetral Flow/Temp/Pressure Calibrator Serial No: 172357 Refer to calibration corrections for Temperature/Pressure and Flows and apply to all readings.

Quarterly or Six Monthly Calibration**1. Flow Verification – Conducted YES/NO**

PM10 Flow verified Flow l/min 3.04 Error % 2.4 (allowed error <6%) PASS/FAIL

Bypass Flow verified Flow l/min 14.18 Error % 4.6 (allowed error <6%) PASS/FAIL

If fail then complete a full multipoint recalibration and review previous data from last good flow check. **Comments if Flows recalibrated:**

2. Leak Check – Conducted YES/NO

PM10 actual 3.00, 1.05adj < Limit 0.15

Bypass actual 13.76, 0.995adj Limit 0.60

Leak check PASS/FAIL – If fail then find leak and retest.

Comments:

*Fail, leak in mass transducer, leak in U Seal on
 Leak in flow temperature probe*





**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

OCTOBER 2024

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date 29 November 2024

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for October 2024 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average PM₁₀ results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average PM₁₀ results were below the Dixon Sand Quarry EPL limit of 42ug/m³.
- The PM₁₀ annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in **green** indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in **red** indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2024 for TEOM's coinciding with the Dixon Sand project year.

Approximately 100% of valid meteorological data was recorded for October 2024.

Approximately 100% of valid TEOM data was available for October 2024.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or NSW EPA approved methods. The following Australian Standards were used:

- AS3580.9.8 - *“Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser”*; and
- AS/NZS 3580.1.1 - *“Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment”*.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³.

All TEOM PM₁₀ results were also below the Dixon Sand Quarry EPL limit of 42ug/m³.

Approximately 100% of valid TEOM data was available for October 2024.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2024 and therefore an annual amount of data has not yet been collected.

The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for October 2024 from AQMS and Annual Average PM₁₀ calculated from 1 July 2024.

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/10/2024	19.0	13.2	47.5	32.9
2/10/2024	19.4	13.2	48.5	33.1
3/10/2024	15.5	13.3	38.8	33.2
4/10/2024	15.1	13.3	37.8	33.2
5/10/2024	11.4	13.3	28.5	33.2
6/10/2024	11.0	13.2	27.5	33.1
7/10/2024	10.9	13.2	27.3	33.1
8/10/2024	18.5	13.3	46.3	33.2
9/10/2024	14.1	13.3	35.3	33.2
10/10/2024	11.1	13.3	27.8	33.2
11/10/2024	20.0	13.3	50.0	33.3
12/10/2024	24.1	13.4	60.3	33.6
13/10/2024	15.5	13.5	38.8	33.6
14/10/2024	14.9	13.5	37.3	33.7
15/10/2024	14.4	13.5	36.0	33.7
16/10/2024	15.7	13.5	39.3	33.7
17/10/2024	12.2	13.5	30.5	33.7
18/10/2024	10.8	13.5	27.0	33.6
19/10/2024	13.1	13.5	32.8	33.6
20/10/2024	15.7	13.5	39.3	33.7
21/10/2024	14.6	13.5	36.5	33.7
22/10/2024	16.4	13.5	41.0	33.8
23/10/2024	23.8	13.6	59.5	34.0
24/10/2024	26.8	13.7	67.0	34.3
25/10/2024	13.5	13.7	33.8	34.3
26/10/2024	15.2	13.7	38.0	34.3
27/10/2024	13.7	13.7	34.3	34.3
28/10/2024	20.7	13.8	51.8	34.5
29/10/2024	24.2	13.9	60.5	34.7
30/10/2024	24.7	14.0	61.8	34.9
31/10/2024	22.4	14.0	56.0	35.1

*Calculated from PM10

**Calculated from PM10 Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 ug/m³ are highlighted in yellow

No Data (ND) - <18hrs hour of valid data to calculate a 24hr average

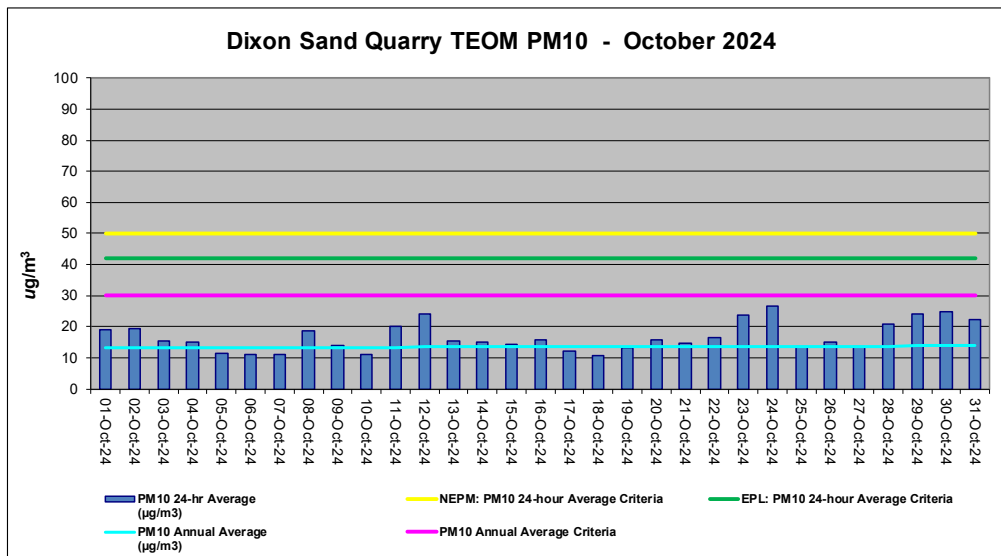


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

A 6-monthly physical screening and system check of the meteorological station was conducted in September 2024 and is next due in March 2025. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 100% of valid meteorological data was recorded for October 2024.

Dixon Sand Quarry Environmental Monitoring Project – October 2024

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/10/2024	10.6	15.5	22.3	0.0	0.0	4.1	25.9	40.2	78.3	100.0	1000.6	1003.1	1006.8
2/10/2024	13.3	14.9	17.5	0.0	0.1	3.1	13.5	68.3	84.7	97.5	1006.7	1009.6	1011.4
3/10/2024	11.4	14.7	19.5	0.0	0.0	3.8	29.2	48.8	77.5	100.0	1005.6	1008.7	1011.8
4/10/2024	9.4	17.3	24.4	0.0	0.5	4.3	17.5	35.2	66.2	100.0	990.5	997.6	1005.5
5/10/2024	16.5	20.6	25.3	0.4	0.2	5.9	29.5	26.9	48.4	79.8	986.6	988.9	991.4
6/10/2024	17.0	21.1	27.7	0.0	0.2	5.4	20.7	21.6	39.4	55.5	989.8	992.8	998.5
7/10/2024	14.8	21.5	28.5	0.0	0.1	4.1	15.3	22.9	42.2	67.0	995.2	997.6	999.5
8/10/2024	11.2	13.7	21.9	2.0	0.0	4.1	15.1	35.7	86.0	100.0	998.3	1002.9	1006.7
9/10/2024	10.4	11.8	14.2	2.6	0.0	3.6	16.9	71.3	90.3	100.0	1004.6	1005.7	1007.3
10/10/2024	10.2	15.8	23.2	0.6	0.0	3.8	14.0	45.5	81.0	99.9	998.9	1002.4	1005.4
11/10/2024	13.1	17.8	24.7	0.0	0.1	4.4	20.3	48.5	83.4	100.0	999.6	1002.3	1005.2
12/10/2024	10.9	14.4	16.6	0.0	0.6	5.8	17.4	59.0	78.3	100.0	1001.4	1006.0	1008.8
13/10/2024	8.2	13.7	20.1	0.0	0.4	3.9	18.8	47.4	76.0	100.0	1002.0	1005.2	1008.4
14/10/2024	11.5	16.1	24.6	45.4	0.1	4.6	20.3	49.4	80.2	99.9	996.1	999.9	1003.1
15/10/2024	12.0	13.9	16.5	2.6	0.1	3.4	11.2	76.5	92.6	100.0	1002.1	1004.3	1005.8
16/10/2024	11.1	13.7	16.3	0.2	0.0	2.2	10.9	66.5	84.2	100.0	999.7	1001.9	1005.2
17/10/2024	10.6	16.7	24.0	0.0	0.3	4.4	15.3	41.5	81.4	100.0	995.7	998.2	1000.4
18/10/2024	15.9	19.3	24.0	0.4	0.3	5.1	18.2	62.6	87.2	100.0	984.6	989.8	996.2
19/10/2024	16.4	19.5	24.2	0.2	0.0	4.1	17.7	51.1	77.9	100.0	984.9	990.2	997.0
20/10/2024	14.8	17.7	22.6	0.0	0.1	4.1	17.9	48.4	79.1	100.0	996.5	999.2	1002.5
21/10/2024	12.1	16.0	20.9	0.0	0.2	5.8	18.7	45.9	68.7	93.7	999.3	1001.0	1003.1
22/10/2024	10.7	16.9	25.4	0.0	0.2	3.8	15.3	19.6	67.3	94.6	993.2	996.5	1000.1
23/10/2024	12.6	21.0	29.6	0.0	0.1	3.9	9.2	30.3	65.5	100.0	988.4	991.0	994.7
24/10/2024	12.6	17.9	22.4	4.0	0.2	5.8	29.9	45.8	77.0	100.0	988.6	991.4	994.8
25/10/2024	10.0	14.8	22.1	0.2	0.1	4.2	23.4	23.6	67.4	100.0	993.7	995.9	1000.5
26/10/2024	10.4	13.9	19.5	0.0	0.2	4.3	22.5	30.0	54.6	74.6	999.2	1001.1	1003.2
27/10/2024	10.7	17.5	25.6	0.0	0.1	4.0	14.1	22.4	57.2	85.8	996.5	999.2	1001.6
28/10/2024	14.7	19.6	29.1	0.0	0.2	4.8	24.4	18.2	58.8	95.6	996.0	998.6	1003.9
29/10/2024	12.7	16.9	23.8	0.0	0.2	4.0	25.4	41.1	78.3	100.0	999.6	1002.5	1004.5
30/10/2024	15.0	20.2	28.5	0.0	0.0	4.5	23.9	34.7	72.4	97.6	991.5	996.7	1002.9
31/10/2024	14.7	20.5	29.6	0.8	0.1	4.3	23.8	19.3	66.0	99.9	988.1	991.3	994.7
Monthly	8.2	16.9	29.6	59.4	0.0	4.3	29.9	18.2	72.5	100.0	984.6	999.1	1011.8

Table 3: Meteorological Data Summary for October 2024

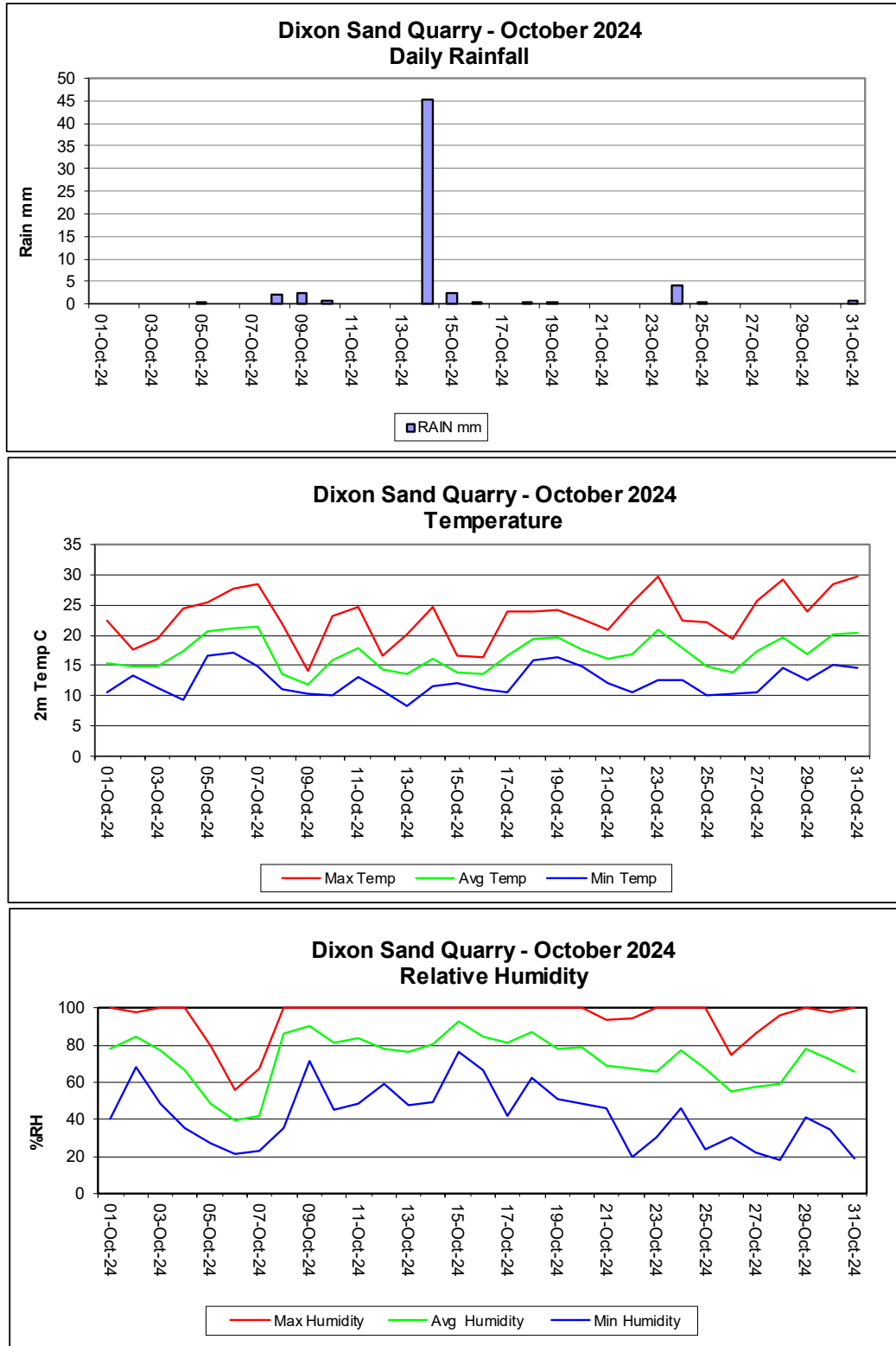


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

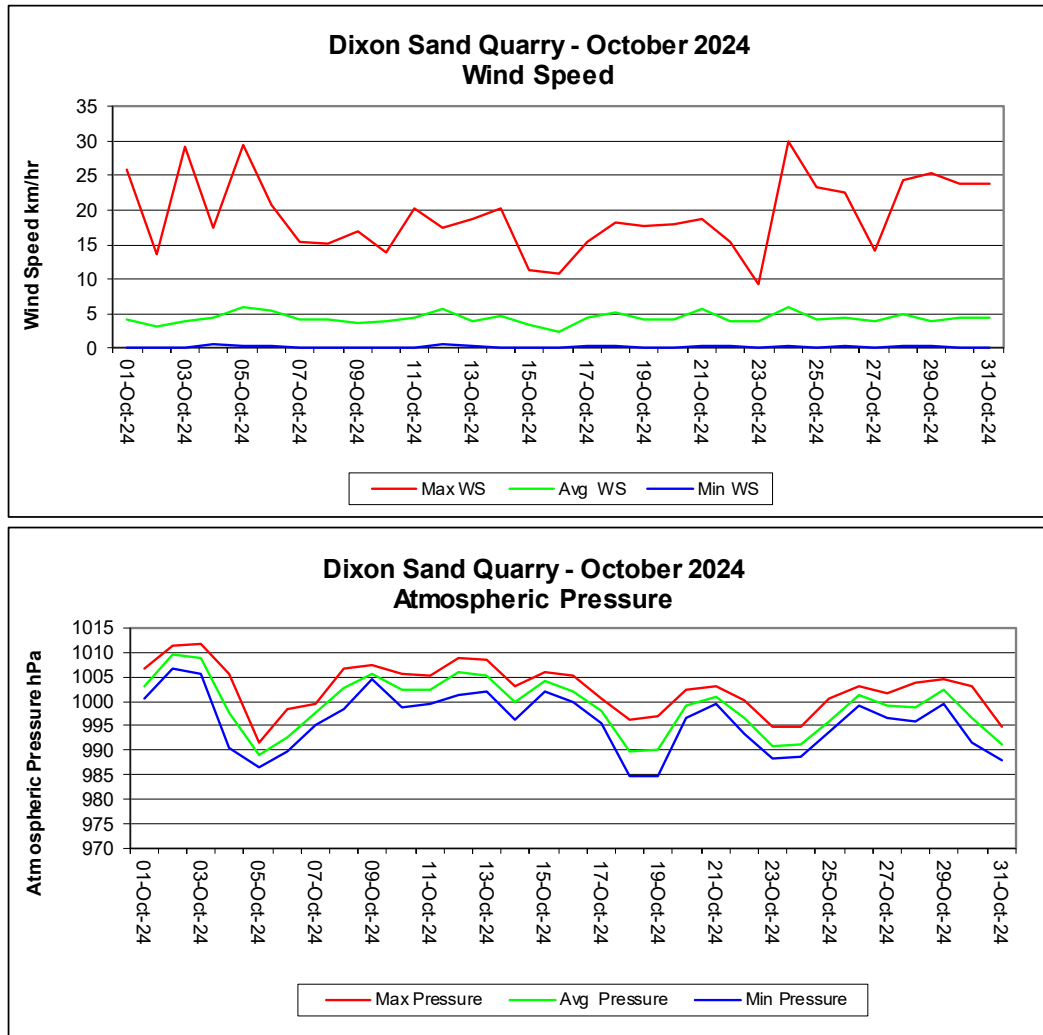


Figure 3: *Wind Speed and Atmospheric Pressure Charts*

Dixon Sand Quarry - Windrose OCTOBER 2024

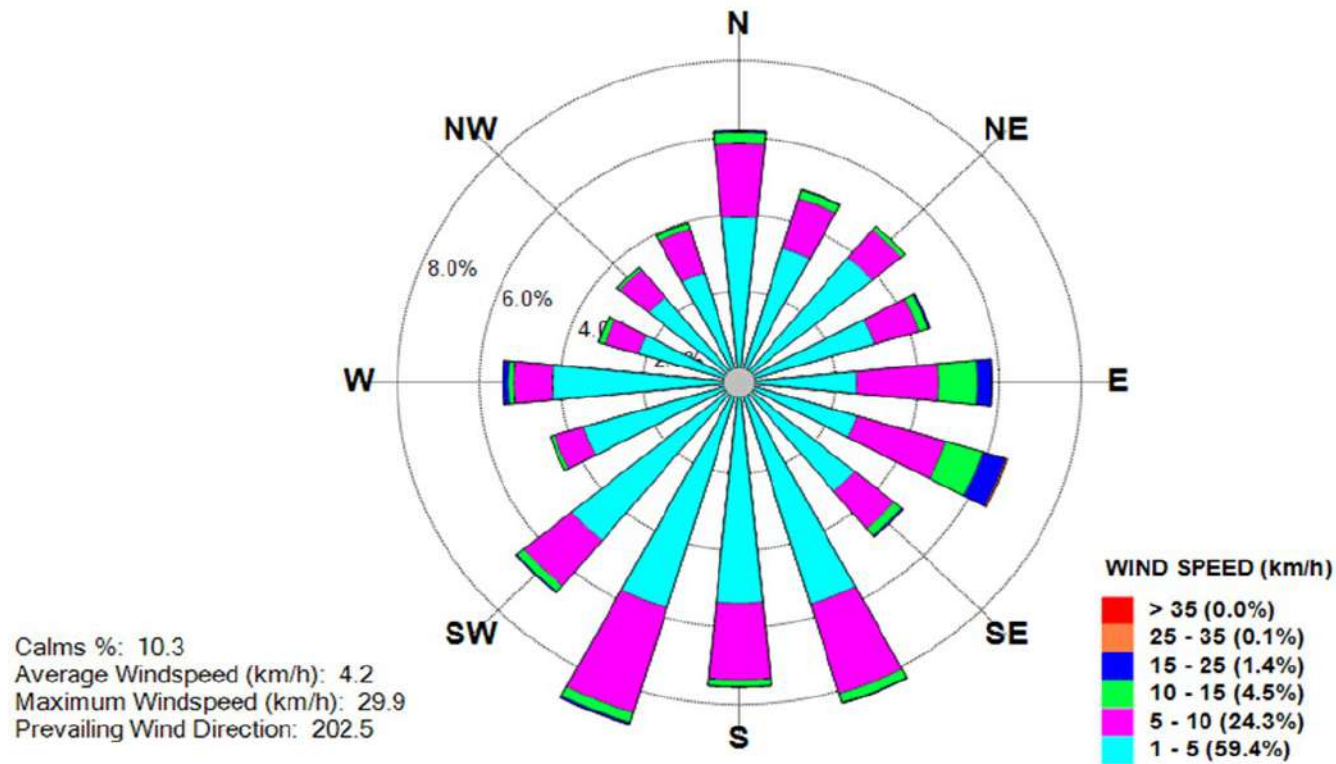


Figure 4: Monthly Windrose

Appendix 1

Calibration Documents (when required)



**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

November 2024

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date 31 December 2024

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for November 2024 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average PM₁₀ results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average PM₁₀ results were below the Dixon Sand Quarry EPL limit of 42ug/m³.
- The PM₁₀ annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in **green** indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in **red** indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2024 for TEOM's coinciding with the Dixon Sand project year.

Approximately 87.7% of valid meteorological data was recorded for November 2024 due to a damaged wire connection to the wind sensor from the 27-30 November 2024. An onsite field inspection was conducted on the 30 December 2024 and repair to the damaged wire connection of the wind sensor was completed.

Approximately 60% of valid TEOM data was available for November 2024 due to a fault resulting in invalid data readings from the 1 -12 November 2024. An onsite field inspection was conducted on the 30 December 2024 however, no obvious cause could be identified.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or NSW EPA approved methods. The following Australian Standards were used:

- AS3580.9.8 - *“Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser”*; and
- AS/NZS 3580.1.1 - *“Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment”*.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³.

All TEOM PM₁₀ results were also below the Dixon Sand Quarry EPL limit of 42ug/m³.

Approximately 60% of valid TEOM data was available for November 2024 due to a fault resulting in invalid data readings from the 1 -12 November 2024. An onsite field inspection was conducted on the 30 December 2024 however, no obvious cause could be identified.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2024 and therefore an annual amount of data has not yet been collected.

The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for November 2024 from AQMS and Annual Average PM₁₀ calculated from 1 July 2024.

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/11/2024	ND	14.0	ND	35.1
2/11/2024	ND	14.0	ND	35.1
3/11/2024	ND	14.0	ND	35.1
4/11/2024	ND	14.0	ND	35.1
5/11/2024	ND	14.0	ND	35.1
6/11/2024	ND	14.0	ND	35.1
7/11/2024	ND	14.0	ND	35.1
8/11/2024	ND	14.0	ND	35.1
9/11/2024	ND	14.0	ND	35.1
10/11/2024	ND	14.0	ND	35.1
11/11/2024	ND	14.0	ND	35.1
12/11/2024	ND	14.0	ND	35.1
13/11/2024	17.4	14.1	43.5	35.2
14/11/2024	14.2	14.1	35.5	35.2
15/11/2024	17.9	14.1	44.8	35.2
16/11/2024	17.5	14.1	43.8	35.3
17/11/2024	12.2	14.1	30.5	35.3
18/11/2024	17.1	14.1	42.8	35.3
19/11/2024	19.8	14.2	49.5	35.4
20/11/2024	16.5	14.2	41.3	35.5
21/11/2024	12.0	14.2	30.0	35.4
22/11/2024	14.1	14.2	35.3	35.4
23/11/2024	12.9	14.2	32.3	35.4
24/11/2024	16.9	14.2	42.3	35.5
25/11/2024	24.4	14.3	61.0	35.7
26/11/2024	26.0	14.4	65.0	35.9
27/11/2024	21.9	14.4	54.8	36.0
28/11/2024	14.0	14.4	35.0	36.0
29/11/2024	12.6	14.4	31.5	36.0
30/11/2024	10.4	14.4	26.0	35.9

*Calculated from PM10

**Calculated from PM10 Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 ug/m³ are highlighted in yellow

No Data (ND) - <18hrs hour of valid data to calculate a 24hr average

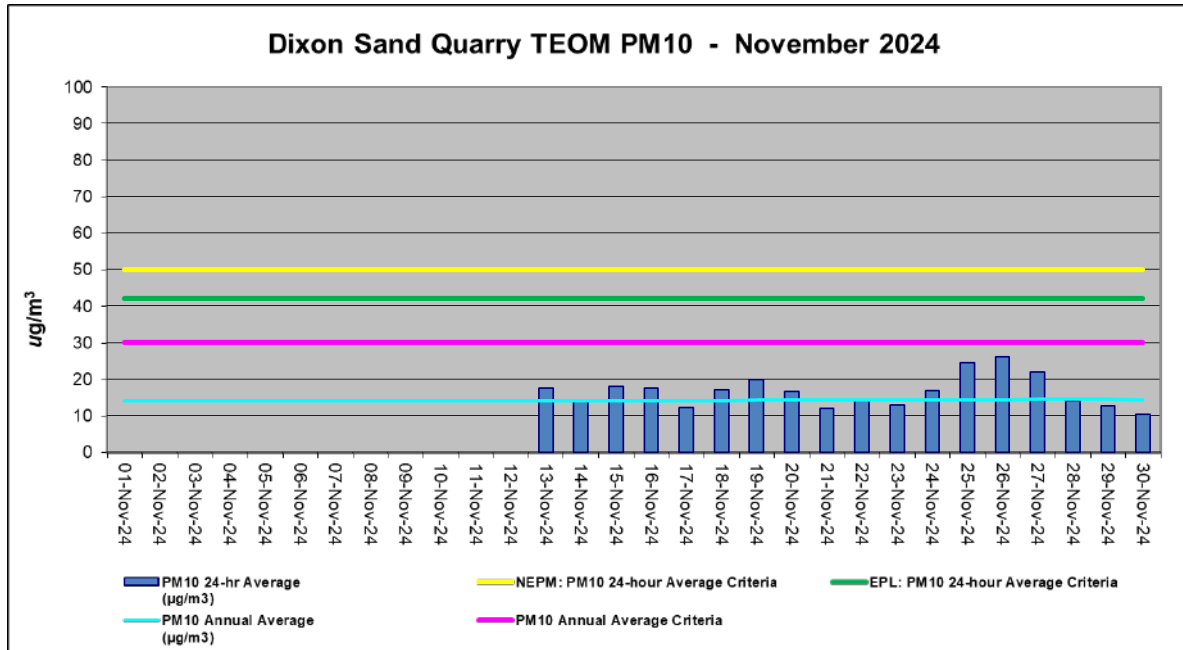


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

A 6-monthly physical screening and system check of the meteorological station was conducted in September 2024 and is next due in March 2025. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 87.7% of valid meteorological data was recorded for November 2024 due to a damaged wire connection to the wind sensor from the 27-30 November 2024. An onsite field inspection was conducted on the 30 December 2024 and repair to the damaged wire connection of the wind sensor was completed.

Dixon Sand Quarry Environmental Monitoring Project – November 2024

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/11/2024	14.1	17.1	22.0	2.8	0.6	5.2	16.2	55.8	83.6	100.0	913.8	996.4	1002.5
2/11/2024	8.0	15.1	18.0	6.8	0.3	3.2	5.7	50.0	99.4	100.0	500.4	999.5	1005.0
3/11/2024	13.0	22.3	31.0	0.0	0.5	4.6	9.3	29.7	66.6	99.9	887.8	994.6	1000.6
4/11/2024	17.0	20.8	27.0	0.0	1.1	5.1	12.5	35.1	78.1	99.5	792.1	991.1	997.8
5/11/2024	16.0	18.3	22.0	0.2	0.2	4.2	13.2	61.5	89.7	100.0	797.8	996.5	999.5
6/11/2024	16.0	22.4	32.0	0.0	0.7	4.6	10.9	38.7	79.4	100.0	990.2	993.5	998.0
7/11/2024	18.0	25.7	34.0	1.2	0.8	4.1	10.8	31.3	59.5	100.0	987.7	989.5	994.9
8/11/2024	16.0	21.9	29.0	0.4	0.0	3.9	19.6	22.8	51.7	100.0	990.3	992.6	997.1
9/11/2024	14.0	19.3	25.0	0.0	0.2	4.6	21.4	40.5	71.6	97.9	997.0	999.3	1001.7
10/11/2024	16.0	19.8	28.0	0.0	0.2	3.7	21.4	45.0	80.4	100.0	997.6	1000.4	1004.5
11/11/2024	15.0	16.9	19.0	0.0	0.1	2.5	8.5	78.7	83.8	90.1	998.8	1001.4	1004.4
12/11/2024	16.0	17.9	22.0	2.6	0.1	3.1	11.6	73.2	94.5	100.0	995.3	997.1	999.1
13/11/2024	15.0	18.1	22.0	4.2	0.0	2.4	16.2	78.1	95.1	100.0	989.7	993.2	996.0
14/11/2024	16.0	17.7	21.0	0.0	0.2	3.8	16.3	75.1	90.8	100.0	993.3	997.0	1001.4
15/11/2024	15.0	16.5	19.0	2.0	0.0	2.5	12.7	86.7	98.7	100.0	1000.3	1001.8	1003.4
16/11/2024	17.0	19.1	22.0	1.2	0.3	5.8	25.0	80.0	94.3	99.9	1000.8	1002.5	1004.1
17/11/2024	18.0	23.3	31.0	8.8	0.2	6.0	32.8	35.2	76.3	100.0	988.0	995.1	1001.3
18/11/2024	17.0	20.5	28.0	6.0	0.2	4.1	27.9	24.7	73.9	100.0	991.1	995.4	1001.7
19/11/2024	15.0	17.7	21.0	0.0	0.0	5.8	27.7	71.7	83.5	99.0	1000.9	1002.6	1004.5
20/11/2024	14.0	18.8	25.0	0.0	0.0	4.4	24.9	45.2	74.0	98.3	1002.5	1004.0	1006.2
21/11/2024	14.0	18.6	24.0	0.0	0.0	4.4	17.4	42.8	75.3	100.0	1004.4	1006.1	1008.3
22/11/2024	14.0	20.2	28.0	0.0	0.0	3.8	18.7	42.8	77.9	100.0	1001.4	1004.1	1006.8
23/11/2024	16.0	22.7	32.0	0.0	0.4	4.8	17.7	23.3	64.0	100.0	997.5	1000.4	1002.9
24/11/2024	18.0	24.2	33.0	0.0	0.4	6.3	24.9	21.1	56.7	94.1	994.9	997.1	999.2
25/11/2024	17.0	23.2	31.0	0.0	0.2	5.9	25.7	40.8	75.4	100.0	991.1	994.3	997.0
26/11/2024	18.0	20.3	28.0	0.0	0.3	3.8	11.6	57.0	89.0	100.0	992.3	993.0	993.7
27/11/2024				0.0									
28/11/2024				5.8									
29/11/2024				3.8									
30/11/2024				2.2									
Monthly	8.0	19.9	34.0	48.0	0.0	4.3	32.8	21.1	79.4	100.0	500.4	997.6	1008.3

No data due to weather station fault possibly sensor or cable/connector issue

Table 3: Meteorological Data Summary for November 2024

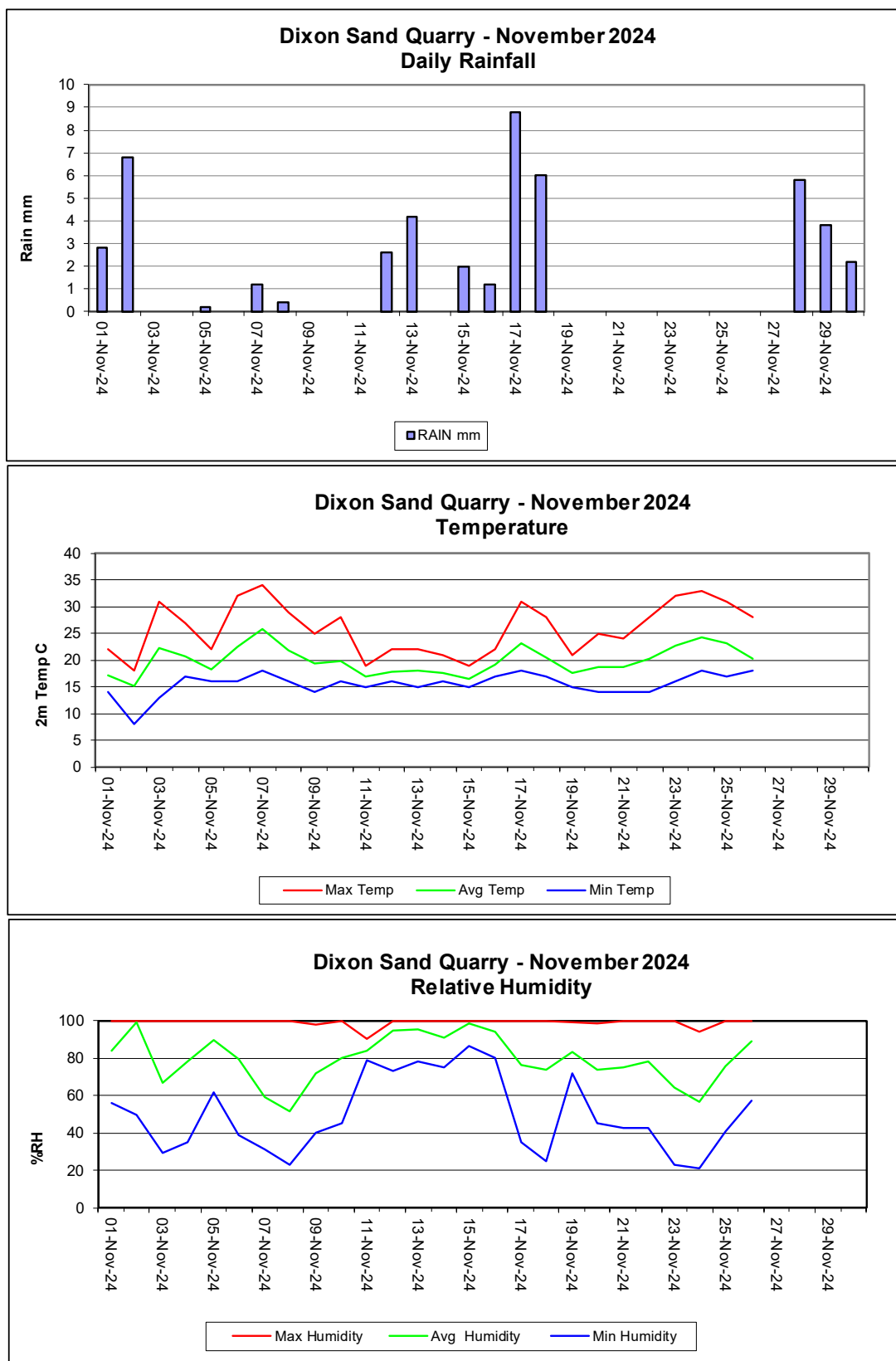


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

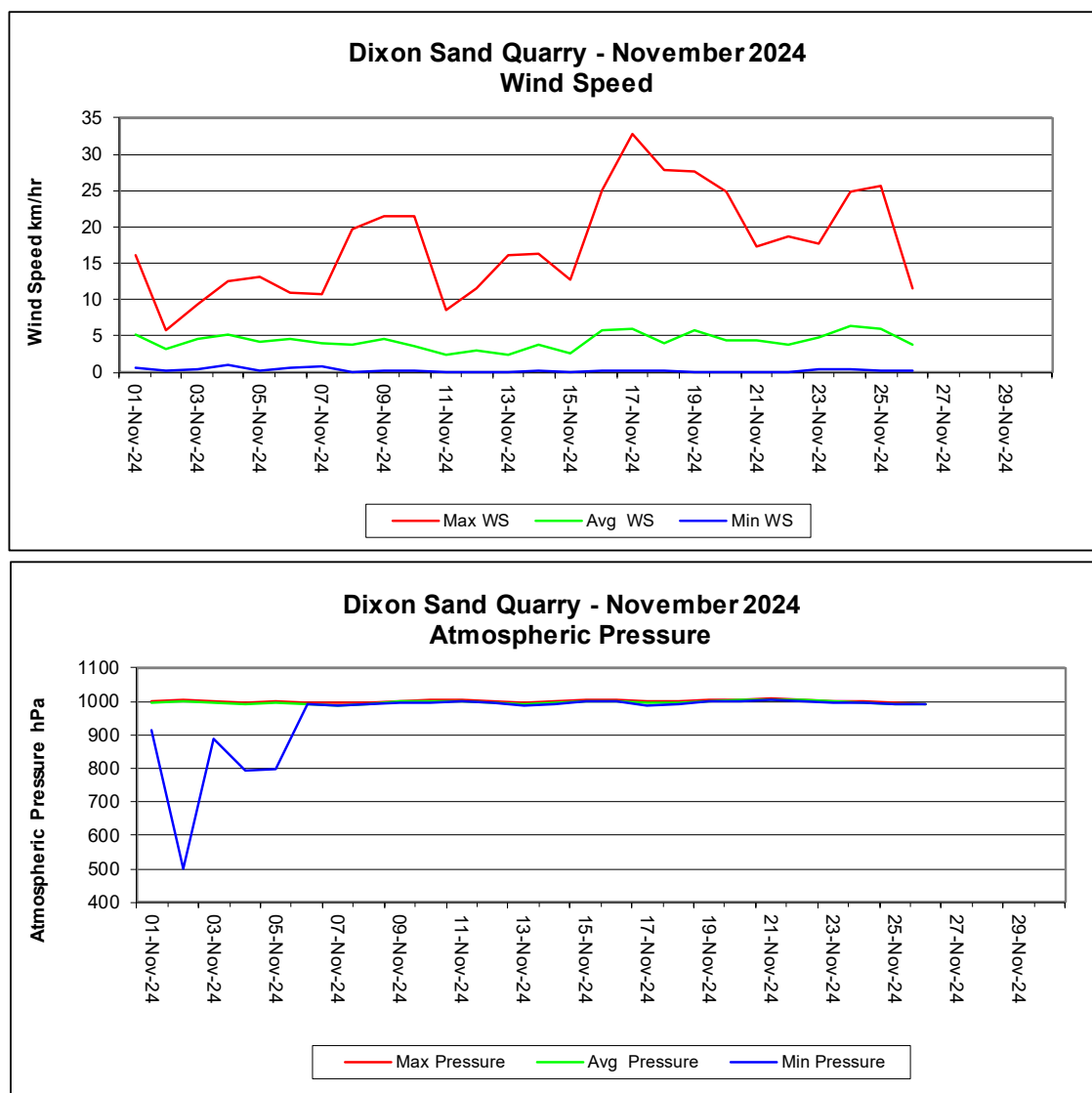


Figure 3: Wind Speed and Atmospheric Pressure Charts

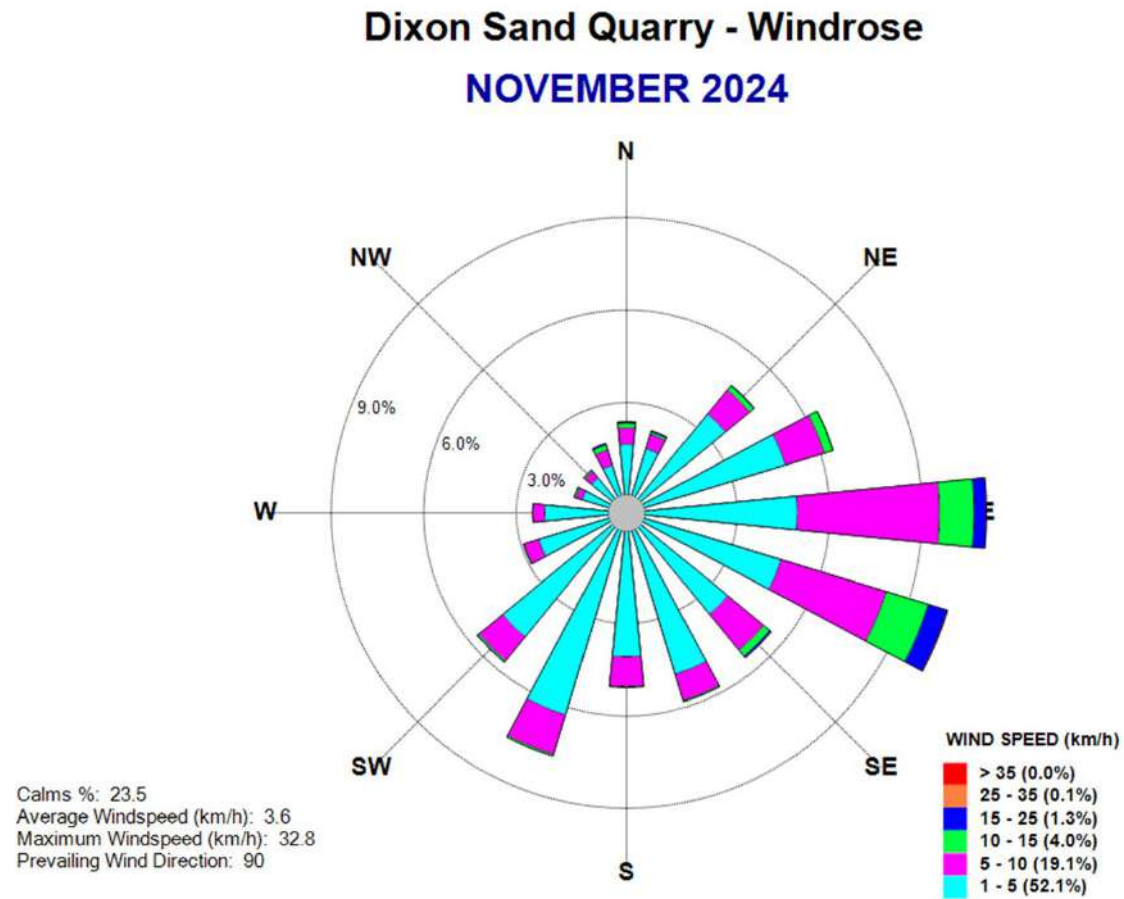


Figure 4: Monthly Windrose

Note: Chart excludes 27-30 November data due to possible sensor or cable/connector fault

Appendix 1

Calibration Documents (when required)



**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

December 2024

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date 28 January 2025

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for December 2024 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average PM₁₀ results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average PM₁₀ results were below the Dixon Sand Quarry EPL limit of 42ug/m³.
- The PM₁₀ annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in green indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in red indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2024 for TEOM's coinciding with the Dixon Sand project year.

Approximately 10.7% of valid meteorological data was recorded for December 2024 due to a faulty connector on the cable from the main sensor, that provides all wind, temperature, humidity, and pressure data to the data logger, for the period 1-30 December 2024. Rainfall data was unaffected during this period. An onsite field inspection was conducted on the 30 December 2024 and repair to the damaged wire connection was completed on 31 December 2024.

Approximately 98.7% of valid TEOM data was available for December 2024.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or NSW EPA approved methods. The following Australian Standards were used:

- AS3580.9.8 - *“Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser”*; and
- AS/NZS 3580.1.1 - *“Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment”*.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³.

All TEOM PM₁₀ results were also below the Dixon Sand Quarry EPL limit of 42ug/m³.

Approximately 98.7% of valid TEOM data was available for December 2024.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2024 and therefore an annual amount of data has not yet been collected.

The calibration certificate is provided in **Appendix 1** (when required).

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/12/2024	9.7	14.3	24.3	35.8
2/12/2024	15.8	14.3	39.5	35.8
3/12/2024	14.3	14.3	35.8	35.8
4/12/2024	20.5	14.4	51.3	36.0
5/12/2024	15.9	14.4	39.8	36.0
6/12/2024	23.3	14.5	58.1	36.1
7/12/2024	10.6	14.4	26.5	36.1
8/12/2024	11.7	14.4	29.3	36.0
9/12/2024	18.2	14.4	45.5	36.1
10/12/2024	18.9	14.5	47.3	36.2
11/12/2024	18.7	14.5	46.8	36.2
12/12/2024	22.0	14.5	55.0	36.4
13/12/2024	28.5	14.6	71.3	36.6
14/12/2024	25.6	14.7	64.0	36.8
15/12/2024	19.2	14.7	48.0	36.8
16/12/2024	17.0	14.7	42.5	36.9
17/12/2024	17.7	14.8	44.3	36.9
18/12/2024	16.2	14.8	40.5	36.9
19/12/2024	16.5	14.8	41.3	37.0
20/12/2024	14.5	14.8	36.3	37.0
21/12/2024	16.9	14.8	42.3	37.0
22/12/2024	23.1	14.9	57.8	37.1
23/12/2024	20.8	14.9	52.1	37.2
24/12/2024	14.5	14.9	36.3	37.2
25/12/2024	14.5	14.9	36.3	37.2
26/12/2024	14.5	14.9	36.3	37.2
27/12/2024	19.3	14.9	48.3	37.3
28/12/2024	21.4	14.9	53.5	37.4
29/12/2024	17.9	15.0	44.6	37.4
30/12/2024	10.6	14.9	26.5	37.3
31/12/2024	15.0	14.9	37.5	37.3

*Calculated from PM10

**Calculated from PM10 Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 ug/m³ are highlighted in yellow

No Data (ND) - <18hrs hour of valid data to calculate a 24hr average

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for December 2024 from AQMS and Annual Average PM₁₀ calculated from 1 July 2024.

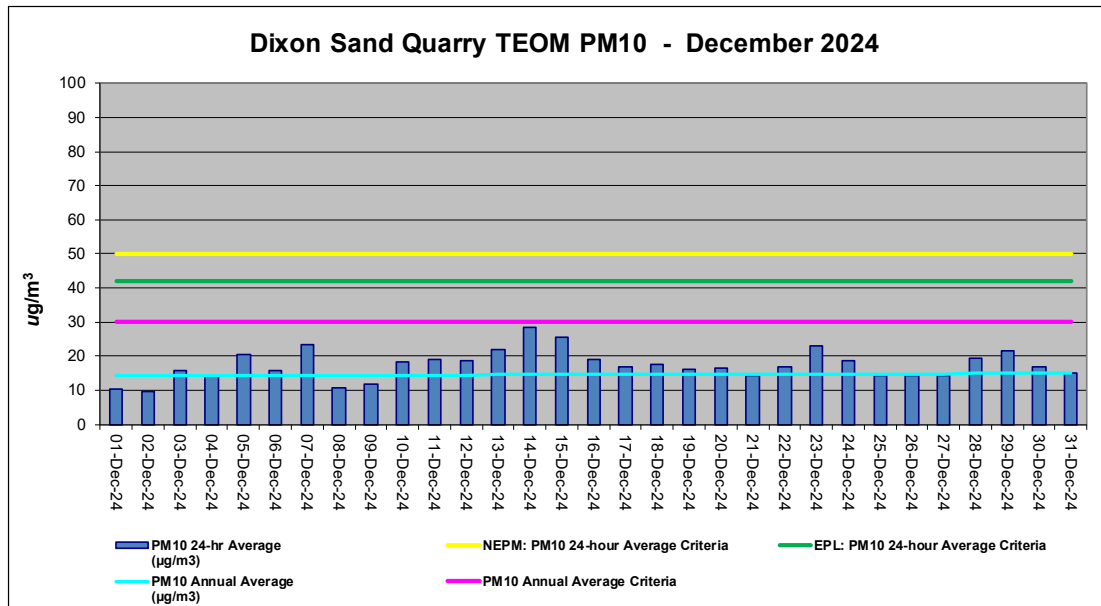


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. **Please Note:** These Windrose excludes data from 1-30 December due to a cable connector fault to the main sensor which resulted in data loss during this period.

A 6-monthly physical screening and system check of the meteorological station was conducted in September 2024 and is next due in March 2025. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 10.7% of valid meteorological data was recorded for December 2024 due to a faulty connector on the cable from the main sensor, that provides all wind, temperature, humidity, and pressure data to the data logger, for the period 1-30 December 2024. Rainfall data was unaffected during this period. An onsite field inspection was conducted on the 30 December 2024 and repair to the damaged wire connection was completed on 31 December 2024.

Dixon Sand Quarry Environmental Monitoring Project – December 2024

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/12/2024				0.6									
2/12/2024				0.0									
3/12/2024				0.0									
4/12/2024				0.0									
5/12/2024				0.2									
6/12/2024				5.6									
7/12/2024				5.6									
8/12/2024				0.6									
9/12/2024				0.8									
10/12/2024				0.0									
11/12/2024				0.4									
12/12/2024				0.0									
13/12/2024				0.0									
14/12/2024				0.0									
15/12/2024				0.0									
16/12/2024				0.0									
17/12/2024				0.0									
18/12/2024				4.0									
19/12/2024				0.0									
20/12/2024				0.0									
21/12/2024				0.0									
22/12/2024				0.0									
23/12/2024				0.0									
24/12/2024				0.0									
25/12/2024				0.0									
26/12/2024				0.0									
27/12/2024				1.6									
28/12/2024				0.0									
29/12/2024				0.0									
30/12/2024				0.2									
31/12/2024	20.0	24.2	28.0	0.0	0.1	6.3	19.1	49.5	70.5	98.9	993.4	995.3	998.4
Monthly	20.0	24.2	28.0	19.6	0.1	6.3	19.1	49.5	70.5	98.9	993.4	995.3	998.4

No Data available due to faulty connector on cable from main sensor

Table 3: Meteorological Data Summary for December 2024

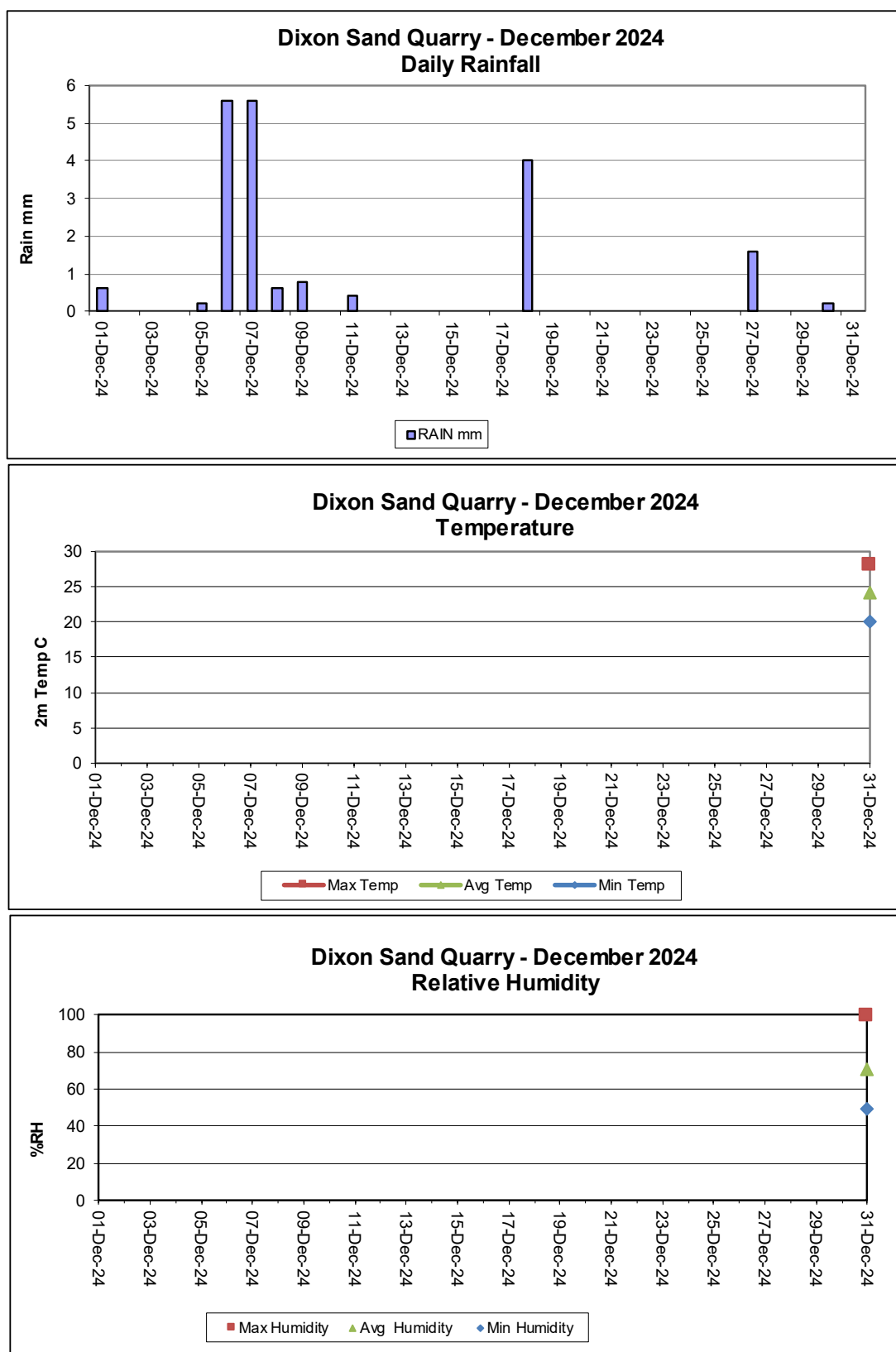


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

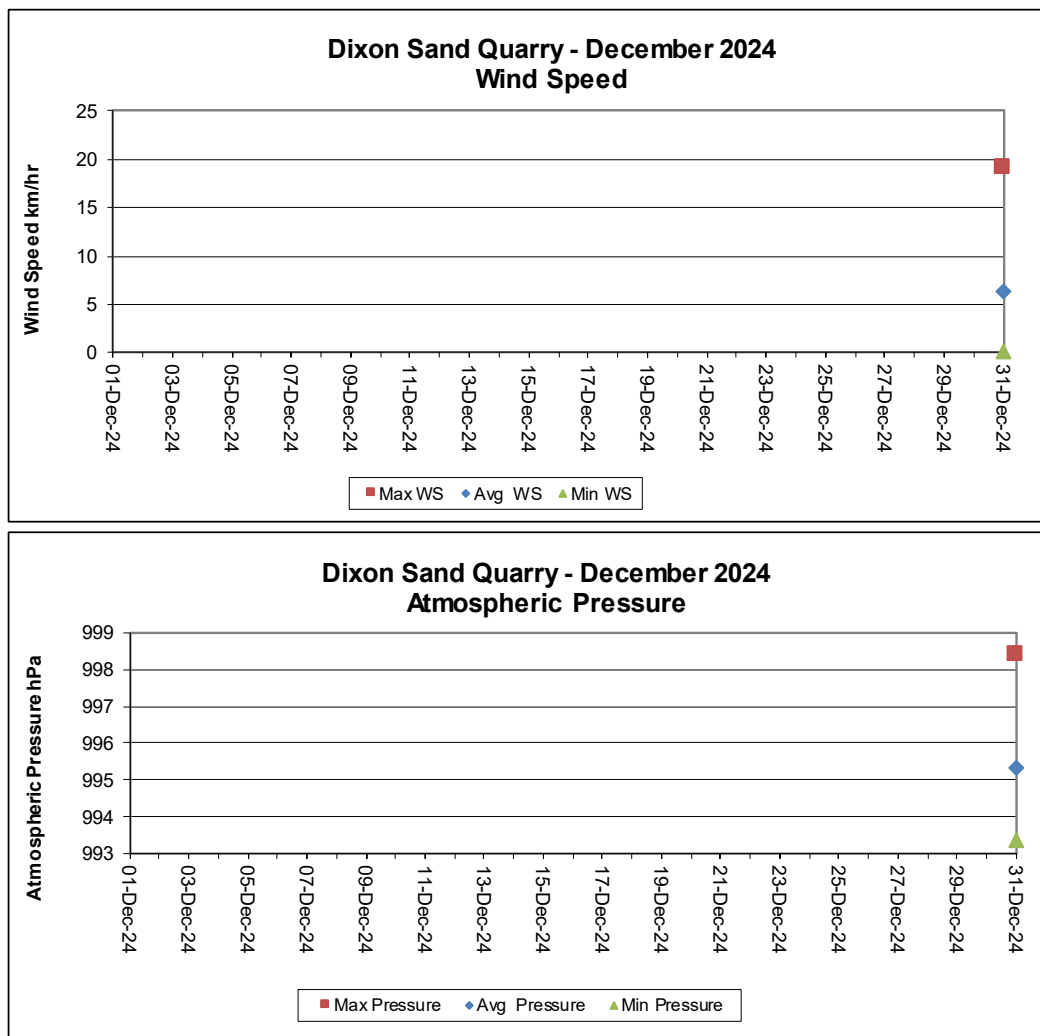


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose

31 December 2024

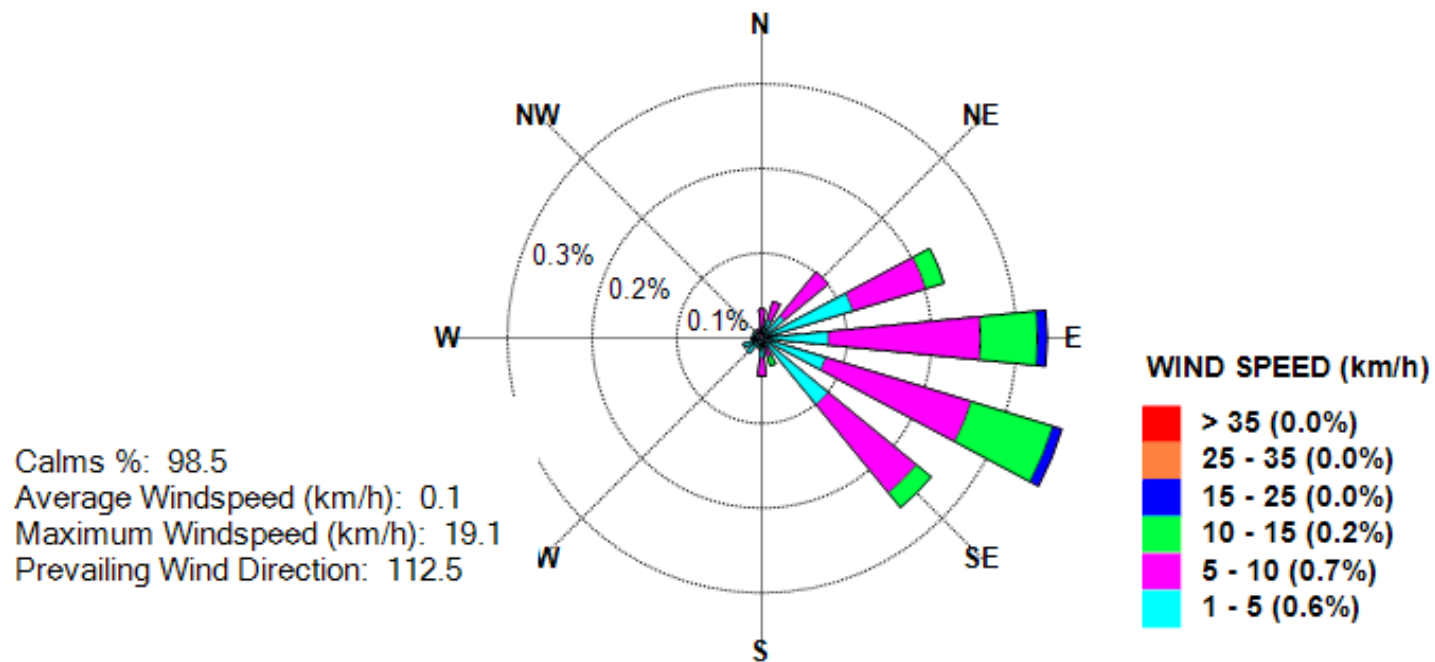


Figure 4: Windrose

Note: Chart excludes data from 1-30 December 2024 due to cable/connector fault

Appendix 1

Calibration Documents (when required)



Continuous Air Quality Monthly/Quarterly/Six Monthly/Annual TEOM Maintenance and Calibration – 1400AB

TEOM Client/Site: Dixon Seals / TEOM 1Date: 30+31/12/241. TEOM Data Screen SERIAL No: 1400AB25570523 Firmware: —

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	<u>Fully OK (4)</u>	Green - Normal	✓	
Date/time	TEOM: <u>30/12</u> <u>10.09</u> Actual: <u>30/12</u> <u>11.10</u>	Current Date/time correct within 5 minutes	✓ <u>EST</u>	
PM-10 24hr av	<u>17.1</u>	Positive values	✓	
Filter loading PM10	<u>32</u>	<80 %	✓	
Frequency PM-10	<u>253.9034</u>	200-300 Hz	✓	
Noise PM-10	<u>0.032</u>	<0.100ug	✓	

Comment: If filter load >80% but <90% and if flows Ok then data is OK

Comments: OK

2. System Status

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Vacuum pump pressure	<u>-28 inch Hg</u>	<0.50 atm <u><-25 inch Hg</u>	✓	
Warnings	<u>NIL</u>	No Warnings	✓	
If any warnings list:				

Comments:

Data Downloaded: YES/NO (circle)Technician Name : COLIN DAVID Signed [Signature]

3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	27.7	-10 to 50 C	✓	
Ambient Dew Point	NA	-10 to 50 C		
Ambient Pressure	0.976	0.9-1.1 atm	✓	
Ambient Relative Humidity	NA	10-100 %RH		
Cap temperature	50.00	50.00 +/- 0.10 C	✓	
Case temperature	50.00	50.00 +/- 0.10 C	✓	
Main (PM-10) Air Tube temp	50.00	50.00 +/- 0.10 C	✓	

Comments:**4. Instrument Conditions – Flows**

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Main (PM-10) Flow rate	3.0	2.82 – 3.18 lpm	✓	
Bypass Flow rate	13.68	12.95 – 14.39 lpm	✓	
Total Flow rate	16.68	15.67 – 17.67 lpm	✓	

Comments:**Results: (Tick box)**

- ☒ There were NO equipment faults found. No action required – (file report)
- ☐ There were faults found (Fails) – Were these fixed on site: YES/NO (circle)
 Any **Fails** that cannot be repaired on site must be reported to CBased:
 Office: 65713334 or email cbased@bigpond.com
 Date faults notified to CBased: _____

Comments/Action Required:

Calibration/Maintenance

1. 1405A: Were Filters replaced ☒ YES/NO
2. PM10 Inlet head cleaned ☒ YES/NO
3. If measurement filters were replaced, confirm stable results after change. Stable particulate results confirmed ☒ YES/NO

Channel	Filter Load %	Frequency Hz initial	Frequency check 1min	Frequency check 3min	Frequency check 5min
PM10	17	255.69502	255.69505	269.69567	269.65509

Frequency should not drift by more than 0.0010 between readings (if instrument is thermodynamically stable)
 Pass/Fail – if Fail – install new filter and redo stability test.

4. Instrument clock verified (Refer Section 1) ☒ YES/NO.
 If Time changed – clock reset OK YES/NO or ☒ NA (not changed)
 Comments:

5. Were TEOM in line and rear TEOM filters checked for cleanliness and replaced if necessary. ☒ YES/NO.
 Comments if changed:

6. TEOM Cleaned and Air Conditioner checked ☒ YES/NO. Air Conditioner settings or operational status: OK ✓

Tetracal Flow/Temp/Pressure Calibrator Serial No: TET 005 Refer to calibration corrections for Temperature/Pressure and Flows and apply to all readings.

Quarterly or Six Monthly Calibration

1. Flow Verification – Conducted ☒ YES/NO

PM10 Flow verified Flow l/min 2.95 Error % 1.7 (allowed error <6%) ☒ PASS/FAIL

Bypass Flow verified Flow l/min 13.49 Error % 1.3 (allowed error <6%) ☒ PASS/FAIL

If fail then complete a full multipoint recalibration and review previous data from last good flow check. **Comments if Flows recalibrated:**

2. Leak Check – Conducted ☒ YES/NO

PM10 actual 0.14 < Limit 0.15

Bypass actual 0.58 < Limit 0.60

Leak check ☒ PASS/FAIL – If fail then find leak and retest.

Comments: slight leaks near transducer as noted.

initial Final
 Fndj Fndj
 1.050 1.053
 0.945 1000
 OK ✓



Annual Calibration/Maintenance**1. Temperature and Pressure Calibration – Conducted** ☒ YES/NO

Reference Temperature: 27.8 C TEOM Temperature 27.7 C
 if difference +/- 1 C recalibrate sensor. Sensor recalibrated ☒ YES/NO

Reference Pressure: 0.983 atm TEOM Pressure 0.976 atm
 if difference +/- 0.010 atm recalibrate sensor. Sensor recalibrated ☒ YES/NO

Note: Tetralcal measures Atmospheric Pressure in mm Hg or mb or hPa
 For mb or hPa divide tetralcal result by 1013.25 to change units to atm.
 For mmHg divide tetralcal result by 760 to change units to atm.

2. Flow Calibration – Conducted ☒ YES/NO

Software + Hardware check

PM10

Set point 2.4 Actual: _____
 Set point 3.6 Actual: _____
 Set point 3.0 Actual: _____ After calibration Final: _____ l/min

BYPASS

Set point 10.9 Actual: _____
 Set point 16.4 Actual: _____
 Set point 13.67 Actual: _____ After calibration Final: _____ l/min

3. Mass calibration (KO) Verification – Conducted ☒ YES/NO

Actual measured KO = 13989 TEOM stated KO 13748 Error %: 1.75
 Allowed Error +/- 2.5%. ☒ PASS/FAIL
 If Error +/- 2.5% repeat. If confirmed consult manufacturer.
 Second Error % = _____ PASS/FAIL. Comments:
 If second test fails consult manufacturer.

4. Annual Noise check - Conducted ☒ YES/NO

Zero filter applied to TEOM and TEOM operated for at least 12 hours:
 Start date/time: 30/12/24 14:30 Finish date/time: 31/12/24 09:55
 Standard deviation of all recorded data (min 30 min averages) = 1.44 ug/m³
 Noise was less than 5ug/m³ ☒ YES/NO

5. Maintenance

Air Inlet system cleaned ☒ YES/NO
 Pump Reconditioned ☒ YES/NO
 Check Waterproofing ☒ YES/NO
 Comments: OK

Ref
 $T = 27.8^{\circ}\text{C}$
 $P = 746.9 \text{ mmHg}$
 $\approx 0.983 \text{ atm}$

Hardware Flow cal
 F adj 1.000 Main
 1.000 aux
 ✓ OK

No filter 341.93557
 Filter 253.07693
 Audit 13989
 Actual 13748
 % 1.75%





**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

January 2025

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date 28 February 2025

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for January 2025 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average PM₁₀ results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average PM₁₀ results were below the Dixon Sand Quarry EPL limit of 42ug/m³.
- The PM₁₀ annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in **green** indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in **red** indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2024 for TEOM's coinciding with the Dixon Sand project year.

Approximately 34.5% of valid meteorological data was recorded for January 2025 due to a fault, with the station, which is currently under investigation. Rainfall data was unaffected during this period.

Approximately 98.8% of valid TEOM data was available for January 2025.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or NSW EPA approved methods. The following Australian Standards were used:

- AS3580.9.8 - *“Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser”*; and
- AS/NZS 3580.1.1 - *“Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment”*.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³.

All TEOM PM₁₀ results were also below the Dixon Sand Quarry EPL limit of 42ug/m³.

Approximately 98.8% of valid TEOM data was available for January 2025.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2024 and therefore an annual amount of data has not yet been collected.

The calibration certificate is provided in **Appendix 1** (when required).

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/01/2025	17.4	15.0	43.5	37.4
2/01/2025	23.3	15.0	58.3	37.5
3/01/2025	17.5	15.0	43.8	37.5
4/01/2025	16.1	15.0	40.3	37.6
5/01/2025	16.5	15.0	41.3	37.6
6/01/2025	19.4	15.1	48.5	37.6
7/01/2025	9.0	15.0	22.5	37.6
8/01/2025	10.2	15.0	25.5	37.5
9/01/2025	9.7	15.0	24.3	37.4
10/01/2025	8.9	14.9	22.3	37.3
11/01/2025	9.1	14.9	22.8	37.2
12/01/2025	11.4	14.9	28.5	37.2
13/01/2025	11.3	14.9	28.3	37.1
14/01/2025	19.8	14.9	49.5	37.2
15/01/2025	15.6	14.9	38.9	37.2
16/01/2025	15.6	14.9	39.0	37.2
17/01/2025	17.3	14.9	43.3	37.3
18/01/2025	13.4	14.9	33.5	37.2
19/01/2025	18.9	14.9	47.3	37.3
20/01/2025	19.8	14.9	49.5	37.4
21/01/2025	20.2	15.0	50.5	37.4
22/01/2025	24.7	15.0	61.8	37.6
23/01/2025	21.3	15.1	53.3	37.6
24/01/2025	17.0	15.1	42.5	37.7
25/01/2025	18.2	15.1	45.5	37.7
26/01/2025	16.8	15.1	42.0	37.7
27/01/2025	14.4	15.1	36.1	37.7
28/01/2025	17.9	15.1	44.8	37.8
29/01/2025	25.8	15.2	64.5	37.9
30/01/2025	18.4	15.2	46.0	37.9
31/01/2025	14.1	15.2	35.3	37.9

*Calculated from PM10

**Calculated from PM10 Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 ug/m³ are highlighted in yellow

No Data (ND) - <18hrs hour of valid data to calculate a 24hr average

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for January 2025 from AQMS and Annual Average PM₁₀ calculated from 1 July 2024.

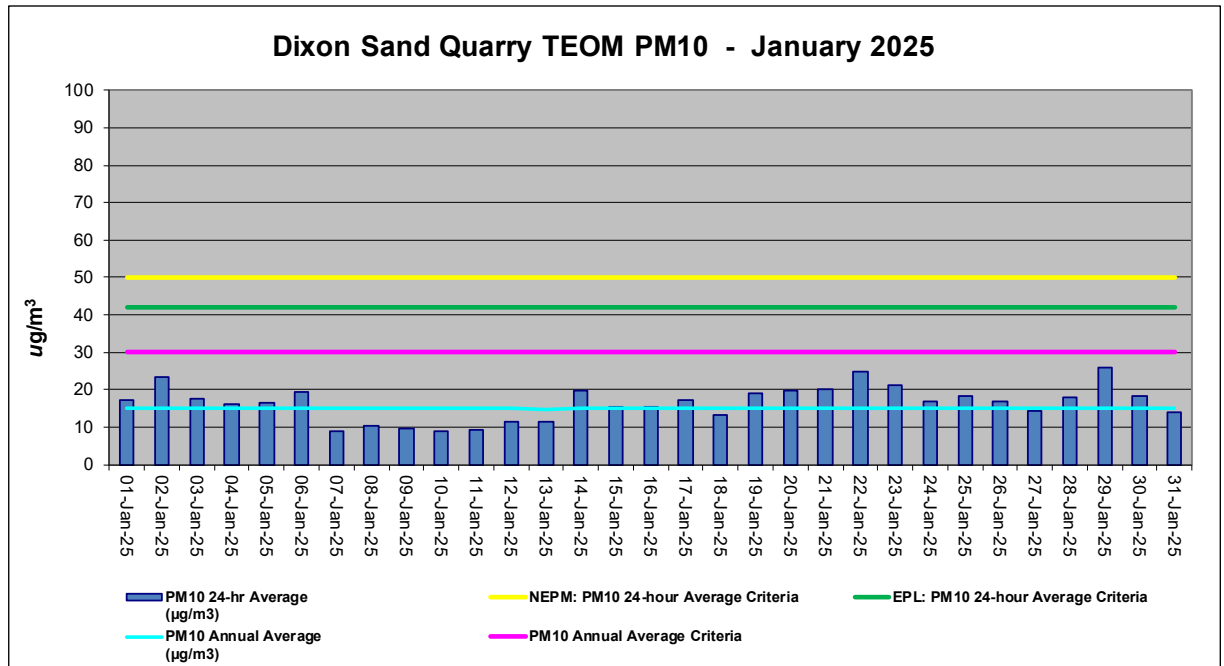


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. **Please Note:** The Windrose excludes data from 5-12, 17-26 and 28-31 January 2025 due to a fault, currently under investigation, which resulted in data loss during this period.

A 6-monthly physical screening and system check of the meteorological station was conducted in September 2024 and is next due in March 2025. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 34.5% of valid meteorological data was recorded for January 2025 due to a fault with the station which is currently under investigation. Rainfall data was unaffected during this period.

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/01/2025	19.0	24.5	33.0	0.0	0.0	4.7	23.6	25.1	69.7	100.0	989.3	993.3	995.9
2/01/2025	17.0	20.3	22.0	0.0	0.4	4.2	14.2	61.9	75.8	96.8	993.5	999.4	1002.9
3/01/2025	15.0	19.8	25.0	0.6	0.1	4.4	17.4	59.6	80.4	100.0	999.1	1001.5	1003.4
4/01/2025	18.0	23.3	31.0	0.0	0.2	4.9	24.1	35.6	64.6	86.0	996.0	999.0	1001.5
5/01/2025				0.0									
6/01/2025				1.6									
7/01/2025				14.0									
8/01/2025				17.4									
9/01/2025				5.8									
10/01/2025				8.2									
11/01/2025				0.6									
12/01/2025				0.8									
13/01/2025	19.0	25.8	32.0	0.2	0.1	5.1	23.2	39.7	70.1	99.9	986.2	988.3	990.3
14/01/2025	20.0	24.9	32.0	1.0	0.1	3.5	26.4	42.4	78.6	100.0	985.6	988.0	990.7
15/01/2025	20.0	24.0	35.0	13.0	0.0	4.5	24.4	43.2	86.7	99.9	974.7	982.6	987.3
16/01/2025	19.0	19.4	20.0	8.4	0.5	3.2	9.6	99.9	99.9	99.9	979.6	980.7	982.2
17/01/2025				5.2									
18/01/2025				25.2									
19/01/2025				0.4									
20/01/2025				0.0									
21/01/2025				0.6									
22/01/2025				0.6									
23/01/2025				0.2									
24/01/2025				0.0									
25/01/2025				0.0									
26/01/2025				0.0									
27/01/2025	22.0	25.0	27.0	7.2	1.7	8.7	24.8	62.7	75.4	96.9	989.1	989.5	991.0
28/01/2025				14.8									
29/01/2025				1.0									
30/01/2025				1.4									
31/01/2025				1.6									
Monthly	15.0	23.0	35.0	129.8	0.0	4.8	26.4	25.1	77.9	100.0	974.7	991.4	1003.4

No Data available due to a fault with station - investigation underway

Table 3: Meteorological Data Summary for January 2025

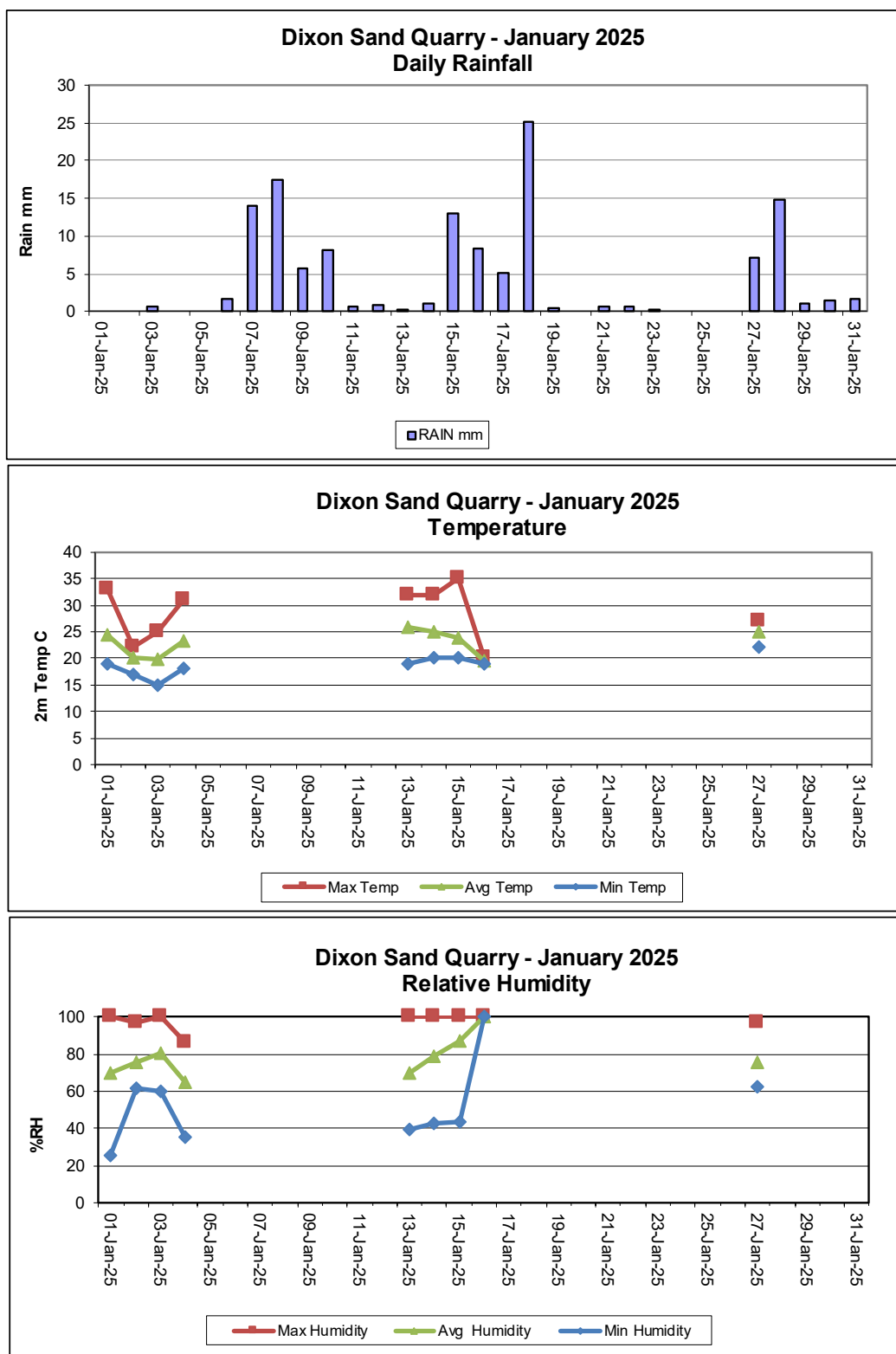


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

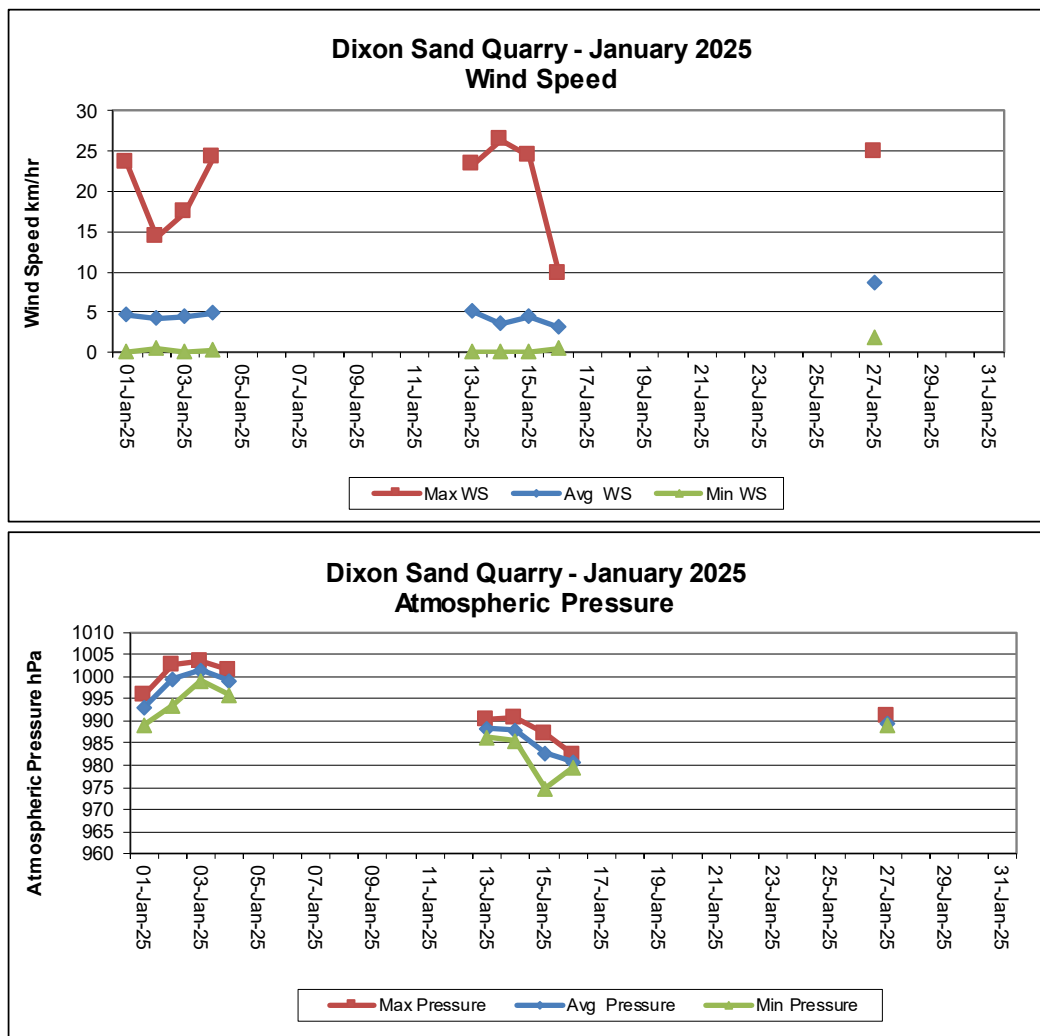


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose

JANUARY 2025

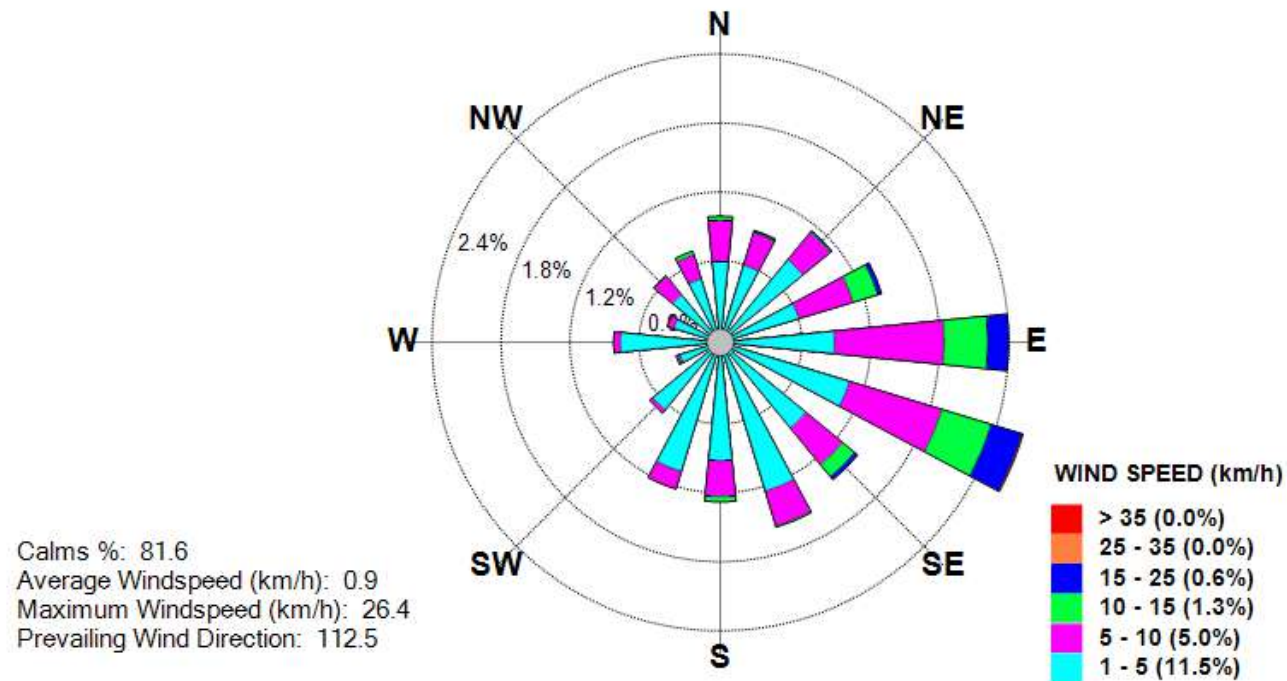


Figure 4: Windrose

Note: Chart excludes data from 5-12, 17-26 and 28-31 January 2025 due to MET station fault

Appendix 1

Calibration Documents (when required)



**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

February 2025

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date 26 March 2025

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for February 2025 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average PM₁₀ results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average PM₁₀ results were below the Dixon Sand Quarry EPL limit of 42ug/m³.
- The PM₁₀ annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in green indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in red indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2024 for TEOM's coinciding with the Dixon Sand project year.

Approximately 24.2% of valid meteorological data was recorded for February 2025 due to a fault, with the station, which is currently under investigation. Rainfall data was unaffected during this period.

Approximately 99.6% of valid TEOM data was available for February 2025.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or NSW EPA approved methods. The following Australian Standards were used:

- AS3580.9.8 - “*Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser*”; and
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TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³.

All TEOM PM₁₀ results were also below the Dixon Sand Quarry EPL limit of 42ug/m³.

Approximately 99.6% of valid TEOM data was available for February 2025.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2024 and therefore an annual amount of data has not yet been collected.

The calibration certificate is provided in **Appendix 1** (when required).

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/02/2025	17.8	15.2	44.5	38.0
2/02/2025	11.3	15.2	28.3	37.9
3/02/2025	15.1	15.2	37.8	37.9
4/02/2025	18.3	15.2	45.8	37.9
5/02/2025	21.4	15.2	53.5	38.0
6/02/2025	21.2	15.2	53.0	38.1
7/02/2025	15.2	15.2	38.0	38.1
8/02/2025	18.4	15.3	46.1	38.1
9/02/2025	10.7	15.2	26.8	38.1
10/02/2025	10.9	15.2	27.3	38.0
11/02/2025	11.8	15.2	29.5	38.0
12/02/2025	13.2	15.2	33.0	38.0
13/02/2025	15.8	15.2	39.5	38.0
14/02/2025	19.4	15.2	48.5	38.0
15/02/2025	16.2	15.2	40.5	38.0
16/02/2025	12.1	15.2	30.3	38.0
17/02/2025	14.7	15.2	36.8	38.0
18/02/2025	16.7	15.2	41.8	38.0
19/02/2025	17.8	15.2	44.5	38.0
20/02/2025	16.7	15.2	41.8	38.0
21/02/2025	15.9	15.2	39.8	38.1
22/02/2025	9.9	15.2	24.8	38.0
23/02/2025	12.0	15.2	30.0	38.0
24/02/2025	31.3	15.3	78.3	38.1
25/02/2025	22.1	15.3	55.3	38.2
26/02/2025	17.4	15.3	43.5	38.2
27/02/2025	18.2	15.3	45.5	38.3
28/02/2025	20.8	15.3	52.0	38.3

*Calculated from PM10

**Calculated from PM10 Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 ug/m³ are highlighted in yellow

No Data (ND) - <18hrs hour of valid data to calculate a 24hr average

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for February 2025 from AQMS and Annual Average PM₁₀ calculated from 1 July 2024.

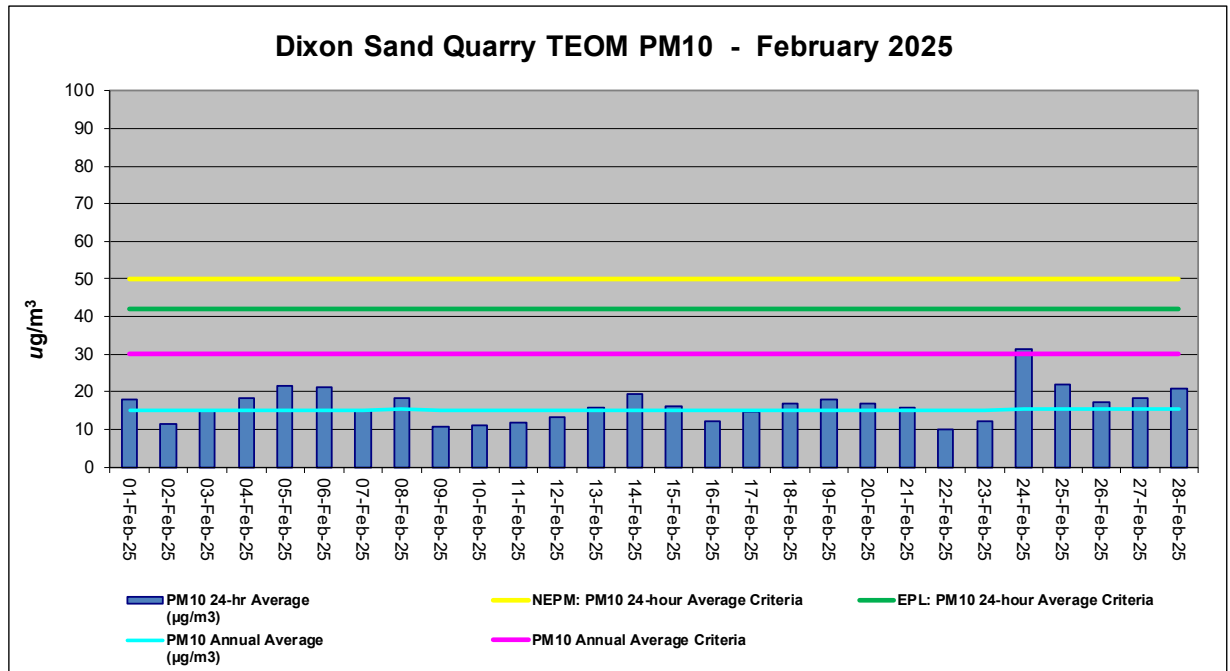


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2 and 3**. A windrose is provided in **Figure 4**. **Please Note:** The Windrose excludes data from 1-7, 10-16 and 21-28 February 2025 due to a fault, currently under investigation, which resulted in data loss during this period.

A 6-monthly physical screening and system check of the meteorological station was conducted in September 2024 and is next due in March 2025. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 24.2% of valid meteorological data was recorded for February 2025 due to a fault with the station which is currently under investigation. Rainfall data was unaffected during this period.

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/02/2025				1.2									
2/02/2025				0.0									
3/02/2025				0.0									
4/02/2025				0.0									
5/02/2025				0.0									
6/02/2025				0.0									
7/02/2025				0.0									
8/02/2025				5.2	0.3	3.4	10.5				991.2	992.4	993.3
9/02/2025				1.2	0.2	1.7	5.6				990.2	991.1	991.9
10/02/2025				22.6									
11/02/2025				0.4									
12/02/2025				0.0									
13/02/2025				0.0									
14/02/2025				0.4									
15/02/2025				0.2									
16/02/2025				0.0									
17/02/2025	14.0	18.9	24.0	0.0	0.1	4.0	18.9	27.7	56.5	78.6	997.6	998.7	999.8
18/02/2025	12.0	19.1	28.0	0.0	0.0	3.6	17.1	26.6	63.9	94.4	991.8	995.5	999.1
19/02/2025	15.0	20.4	26.0	0.0	0.0	3.7	24.7	52.4	75.9	100.0	993.1	995.4	997.1
20/02/2025	18.0	18.5	21.0	0.0	0.2	3.6	12.9	77.7	92.0	96.5	996.4	998.1	1000.8
21/02/2025				0.2									
22/02/2025				2.0									
23/02/2025				0.0									
24/02/2025				0.0									
25/02/2025				0.4									
26/02/2025				0.0									
27/02/2025				0.0									
28/02/2025				0.0									
Monthly	12.0	19.2	28.0	33.8	0.0	3.3	24.7	26.6	72.1	100.0	990.2	995.2	1000.8

No Data available due to a fault with station - investigation underway

Table 3: Meteorological Data Summary for February 2025

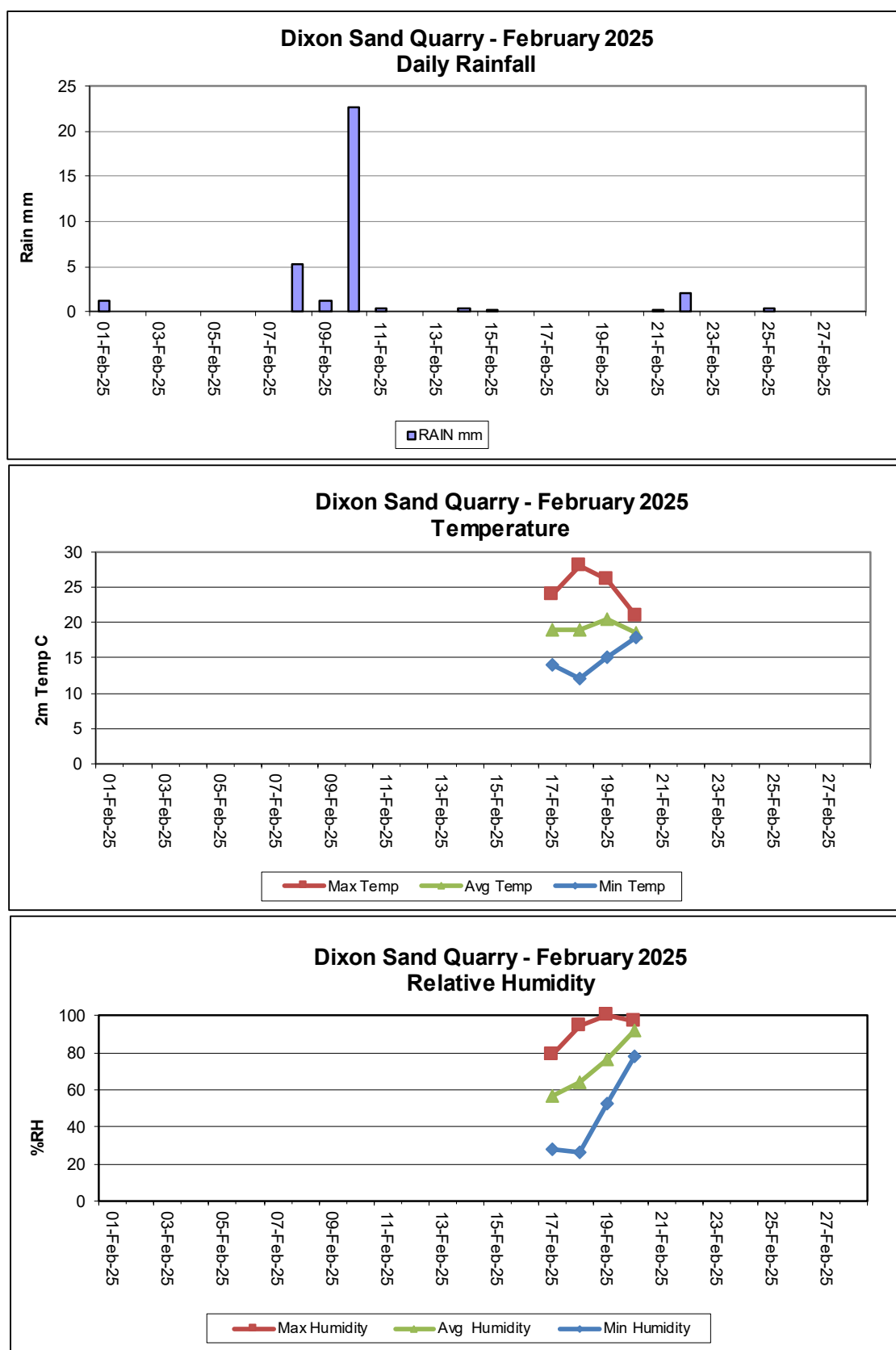


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

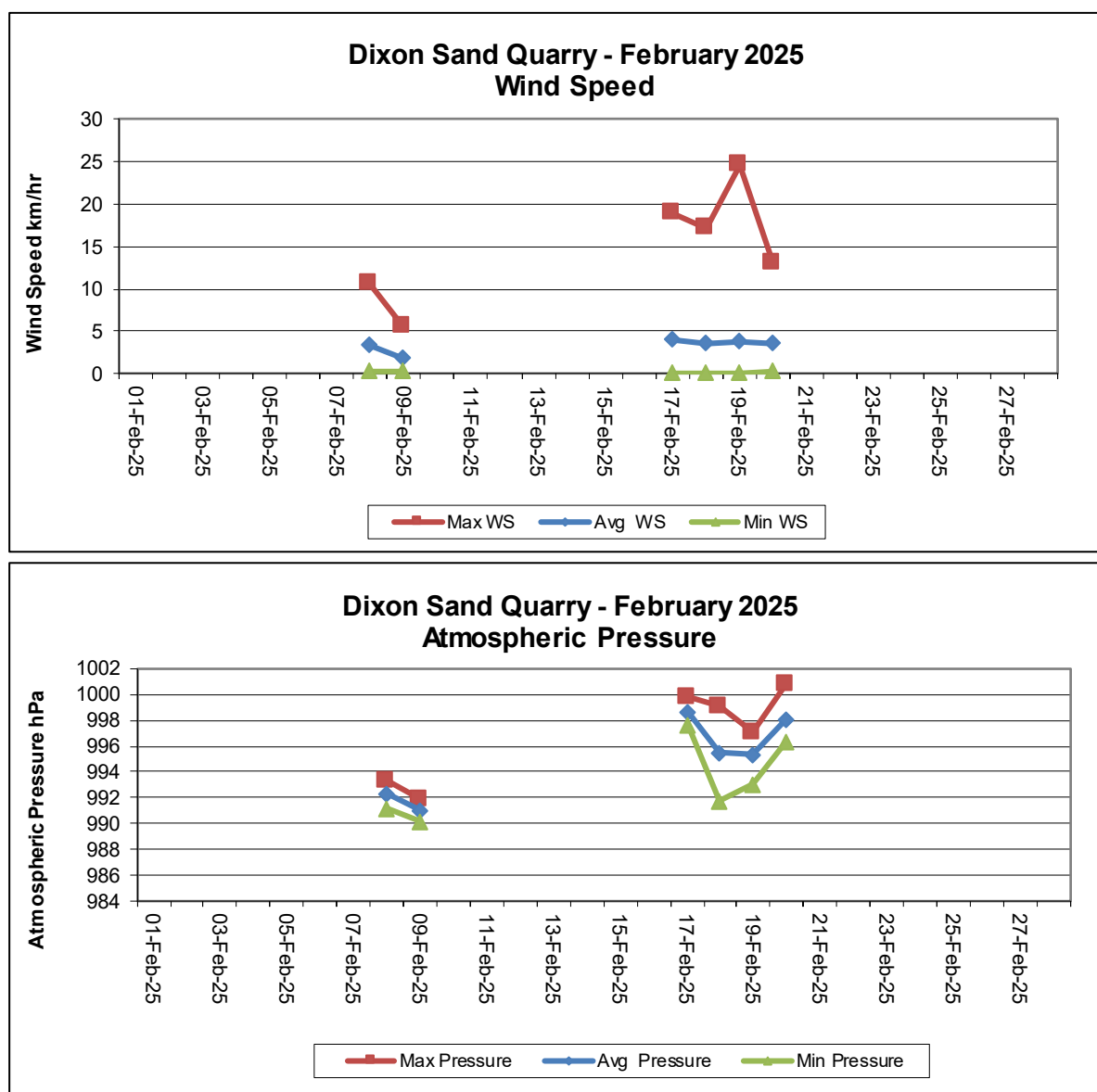


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose

FEBRUARY 2025

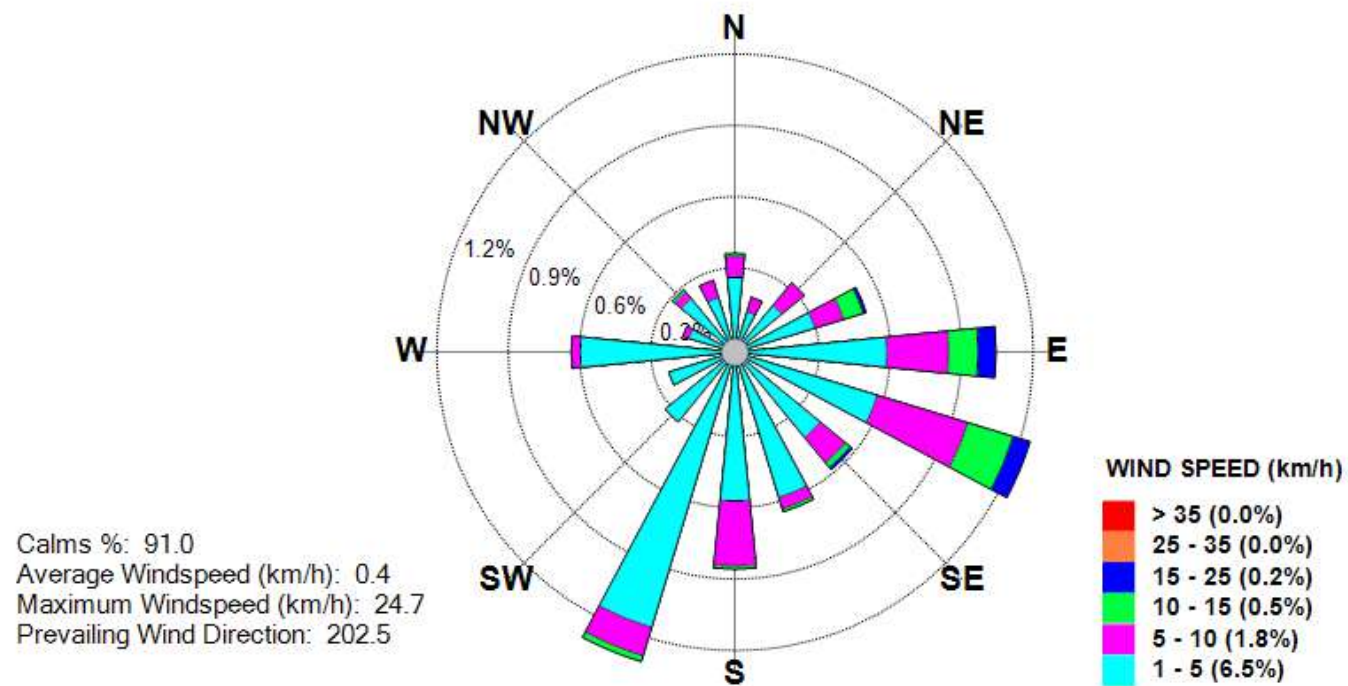


Figure 4: Windrose

Note: Chart excludes data from 1-7, 10-16 and 21-28 February 2025 due to MET station fault

Appendix 1

Calibration Documents (when required)



**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

March 2025

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date 29 April 2025

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for March 2025 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average PM₁₀ results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average PM₁₀ results were below the Dixon Sand Quarry EPL limit of 42ug/m³.
- The PM₁₀ annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in green indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in red indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2024 for TEOM's coinciding with the Dixon Sand project year.

Approximately 19.6% of valid meteorological data was recorded for March 2025 due to a fault with the station. Rainfall data was unaffected during this period.

Approximately 99.8% of valid TEOM data was available for March 2025.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or NSW EPA approved methods. The following Australian Standards were used:

- AS3580.9.8 - *“Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser”*; and
- AS/NZS 3580.1.1 - *“Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment”*.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³.

All TEOM PM₁₀ results were also below the Dixon Sand Quarry EPL limit of 42ug/m³.

Approximately 99.8% of valid TEOM data was available for March 2025.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2024 and therefore an annual amount of data has not yet been collected.

The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for March 2025 from AQMS and Annual Average PM₁₀ calculated from 1 July 2024.

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/03/2025	29.0	15.4	72.5	38.5
2/03/2025	22.5	15.4	56.3	38.6
3/03/2025	17.2	15.4	43.0	38.6
4/03/2025	14.9	15.4	37.3	38.6
5/03/2025	15.5	15.4	38.8	38.6
6/03/2025	15.5	15.4	38.8	38.6
7/03/2025	9.8	15.4	24.5	38.5
8/03/2025	13.2	15.4	33.0	38.5
9/03/2025	10.5	15.4	26.3	38.4
10/03/2025	10.2	15.4	25.5	38.4
11/03/2025	7.5	15.3	18.8	38.3
12/03/2025	11.5	15.3	28.8	38.3
13/03/2025	14.5	15.3	36.3	38.3
14/03/2025	14.7	15.3	36.8	38.2
15/03/2025	20.2	15.3	50.5	38.3
16/03/2025	12.6	15.3	31.5	38.3
17/03/2025	19.2	15.3	48.0	38.3
18/03/2025	17.2	15.3	43.0	38.3
19/03/2025	21.0	15.4	52.5	38.4
20/03/2025	18.5	15.4	46.3	38.4
21/03/2025	13.7	15.4	34.3	38.4
22/03/2025	13.7	15.4	34.3	38.4
23/03/2025	8.9	15.3	22.3	38.3
24/03/2025	17.2	15.3	43.0	38.3
25/03/2025	12.2	15.3	30.5	38.3
26/03/2025	13.4	15.3	33.5	38.3
27/03/2025	13.8	15.3	34.5	38.3
28/03/2025	10.4	15.3	26.0	38.2
29/03/2025	8.1	15.3	20.3	38.2
30/03/2025	10.5	15.2	26.3	38.1
31/03/2025	9.7	15.2	24.3	38.1

*Calculated from PM10

**Calculated from PM10 Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 ug/m³ are highlighted in yellow

No Data (ND) - <18hrs hour of valid data to calculate a 24hr average

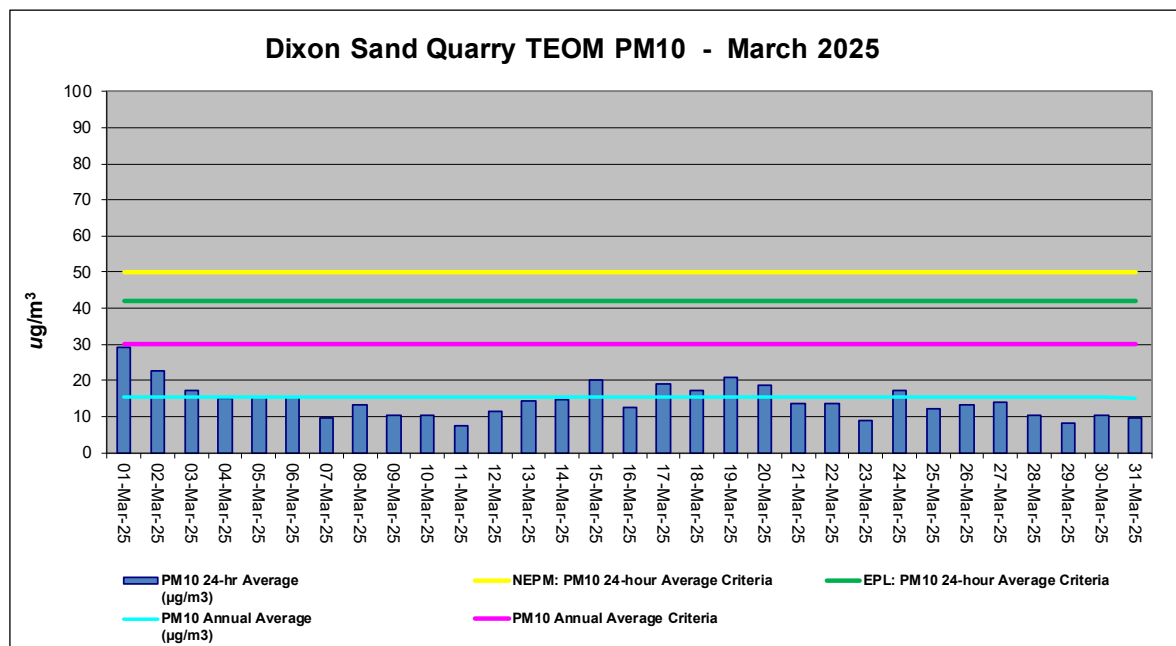


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. **Please Note:** The Windrose excludes data from 1-19 and 24-31 March 2025 due to an ongoing Met station fault, which resulted in data loss during this period.

A 6-monthly physical screening and system check of the meteorological station was conducted in September 2024 and will be conducted upon completion of repair to the station. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 19.6% of valid meteorological data was recorded for March 2025 due to an ongoing fault with the station. A replacement sensor has been ordered by CBased and repair of the MET station will be scheduled upon receipt of the sensor. Rainfall data was unaffected during this period.

Table 3: Meteorological Data Summary for March 2025

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/03/2025				0.0									
2/03/2025				0.0									
3/03/2025				0.8									
4/03/2025				6.6									
5/03/2025				4.8									
6/03/2025				0.4									
7/03/2025				1.2									
8/03/2025				3.6									
9/03/2025				1.4									
10/03/2025				1.2									
11/03/2025				3.0									
12/03/2025				2.8									
13/03/2025				0.2									
14/03/2025				0.0									
15/03/2025				0.0									
16/03/2025				0.0									
17/03/2025				0.0									
18/03/2025				0.0									
19/03/2025				0.0									
20/03/2025	22.0	26.8	32.0	0.0	0.3	5.2	15.5	42.5	64.1	86.8	996.0	997.8	1001.3
21/03/2025	19.0	21.6	25.0	5.6	0.0	3.3	12.8	75.8	90.6	100.0	993.9	995.6	997.5
22/03/2025	19.0	21.1	25.0	1.6	0.2	3.5	18.8	71.2	93.6	100.0	996.3	998.1	1000.2
23/03/2025	19.0	19.8	20.0	9.0	0.1	2.0	6.0	99.9	99.9	99.9	999.5	1000.3	1002.2
24/03/2025				1.2									
25/03/2025				3.8									
26/03/2025				0.2									
27/03/2025				6.8									
28/03/2025				3.6									
29/03/2025				43.2									
30/03/2025				5.2									
31/03/2025				1.0									
Monthly	19.0	22.3	32.0	107.2	0.0	3.5	18.8	42.5	87.1	100.0	993.9	997.9	1002.2

No Data available due to a fault with station - investigation underway

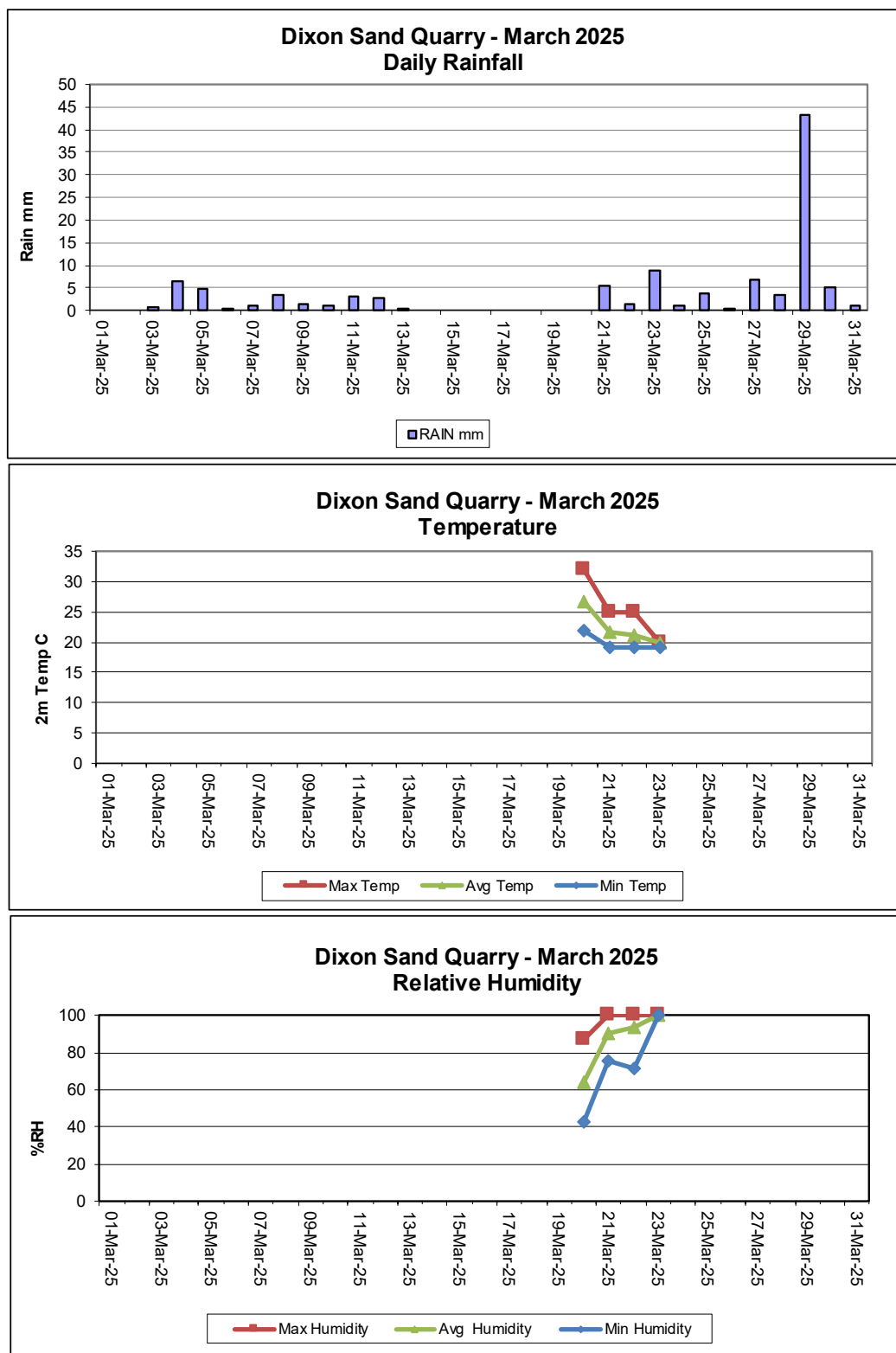


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

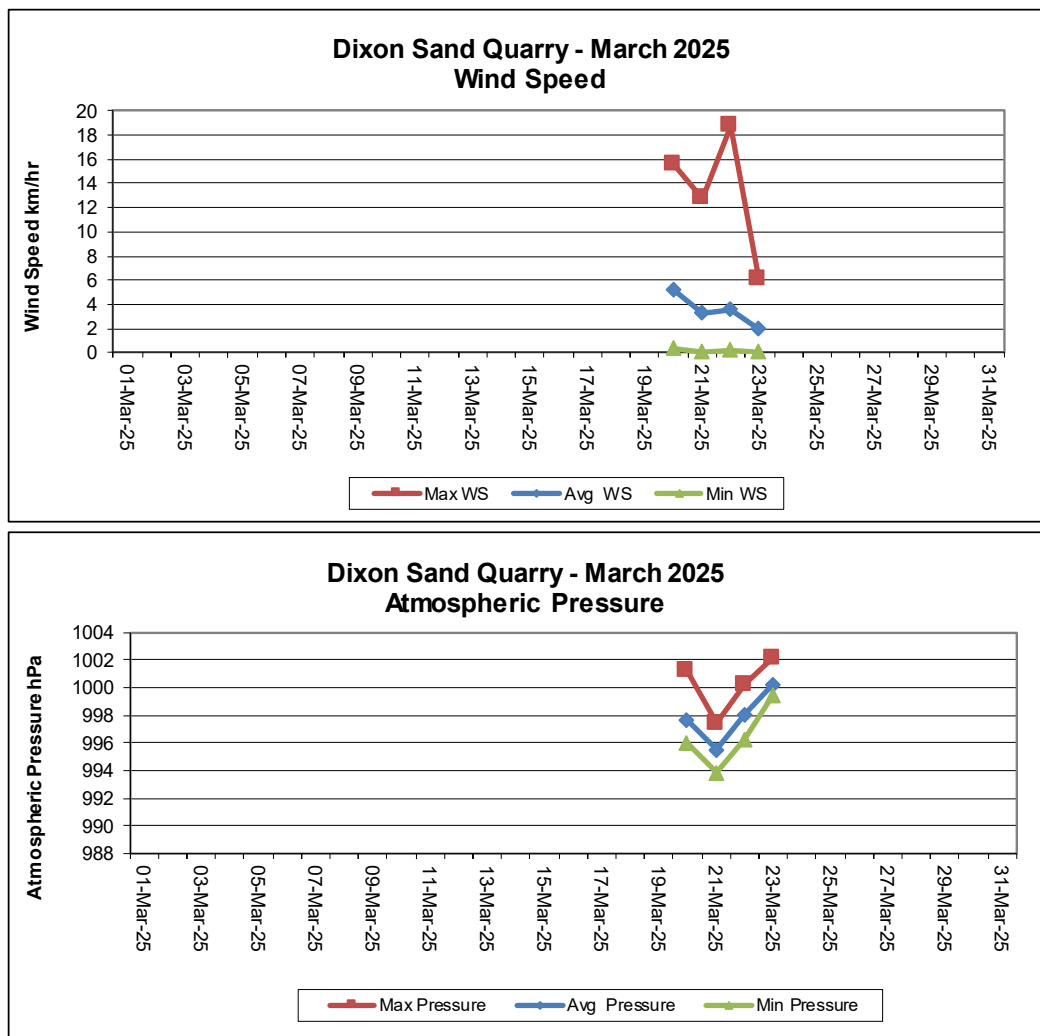


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose

MARCH 2025

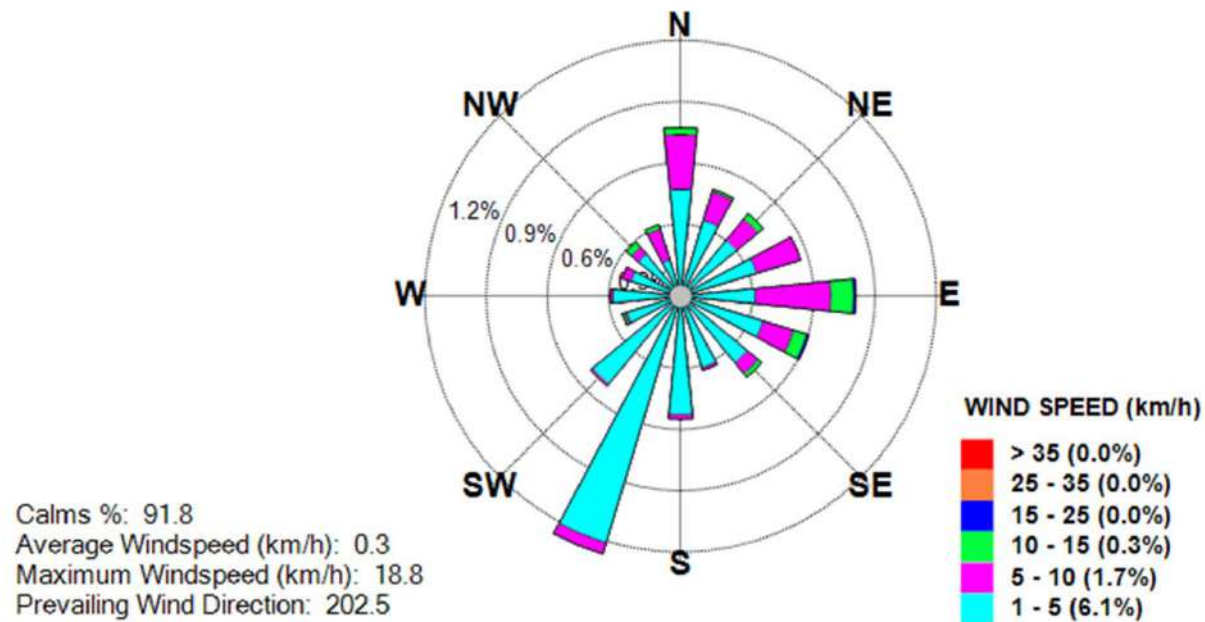


Figure 4: Windrose

Note: Chart excludes data from 1-19 and 24-31 March 2025 due to MET station fault

Appendix 1

Calibration Documents (when required)



Continuous Air Quality

Monthly/Quarterly/Six Monthly/Annual

TEOM Maintenance and Calibration – 1400AB

TEOM Client/Site: Dixon Sands / TEOM1Date: 20/3/251. TEOM Data Screen SERIAL No: 1400AB255700523 Firmware: —

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	<u>Filter OK (4)</u>	Green - Normal	☒	
Date/time	TEOM: <u>9.19</u> Actual: <u>10.20</u>	Current Date/time correct within 5 minutes	☒ <u>OK ET</u>	
PM-10 24hr av	<u>19.3</u>	Positive values	☒	
Filter loading PM10	<u>50</u>	<80 %	☒	
Frequency PM-10	<u>253.36972</u>	200-300 Hz	☒	
Noise PM-10	<u>0.049</u>	<0.100ug	☒	

Comment: If filter load >80% but <90% and if flows OK then data is OK

Comments:**2. System Status**

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Vacuum pump pressure	<u>-28 in Hg.</u>	<0.50 atm <u><-25 in Hg</u>	☒	
Warnings	<u>NIL</u>	No Warnings	☒	
If any warnings list:				

Comments:

Data Downloaded: YES/NO (circle)

Technician Name : COLIN DANIELSigned Colin

3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	28.2	-10 to 50 C	✓	
Ambient Dew Point	NA	-10 to 50 C	✓	
Ambient Pressure	0.976	0.9-1.1 atm	✓	
Ambient Relative Humidity	NA	10-100 %RH	✓	
Cap temperature	50.00	50.00 +/- 0.10 C	✓	
Case temperature	50.00	50.00 +/- 0.10 C	✓	
Main (PM-10) Air Tube temp	50.00	50.00 +/- 0.10 C	✓	

Comments:**4. Instrument Conditions – Flows**

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Main (PM-10) Flow rate	3.00	2.82 – 3.18 lpm	✓	
Bypass Flow rate	13.67	12.95 – 14.39 lpm	✓	
Total Flow rate	16.67	15.67 – 17.67 lpm	✓	

Comments:**Results: (Tick box)**

There were NO equipment faults found. No action required – (file report)



There were faults found (Fails) – Were these fixed on site: YES/NO (circle)

Any **Fails** that cannot be repaired on site must be reported to CBased:Office: 65713334 or email cbased@bigpond.com

Date faults notified to CBased: _____

Comments/Action Required:

Calibration/Maintenance

1. 1405A: Were Filters replaced YES/NO
 2. PM10 Inlet head cleaned YES/NO
 3. If measurement filters were replaced, confirm stable results after change. Stable particulate results confirmed YES/NO

Channel	Filter Load %	Frequency Hz initial	Frequency check 1min	Frequency check 3min	Frequency check 5min
PM10	16	255-67951	255-67953	255-67954	255-67955 ✓ ok

Frequency should not drift by more than 0.0010 between readings (if instrument is thermodynamically stable)
 Pass/Fail – if Fail – install new filter and redo stability test.

4. Instrument clock verified (Refer Section 1) YES/NO.
 If Time changed – clock reset OK YES/NO or NA (not changed)
 Comments:

5. Were TEOM in line and rear TEOM filters checked for cleanliness and replaced if necessary. YES/NO.
 Comments if changed:

6. TEOM Cleaned and Air Conditioner checked YES/NO. Air Conditioner settings or operational status: OK ✓

Tetralcal Flow/Temp/Pressure Calibrator Serial No: TET005 Refer to calibration corrections for Temperature/Pressure and Flows and apply to all readings.

Quarterly or Six Monthly Calibration

1. Flow Verification – Conducted YES/NO

PM10 Flow verified Flow l/min 3.01 Error % 0.3 (allowed error <6%) PASS/FAIL

Bypass Flow verified Flow l/min 13.47 Error % 1.5 (allowed error <6%) PASS/FAIL

If fail then complete a full multipoint recalibration and review previous data from last good flow check. **Comments if Flows recalibrated:**

2. Leak Check – Conducted YES/NO

PM10 actual 0.13 < Limit 0.15

Bypass actual 0.55 < Limit 0.60

Leak check PASS/FAIL – If fail then find leak and retest.

Comments:

Slight leak in mass transducer as noted previously ok for now.



Annual Calibration/Maintenance**1. Temperature and Pressure Calibration – Conducted YES/NO**

Reference Temperature: _____ C TEOM Temperature _____ C
 if difference +/- 1 C recalibrate sensor. Sensor recalibrated YES/NO

Reference Pressure: _____ atm TEOM Pressure _____ atm
 if difference +/- 0.010 atm recalibrate sensor. Sensor recalibrated YES/NO

Note: Tetracl measures Atmospheric Pressure in mm Hg or mb or hPa
For mb or hPa divide tetracl result by 1013.25 to change units to atm.
For mmHg divide tetracl result by 760 to change units to atm.

2. Flow Calibration – Conducted YES/NO**PM10**

Set point 2.4 Actual: _____

Set point 3.6 Actual: _____

Set point 3.0 Actual: _____ After calibration Final: _____ l/min

BYPASS

Set point 10.9 Actual: _____

Set point 16.4 Actual: _____

Set point 13.67 Actual: _____ After calibration Final: _____ l/min

3. Mass calibration (K0) Verification – Conducted YES/NO

Actual measured K0 = _____ TEOM stated K0 _____ Error %: _____

Allowed Error +/- 2.5%. PASS/FAIL

If Error +/- 2.5% repeat. If confirmed consult manufacturer.

Second Error % = _____ PASS/FAIL. Comments:

If second test fails consult manufacturer.

4. Annual Noise check - Conducted YES/NO

Zero filter applied to TEOM and TEOM operated for at least 12 hours:

Start date/time: _____ Finish date/time: _____

Standard deviation of all recorded data (min 30 min averages) = _____ ug/m³

Noise was less than 5ug/m³ YES/NO

5. Maintenance

Air Inlet system cleaned YES/NO

Pump Reconditioned YES/NO

Check Waterproofing YES/NO

Comments:





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Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

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Approximately 99.7% of valid TEOM data was available for April 2025.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2024 and therefore an annual amount of data has not yet been collected.

The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for April 2025 from AQMS and Annual Average PM₁₀ calculated from 1 July 2024.

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/04/2025	11.4	15.2	28.5	38.0
2/04/2025	21.5	15.2	53.8	38.1
3/04/2025	19.1	15.2	47.8	38.1
4/04/2025	20.9	15.3	52.3	38.2
5/04/2025	16.3	15.3	40.8	38.2
6/04/2025	14.4	15.3	36.0	38.2
7/04/2025	18.1	15.3	45.3	38.2
8/04/2025	16.9	15.3	42.3	38.2
9/04/2025	12.0	15.3	30.0	38.2
10/04/2025	13.9	15.3	34.8	38.2
11/04/2025	27.4	15.3	68.5	38.3
12/04/2025	21.3	15.3	53.3	38.3
13/04/2025	11.4	15.3	28.5	38.3
14/04/2025	20.5	15.3	51.3	38.3
15/04/2025	13.0	15.3	32.5	38.3
16/04/2025	16.1	15.3	40.3	38.3
17/04/2025	14.5	15.3	36.3	38.3
18/04/2025	13.7	15.3	34.3	38.3
19/04/2025	15.4	15.3	38.5	38.3
20/04/2025	14.4	15.3	36.0	38.3
21/04/2025	13.6	15.3	34.0	38.3
22/04/2025	18.3	15.3	45.8	38.3
23/04/2025	13.1	15.3	32.8	38.3
24/04/2025	13.9	15.3	34.8	38.3
25/04/2025	9.9	15.3	24.8	38.2
26/04/2025	10.2	15.3	25.5	38.2
27/04/2025	8.1	15.3	20.3	38.1
28/04/2025	12.1	15.2	30.3	38.1
29/04/2025	18.0	15.2	45.0	38.1
30/04/2025	11.7	15.2	29.3	38.1

*Calculated from PM10

**Calculated from PM10 Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 ug/m³ are highlighted in yellow

No Data (ND) - <18hrs hour of valid data to calculate a 24hr average

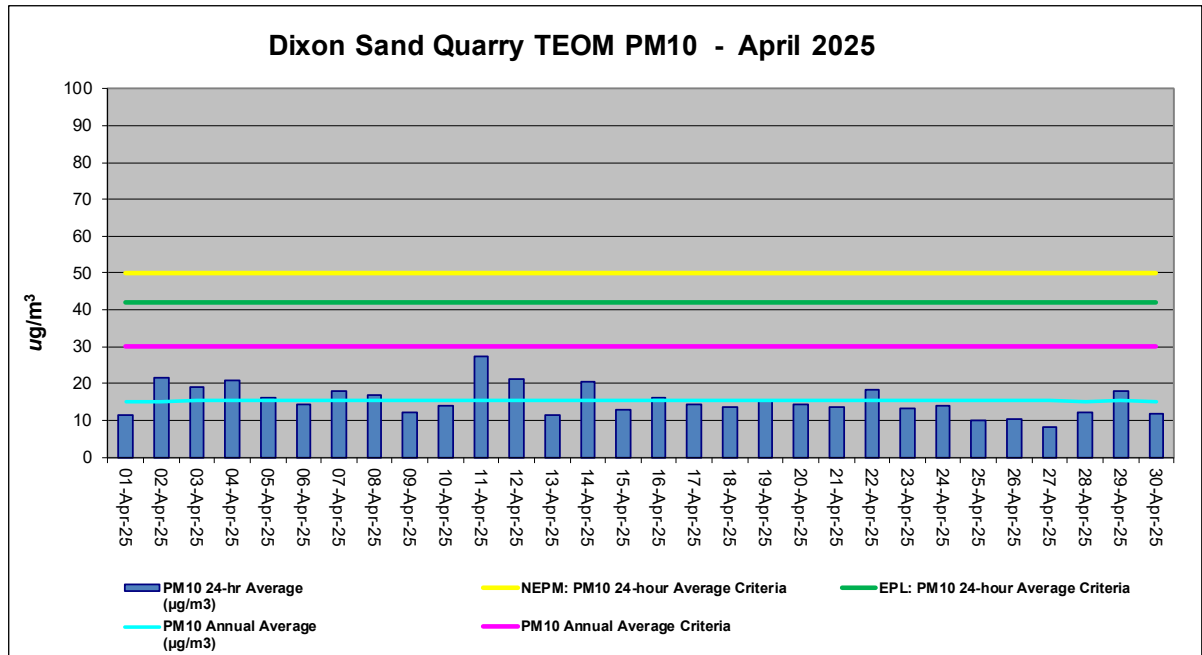


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. The chart for rainfall data is presented in **Figures 2**. No other meteorological parameters including the windrose are unavailable due to the ongoing MET station fault which resulted in data loss during the April 2025 reporting period.

A 6-monthly physical screening and system check of the meteorological station was conducted in September 2024. The next physical screening and system check is currently scheduled for September 2025. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 7.7% of valid meteorological data was recorded for April 2025 due to an ongoing sensor fault with the station. A replacement sensor for the MET station has been installed by CBased on the 14 May 2025. Rainfall data was unaffected during this period.

Table 3: Meteorological Data Summary for April 2025

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/04/2025				0.0									
2/04/2025				0.0									
3/04/2025				0.0									
4/04/2025				0.0									
5/04/2025				0.0									
6/04/2025				0.0									
7/04/2025				0.0									
8/04/2025				0.0									
9/04/2025				0.0									
10/04/2025				0.0									
11/04/2025				0.0									
12/04/2025				0.0									
13/04/2025				0.2									
14/04/2025				0.2									
15/04/2025				1.4									
16/04/2025				0.0									
17/04/2025				0.4									
18/04/2025				0.0									
19/04/2025				0.0									
20/04/2025				0.0									
21/04/2025				0.0									
22/04/2025				7.4									
23/04/2025				19.8									
24/04/2025				0.2									
25/04/2025				10.0									
26/04/2025				0.8									
27/04/2025				25.4									
28/04/2025				2.6									
29/04/2025				8.2									
30/04/2025				1.0									
Monthly				77.6									

April 2025 Data unavailable due to a fault with station - Met sensor replaced 14 May 2025

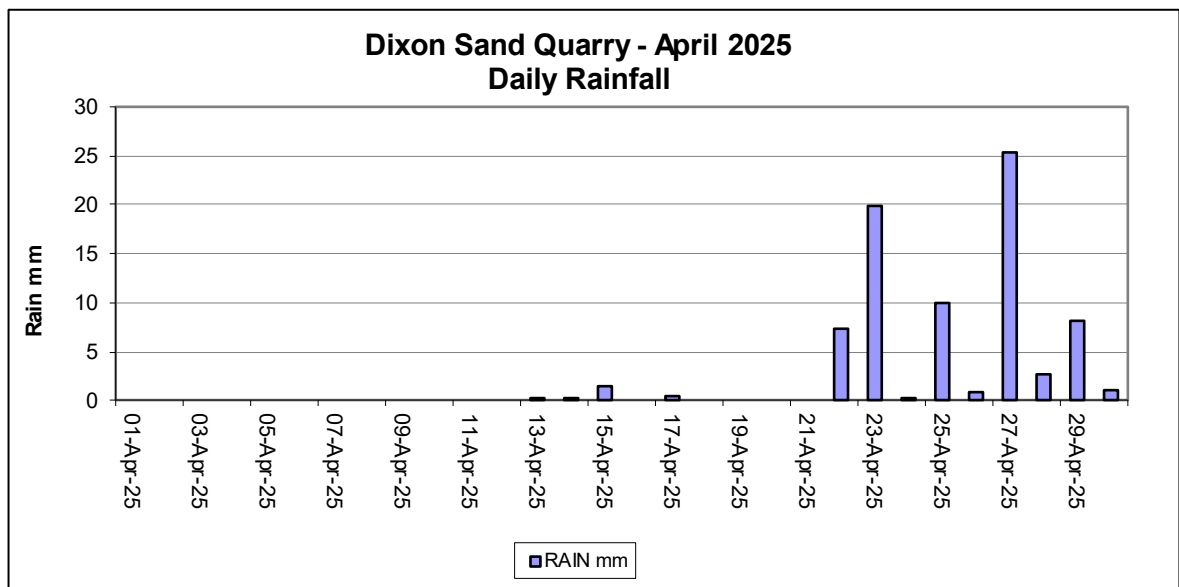


Figure 2: *Daily Rainfall*

Appendix 1

Calibration Documents (when required)



**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

May 2025

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date 30 June 2025

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for May 2025 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average PM₁₀ results were below the NEPM 24-hour maximum criteria of 50ug/m³; with the exception of one occurrence on the 27 May 2025 (71.7 ug/m³)
- 24-hour average PM₁₀ results were below the Dixon Sand Quarry EPL limit of 42ug/m³, with the exception of one occurrence on the 27 May 2025 (71.7 ug/m³)
- The PM₁₀ annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in green indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in red indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2024 for TEOM's coinciding with the Dixon Sand project year.

Approximately 61.3% of valid meteorological data was recorded for May 2025 due to a fault with the station. Rainfall data was unaffected during this period.

Approximately 100% of valid TEOM data was available for May 2025.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or NSW EPA approved methods. The following Australian Standards were used:

- AS3580.9.8 - “*Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser*”; and
- AS/NZS 3580.1.1 - “*Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment*”.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the May 2025 monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environmental Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³, with the exception of one occurrence on 27 May 2025 (71.7 ug/m³).

Additionally, TEOM PM₁₀ results were below the Dixon Sand Quarry EPL limit of 42ug/m³ with the exception of the above-mentioned occurrence on 27 May 2025 (71.7 ug/m³) highlighted in yellow in **Table 2**.

Please Note: TEOM exceedances on 27 May 2025 was due to the forecasted dust storm for this day. The Maroota Rural Fire Service (RFS) notification and Sydney Northwest region data from the NSW Government Air Quality website are provided in **Appendix 1**.

Approximately 100% of valid TEOM data was available for May 2025.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2024 and therefore an annual amount of data has not yet been collected.

The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for May 2025 from AQMS and Annual Average PM₁₀ calculated from 1 July 2024.

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/05/2025	10.6	15.2	26.5	38.1
2/05/2025	9.8	15.2	24.5	38.0
3/05/2025	10.9	15.2	27.3	38.0
4/05/2025	9.6	15.2	24.0	37.9
5/05/2025	9.6	15.2	24.0	37.9
6/05/2025	19.0	15.2	47.5	37.9
7/05/2025	10.1	15.1	25.3	37.9
8/05/2025	17.2	15.2	43.0	37.9
9/05/2025	13.8	15.1	34.5	37.9
10/05/2025	8.0	15.1	20.0	37.8
11/05/2025	7.1	15.1	17.8	37.7
12/05/2025	9.3	15.1	23.3	37.7
13/05/2025	8.9	15.1	22.3	37.6
14/05/2025	10.5	15.0	26.3	37.6
15/05/2025	14.5	15.0	36.3	37.6
16/05/2025	13.6	15.0	34.0	37.6
17/05/2025	13.1	15.0	32.8	37.6
18/05/2025	10.8	15.0	27.0	37.5
19/05/2025	11.0	15.0	27.5	37.5
20/05/2025	16.2	15.0	40.5	37.5
21/05/2025	12.0	15.0	30.0	37.5
22/05/2025	6.9	15.0	17.3	37.4
23/05/2025	5.0	14.9	12.5	37.4
24/05/2025	9.2	14.9	23.0	37.3
25/05/2025	10.1	14.9	25.3	37.3
26/05/2025	16.0	14.9	40.0	37.3
27/05/2025	71.7	15.1	179.3	37.7
28/05/2025	9.1	15.1	22.8	37.7
29/05/2025	18.3	15.1	45.8	37.7
30/05/2025	14.5	15.1	36.3	37.7
31/05/2025	13.4	15.1	33.5	37.7

*Calculated from PM10

**Calculated from PM10 Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 ug/m³ are highlighted in yellow

No Data (ND) - <18hrs hour of valid data to calculate a 24hr average

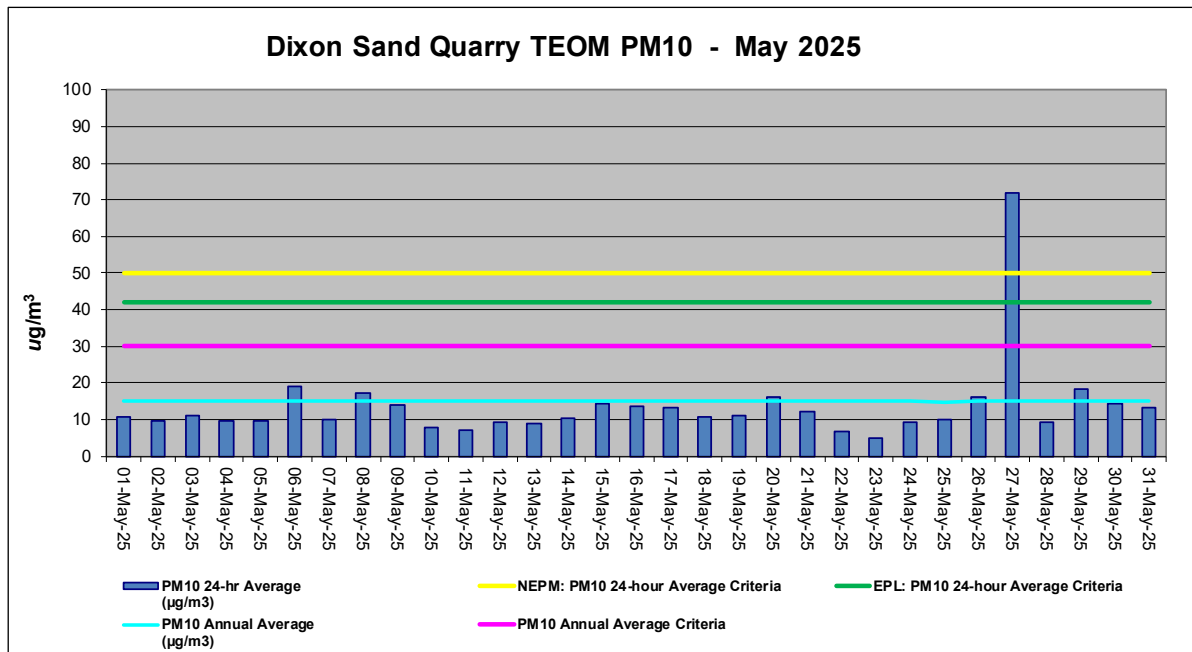


Figure 1: TEOM PM₁₀ 24 hr, Annual Average and Criteria

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A Windrose is provided in **Figure 4**.

Please Note: The Windrose excludes data from 1-13 May 2025 and are unavailable due to the ongoing MET station fault which resulted in data loss during this reporting period.

A 6-monthly physical screening and system check of the meteorological station was conducted in September 2024. The next physical screening and system check is currently scheduled for June 2025. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 61.3% of valid meteorological data was recorded for May 2025 due to the ongoing sensor fault with the station. A replacement sensor for the MET station has been installed by CBased on the 14 May 2025. Rainfall data was unaffected during the May 2025 reporting period.

Table 3: Meteorological Data Summary for May 2025

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/05/2025				3.8									
2/05/2025				3.2									
3/05/2025				0.2									
4/05/2025				0.0									
5/05/2025				0.8									
6/05/2025				0.0									
7/05/2025				0.0									
8/05/2025				0.0									
9/05/2025				0.8									
10/05/2025				0.6									
11/05/2025				5.8									
12/05/2025				3.0									
13/05/2025				3.2									
14/05/2025	15.0	17.5	22.0	4.8	0.2	2.4	10.7	62.8	83.1	96.3	991.5	992.9	993.9
15/05/2025	13.0	15.0	17.1	0.6	0.0	2.9	10.6	85.4	92.3	97.6	992.9	993.6	994.7
16/05/2025	14.3	15.7	18.5	1.6	0.1	2.6	12.8	85.7	95.5	98.3	987.5	990.1	993.1
17/05/2025	13.3	15.9	21.3	8.8	0.2	2.5	12.2	50.5	86.3	98.9	986.8	988.3	990.7
18/05/2025	10.1	12.0	13.8	11.4	0.2	4.3	25.8	73.3	92.3	98.2	990.8	994.2	997.2
19/05/2025	9.9	11.6	15.0	21.0	0.2	6.2	18.5	68.2	91.2	98.7	997.0	999.7	1002.1
20/05/2025	10.6	13.7	18.1	0.8	0.4	4.3	11.7	65.6	85.3	94.4	999.5	1000.8	1002.4
21/05/2025	12.6	14.3	16.2	14.8	0.1	3.0	11.8	92.2	97.5	98.7	994.7	997.8	1000.1
22/05/2025	14.7	16.2	17.5	89.4	0.3	3.8	20.1	93.8	97.2	99.2	988.1	990.6	994.6
23/05/2025	13.3	17.2	20.5	31.2	0.3	4.1	12.0	64.9	86.9	98.1	983.8	986.4	988.8
24/05/2025	12.3	15.4	20.3	0.0	0.2	4.6	15.1	50.3	65.3	77.6	984.7	987.6	990.2
25/05/2025	12.7	14.2	17.2	0.0	0.0	3.6	15.4	51.2	59.9	68.0	989.4	991.3	992.9
26/05/2025	10.1	12.8	15.6	9.4	0.2	5.2	18.7	54.5	74.3	96.0	983.8	989.2	992.5
27/05/2025	9.8	13.9	17.2	0.6	0.1	5.1	27.4	38.7	68.3	96.3	979.5	982.5	986.5
28/05/2025	8.8	13.2	19.2	0.0	0.2	3.1	9.4	44.8	61.0	74.2	986.0	988.0	991.1
29/05/2025	8.3	12.5	15.0	0.0	0.1	2.8	11.6	65.2	73.6	85.8	990.9	992.7	994.9
30/05/2025	7.9	13.1	18.9	0.0	0.0	2.0	9.9	54.8	82.0	97.5	994.8	997.4	1000.6
31/05/2025	9.1	13.0	18.6	0.0	0.0	2.0	7.1	58.4	84.0	97.8	999.6	1000.4	1001.7
Monthly	7.9	14.3	22.0	215.8	0.0	3.6	27.4	38.7	82.0	99.2	979.5	992.4	1002.4

No Data available due to a fault with station - repair completed 14/05/2025

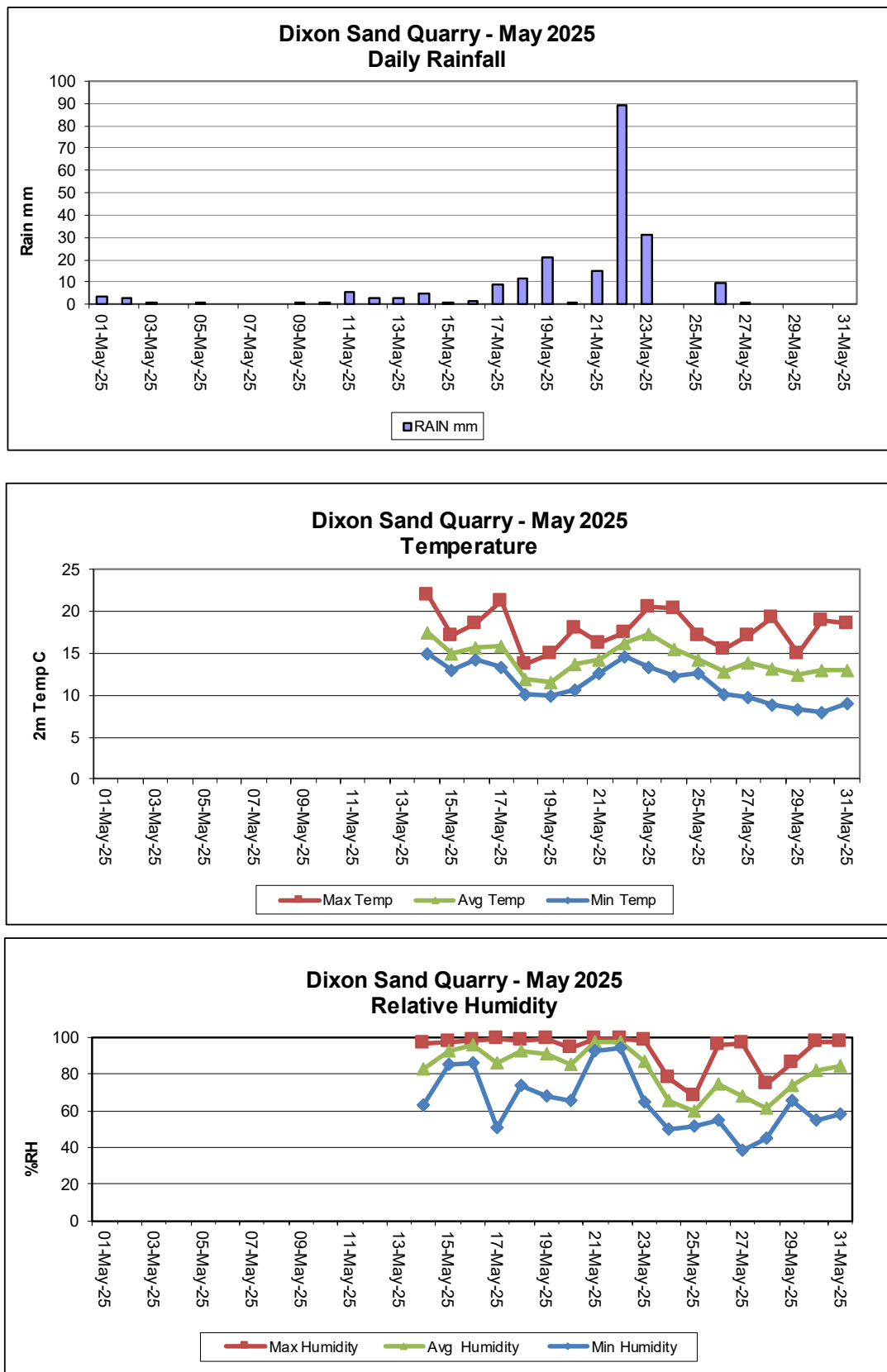


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

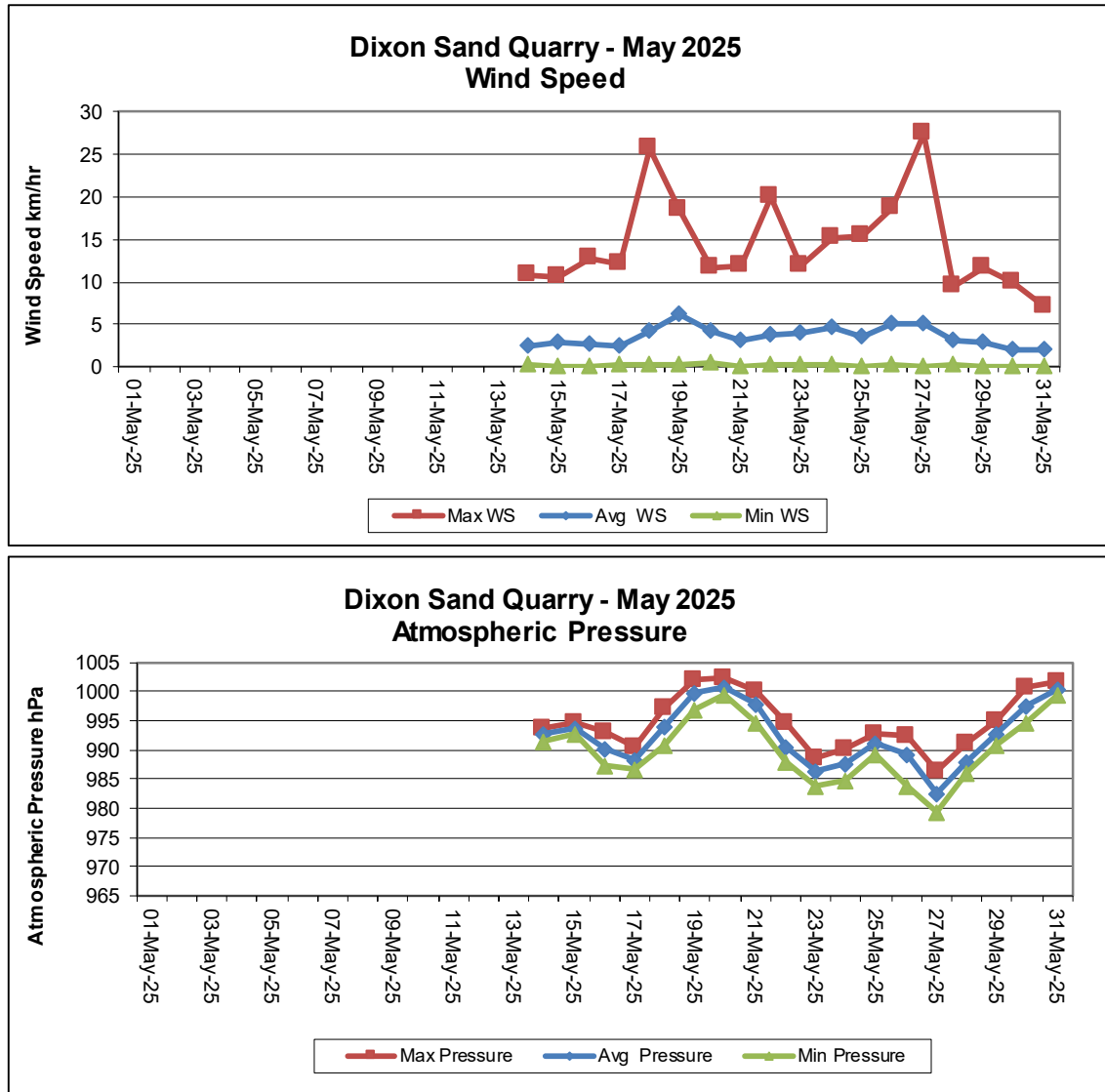


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose

MAY 2025

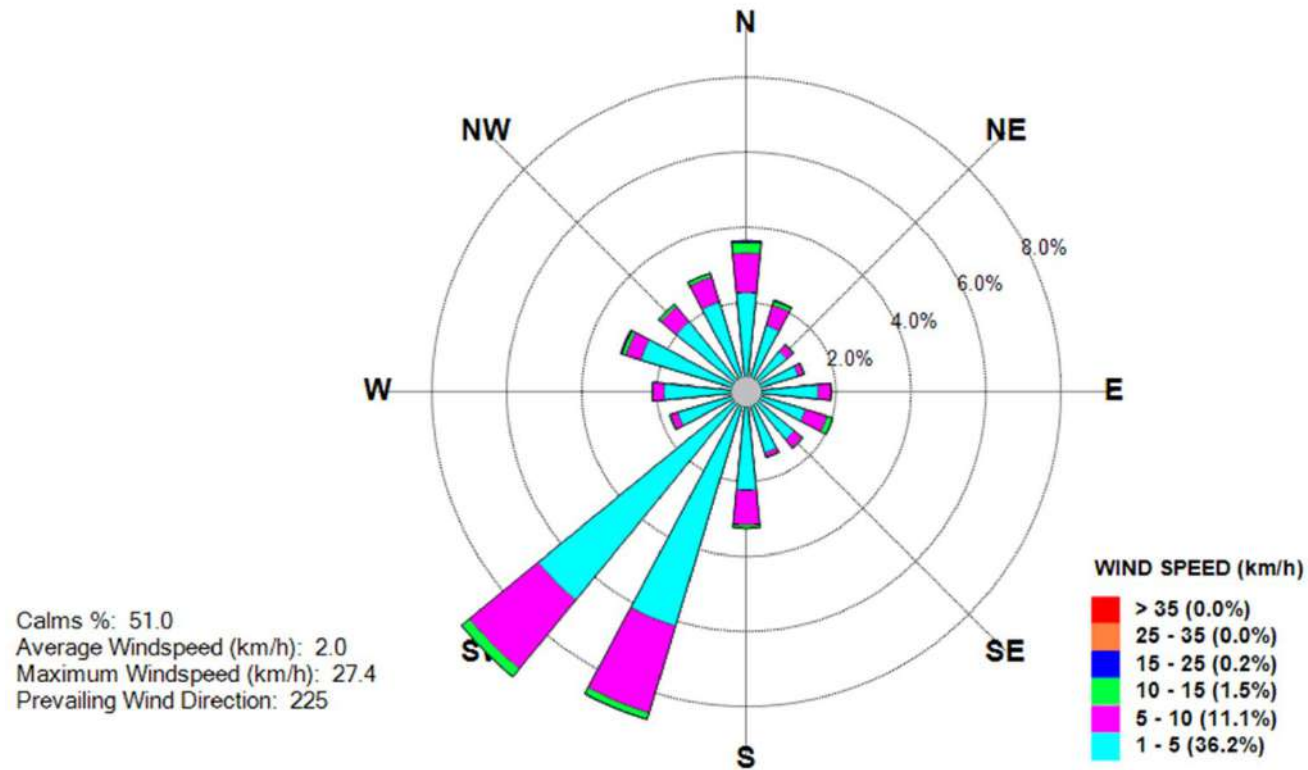


Figure 4: Windrose

Note: Chart excludes data from 1-13 May 2025 due to MET station fault

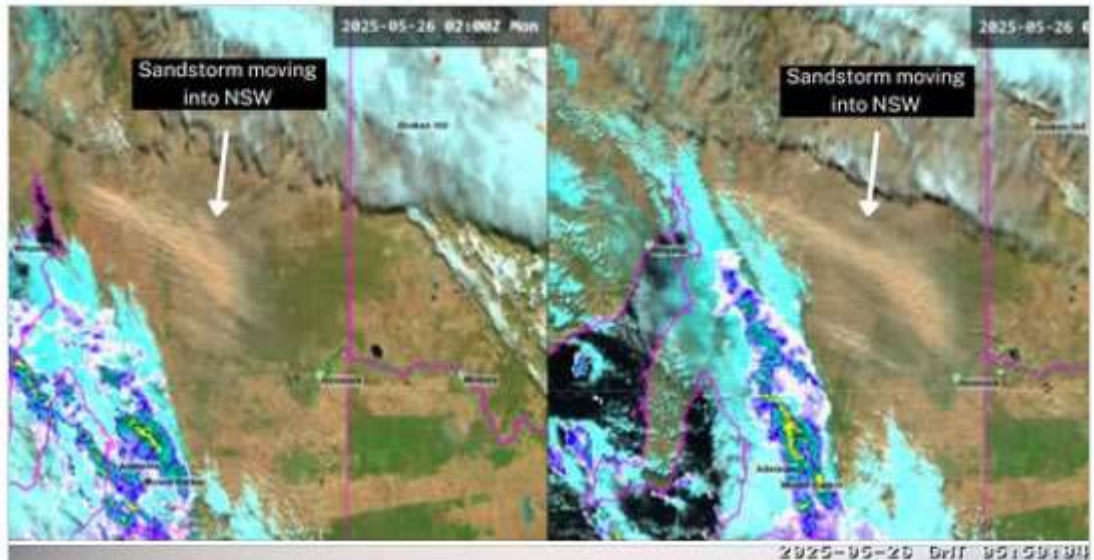
Appendix 1
Calibration Documents (when required)

Maroota Rural Fire Brigade's post



Maroota Rural Fire Brigade

27 May · 🌐



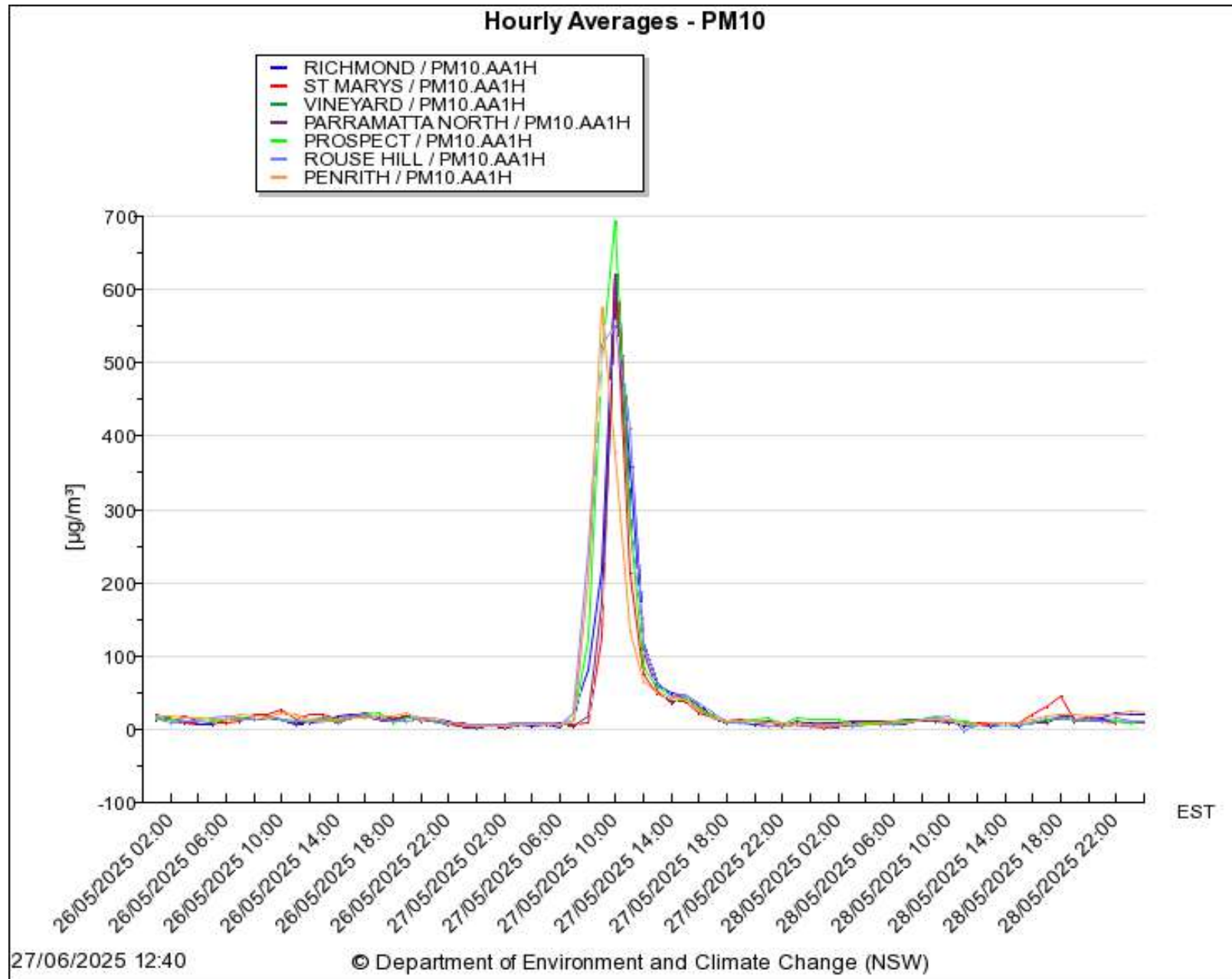
NSW Rural Fire Service

27 May · 🌐

Dust and airborne particles, caused by severe drought in other states are currently being blown across south-east Australia by intense storms. A dust storm originating in South Australia has moved into NSW overnight, significantly impacting air quality in several regions including the Greater Sydney area.

Those with asthma or other respiratory issues are advised to minimise their exposure to the dust particles by avoiding outdoor activity, stay inside with your windows closed and cover your nose and mouth with a damp cloth. For more information on the health impacts, visit [NSW Health](https://www.health.nsw.gov.au/airquality/Pages/default.aspx).

You can check the air quality in your area by visiting the NSW Government Air Quality website: <https://www.airquality.nsw.gov.au/>





**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

June 2025

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date 31 July 2025

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for June 2025 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average PM₁₀ results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average PM₁₀ results were below the Dixon Sand Quarry EPL limit of 42ug/m³
- The PM₁₀ annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in **green** indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in **red** indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2024 for TEOM's coinciding with the Dixon Sand project year.

Approximately 100% of valid meteorological data was recorded for June 2025.

Approximately 100% of valid TEOM data was available for June 2025.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or NSW EPA approved methods. The following Australian Standards were used:

- AS3580.9.8 - *“Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser”*; and
- AS/NZS 3580.1.1 - *“Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment”*.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the June 2025 monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environmental Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³ and the Dixon Sand Quarry EPL limit of 42ug/m³.

Approximately 100% of valid TEOM data was available for June 2025.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2024 and therefore an annual amount of data has now been collected.

The quarterly TEOM calibration was conducted on the 22nd July 2025 (for June). The next calibration is due to be completed in September 2025. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for June 2025 from AQMS and Annual Average PM₁₀ calculated from 1 July 2024.

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/06/2025	8.6	15.1	21.5	37.6
2/06/2025	13.5	15.0	33.8	37.6
3/06/2025	13.5	15.0	33.8	37.6
4/06/2025	11.1	15.0	27.8	37.6
5/06/2025	18.9	15.0	47.3	37.6
6/06/2025	7.8	15.0	19.5	37.6
7/06/2025	6.9	15.0	17.3	37.5
8/06/2025	7.2	15.0	18.0	37.4
9/06/2025	5.3	14.9	13.3	37.4
10/06/2025	6.4	14.9	16.0	37.3
11/06/2025	8.4	14.9	21.0	37.2
12/06/2025	14.5	14.9	36.3	37.2
13/06/2025	10.1	14.9	25.3	37.2
14/06/2025	10.2	14.9	25.5	37.2
15/06/2025	6.4	14.8	16.0	37.1
16/06/2025	8.2	14.8	20.5	37.1
17/06/2025	11.3	14.8	28.3	37.0
18/06/2025	16.2	14.8	40.5	37.0
19/06/2025	15.2	14.8	38.0	37.0
20/06/2025	18.7	14.8	46.8	37.1
21/06/2025	12.1	14.8	30.3	37.1
22/06/2025	12.5	14.8	31.3	37.0
23/06/2025	11.4	14.8	28.5	37.0
24/06/2025	8.8	14.8	22.0	37.0
25/06/2025	26.3	14.8	65.8	37.1
26/06/2025	10.6	14.8	26.5	37.0
27/06/2025	17.4	14.8	43.5	37.0
28/06/2025	16.1	14.8	40.3	37.1
29/06/2025	8.8	14.8	22.0	37.0
30/06/2025	16.4	14.8	41.0	37.0

*Calculated from PM10

**Calculated from PM10 Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 ug/m³ are highlighted in yellow

No Data (ND) - <18hrs hour of valid data to calculate a 24hr average

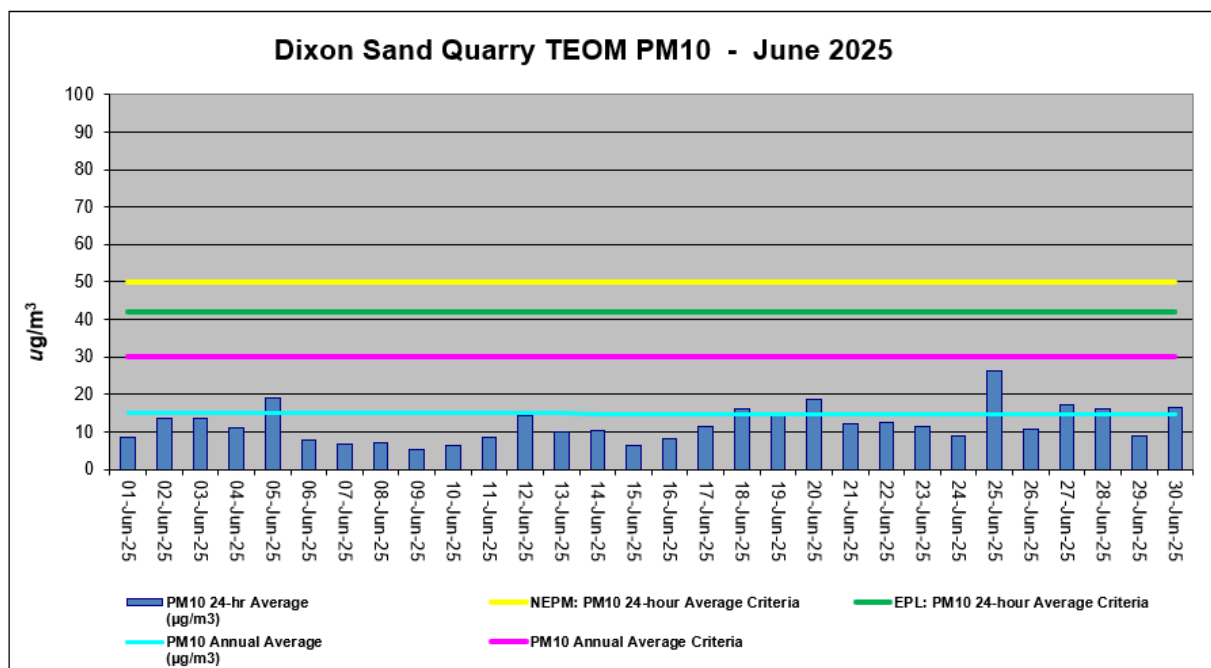


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A Windrose is provided in **Figure 4**.

A 6-monthly physical screening and system check of the meteorological station was conducted on the 22nd July 2025 (for June). The next physical screening and system check is currently scheduled for December 2025. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 100% of valid meteorological data was recorded for June 2025.

Table 3: Meteorological Data Summary for June 2025

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/06/2025	8.7	13.2	18.4	0.0	0.1	2.3	15.5	55.7	83.0	96.5	994.7	997.7	1000.1
2/06/2025	10.7	13.4	17.7	0.0	0.1	3.3	10.9	72.4	89.8	97.7	984.8	990.2	994.7
3/06/2025	9.0	12.8	17.3	0.2	0.0	2.4	11.3	51.0	76.5	98.5	980.9	982.6	984.7
4/06/2025	8.0	10.7	12.3	1.0	0.2	6.9	23.0	52.8	67.6	91.6	983.1	988.8	994.9
5/06/2025	6.4	10.5	15.5	0.2	0.1	3.5	14.9	51.0	62.0	74.8	993.9	995.3	997.1
6/06/2025	5.7	11.3	15.7	0.0	0.3	5.0	16.8	51.6	67.8	89.8	987.1	991.3	995.2
7/06/2025	10.7	13.5	18.1	0.0	0.4	5.5	18.3	38.3	54.2	69.1	979.5	983.0	986.9
8/06/2025	6.8	10.7	14.2	0.0	0.6	5.9	24.6	42.6	56.6	68.7	976.9	978.9	980.7
9/06/2025	6.1	8.7	12.9	0.2	0.5	5.5	21.3	47.5	64.8	75.9	973.0	976.0	979.0
10/06/2025	8.0	11.6	16.6	0.2	0.2	3.1	13.2	45.7	62.5	75.2	977.0	980.6	983.9
11/06/2025	7.0	10.2	15.4	0.0	0.0	2.7	8.5	44.4	61.6	72.7	983.5	985.9	989.0
12/06/2025	5.8	9.8	14.3	0.0	0.1	2.4	15.2	55.6	67.3	78.6	988.6	991.0	993.8
13/06/2025	6.5	10.0	14.7	0.0	0.3	5.2	17.4	59.3	73.5	86.9	992.9	994.3	995.5
14/06/2025	7.0	10.8	16.3	0.0	0.2	3.7	13.2	61.6	79.2	93.9	993.7	994.8	996.0
15/06/2025	7.6	11.0	17.6	0.4	0.1	2.4	12.3	43.4	79.9	95.1	992.2	994.4	995.9
16/06/2025	5.1	10.4	16.2	0.2	0.0	2.6	9.0	43.4	69.8	93.5	993.6	995.3	997.2
17/06/2025	6.9	11.7	17.0	0.0	0.2	4.3	15.1	50.3	61.8	79.6	991.5	994.2	996.5
18/06/2025	5.8	10.3	16.2	0.0	0.1	2.3	8.1	39.6	61.0	75.7	995.5	997.5	999.3
19/06/2025	4.3	9.9	16.2	0.0	0.1	2.9	10.8	51.9	71.7	88.8	997.1	998.7	1000.5
20/06/2025	5.3	10.1	16.8	0.0	0.1	1.9	7.4	46.4	73.5	91.0	999.1	1000.9	1002.7
21/06/2025	5.5	11.5	18.3	0.0	0.4	3.0	13.5	47.1	72.4	89.7	1000.8	1002.3	1004.2
22/06/2025	6.6	12.1	19.8	0.0	0.0	4.1	15.6	46.6	71.4	87.7	996.8	999.5	1001.9
23/06/2025	10.3	15.2	20.9	0.0	0.2	5.4	17.1	55.4	68.5	84.6	989.6	993.8	996.8
24/06/2025	13.7	15.9	19.2	3.0	0.6	7.6	24.0	52.2	68.7	90.9	980.5	983.5	989.6
25/06/2025	7.7	11.8	14.9	0.0	0.3	7.0	40.7	44.6	55.1	68.5	979.2	982.6	988.3
26/06/2025	4.7	8.6	13.1	0.0	0.0	3.5	20.3	41.1	57.4	71.0	988.4	997.0	1002.4
27/06/2025	5.0	9.4	14.3	0.0	0.1	3.0	14.1	61.0	70.4	82.4	1001.2	1002.2	1003.7
28/06/2025	6.4	10.8	15.4	0.0	0.1	2.3	8.6	63.2	80.2	93.7	998.1	1000.1	1002.0
29/06/2025	6.8	11.6	18.3	0.0	0.1	3.1	9.3	51.2	78.8	95.5	995.6	997.3	998.6
30/06/2025	6.5	10.5	14.9	0.0	0.2	3.4	10.9	60.5	80.4	94.7	992.5	996.6	999.2
Monthly	4.3	11.3	20.9	5.4	0.0	3.9	40.7	38.3	69.6	98.5	973.0	992.2	1004.2

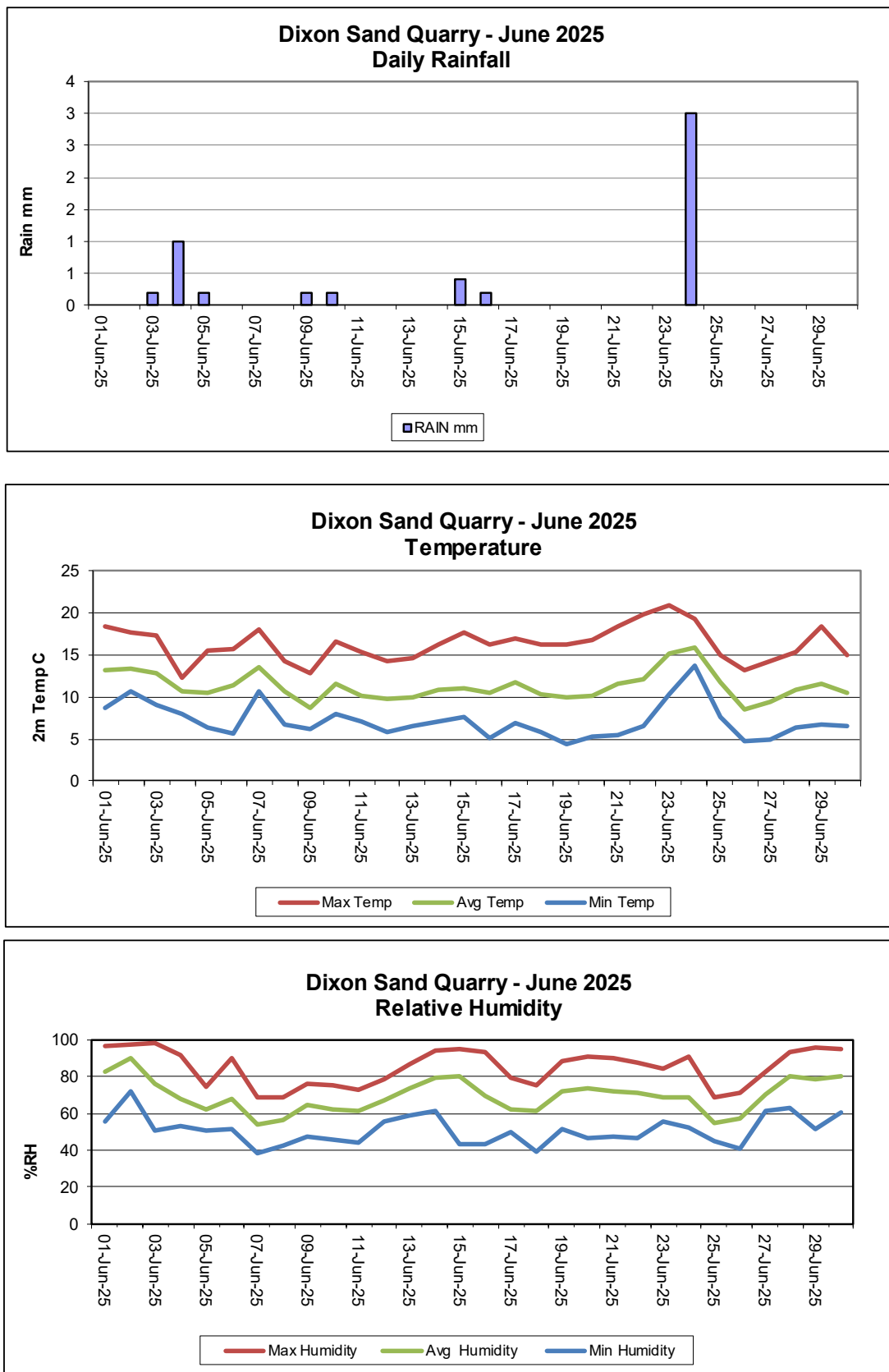


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

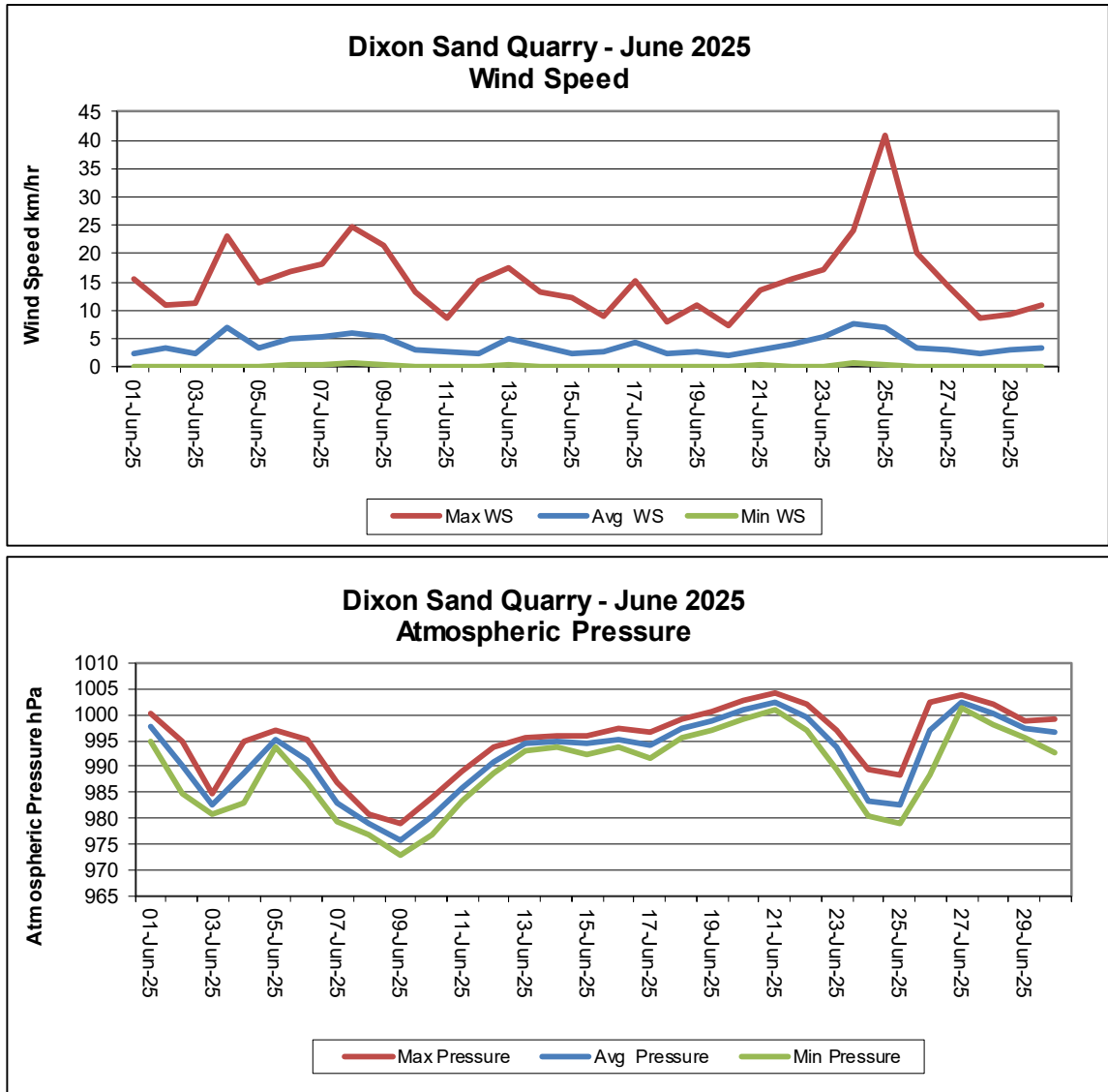


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose JUNE 2025

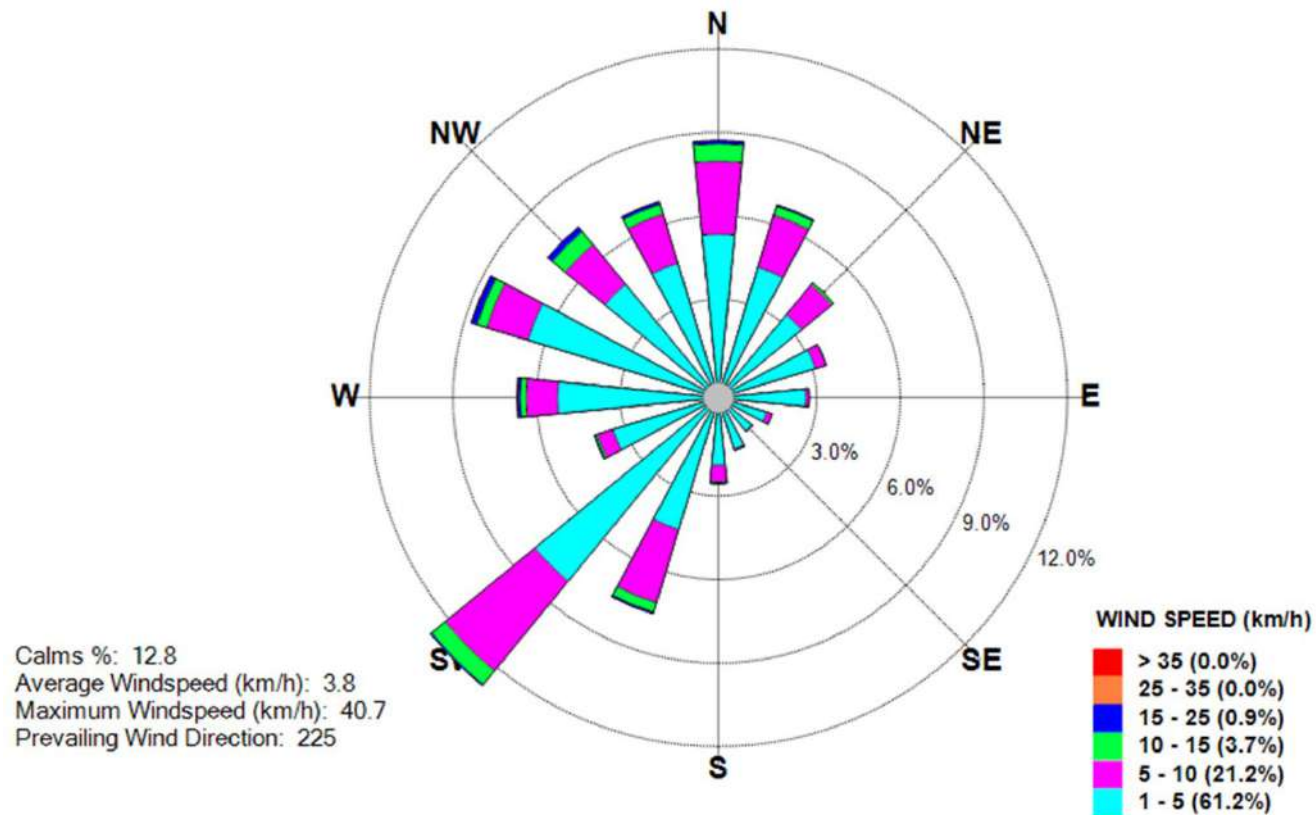


Figure 4: Windrose

Appendix 1
Calibration Documents (when required)

UNCONTROLLED DOCUMENT IF PRINTED



Continuous Air Quality Monthly/Quarterly/Six Monthly/Annual TEOM Maintenance and Calibration – 1400AB



TEOM Client/Site: Dixon Sands / TEOM

Date: 22/7/2025

1. TEOM Data Screen SERIAL No: 1405AB255700503 Firmware: NA

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	Full	Green - Normal	✓	
Date/time	TEOM: 1103 Actual: 1104	Current Date/time correct within 5 minutes	✓	
PM-10 24hr av	15.1	Positive values	✓	
Filter loading PM10	73.0	<80 %	✓	
Frequency PM-10	252.77169	200-300 Hz	✓	
Noise PM-10	0.046	<0.100ug	✓	

Comment: If filter load >80% but <90% and if flows Ok then data is OK

Comments:

2. System Status

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Vacuum pump pressure	0.35	<0.50 atm	✓	
Warnings	None	No Warnings	✓	
If any warnings list:				

Comments:

Data Downloaded: YES/NO(circle)

Technician Name : Corral Melina Signed [Signature]



3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	15.8	-10 to 50 C	✓	
Ambient Dew Point	—	-10 to 50 C	✓	
Ambient Pressure	0.973	0.9-1.1 atm	✓	
Ambient Relative Humidity	—	10-100 %RH	✓	
Cap temperature	50.00	50.00 +/- 0.10 C	✓	
Case temperature	50.00	50.00 +/- 0.10 C	✓	
Main (PM-10) Air Tube temp	50.00	50.00 +/- 0.10 C	✓	

Comments:

4. Instrument Conditions – Flows

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Main (PM-10) Flow rate	3.00	2.82 – 3.18 lpm	✓	
Bypass Flow rate	13.68	12.95 – 14.39 lpm	✓	
Total Flow rate	—	15.67 – 17.67 lpm		

Comments:

Results: (Tick box)

- ☒ There were NO equipment faults found. No action required – (file report)
- ☐ There were faults found (Fails) – Were these fixed on site: YES/NO (circle)
 Any **Fails** that cannot be repaired on site must be reported to CBased:
 Office: 65713334 or email cbased@bigpond.com
 Date faults notified to CBased: _____

Comments/Action Required:



Calibration/Maintenance

1. 1405A: Were Filters replaced YES/NO
 2. PM10 Inlet head cleaned YES/NO
 3. If measurement filters were replaced, confirm stable results after change. Stable particulate results confirmed YES/NO

Channel	Filter Load %	Frequency Hz initial	Frequency check 1min	Frequency check 3min	Frequency check 5min
PM10	18.00	256.55718	256.55677	256.55657	256.55648

Frequency should not drift by more than 0.0010 between readings (if instrument is thermodynamically stable)
 Pass/Fail – if Fail – install new filter and redo stability test.

4. Instrument clock verified (Refer Section 1) YES/NO.
 If Time changed – clock reset OK YES/NO or NA (not changed)
 Comments:

5. Were TEOM in line and rear TEOM filters checked for cleanliness and replaced if necessary. YES/NO.
 Comments if changed:

6. TEOM Cleaned and Air Conditioner checked YES/NO. Air Conditioner settings or operational status: "5.5" Low Cool

Tetralcal Flow/Temp/Pressure Calibrator Serial No: 172357 Refer to calibration corrections for Temperature/Pressure and Flows and apply to all readings.

Quarterly or Six Monthly Calibration**1. Flow Verification – Conducted YES/NO**

PM10 Flow verified Flow l/min 2.85 Error % 6.4 (allowed error <6%) PASS/FAIL

Bypass Flow verified Flow l/min 12.23 Error % 10.5 (allowed error <6%) PASS/FAIL
 If fail then complete a full multipoint recalibration and review previous data from last good flow check. **Comments if Flows recalibrated:**

2. Leak Check – Conducted YES/NO

PM10 actual 0.15 < Limit 0.15

Bypass actual 0.12 < Limit 0.60

Leak check PASS/FAIL – If fail then find leak and retest.

Comments:

Spent some time looking for leak in main flow
 no success



UNCONTROLLED DOCUMENT IF PRINTED

Annual Calibration/Maintenance

1. Temperature and Pressure Calibration – Conducted YES/NO

Reference Temperature: _____ C TEOM Temperature _____ C
if difference +/- 1 C recalibrate sensor. Sensor recalibrated YES/NO

Reference Pressure: _____ atm TEOM Pressure _____ atm
if difference +/- 0.010 atm recalibrate sensor. Sensor recalibrated YES/NO

**Note: Tetralcal measures Atmospheric Pressure in mm Hg or mb or hPa
For mb or hPa divide tetralcal result by 1013.25 to change units to atm.
For mmHg divide tetralcal result by 760 to change units to atm.**

2. Flow Calibration – Conducted YES/NO

PM10

Set point 2.4 Actual: _____
Set point 3.6 Actual: _____
Set point 3.0 Actual: _____ After calibration Final: _____ l/min

BYPASS

Set point 10.9 Actual: _____
Set point 16.4 Actual: _____
Set point 13.67 Actual: _____ After calibration Final: _____ l/min

3. Mass calibration (K0) Verification – Conducted YES/NO

Actual measured K0 = _____ TEOM stated K0 _____ Error %: _____
Allowed Error +/- 2.5%. PASS/FAIL
If Error +/- 2.5% repeat. If confirmed consult manufacturer.
Second Error % = _____ PASS/FAIL. Comments: _____
If second test fails consult manufacturer.

4. Annual Noise check - Conducted YES/NO

Zero filter applied to TEOM and TEOM operated for at least 12 hours:
Start date/time: _____ Finish date/time: _____
Standard deviation of all recorded data (min 30 min averages) = _____ ug/m³
Noise was less than 5ug/m³ YES/NO

5. Maintenance

Air Inlet system cleaned YES/NO

Pump Reconditioned YES/NO

Check Waterproofing YES/NO

Comments:





Meteorological Monitoring Maintenance and Calibration

Maintenance and Calibration as per CBased Environmental Method M202

Client: <i>Dixon Land</i>	Site Name: <i>AWS of TEOM</i>
Date: <i>22.7.25</i>	Time: <i>1020</i>
General Climatic Conditions: <i>8/8 Cloud, low sun & cool light breeze</i>	
Latitude: <i>-33° 27' 16"</i>	Longitude: <i>150° 59' 36"</i>
Note: Contact office to confirm coordinates if required. Coordinates required to determine magnetic declination.	

1. Physical Maintenance

Item	Yes (Pass)	No (Fail)	Comments
<u>Grass / Vegetation Impacts</u>			
Compound Grass height <10cm	✓		
<u>Ground Anchor / Guy Wires / Mast Condition</u>			
Bottom guy wires tight (correct tension = 35-50mm deflection, with only moderate hand force at 1.5 metres up the guy wire)	NA		Fixed mast
Top Guy wires tensioned (correct tension = 60-75mm deflection, with only moderate hand force at 1.5 metres up the guy wire)	NA		Fixed mast
Mast Vertical and in good condition	✓		
Ground anchors/star pickets tight in ground	NA		
Guy Wires insignificant corrosion	NA		
Ground anchors/D shackles/ winders insignificant corrosion	NA		
Bolts/hinge points in mast are secure	NA		
<u>Cables / Connectors / Logger Cabinet / Solar Panel</u>			
Cables attached to mast/guy wires via ties are secure	NA		Cable needs to be free
Insignificant corrosion to plugs/connectors	✓		
No water ingress in logger/battery cabinet	✓		
Wiring/plugs in cabinet OK, Logger OK	✓		
Battery terminals and condition OK	NA		Battery Volts = 240 Supply
Battery volts (charging >13V, not charging >12V)	NA		
Solar panel undamaged and clean	NA		
Check for ants/insects and install new ant bait station in enclosure	✓		



Item	Yes (Pass)	No (Fail)	Comments
<u>Sensor Maintenance / Checks</u>			
Recent data checked and OK / Logging data OK, review sensor data and station battery voltage.	✓		
<u>Wind Speed/Direction</u>			
Wind direction aligned to ± 3 degrees of: True North/Magnetic North (strike out N/A) Refer: https://geomagnetism.ga.gov.au/agrf-calculations/agrf-form#magfield	✓		Magnetic Declination: 12.62° Compass Bearing: 168° Looking: North South
Anemometer/wind vane moving freely (analogue sensors)	NA.		Alta sonic
Mechanical sensors are inaudible (audible bearing noises may indicate sensor issues)	NA.		
<u>Temperature</u>			
Temperature sensor(s), and associated radiation shield(s) inspected and cleaned	✓		Sensor only new. Inspect from ground only.
Fan(s) on aspirated radiation shields confirmed running	NA.		
Sensor shields cleaned	NA.		No 2m sensors. Did not lower mast.
<u>Humidity</u>			
Humidity sensor, and associated radiation shield inspected and cleaned	NA.		Inspect from ground.
<u>Barometric Pressure</u>			
Barometric sensor inspected, and any vents for sensor checked and cleared	NA.		Inspect from ground.
<u>Solar Radiation</u>			
Solar radiation sensor inspected	NA.		
Solar radiation sensor cleaned	NA.		
Solar radiation sensor alignment OK	NA.		
<u>Rainfall/Precipitation</u>			
Rain gauge checked for blockages and cleaned if required	✓		
Rain gauge level on arrival	✓		
Rain gauge re-levelled	NA.		Fine adjust only.



2. Calibration Equipment / Transfer Standard Details

Wind Speed, Wind Direction		Temperature, Humidity & Pressure	
Manufacturer:	Vaisala	Manufacturer:	Vaisala
Model:	WXT536	Model:	WXT536 (PTU Module)
Serial Number:	W4710639	Serial Number:	T1910754
Calibration Date:	17/12/2024	Calibration Date:	18/3/2025
Calibration Expires:	17/12/2026	Calibration Expires:	18/3/2027

Precipitation		Solar Radiation	
Manufacturer:	Hydrological Services	Manufacturer:	EKO Instruments
Model:	FCD	Model:	MS-80SH
Serial Number:	FCD001	Serial Number:	S24083856
Calibration Date:	7/3/2025	Calibration Date:	23/1/2025
Calibration Expires:	7/3/2030	Calibration Expires:	23/1/2030

1. Wind Sensor Precision Check

Sensor mounting height, 10m or Other (specify):

Wind Speed Sensor

Calibration Point	Transfer Standard, km/hr or _____	Sensor under test, km/hr or _____	Difference, km/hr or _____
1	3.50	3.31	-0.19
2	3.40	3.56	0.16
3	3.20	3.20	0.00
4	4.80	4.86	0.06
5	2.30	2.44	0.14
6	4.50	4.57	0.07
Average	3.66		0.04
Determination of Result Allowable accuracy (average of difference) $\pm (0.72\text{km/hr} + 5\% \text{ of observed})$ i.e. $\pm (0.2\text{m/s} + 5\% \text{ of observed})$ (Refer Section 5-1 of USEPA 454/R-99-005)			Calculate Allowable: <u>0.18</u> Result: <u>PASS</u> / FAIL

Wind Direction Sensor

Calibration Point	Transfer Standard, degrees	Sensor under test, degrees	Difference, degrees
1	032	031	-1
2	286	287	1
3	330	331	1
4	321	320	-1
5	030	031	1
6	034	035	1
Average			0.33
Determination of Result Allowable accuracy (average of difference) ± 5 degrees (Refer Section 5-1 of USEPA 454/R-99-005)			Result: <u>PASS</u> / FAIL



2. Temperature Sensor Precision Check

Temperature Sensor # 1

Sensor mounting height: 2m, 10m or Other (specify):

Operational Precision Check 1430

Time Interval	Calibration Point	Transfer Standard, °C	Sensor under test, °C	Difference, °C
1 min	1	16.90	17.30	0.40
2 min	2	16.90	17.30	0.40
3 min	3	17.00	17.40	0.40
4 min	4	16.80	17.20	0.40
5 min	5	16.80	17.20	0.40
Average				0.40
Determination of Result				Result: PASS/ FAIL
Acceptable tolerance is $\pm 0.5^{\circ}\text{C}$ (Refer Section 5-1 of USEPA 454/R-99-005)				

Temperature Sensor # 2 (If Present)

Sensor mounting height: 2m, 10m or Other (specify):

Operational Precision Check

Time Interval	Calibration Point	Transfer Standard, °C	Sensor under test, °C	Difference, °C
1 min	1	N	A	
2 min	2			
3 min	3			
4 min	4			
5 min	5			
Average				
Determination of Result				Result: PASS / FAIL
Acceptable tolerance is $\pm 0.5^{\circ}\text{C}$ (Refer Section 5-1 of USEPA 454/R-99-005)				



3. Humidity Sensor Precision Check

Operational Precision Check

Precision Test Start Time: 1420				
Time Interval	Calibration Point	Transfer Standard, % RH	Sensor under test, % RH	Difference, % RH
5 min	1	67.10	67.30	0.20
10 min	2	67.50	67.90	0.40
15 min	3	67.10	67.20	0.10
Average				0.23
Determination of Result Allowable Relative Humidity (average of difference) not specified in USEPA 454/R-99-005. Using AS3580.14:2014 which specifies $\pm 5\%$ (when RH < 35%) and $\pm 7\%$ (when RH $\geq 35\%$),				Result: <u>PASS</u> / FAIL

4. Solar Radiation Sensor Precision Check

Operational Precision Check

Calibration Point	Transfer Standard, W/m ²	Sensor under test, W/m ²	Difference, W/m ²
1			
2			
3			
4			
5			
6			
Average			
Determination of Result Allowable Solar Radiation (average of difference) $\pm 5\%$ of observed (Refer Section 5-1 of USEPA 454/R-99-005) or $\pm 50 \text{ W/m}^2$ (Refer Section 5.5.2.3 of AS/NZS 3580.14)			Calculate Allowable: _____ Result: PASS / FAIL

5. Barometric Pressure Operational Precision Check

Operational Precision Check

Time Interval	Calibration Point	Transfer Standard, hPa	Sensor under test, hPa	Difference, hPa
0 min	1	987.70	987.40	0.30
15 min	2	987.70	987.40	0.30
30 min	3	987.70	987.40	0.30
45 min	4	987.60	987.30	0.30
60 min	5	987.70	987.40	0.30
Average				0.30
Determination of Result Allowable difference: $\pm 3 \text{ mb}$ ($\pm 3 \text{ hPa}$) (average difference) (Refer Section 5-1 of USEPA 454/R-99-005)				Result: <u>PASS</u> / FAIL



6. Precipitation/Rainfall Operational Precision Check – In Situ

Sensor Under Test

Manufacturer:	Hydrological Services
Model:	7B4 S/N: 12-468
Resolution / Tipping bucket size:	(circle) 0.2mm 0.5mm or Other (specify):
Catch diameter:	(circle) 200mm or Other (specify):

Maintenance

Item	Completed
Record "As Found" details of rain gauge, are any conditions present that would affect data integrity? No. Comments: slight debris build up in catchment bucket.	✓
Disassemble the rain gauge and clean thoroughly	✓
Check rain gauge is level	✓
Re-level if needed Comments if unable to re-level:	✓
Reassemble the rain gauge and check to confirm no leaks through funnel mechanism	✓

Operational Precision Check

Precision Test Start Time: 1500		
Expected	Recorded	Difference
104 tips 20.8 mm	99 tips 19.8 mm	1mm / 5 tips
Determination of Result Allowable difference: $\pm 10\%$ or 0.5mm		Result: PASS / FAIL
Comments:		
Tips/mm added during cleaning/test preparation: 0		
Total rainfall volume to be removed from daily rain records due to maintenance and precision test completed: 19.8 mm		



Maintenance Summary	Yes	No	Comments
There were NO equipment faults found. No action required – (file report)	✓		
There were faults found (Fails) – Were these fixed on site?			

Any Faults / Fails that cannot be repaired on site must be reported to CBased:
Office: (02) 65713334 or email support@cbased.com.au
Date faults notified to CBased: _____
Comments/Action Taken/Action Recommended:
(If sensors are replaced - record serial numbers and details of both the removed and installed sensors and attach calibration certificates)

Specific Comments on equipment "as found":

Specific Comments on equipment "as left":

NB: CBased Environmental completes maintenance, calibration and diagnostic checks on a six monthly basis as per Section 8.3.5 of USEPA 454/R-99-005, it is the Clients responsibility to complete daily remote operational checks and weekly onsite inspections/maintenance of the meteorological station.

Completed By:

Technician Name(s): <i>A Lewis</i>	Signed: <i>A</i>
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Appendix C – Groundwater and Surface Water Monitoring Results

Groundwater Quality

Report Number: 17150

Date Issued: 16/12/2024

Revision Number: 00

Site/Job: Old Northern Rd 6 Mnth Ground Water

Client: Dixon Sand Pty Ltd
Address: PO Box 4019
Pitt Town NSW 2756
Contact: David Dixon

The following groundwater sample(s) were received on 6/12/2024

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
BH1	6/12/2024	17150/1	Water	
BH2	6/12/2024	17150/2	Water	
BH3	6/12/2024	17150/3	Water	
BH6	6/12/2024	17150/4	Water	
BH7	6/12/2024	17150/5	Water	
BH8	6/12/2024	17150/6	Water	
BH9	6/12/2024	17150/7	Water	
MW1	6/12/2024	17150/8	Water	
MW2	6/12/2024	17150/9	Water	
MW3	6/12/2024	17150/10	Water	
MW5	6/12/2024	17150/11	Water	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 16/12/2024.

Test Report Number: 17150

Date Issued: 16/12/2024

Revision No: 00

Results

Field Analysis		Lab ID Sample Date Sample ID Units	17150/1 6/12/2024 BH1	17150/2 6/12/2024 BH2	17150/3 6/12/2024 BH3	17150/4 6/12/2024 BH6	17150/5 6/12/2024 BH7
	Method						
Depth to Water	AS5667.11	m(bTORef)	59.75	35.26	31.90	30.61	21.06
Temperature	Temp	°C	22.6	21.1	21.9	20.5	21.5
pH	APHA 4500-H B	pH Units	6.4	6.1	5.8	5.2	4.9
Electrical Conductivity	APHA 2510 B	µS/cm 25°C	203	264	188	129	248

Field Analysis		Lab ID Sample Date Sample ID Units	17150/6 6/12/2024 BH8	17150/7 6/12/2024 BH9	17150/8 6/12/2024 MW1	17150/9 6/12/2024 MW2	17150/10 6/12/2024 MW3
	Method						
Depth to Water	AS5667.11	m(bTORef)	26.32	33.51	12.63	17.58	23.25
Temperature	Temp	°C	19.6	21.3	20.6	18.8	20.5
pH	APHA 4500-H B	pH Units	3.9	5.6	4.1	3.8	5.5
Electrical Conductivity	APHA 2510 B	µS/cm 25°C	313	291	162	518	126

Field Analysis		Lab ID Sample Date Sample ID Units	17150/11 6/12/2024 MW5
	Method		
Depth to Water	AS5667.11	m(bTORef)	6.94
Temperature	Temp	°C	21.1
pH	APHA 4500-H B	pH Units	4.3
Electrical Conductivity	APHA 2510 B	µS/cm 25°C	179

Solids		Lab ID Sample Date Sample ID Units	17150/1 6/12/2024 BH1	17150/2 6/12/2024 BH2	17150/3 6/12/2024 BH3	17150/4 6/12/2024 BH6	17150/5 6/12/2024 BH7
	Method						
Total Dissolved Solids	AS3550.4	mg/L	110	140	84	64	110

Solids		Lab ID Sample Date Sample ID Units	17150/6 6/12/2024 BH8	17150/7 6/12/2024 BH9	17150/8 6/12/2024 MW1	17150/9 6/12/2024 MW2	17150/10 6/12/2024 MW3
	Method						
Total Dissolved Solids	AS3550.4	mg/L	130	140	54	250	36

Solids		Lab ID Sample Date Sample ID Units	17150/11 6/12/2024 MW5
	Method		
Total Dissolved Solids	AS3550.4	mg/L	36



Date Tested		Lab ID Sample Date Sample ID Units	17150/1 6/12/2024 BH1	17150/2 6/12/2024 BH2	17150/3 6/12/2024 BH3	17150/4 6/12/2024 BH6	17150/5 6/12/2024 BH7
	Method						
Date Tested - Field	--	--	06/12/2024	06/12/2024	06/12/2024	06/12/2024	06/12/2024
Date Tested - TDS	AS3550.4	--	13/12/2024	13/12/2024	13/12/2024	13/12/2024	13/12/2024

Date Tested		Lab ID Sample Date Sample ID Units	17150/6 6/12/2024 BH8	17150/7 6/12/2024 BH9	17150/8 6/12/2024 MW1	17150/9 6/12/2024 MW2	17150/10 6/12/2024 MW3
	Method						
Date Tested - Field	--	--	06/12/2024	06/12/2024	06/12/2024	06/12/2024	06/12/2024
Date Tested - TDS	AS3550.4	--	13/12/2024	13/12/2024	13/12/2024	13/12/2024	13/12/2024

Date Tested		Lab ID Sample Date Sample ID Units	17150/11 6/12/2024 MW5
	Method		
Date Tested - Field	--	--	06/12/2024
Date Tested - TDS	AS3550.4	--	13/12/2024

Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Where applicable, results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 17150

Date Issued: 16/12/2024

Revision No: 00

Sampling Conditions: Cloudy, 29 - 35 °C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
17150/1	BH1		T & D.Walker	6/12/2024 10:47 AM	AS5667.11, Bail	AS5667.1
17150/2	BH2		T & D.Walker	6/12/2024 12:42 PM	AS5667.11, Pump	AS5667.1
17150/3	BH3		T & D.Walker	6/12/2024 12:21 PM	AS5667.11, Pump	AS5667.1
17150/4	BH6		T & D.Walker	6/12/2024 12:06 PM	AS5667.11, Bail	AS5667.1
17150/5	BH7		T & D.Walker	6/12/2024 1:34 PM	AS5667.11, Pump	AS5667.1
17150/6	BH8		T & D.Walker	6/12/2024 2:06 PM	AS5667.11, Bail	AS5667.1
17150/7	BH9		T & D.Walker	6/12/2024 1:10 PM	AS5667.11, Pump	AS5667.1
17150/8	MW1		T & D.Walker	6/12/2024 1:52 PM	AS5667.11, Bail	AS5667.1
17150/9	MW2		T & D.Walker	6/12/2024 11:09 AM	AS5667.11, Bail	AS5667.1
17150/10	MW3		T & D.Walker	6/12/2024 11:46 AM	AS5667.11, Bail	AS5667.1
17150/11	MW5		T & D.Walker	6/12/2024 11:08 AM	AS5667.11, Bail	AS5667.1

Lab ID	Client Sample Reference	Sampling Observations
17150/1	BH1	
17150/2	BH2	
17150/3	BH3	
17150/4	BH6	
17150/5	BH7	
17150/6	BH8	
17150/7	BH9	
17150/8	MW1	
17150/9	MW2	
17150/10	MW3	
17150/11	MW5	

Sampling procedures have been approved and report finalised on 16/12/2024.

Where method is "unknown" sampling procedures are not endorsed

Well Parameters:

Client: Dixon Sand Pty Ltd

Site/Job: Old Northern Rd 6 Mnth Ground Water

Well ID	GPS-Easting	GPS-Northing	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
BH1	312290	6297039			
BH2	313429	6297202			
BH3	313808	6297093			
BH6	313153	6296833			
BH7	313097	6296495			
BH8	313435	6296617			
BH9	313294	6296504			
MW1	313092	6296499			
MW2	313417	6296733			
MW3	313161	6296838			
MW5	312460	6296903			

Well ID	Date Well Measured	Monument Height (TOM) (m)	Depth to Bottom (bTOM) (m)	Recharge Rate	Approximate Volume (L)
BH1	2/12/2019	0.68	>60	Slow	unkown
BH2	2/12/2019	0.57	>60	slow	unkown
BH3	2/12/2019	0.56	>60	Slow	Unkown
BH6	2/12/2019	0.52	>60	Slow	Unkown
BH7	2/12/2019	0.53	>60	Slow	Unknown
BH8	2/12/2019	0.73	27.53	Slow	2
BH9	2/12/2019	0.64	>60	Medium	Unkown
MW1	2/12/2019	0.28	15.53	Medium	12
MW2	2/12/2019	0.45	24.53	Slow	7.5
MW3	2/12/2019	0.88	34.57	Slow	2.5
MW5	2/12/2019	0.70	21.19	Slow	28

Note: NATA accreditation does not cover information provided in this section

*Where indicated AHD from ground level (m) estimated based on handheld GPS

Report Number: 18238

Date Issued: 26/06/2025

Revision Number: 00

Site/Job: Old Northern Rd Groundwater- 6 Monthly

Client: Dixon Sand Pty Ltd
Address: PO Box 4019
Pitt Town NSW 2756
Contact: David Dixon

The following groundwater sample(s) were received on 20/06/2025

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
BH1	20/06/2025	18238/1	Water	
BH2	20/06/2025	18238/2	Water	
BH3	20/06/2025	18238/3	Water	
BH6	20/06/2025	18238/4	Water	
BH7	20/06/2025	18238/5	Water	
BH8	20/06/2025	18238/6	Water	
BH9	20/06/2025	18238/7	Water	
MW1	20/06/2025	18238/8	Water	
MW2	20/06/2025	18238/9	Water	
MW3	20/06/2025	18238/10	Water	
MW5	20/06/2025	18238/11	Water	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 26/06/2025.

Test Report Number: 18238

Date Issued: 26/06/2025

Revision No: 00

Results

Well Parameters		Lab ID Sample Date Sample ID Units	18238/1 20/06/2025 BH1	18238/2 20/06/2025 BH2	18238/3 20/06/2025 BH3	18238/4 20/06/2025 BH6	18238/5 20/06/2025 BH7
Depth Reference Point		--	TOM	TOM	TOM	TOM	TOM
Depth to Water	AS5667.11	m(bTOLRef)	60.03	35.81	32.05	31.20	21.57

Well Parameters		Lab ID Sample Date Sample ID Units	18238/6 20/06/2025 BH8	18238/7 20/06/2025 BH9	18238/8 20/06/2025 MW1	18238/9 20/06/2025 MW2	18238/10 20/06/2025 MW3
Depth Reference Point		--	TOM	TOM	TOM	TOM	TOM
Depth to Water	AS5667.11	m(bTOLRef)	26.48	33.90	12.88	18.97	23.12

Well Parameters		Lab ID Sample Date Sample ID Units	18238/11 20/06/2025 MW5
Depth Reference Point		--	TOM
Depth to Water	AS5667.11	m(bTOLRef)	6.09

Field Analysis		Lab ID Sample Date Sample ID Units	18238/1 20/06/2025 BH1	18238/2 20/06/2025 BH2	18238/3 20/06/2025 BH3	18238/4 20/06/2025 BH6	18238/5 20/06/2025 BH7
Temperature	Temp	°C	17.2	18.1	17.8	17.3	18.2
pH	APHA 4500-H B	pH Units	6.3	6.0	5.8	5.1	4.7
Electrical Conductivity	APHA 2510 B	µS/cm 25°C	178	273	197	137	<50.0

Field Analysis		Lab ID Sample Date Sample ID Units	18238/6 20/06/2025 BH8	18238/7 20/06/2025 BH9	18238/8 20/06/2025 MW1	18238/9 20/06/2025 MW2	18238/10 20/06/2025 MW3
Temperature	Temp	°C	16.8	17.1	18.6	16.9	17.4
pH	APHA 4500-H B	pH Units	3.8	5.7	4.1	3.7	6.2
Electrical Conductivity	APHA 2510 B	µS/cm 25°C	333	310	174	608	165

Field Analysis		Lab ID Sample Date Sample ID Units	18238/11 20/06/2025 MW5
Temperature	Temp	°C	18.2
pH	APHA 4500-H B	pH Units	5.3
Electrical Conductivity	APHA 2510 B	µS/cm 25°C	173



Solids		Lab ID Sample Date Sample ID Units	18238/1 20/06/2025 BH1	18238/2 20/06/2025 BH2	18238/3 20/06/2025 BH3	18238/4 20/06/2025 BH6	18238/5 20/06/2025 BH7
	Method						
Total Dissolved Solids	AS3550.4	mg/L	120	160	120	100	120

Solids		Lab ID Sample Date Sample ID Units	18238/6 20/06/2025 BH8	18238/7 20/06/2025 BH9	18238/8 20/06/2025 MW1	18238/9 20/06/2025 MW2	18238/10 20/06/2025 MW3
	Method						
Total Dissolved Solids	AS3550.4	mg/L	140	170	82	300	110

Solids		Lab ID Sample Date Sample ID Units	18238/11 20/06/2025 MW5
	Method		
Total Dissolved Solids	AS3550.4	mg/L	86

Date Tested		Lab ID Sample Date Sample ID Units	18238/1 20/06/2025 BH1	18238/2 20/06/2025 BH2	18238/3 20/06/2025 BH3	18238/4 20/06/2025 BH6	18238/5 20/06/2025 BH7
	Method						
Date Tested - Field	--	--	20/06/2025	20/06/2025	20/06/2025	20/06/2025	20/06/2025
Date Tested - TDS	AS3550.4	--	24/06/2025	24/06/2025	24/06/2025	24/06/2025	25/06/2025

Date Tested		Lab ID Sample Date Sample ID Units	18238/6 20/06/2025 BH8	18238/7 20/06/2025 BH9	18238/8 20/06/2025 MW1	18238/9 20/06/2025 MW2	18238/10 20/06/2025 MW3
	Method						
Date Tested - Field	--	--	20/06/2025	20/06/2025	20/06/2025	20/06/2025	20/06/2025
Date Tested - TDS	AS3550.4	--	25/06/2025	25/06/2025	25/06/2025	25/06/2025	25/06/2025

Date Tested		Lab ID Sample Date Sample ID Units	18238/11 20/06/2025 MW5
	Method		
Date Tested - Field	--	--	20/06/2025
Date Tested - TDS	AS3550.4	--	25/06/2025

Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Guideline applied - No Limits.

Results in **bold** indicate an exceedance of the applied guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Field Analysis conducted on site as listed

Location Analysed : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 18238

Date Issued: 26/06/2025

Revision No: 00

Sampling Conditions: Fine 11 - 17 °C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
18238/1	BH1		T & D.Walker	20/06/2025 10:53 AM	AS5667.11, Bail	AS5667.1
18238/2	BH2		T & D.Walker	20/06/2025 12:06 PM	AS5667.11, Pump	AS5667.1
18238/3	BH3		T & D.Walker	20/06/2025 11:42 AM	AS5667.11, Pump	AS5667.1
18238/4	BH6		T & D.Walker	20/06/2025 12:46 PM	AS5667.11, Bail	AS5667.1
18238/5	BH7		T & D.Walker	20/06/2025 1:51 PM	AS5667.11, Pump	AS5667.1
18238/6	BH8		T & D.Walker	20/06/2025 2:23 PM	AS5667.11, Bail	AS5667.1
18238/7	BH9		T & D.Walker	20/06/2025 1:29 PM	AS5667.11, Pump	AS5667.1
18238/8	MW1		T & D.Walker	20/06/2025 2:05 PM	AS5667.11, Bail	AS5667.1
18238/9	MW2		T & D.Walker	20/06/2025 1:12 PM	AS5667.11, Bail	AS5667.1
18238/10	MW3		T & D.Walker	20/06/2025 12:31 PM	AS5667.11, Bail	AS5667.1
18238/11	MW5		T & D.Walker	20/06/2025 11:19 AM	AS5667.11, Bail	AS5667.1

Lab ID	Client Sample Reference	Sampling Observations
18238/1	BH1	Unable to purge sufficiently
18238/2	BH2	
18238/3	BH3	
18238/4	BH6	
18238/5	BH7	
18238/6	BH8	
18238/7	BH9	
18238/8	MW1	
18238/9	MW2	
18238/10	MW3	
18238/11	MW5	

Sampling procedures have been approved and report finalised on 26/06/2025.

Where method is "unknown" sampling procedures are not endorsed

Well Parameters:

Client: Dixon Sand Pty Ltd

Site/Job: Old Northern Rd Groundwater- 6 Monthly

Well ID	GPS-Easting	GPS-Northing	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
BH1	312290	6297039			
BH2	313429	6297202			
BH3	313808	6297093			
BH6	313153	6296833			
BH7	313097	6296495			
BH8	313435	6296617			
BH9	313294	6296504			
MW1	313092	6296499			
MW2	313417	6296733			
MW3	313161	6296838			
MW5	312460	6296903			

Well ID	Date Well Measured	Reference Point	Reference Point Height (m)	Depth to Bottom (m)	Recharge Rate	Approximate Volume (L)
BH1	2/12/2019	TOM	0.68	>60	Slow	unkown
BH2	2/12/2019	TOM	0.57	>60	slow	unkown
BH3	2/12/2019	TOM	0.56	>60	Slow	Unkown
BH6	2/12/2019	TOM	0.52	>60	Slow	Unkown
BH7	2/12/2019	TOM	0.53	>60	Slow	Unknown
BH8	2/12/2019	TOM	0.73	27.53	Slow	2
BH9	2/12/2019	TOM	0.64	>60	Medium	Unkown
MW1	2/12/2019	TOM	0.28	15.53	Medium	12
MW2	2/12/2019	TOM	0.45	24.53	Slow	7.5
MW3	2/12/2019	TOM	0.88	34.57	Slow	2.5
MW5	2/12/2019	TOM	0.70	21.19	Slow	28

Note: NATA accreditation does not cover information provided in this section

*Where indicated AHD from ground level (m) estimated based on handheld GPS
Survey Data provided by client.

Surface Water Quality



CERTIFICATE OF ANALYSIS

Work Order	: ES2433983	Page	: 1 of 3
Client	: DIXON SAND PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: HUNNY CHURCHER	Contact	: Customer Services ES
Address	: 4610 Old Northern Road Maroota	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 4566 8348	Telephone	: +61-2-8784 8555
Project	: Old Northern Road Quarry	Date Samples Received	: 17-Oct-2024 14:12
Order number	: ----	Date Analysis Commenced	: 17-Oct-2024
C-O-C number	: ----	Issue Date	: 21-Oct-2024 12:47
Sampler	: Melissa Mass		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 2		
No. of samples analysed	: 2		



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Dian Dao	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions – Chloride, Alkalinity and Sulfate; and Major Cations – Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Page : 3 of 3
 Work Order : ES2433983
 Client : DIXON SAND PTY LTD
 Project : Old Northern Road Quarry



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				SW19	Cons Hill	----	----	----
Sampling date / time				24-Sep-2024 11:15	24-Sep-2024 11:25	----	----	----
Compound	CAS Number	LOR	Unit	ES2433983-001	ES2433983-002	-----	-----	-----
Result				Result	Result	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	4.55	6.47	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	208	134	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	127	95	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	12	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	3.2	14.6	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	5	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	<1	5	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	8	9	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	28	28	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	2	2	----	----	----
Magnesium	7439-95-4	1	mg/L	7	2	----	----	----
Sodium	7440-23-5	1	mg/L	17	18	----	----	----
Potassium	7440-09-7	1	mg/L	2	7	----	----	----
EN055: Ionic Balance								
∅ Total Anions	----	0.01	meq/L	0.96	1.08	----	----	----
∅ Total Cations	----	0.01	meq/L	1.47	1.23	----	----	----



CERTIFICATE OF ANALYSIS

Work Order : **ES2441415**

Client : **DIXON SAND PTY LTD**

Contact : **HUNNY CHURCHER**

Address : 4610 Old Northern Road
Maroota

Telephone : 02 4566 8348

Project : **ONR**

Order number : ----

C-O-C number : ----

Sampler : **Melissa Mass**

Site : ----

Quote number : **EN/333**

No. of samples received : **1**

No. of samples analysed : **1**

Page : 1 of 2

Laboratory : Environmental Division Sydney

Contact : Customer Services ES

Address : 277-289 Woodpark Road Smithfield NSW Australia 2164

Telephone : +61-2-8784 8555

Date Samples Received : 18-Dec-2024 11:40

Date Analysis Commenced : 18-Dec-2024

Issue Date : 24-Dec-2024 11:27



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories

Position

Accreditation Category

Ankit Joshi

Senior Chemist - Inorganics

Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SW19	----	----	----	----
			Sampling date / time	18-Dec-2024 07:30	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2441415-001	-----	-----	-----	-----
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.28	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	147	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	9	----	----	----	----



CERTIFICATE OF ANALYSIS

Work Order	: ES2506066	Page	: 1 of 2
Client	: DIXON SAND PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: HUNNY CHURCHER	Contact	: Customer Services ES
Address	: 4610 Old Northern Road Maroota	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 4566 8348	Telephone	: +61-2-8784 8555
Project	: ONR	Date Samples Received	: 04-Mar-2025 10:35
Order number	: ----	Date Analysis Commenced	: 04-Mar-2025
C-O-C number	: ----	Issue Date	: 11-Mar-2025 11:43
Sampler	: MELISSA MASS		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 1		
No. of samples analysed	: 1		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

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 LOR = Limit of reporting
 ^ = This result is computed from individual analyte detections at or above the level of reporting
 ø = ALS is not NATA accredited for these tests.
 ~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Sample ID

				SW19	----	----	----	----
Sampling date / time				04-Mar-2025 07:50	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2506066-001	-----	-----	-----	-----
Result					----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.30	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	150	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	76	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	155	----	----	----	----



CERTIFICATE OF ANALYSIS

Work Order : **ES2517731**
Client : **DIXON SAND PTY LTD**
Contact : **HUNNY CHURCHER**
Address : **4610 Old Northern Road**
Maroota
Telephone : **02 4566 8348**
Project : **Old Northern Rd Quarry**
Order number : **----**
C-O-C number : **----**
Sampler : **Melissa Mass**
Site : **----**
Quote number : **EN/333**
No. of samples received : **1**
No. of samples analysed : **1**

Page : **1 of 2**
Laboratory : **Environmental Division Sydney**
Contact : **Customer Services ES**
Address : **277-289 Woodpark Road Smithfield NSW Australia 2164**
Telephone : **+61-2-8784 8555**
Date Samples Received : **13-Jun-2025 12:30**
Date Analysis Commenced : **13-Jun-2025**
Issue Date : **19-Jun-2025 10:44**



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 ^ = This result is computed from individual analyte detections at or above the level of reporting
 ø = ALS is not NATA accredited for these tests.
 ~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Sample ID

				SW19	----	----	----	----
Sampling date / time				13-Jun-2025 09:15	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2517731-001	-----	-----	-----	-----
Result					----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	4.47	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	205	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	0.7	----	----	----	----

Discharge Point – Water Quality

(No planned discharge during this reporting period)

Appendix D – Noise Monitoring Reports

Dixon Sand Pty Ltd

Old Northern Road Quarry, Maroota

Noise monitoring report
December 2024

Doc no. 19020-NV-RP-18-0





Dixon Sand Pty Ltd
Old Northern Road Quarry, Maroota

Title	Noise monitoring report
Document no.	19020-NV-RP-18-0
Revision	0
Date	11 December 2024
Author	James Daramola
Reviewer	John Hutchison

Hutchison Weller Pty Ltd
ABN 37 001 024 095
13/357 Military Road
Mosman NSW 2008

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Revision history

0	1 May 2024	Report issued to client
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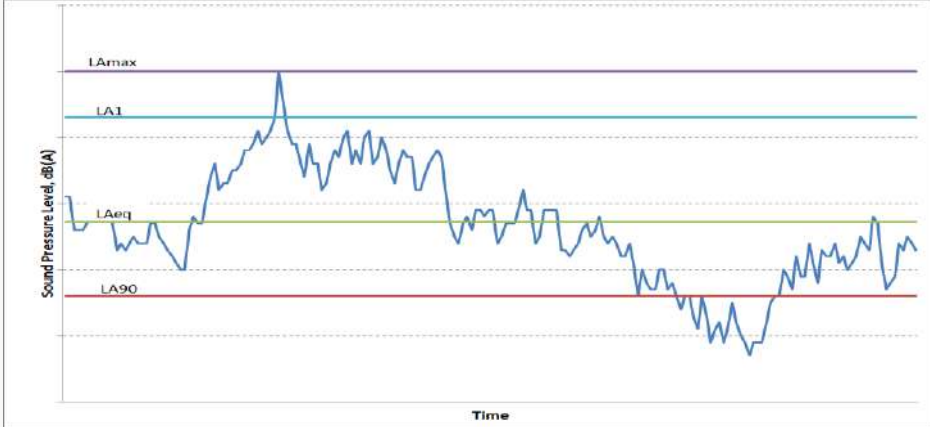
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Definition of terms

Background noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation.
Decibel (dB)	A measure of sound equivalent to 20 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure, and 10 times the logarithm (to base 10) of the ratio of a given sound power to a reference power.
dB(A)	Unit used to measure 'A-weighted' sound pressure levels. A-weighting is an adjustment made to sound-level measurement to approximate the response of the human ear.
dB(C)	Unit used to measure 'C-weighted' sound pressure levels, an adjustment made to sound level to approximate low frequency noise between 10 Hz and 200 Hz.
EPA	Environment Protection Authority
Extraneous noise	Noise resulting from activities that are not typical of the area such as construction, and traffic generated by holiday periods or special events such as concerts or sporting events. Normal daily traffic is not considered to be extraneous.
Noise level statistics	L_{A90} – The A-weighted sound pressure level exceeded 90% of the monitoring period. This is considered to represent the background noise. L_{Aeq} – The equivalent continuous A-weighted noise level—the level of noise equivalent to the energy average of noise levels occurring over a measurement period. L_{A1} – The A-weighted sound pressure level exceeded 1% of the monitoring period. L_{Amax} – The maximum A-weighted noise level associated with the measurement period. 
RBL	The Rating Background Level for each period is the medium value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period (day, evening and night)
Receiver	The land use at which noise is heard
SLM	Sound Level Meter
Sound Power Level (SWL)	The A-weighted sound power level is a logarithmic ratio of the acoustic power output of a source relative to 10^{-12} watts and expressed in decibels. Sound power level is calculated from measured sound pressure levels and represents the level of total sound power radiated by a sound source.
Sound Pressure Level (SPL)	This is the level of noise, usually expressed in dB(A), as measured by a standard sound level meter (SLM) with a pressure microphone. The sound pressure level in dB(A) gives a close indication of the subjective loudness of noise. A technical definition for the sound pressure level, in decibels, is 20 times the logarithm (base 10) of the ratio of any two quantities related to a given sound pressure to a reference pressure (typically 20 μPa equivalent to 0 dB).
Tonal noise	Noise with perceptible and definite pitch or tone



1. Introduction

Dixon Sand Pty Ltd operates the Old Northern Road Quarry in Maroota, NSW (the Quarry). The Quarry is located off Old Northern Road, as illustrated in Figure 1.

Operations at the quarry include extraction of sand and sandstone blocks, processing by screening and grading and direct sales involving loading of trucks for shipment.

The Quarry operates under Development Consent 250-09-01 and Environment Protection Licence (EPL) 3916, which set noise limits for its operation and require noise monitoring to be completed on a six-monthly basis to ensure compliance with the conditions.

Hutchison Weller was commissioned by Dixon Sand to undertake the six-monthly noise monitoring in accordance with the conditions of consent, EPL and requirements of the Noise Management Plan.

This document outlines the consent conditions, monitoring methodology and results of the monitoring undertaken on 11 December 2024.



Figure 1 Location of the Quarry

2. Noise compliance criteria

Conditions 1 and 2 of Schedule 3 of development consent DA250-09-01 outline the Quarry operating hours and condition 3 defines the noise criteria for compliance. Environment Protection Licence (EPL) 3916

1. The Applicant must comply with the operating hours set out in Table 1.

Table 1 Operating hours

Activity	Permissible hours
Quarrying operations (excluding truck arrival, loading and dispatch)	7.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays
Truck arrival (unladen)	5.45 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays
Truck loading Truck dispatch Truck arrival (laden)	6.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays
Bund construction or rehabilitation works within 250 m of Maroota Public School	7.00 am to 6.00 pm Monday to Friday during school holiday periods unless otherwise approved in writing by the EPA
Maintenance	May be conducted at any time, provided that these activities are not audible at any privately-owned residence

2. The following activities may be carried out outside the hours specified in condition 1 above:
 - (a) delivery or dispatch of materials as requested by the NSW Police Force or other public authorities; and
 - (b) emergency work to avoid the loss of lives, property or to prevent environmental harm.

In such circumstances, the Applicant must notify the Secretary and affected residents prior to undertaking the activities, or as soon as is practical thereafter.

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 2 at any residence on privately-owned land or at the Maroota Public School.

Table 2 Noise criteria dB(A)

Receiver	Averaging period	Shoulder (6.00 am to 7.00 am)	Day (7.00 am to 6.00 pm)
Any residence on privately owned land	LAeq (15 minute)	37	44
Any classroom at Maroota Public School	LAeq (1 hour)	-	45

Noise generated by the development is to be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions and modification factors) of the NSW Noise Policy for Industry (2017). Appendix 6 sets out the meteorological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria.

However, the noise criteria in Table 2 do not apply if the Applicant has an agreement with the relevant landowner to exceed the noise criteria, and the Applicant has advised the Department in writing of the terms of this agreement.

3. Monitoring methodology

Operator-attended noise monitoring was undertaken by Hutchison Weller, an independent acoustic specialist and Member of the Australian Acoustical Society. Monitoring locations included those described in the Quarry Noise Management Plan plus additional sensitive receivers, as illustrated in Figure 1 and summarised in Table 3.

Table 3 Monitoring locations

Receiver ¹	Address	Description
OR1	Maroota public school	Classroom closest to quarry operations
OR2	4624 Old Northern Road	Private residence
OR3	4634 Old Northern Road	Private residence
R2	4579 Old Northern Road	Private residence
R3	4567 Old Northern Road	Private residence
R4/5	4547 – 4543 Old Northern Road	Mid-point between private residence
OAS1	Lot 196 of the Quarry	At source monitoring, close to operations
OAS2	Lots 1 and 2 of the Quarry	At source monitoring, close to operations
OAS3	Lots 1 and 2 of the Quarry	At source monitoring, close to operations

Note 1: An agreement between Dixon Sand and receiver R1 is in place and, therefore, noise management levels defined by the development consent are not applicable.

Monitoring was conducted in accordance with procedures outlined in the Noise Policy for Industry and Section 6 of the Noise Management Plan.

At-receiver monitoring locations were within 30 metres of residential dwellings, whilst onsite measurement locations were selected for safe access and to be representative of the operations, without extraneous noise from sources such as traffic and insects.

Instrumentation included a Bruel & Kjaer Class 1 sound level meter (SLM), serial no. 3008237, field-calibrated prior to and following monitoring. The SLM was within current calibration, next due January 2025.

Monitoring was undertaken with the SLM set on a tripod at 1.5 metres above ground and measuring A-weighted sound pressure levels under fast response. Each measurement period was 15 minutes and recorded the LAeq, LA90 and LAmx statistics.

Meteorological data is usually recorded during each monitoring period adjacent to the Maroota public school to establish whether meteorological conditions were suitable for monitoring. Data includes wind speed, direction, temperature, relative humidity, and sigma-theta (to establish the Pascall-Guifford stability category). This data was not available for the monitoring period due to equipment malfunction. Therefore meteorological data was taken from the nearby BOM Automatic Weather Station at Richmond Airport (Station ID: 067105).

Where extraneous noise such as road traffic and fauna (insects/birds) were the dominant noise sources, making it impractical to discern the contribution of the Quarry to ambient noise levels, noise levels measured at alternative locations closer to the Quarry were utilised, in line with procedures outlined in Noise Policy for Industry (NSW EPA 2017). This involved extrapolation from the near-distance location to the sensitive receiver location, as described in Section 4.2.



4. Monitoring results

4.1 Attended measurements

Results of noise monitoring for each location are presented in Table 4 to Table 6.

In general, quarry operations were inaudible from most locations, with traffic the dominant source of noise for residents on the Old Northern Road.

Quarry operations in December 2024 fell into three categories representing the main sources of noise. These were:

- Sand processing and truck loading (main plant, front end loaders, trucks)
- Extraction of bulk sandstone by triple saw ("log popping")
- Stockpile management with articulated dump trucks

Depending on the receiver location, these sources played a varying role in contributing to the total noise level.

Measured results indicated quarry operations during the shoulder period (from 6.00am to 7.00am) were inaudible, including during breaks in traffic noise, and complied with the noise criteria at all measurement locations.

On-site measurements were taken to determine the noise level of various noise sources without the influence of traffic noise. Measurements were undertaken over 15-minute periods to establish representative sound power levels of the operation to allow extrapolation to receiver locations where background noise was too high to discern quarry noise contributions. This is discussed further in Section 4.2.

During the day (standard hours), measurement at the school and residential receivers established traffic was the dominant source of noise in the area and heavily influenced measured LAeq, 15-minute noise levels. Quarry noise was inaudible throughout the duration of the monitoring.

Estimated contributions of quarry noise on the total noise level indicated compliance with the noise limit. However, due to ambient noise (traffic, birds, breeze in trees), extrapolation from at-source measurements has been undertaken to support this assertion (See Section 4.2.)



Table 4 Monitoring results – Shoulder Period - 6.00am to 7.00am – Measurements at Sensitive Receivers

Time	Location	Noise criterion	Measured 15-minute noise level			Estimated LAeq, 15 min quarry contribution	Observations	Meteorological conditions
			LAeq	LA90	LAmaz			
5.55am	OR3	37	46.2	43.8	66.8	<37	Site inaudible. Audible noise: Access road, Old Northern Road (ONR), insects, and tractor working on the crops on the other side of the access road (towards the end of the measurement).	Overcast sky and calm to light breeze.
6.15am	OR2		49.5	43.1	61.3	<37	Site inaudible. Audible noise: Access road, Old Northern Road (ONR), insects, and dog barking in the distant. Site watercart on access road approx. 50dB (350-380m away from the sound level meter (SLM))	
6.34am	R3		67.7	43.8	88.6	<37	Site inaudible. Dominant noise: Old Northern Road (defining average and maximums). Other audible noise dominant during lulls in road traffic noise: birds and insects.	
6.51am	R4/5		69.0	46.0	89.2	<37	Site inaudible. Dominant noise: Old Northern Road (defining average and maximums). Other audible noise dominant during lulls in road traffic noise: birds and insects.	



Table 5 Monitoring results – Day Period - 7.00am to 6.00pm – Site Boundary Measurements

Time	Location	Noise criterion	Measured 15-minute noise level			Estimated LAeq, 15 min quarry contribution	Observations	Meteorological conditions
			LAeq	LA90	LAmaz			
11/12/2024 9:25	OAS1 (Top of ledge NW of carpark)	N/A	59.3	57.9	72.3	-	Plant audible. 82-100m away from the SLM. Continuous and dominant. No FEL active during measurement. Truck emptying load 68 dBA (Maximum) 111m away from the SLM	Overcast sky and calm to light breeze.
11/12/2024 10:11	OAS2	N/A	58.7	57.0	66.8	-	Site pit activity just as audible as ambient noise level. Audible noise: - Excavator with triple saw operating 312m away from SLM - Forklift loading truck - Insect noise - ONR Excavator with saw audible and dominant 58-59 dBA for a short duration, and then returned to being masked by ambient noise.	
11/12/2024 8:50	OAS3	N/A	68.1	66.1	70.7	-	Excavator with triple saw audible and operating 150m away from SLM. Excavator with bucket (left initial position during pit measurement heading out). Insects audible from towards the school direction.	



Table 6 Monitoring results – Day Period - 7.00am to 6.00pm – Measurements at Sensitive Receivers

Time	Location	Noise criterion	Measured 15-minute noise level			Estimated LAeq, 15 min quarry contribution	Observations	Meteorological conditions	
			LAeq	LA90	LAmaz				
11/12/2024 12:13	OR1 (School)	45	68.9	62.4	77.0	<45	Site inaudible. Dominated by Old Northern Road, insect noise and birds. Some occasional school noise.	Overcast sky and calm to light breeze.	
11/12/2024 12:28	OR1 (School)	45	62.6	57.2	74.4	<45			
11/12/2024 12:44	OR1 (School)	45	67.5	61.6	75.9	<45			
11/12/2024 13:00	OR1 (School)	45	66.8	60.1	77.3	<45			
11/12/2024 10:34	OR3	44	66.8	64.4	70.2	<44	Site inaudible. Audible noise: access road, Old Northern Road, insect noise, watercart, helicopter passing above 64 dBA+		
11/12/2024 10:53	OR2	44	58.8	51.1	64.7	<44	Site inaudible. Audible noise: Insect noise, Old Northern Road, and access road.		
11/12/2024 11:12	R2	44	70.5	61.5	90.4	<44	Site inaudible. Insect noise and Old Northern Road dominant.		
11/12/2024 11:30	R3	44	71.5	64.8	87.2	<44			
11/12/2024 11:47	R4/5	45	69.1	55.4	89.9	<45			

4.2 Extrapolated measurements

A conclusive noise level attributable to the Quarry was not possible in all locations due to ambient noise levels. Therefore, measurements captured on-site without substantial influence from extraneous noise were used to calculate sound pressure levels at each receiver.

Based on observations close to the quarry, the following plant and equipment was in use during the monitoring period.

1. Processing plant - conveyors and drives, screens, front end loaders, Moxies (plant to stockpile)
2. Pit – Excavator-mounted rock saw, excavators grinding and popping logs, front end loaders.

It should be noted:

- The rock saw was not in operation during the monitoring period, and it was advised it was not part of the current operations.
- FEL (near the plant) were not operating during the measurement period; however, we were advised that they were active at some point. Previous measurements of FEL have been incorporated into the noise modelling.

Measurements close to these plant items were undertaken to establish a representative noise model of the quarry operations. A summary of noise emission data for these items is presented in Appendix A.

Predictions of noise at nearby receivers were based on measured onsite noise levels and propagation methods described in ISO 9613-2:1996 *Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation*, which accounts for geometric spreading, air and ground absorption as well as barrier effects, assuming worst case meteorology of a gentle breeze from source to receiver and stable conditions.

Since site operations were entirely inaudible at the receiver locations, source noise measurements have been modelled and extrapolated to estimate the noise levels at the surrounding sensitive receivers.

The predicted noise levels at the sensitive receiver locations are presented in Table 7.

Extrapolated results indicate the Quarry demonstrates a contribution to the ambient noise environment that meets the noise limit for the day period in all locations.

Noise contour maps from the model are presented in Appendix B and illustrate noise propagation from the Quarry to all surrounding sensitive receiver locations.

Table 7 Extrapolated monitoring results

Receiver	Noise criteria		Extrapolated noise level, LAeq, 15 minute	Comment
	Shoulder	Day		
OR1	-	45	32	Predicted noise levels meet the noise limits during the day period.
OR2	37	44	36	
OR3			36	
R2			33	
R3			33	
4/5			32	



4.3 Compliance summary

Results of attended monitoring and extrapolated noise levels demonstrate the following.

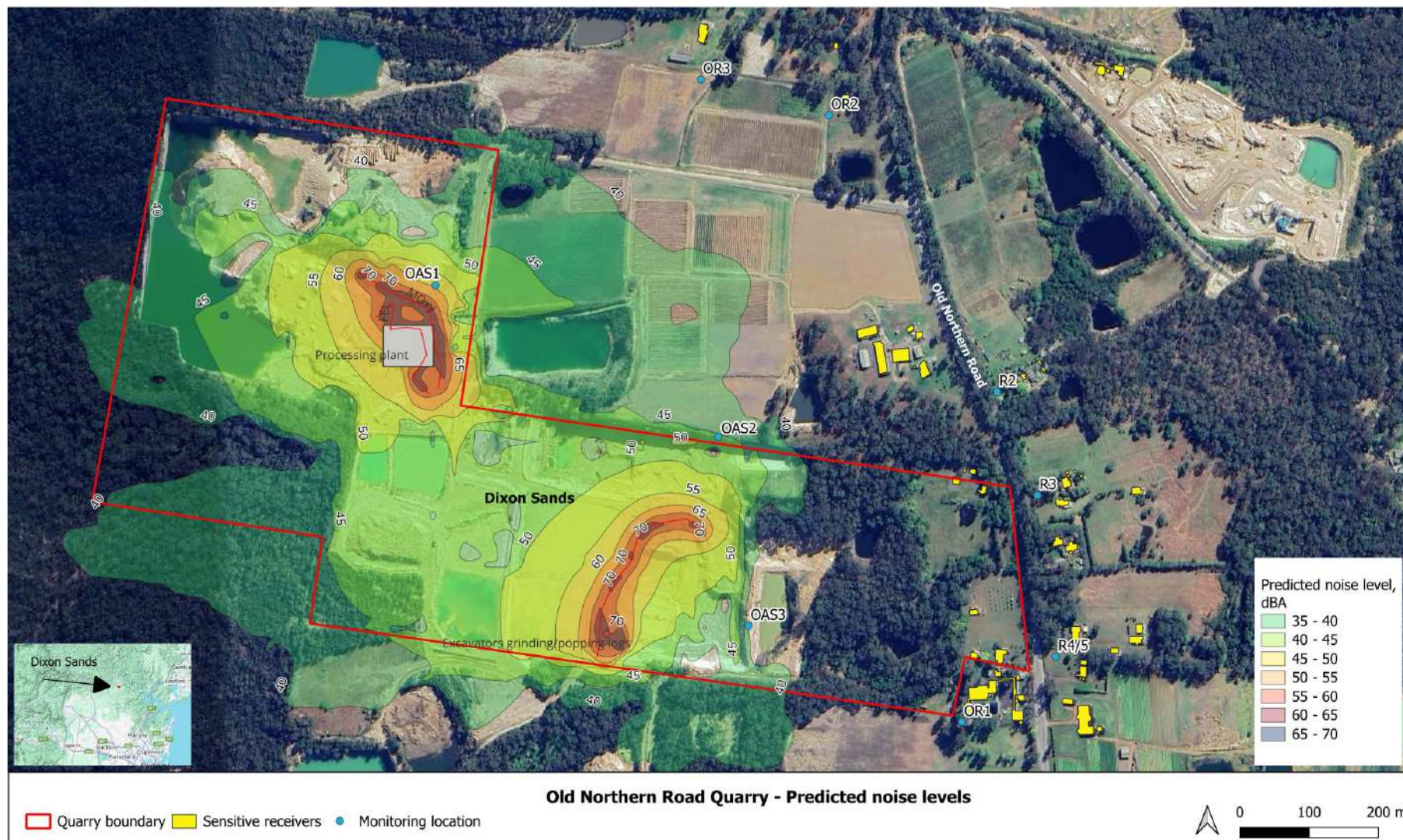
1. Observed operations during the day period were compliant with the noise limit at each receiver under the meteorological conditions at the time.
2. Observed operations during the shoulder period were compliant with the noise criteria at all receivers under the meteorological conditions at the time.



Appendix A. On-site measurements

Location	Plant item	Height, m	Sound Power Level, (third octave, Hz), dBA																													
			Sum	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k
Process area	Screens, conveyors	4	106	42	58	53	59	74	74	83	81	81	80	82	83	84	84	87	90	92	91	93	95	96	94	93	93	96	95	99	92	86
Pit operations	FEL only	4	98	39	52	52	55	66	67	71	75	77	75	78	78	79	79	81	84	86	88	88	89	90	88	87	85	83	77	72	70	67
	Excavators (2) grinding and popping logs	4	104	28	47	46	50	58	71	76	79	87	84	88	92	91	90	90	94	91	94	94	92	92	93	92	94	93	91	83	78	72

Appendix B. Noise contours



Dixon Sand Pty Ltd

Old Northern Road Quarry, Maroota

**Noise monitoring report
September 2025**

Doc no. 19020-NV-RP-20-0





Dixon Sand Pty Ltd
Old Northern Road Quarry, Maroota

Title	Noise monitoring report
Document no.	19020-NV-RP-20-0
Revision	0
Date	8 September 2025
Author	James Daramola
Reviewer	John Hutchison

Hutchison Weller Pty Ltd
ABN 37 001 024 095
13/357 Military Road
Mosman NSW 2008

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Revision history

0	5 September 2025	Report issued to client
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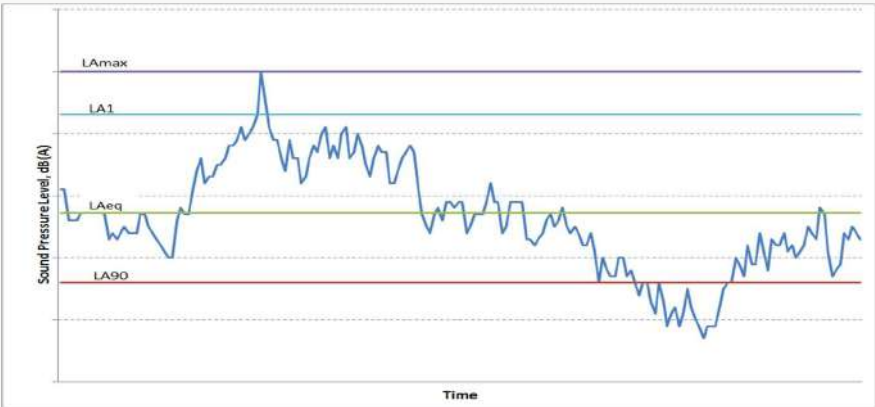


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Definition of terms

Background noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation.
Decibel (dB)	A measure of sound equivalent to 20 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure, and 10 times the logarithm (to base 10) of the ratio of a given sound power to a reference power.
dB(A)	Unit used to measure 'A-weighted' sound pressure levels. A-weighting is an adjustment made to sound-level measurement to approximate the response of the human ear.
dB(C)	Unit used to measure 'C-weighted' sound pressure levels, an adjustment made to sound level to approximate low frequency noise between 10 Hz and 200 Hz.
EPA	Environment Protection Authority
Extraneous noise	Noise resulting from activities that are not typical of the area such as construction, and traffic generated by holiday periods or special events such as concerts or sporting events. Normal daily traffic is not considered to be extraneous.
Noise level statistics	L_{A90} – The A-weighted sound pressure level exceeded 90% of the monitoring period. This is considered to represent the background noise. L_{Aeq} – The equivalent continuous A-weighted noise level—the level of noise equivalent to the energy average of noise levels occurring over a measurement period. L_{A1} – The A-weighted sound pressure level exceeded 1% of the monitoring period. L_{Amax} – The maximum A-weighted noise level associated with the measurement period. 
RBL	The Rating Background Level for each period is the medium value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period (day, evening and night)
Receiver	The land use at which noise is heard
SLM	Sound Level Meter
Sound Power Level (SWL)	The A-weighted sound power level is a logarithmic ratio of the acoustic power output of a source relative to 10^{-12} watts and expressed in decibels. Sound power level is calculated from measured sound pressure levels and represents the level of total sound power radiated by a sound source.
Sound Pressure Level (SPL)	This is the level of noise, usually expressed in dB(A), as measured by a standard sound level meter (SLM) with a pressure microphone. The sound pressure level in dB(A) gives a close indication of the subjective loudness of noise. A technical definition for the sound pressure level, in decibels, is 20 times the logarithm (base 10) of the ratio of any two quantities related to a given sound pressure to a reference pressure (typically 20 μPa equivalent to 0 dB).
Tonal noise	Noise with perceptible and definite pitch or tone



1. Introduction

Dixon Sand Pty Ltd operates the Old Northern Road Quarry in Maroota, NSW (the Quarry). The Quarry is located off Old Northern Road, as illustrated in Figure 1.

Operations at the quarry include extraction of sand and sandstone blocks, processing by screening and grading and direct sales involving loading of trucks for shipment.

The Quarry operates under Development Consent 250-09-01 and Environment Protection Licence (EPL) 3916, which set noise limits for its operation and require noise monitoring to be completed on a six-monthly basis to ensure compliance with the conditions.

Hutchison Weller was commissioned by Dixon Sand to undertake the six-monthly noise monitoring in accordance with the conditions of consent, EPL and requirements of the Noise Management Plan.

This document outlines the consent conditions, monitoring methodology and results of the monitoring undertaken on 10 June 2025.



Figure 1 Location of the Quarry



2. Noise compliance criteria

Conditions 1 and 2 of Schedule 3 of development consent DA250-09-01 outline the Quarry operating hours and condition 3 defines the noise criteria for compliance. Environment Protection Licence (EPL) 3916

1. The Applicant must comply with the operating hours set out in Table 1.

Table 1 Operating hours

Activity	Permissible hours
Quarrying operations (excluding truck arrival, loading and dispatch)	7.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays
Truck arrival (unladen)	5.45 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays
Truck loading Truck dispatch Truck arrival (laden)	6.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays
Bund construction or rehabilitation works within 250 m of Maroota Public School	7.00 am to 6.00 pm Monday to Friday during school holiday periods unless otherwise approved in writing by the EPA
Maintenance	May be conducted at any time, provided that these activities are not audible at any privately-owned residence

2. The following activities may be carried out outside the hours specified in condition 1 above:
 - (a) delivery or dispatch of materials as requested by the NSW Police Force or other public authorities; and
 - (b) emergency work to avoid the loss of lives, property or to prevent environmental harm.

In such circumstances, the Applicant must notify the Secretary and affected residents prior to undertaking the activities, or as soon as is practical thereafter.

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 2 at any residence on privately-owned land or at the Maroota Public School.

Table 2 Noise criteria dB(A)

Receiver	Averaging period	Shoulder (6.00 am to 7.00 am)	Day (7.00 am to 6.00 pm)
Any residence on privately owned land	LAeq (15 minute)	37	44
Any classroom at Maroota Public School	LAeq (1 hour)	-	45

Noise generated by the development is to be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions and modification factors) of the NSW Noise Policy for Industry (2017). Appendix 6 sets out the meteorological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria.

However, the noise criteria in Table 2 do not apply if the Applicant has an agreement with the relevant landowner to exceed the noise criteria, and the Applicant has advised the Department in writing of the terms of this agreement.



3. Monitoring methodology

Operator-attended noise monitoring was undertaken by Hutchison Weller, an independent acoustic specialist and Member of the Australian Acoustical Society. Monitoring locations included those described in the Quarry Noise Management Plan plus additional sensitive receivers, as illustrated in Figure 1 and summarised in Table 3.

Table 3 Monitoring locations

Receiver ¹	Address	Description
OR1	Maroota public school	Classroom closest to quarry operations
OR2	4624 Old Northern Road	Private residence
OR3	4634 Old Northern Road	Private residence
R2	4579 Old Northern Road	Private residence
R3	4567 Old Northern Road	Private residence
R4/5	4547 – 4543 Old Northern Road	Mid-point between private residence
OAS1	Lot 196 of the Quarry	At source monitoring, close to operations
OAS2	Lots 1 and 2 of the Quarry	At source monitoring, close to operations
OAS3	Lots 1 and 2 of the Quarry	At source monitoring, close to operations

Note 1: An agreement between Dixon Sand and receiver R1 is in place and, therefore, noise management levels defined by the development consent are not applicable.

Monitoring was conducted in accordance with procedures outlined in the Noise Policy for Industry and Section 6 of the Noise Management Plan.

At-receiver monitoring locations were within 30 metres of residential dwellings, whilst onsite measurement locations were selected for safe access and to be representative of the operations, without extraneous noise from sources such as traffic and insects.

Instrumentation included a Bruel & Kjaer Class 1 sound level meter (SLM), serial no. 3008237, field-calibrated prior to and following monitoring. The SLM was within current calibration, next due January 2025.

Monitoring was undertaken with the SLM set on a tripod at 1.5 metres above ground and measuring A-weighted sound pressure levels under fast response. Each measurement period was 15 minutes and recorded the LAeq, LA90 and LMax statistics.

Meteorological data is usually recorded during each monitoring period adjacent to the Maroota public school to establish whether meteorological conditions were suitable for monitoring. Data includes wind speed, direction, temperature, relative humidity, and sigma-theta (to establish the Pascall-Guifford stability category). This data was used to establish the meteorological conditions as being suitable for monitoring.

Where extraneous noise such as road traffic and fauna (insects/birds) were the dominant noise sources, making it impractical to discern the contribution of the Quarry to ambient noise levels, noise levels measured at alternative locations closer to the Quarry were utilised, in line with procedures outlined in Noise Policy for Industry (NSW EPA 2017). This involved extrapolation from the near-distance location to the sensitive receiver location, as described in Section 4.2.



4. Monitoring results

4.1 Attended measurements

Results of noise monitoring for each location are presented in Table 4 to Table 6.

In general, quarry operations were inaudible from most locations, with traffic the dominant source of noise for residents on the Old Northern Road.

Quarry operations in June 2025 fell into three categories representing the main sources of noise. These were:

- Sand processing and truck loading (main plant, front end loaders, trucks)
- Extraction of bulk sandstone by triple saw ("log popping")
- Stockpile management with articulated dump trucks

Depending on the receiver location, these sources played a varying role in contributing to the total noise level.

Measured results indicated quarry operations during the shoulder period (from 6.00am to 7.00am) were inaudible, including during breaks in traffic noise, and complied with the noise criteria at all measurement locations.

On-site measurements were taken to determine the noise level of various noise sources without the influence of traffic noise. Measurements were undertaken over 15-minute periods to establish representative sound power levels of the operation to allow extrapolation to receiver locations where background noise was too high to discern quarry noise contributions. This is discussed further in Section 4.2.

During the day (standard hours), measurement at the school and residential receivers established traffic was the dominant source of noise in the area and heavily influenced measured LAeq, 15-minute noise levels. Quarry noise was generally inaudible throughout the duration of the monitoring.

Estimated contributions of quarry noise on the total noise level indicated compliance with the noise limit. However, due to ambient noise (traffic, birds, breeze in trees), extrapolation from at-source measurements has been undertaken to support this assertion (See Section 4.2.)



Table 4 Monitoring results – Shoulder Period - 6.00am to 7.00am – Measurements at Sensitive Receivers

Time	Location	Noise criterion	Measured 15-minute noise level			Estimated LAeq, 15 min quarry contribution	Observations	Meteorological conditions
			LAeq	LA90	LAm _{ax}			
10/06/2025 5:55	OR3*	37	59.5	38.3	77.9	<37	Site inaudible. Dominant noise sources were road traffic noise on from the access road and Old Northern Road.	Clear skies, light winds, from ESE to NNW @ 0.4-3.8 km/hr Temperature 8.9-9.5°C Extremely unstable conditions (A Class)
10/06/2025 6:14	OR2		49.1	41.0	62.0	<37		
10/06/2025 6:34	R3		69.9	41.6	93.0	<37		
10/06/2025 6:51	R4/5		69.5	48.3	88.9	<37		

*= Measurement was conducted along the access road. Accessing monitoring location OR3 during night-time hours was challenging due to overgrown grass and limited visibility.



Table 5 Monitoring results – Day Period - 7.00am to 6.00pm – Site Boundary Measurements

Time	Location	Noise criterion	Measured 15-minute noise level			Estimated LAeq, 15 min quarry contribution	Observations	Meteorological conditions
			LAeq	LA90	LAmaz			
10/06/2025 8:31	OAS1 (Top of ledge NW of carpark)	N/A	62.7	59.9	72.2	-	Continuous plant noise was audible, originating approximately 82–100 m from the sound level meter, with measured levels of 60–61 dBA. A front-end loader (FEL) was operating to the east of the SLM but did not influence the recorded noise levels. A second FEL operated at a distance of 36 m from the SLM, passing by with measured levels of 67–72 dBA before moving to pick up material approximately 70 m away. A truck was observed entering the site at a distance of 33 m from the SLM, generating noise levels of 65 dBA.	Clear skies, light to moderate winds, from WNW to SSW at 1.8-2.3km/hr Temperature 12-15°C Extremely unstable conditions (A Class)
10/06/2025 10:20	OAS2	N/A	62.0	55.8	70.6	-	A second pump was operational approximately 200 m from the SLM and was the dominant noise source, alongside an excavator conducting grinding works 145 m away, with measured levels ranging from 61–63 dBA. Hitachi EX17 excavator was observed in the distance 'cleaning the wall', contributing to intermittent noise impacts up to 64 dBA. General site noise was primarily attributed to the pump. Excavator log popping was not visible during the measurement period.	
10/06/2025 8:59	OAS3	N/A	59.1	55.4	72.9	-	Hitachi EX17 excavator was observed 'cleaning the wall' using the bucket/shovel at a distance of 131 m from the SLM, defining the measured LAmaz levels. Hyundai EX11 excavator was conducting log popping activities approximately 160 m from the SLM. A pump was operating continuously 194 m away from the SLM, influencing the recorded LA90 noise level.	



Table 6 Monitoring results – Day Period - 7.00am to 6.00pm – Measurements at Sensitive Receivers

Time	Location	Noise criterion	Measured 15-minute noise level			Estimated LAeq, 15 min quarry contribution	Observations	Meteorological conditions
			LAeq	LA90	LAmix			
10/06/2025 10:54	OR3*		51.9	42.4	74.6	<44	(Measurement taken along the access road) Site generally inaudible. Continuous plant near OAS1 was intermittently just audible, with levels around 43 dBA (equivalent to approx. 40dBA distance corrected to the façade of OR3). Audibility appeared wind-influenced as the plant operates continuously. A truck pass-by on the access road recorded 72 dBA. A truck idling approximately 150 m east of the SLM (facing the site) generated 50 dBA from 12 minutes onward.	Clear skies, light to moderate winds, from SW/WSW at 2-10km/hr Temperature 15-16°C Extremely unstable conditions (A Class)
10/06/2025 11:12	OR2		49.4	43.6	62.2	<44	Site was inaudible during the measurement period. Noise environment was dominated by activity on the access road and main road. Occasional farm activity across the access road and distant bird calls were also audible.	
10/06/2025 11:32	R2		70.5	45.9	95.7	<44	Site generally inaudible. Some site noise barely audible and not influencing the measure Old Northern Road dominant.	
10/06/2025 11:51	R3		72.3	47.0	94.7	<44	Occasional shovel impacts were barely audible and did not influence measured levels. Main road was audible and the dominant noise source. Brief shovel impacts reached approximately 52 dBA for a few seconds but did not define LAeq measurement. Wind in surrounding trees also audible.	
10/06/2025 12:08	R4/5		70.1	46.3	90.4	<45	Brief shovel impacts were audible for a few seconds but did not define LAeq measurement. Main road was audible and the dominant source, influencing both LAeq and LAmix. Bird calls	



Time	Location	Noise criterion	Measured 15-minute noise level			Estimated LAeq, 15 min quarry contribution	Observations	Meteorological conditions
			LAeq	LA90	LAmx			
							were audible within the range of 45–52 dBA. Wind in surrounding trees was also audible.	
10/06/2025 12:30	OR1 (School)	45	53.5	47.8	72.6	<45	The site was generally inaudible during the attended monitoring. Occasional light shovel or bucket impacts were audible intermittently during some 15-minute measurement periods but did not define any of the measured noise levels. The dominant noise source was road traffic from Old Northern Road. Continuous mid-frequency tonal plant noise, likely from a screening plant, was audible from the adjacent PF Formation Sand & Concrete site and is not associated with Dixon Sands operations. Other background noise sources included near and distant bird calls within the surrounding vegetation, wind in trees, and intermittent voices from school children, audible for approximately 5 minutes during the final 15-minute measurement period.	
10/06/2025 12:45	OR1 (School)	45	54.0	49.2	75.8	<45		
10/06/2025 13:01	OR1 (School)	45	55.6	49.0	74.0	<45		
10/06/2025 13:16	OR1 (School)	45	54.7	49.6	72.6	<45		

*= Measurement was conducted along the access road. Accessing monitoring location OR3 during night-time hours was challenging due to overgrown grass and limited visibility.



4.2 Extrapolated measurements

A conclusive noise level attributable to the Quarry was not possible in all locations due to ambient noise levels. Therefore, measurements captured on-site without substantial influence from extraneous noise were used to calculate sound pressure levels at each receiver.

Based on observations close to the quarry, the following plant and equipment was in use during the monitoring period.

1. Processing plant - conveyors and drives, screens, front end loaders, Moxies (plant to stockpile)
2. Pit – Excavator-mounted rock saw, excavators grinding and popping logs, front end loaders.
3. FEL(near the plant) moving stockpile

Measurements close to these plant items were undertaken to establish a representative noise model of the quarry operations. A summary of noise emission data for these items is presented in Appendix A.

Predictions of noise at nearby receivers were based on measured onsite noise levels and propagation methods described in ISO 9613-2:1996 *Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation*, which accounts for geometric spreading, air and ground absorption as well as barrier effects, assuming worst case meteorology of a gentle breeze from source to receiver and stable conditions.

Since site operations were generally inaudible at the receiver locations, source noise measurements have been modelled and extrapolated to estimate the noise levels at the surrounding sensitive receivers.

Based on the above, modelled noise levels for each monitoring location are presented in Table 7 and Table 8. It should be noted a change in dominant or active equipment was observed during measurements at OAS2 and OAS3 and have been considered in the model validation. Refer to Table 5.

Modelled noise levels are within 2dB of the measured values indicating the model is sufficiently accurate represent operating conditions.

Table 7 Extrapolated monitoring results to intermediate measurement locations – Pit Activity Scenario A

Location	Modelled noise level, dBA	Measured noise level, LAeq, 15 minute	dB Difference
OAS1	63.7	62.7	1
OAS3	57	57.2	0.2

Table 8 Extrapolated monitoring results to intermediate measurement locations – Pit Activity Scenario B

Location	Modelled noise level, dBA	Measured noise level, LAeq, 15 minute	dB Difference
OAS1	63.8	62.7	1.1
OAS2	60.5	62.0	1.5



The predicted noise levels at the sensitive receiver locations are presented in Table 9 and Table 10.

Extrapolated results indicate residential receivers meet the daytime criteria during both modelled scenarios.

The school, OR1 is also compliant with the daytime noise criteria during both modelled scenarios.

Noise contour maps from the model are presented in Appendix B and C and illustrate noise propagation from the Quarry to all surrounding sensitive receiver locations.

Table 9 Extrapolated monitoring results – Scenario A

Receiver	Noise criteria		Pit Scenario A Extrapolated noise level, LAeq, 15 minute	Compliant with the day criteria (yes/no)
	Shoulder	Day		
OR1	-	45	34	Yes
OR2	37	44	39	Yes
OR3			38	Yes
R2			34	Yes
R3			36	Yes
R4/5			39	Yes

Table 10 Extrapolated monitoring results – Scenario B

Receiver	Noise criteria		Pit Scenario A Extrapolated noise level, LAeq, 15 minute	Compliant with the day criteria (yes/no)
	Shoulder	Day		
OR1	-	45	40	Yes
OR2	37	44	42	Yes
OR3			42	Yes
R2			36	Yes
R3			36	Yes
R4/5			39	Yes

4.3 Compliance summary

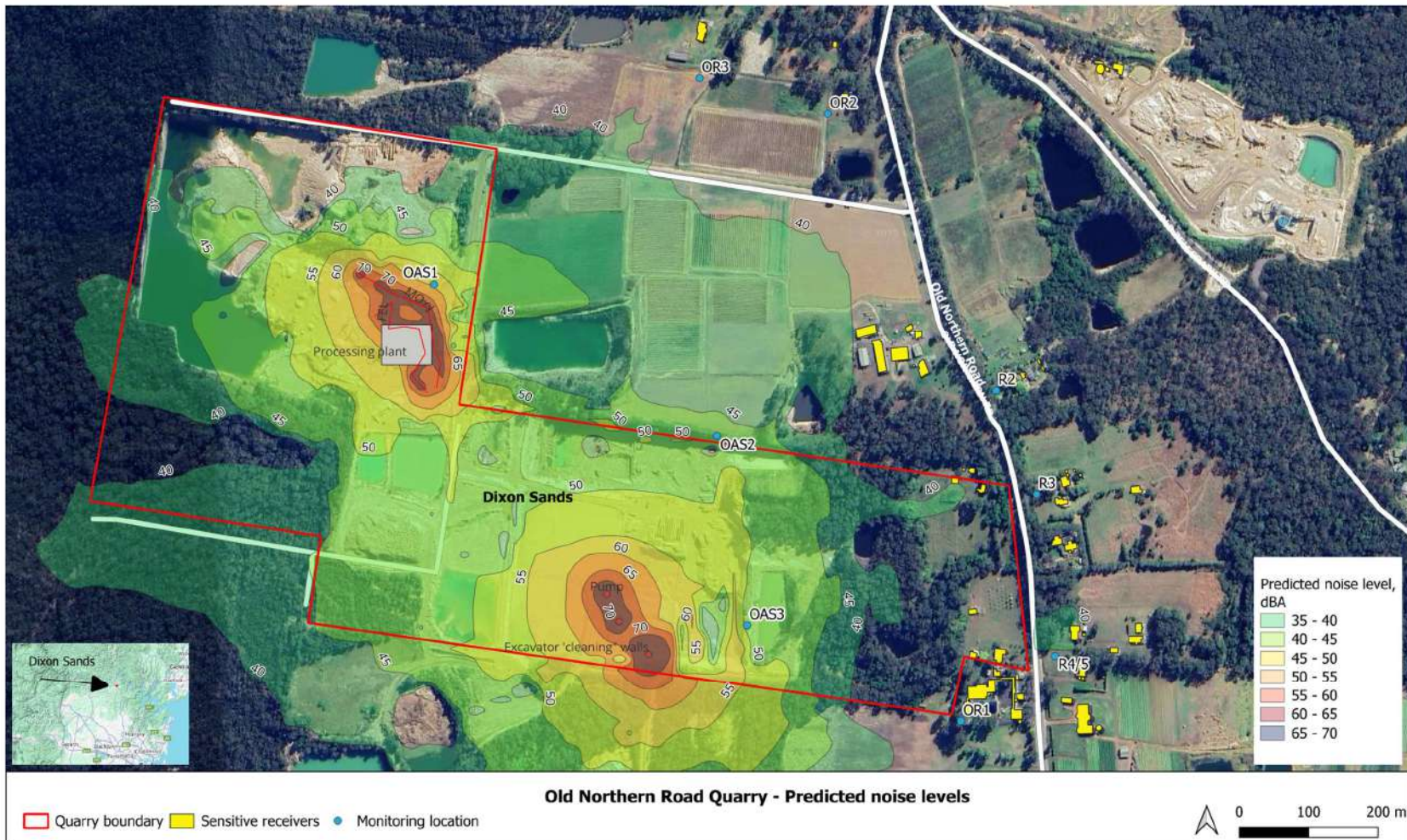
Results of attended monitoring and extrapolated noise levels demonstrate the observed operations during the day period were compliant with the noise limit at each receiver under the meteorological conditions at the time.



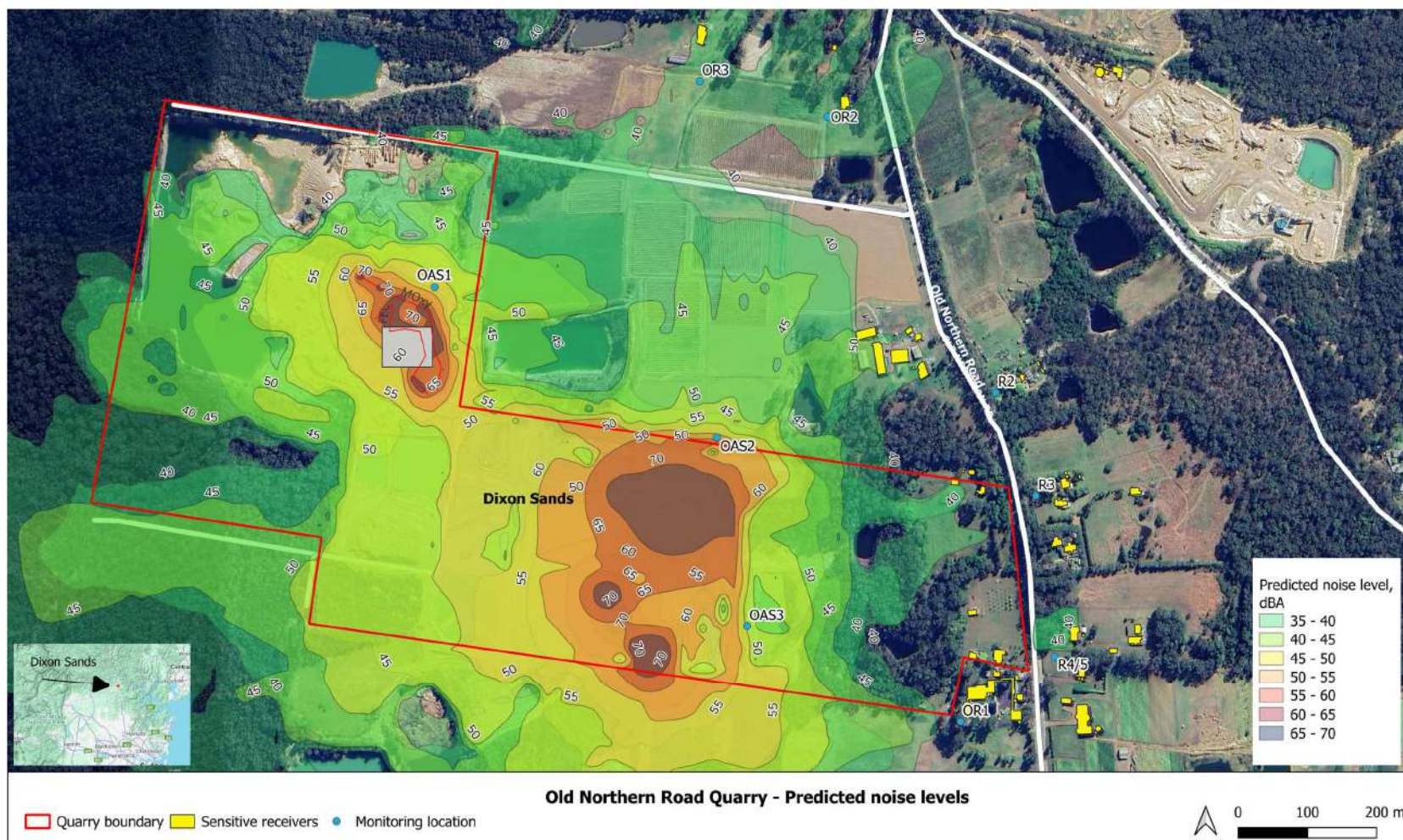
Appendix A. On-site measurements

Location	Plant item	Height, m	Sound Power Level, (third octave, Hz), dBA																													
			Sum	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k
Process area	Screens, conveyors	4	106	42	58	53	59	74	74	83	81	81	80	82	83	84	84	87	90	92	91	93	95	96	94	93	93	96	95	99	92	86
Pit operations	FEL only	4	98	39	52	52	55	66	67	71	75	77	75	78	78	79	79	81	84	86	88	88	89	90	88	87	85	83	77	72	70	67
	Excavators (2) grinding and popping logs	4	104	28	47	46	50	58	71	76	79	87	84	88	92	91	90	90	94	91	94	94	92	92	93	92	94	93	91	83	78	72
	Rock saw / cleaning	1.5	108	85	95	91	92	95	100	95	101	106	100	110	104	95	94	95	97	98	98	101	100	100	96	95	94	92	87	82	80	76
	Pump	1.5	111	77	89	84	80	84	84	97	114	95	91	98	90	97	90	95	94	93	96	99	99	104	103	101	100	98	96	97	95	92

Appendix B. Noise contours – Scenario A



Appendix C. Noise Contours – Scenario B



Appendix E – Monthly Site Inspection



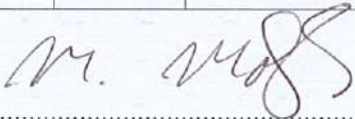
OLD NORTHERN ROAD QUARRY DIXON SAND, MAROOTA MONTHLY SITE CONDITION CHECKLIST

This checklist is to be completed monthly by the Environmental Officer.
Completed checklists are to be retained and included in the Annual Review.

Date of inspection:	30/4/2025			
Inspection by:	Melissa Mass			
Measured monthly rainfall (mm)	31/3/2025 - 30/4/2025 Rainfall = 78.6mm			
	Yes (✓) No (X) NA	Comments	Actions	Actions Complete (Date/Sign)
SEDIMENT CONTROLS				
Site checked for potential erosion issues or transport of sediment from batters, vehicle access points, excavations, haul roads, vegetation clearing etc.	✓	No erosion or transport of sediment noted.		
Effectiveness and capacity of Erosion and Sediment controls checked (drains, basins, filters etc.)	✓	All basins and drains etc clear		
Stockpiles located and maintained correctly	✓			
Tree clearance restricted to required area	N/A			
WATER QUALITY AND QUANTITY				
Water sample taken daily for quality testing prior to discharge of water. Water quality tested and EPL#3916 criteria for pH, TSS and turbidity complied prior to discharge.	N/A			
Weir: Daily volume of water discharged recorded.	N/A			
4 monthly monitoring of surface water quality at SW19.	✓	undertaken on 28/2/2025		
6 monthly monitoring of groundwater quality at six bores on Lots 1&2 and two bores on Lots 196.	✓	undertaken by V&T		
Monthly depth measurement of all groundwater bores and comparison with rainfall	✓	undertaken on 30/4/2025		
Monthly inspection of drainage & sediment controls including water storages, pumps, pipes and dams' walls	✓	undertaken on 30/4/2025		
Any Fuel or oil spills reported and maintained	✓			
Fuels/chemicals stored in bunded areas	✓	EPA approved bunding.		
AIR QUALITY				
Continuous static dust (collected for analysis monthly)	✓	undertaken by V&T		
On site dust suppression	✓	use of water cart when required.		
Loads covered entering and leaving site	✓	In compliance with Tmp.		
No burning of vegetation	✓			

Wind speed, direction and rainfall recorded	✓	Team and weather station managed by CBASED.		
NOISE				
Operation only during hours of operation	✓			
No complaints received from school, residences or local community members.	✓			
6 monthly monitoring at Maroota PS	✓	undertaken by Hutchison + Weller.		
Bulldozer not being used concurrently with any other plant on strips 4, 5 and 6 of Lots 1 and 2 DP547255 at depths between EGL and 6 metres below EGL	N/A			
Bulldozer being used for clearing, topsoil stripping and bund construction on Lots 1 and 2 DP547255 only during calm wind conditions	N/A	None this period.		
Between 0-6 metres depth below EGL, dozer-dump truck combination replaced by excavator-dump truck combination to strip overburden on Strips 2-6 inclusive	✓			
Quarrying at ground level on Lot 196 not occurring during southwest to northwest winds	✓	In compliance with NMP		
Construction and rehabilitation of eastern highwall of quarry within 250 metres of Maroota Public School occurring in school holiday periods only	✓			
FLORA & FAUNA/ REHABILITATION				
Sightings of threatened species reported	✓			
No disturbance of buffer/conservation areas	✓			
All buffer/conservation area fencing/markings intact	✓			
Rehabilitation undertaken to schedule	✓	monthly visit by Bush - it		
Success of rehabilitation of buffers, conservation areas & rehabilitation areas	✓			
Rehabilitation near school during holidays	✓			
Flora and fauna monitoring program undertaken to schedule	✓			
ARCHAEOLOGY				
Stop work if sites located – OEH notified	✓			
WASTE AND SITE CONDITION				
No rubbish visible or buried on site	✓			
Recyclables removed by licensed Contractors	✓	By council Contractors		
Putrescible waste covered and regularly removed	✓	By council Contractors		
EXTRACTION PROGRAM				
Extraction depths from monthly checked control points in accordance with extraction program.	✓			

ROADS AND TRANSPORT				
Weekly inspection of Old Northern Rd/Crown Rd intersection and sand/clay removed as necessary.	✓			
Crown Road, Old Northern Road near site, intersection & haul roads in good state of repair.	✓			
Truck movements have not exceeded 180/day, or 40 between 6-7am.	✓	Refer to runway to check		
Weighbridge/log book records forwarded to Council monthly	✓	Refer to runway to check.		
REPORTING				
Complaints register maintained	✓	updated and published monthly		
Environmental incidents reported to EPA and DPIE	✓	None this period		
PIRMP / SPILL KIT				
Spill kits inspected and used items replaced	✓			
A copy of PIRMP flowchart available in each Spill Kit	✓			

Signed:  (Environmental Officer or Delegate)

Appendix F – Waste Register

Old Northern Road

Waste Tracking Register FY 2024-2025

Date	Waste Type	Amount	Measurement	Contractor	Disposal / Recycle	Receipt No
18/10/2024	Liquid Waste	2000	litres	ABC Waste Oil Collection	Treatment	2764
28/01/2025	Liquid Waste	1500	litres	ABC Waste Oil Collection	Treatment	2780
8/05/2025	Liquid Waste	1500	litres	ABC Waste Oil Collection	Treatment	2856
6/06/2025	Liquid Waste	1500	litres	ABC Waste Oil Collection	Treatment	2865
17/07/2024	Non-Putrescible skip	6	cubic metre	Asquith Mini Skips	Disposal	9823
28/08/2024	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9843
23/09/2024	Non-Putrescible skip	6	cubic metre	Asquith Mini Skips	Disposal	9850
17/12/2024	Non-Putrescible skip	6	cubic metre	Asquith Mini Skips	Disposal	9895
19/05/2025	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9959
6/06/2025	Non-Putrescible skip	6	cubic metre	Asquith Mini Skips	Disposal	9970
10/07/2025	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9983
13/07/2025	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9986
01/07/24 - 30/06/25	General Solid Waste - recyclable	12.48	cubic metre	Council Waste Contractor	Recycle	Council Rate
01/07/24 - 30/06/25	Genral Solid Waste - putrescible	37.44	cubic metre	Council Waste Contractor	Disposal	Council Rate
2/07/2025	Hydrocarbon waste	300	litres	Greaseaters	Treatment	99930
31/07/2025	Hydrocarbon waste	300	litres	Greaseaters	Treatment	100241
28/08/2024	Hydrocarbon waste	300	litres	Greaseaters	Treatment	100645
23/09/2025	Hydrocarbon waste	300	litres	Greaseaters	Treatment	101164
22/10/2024	Hydrocarbon waste	300	litres	Greaseaters	Treatment	101470
21/11/2024	Hydrocarbon waste	300	litres	Greaseaters	Treatment	101820
16/12/2024	Hydrocarbon waste	300	litres	Greaseaters	Treatment	102070
13/01/2025	Hydrocarbon waste	300	litres	Greaseaters	Treatment	102352
11/02/2025	Hydrocarbon waste	300	litres	Greaseaters	Treatment	102694
10/03/2025	Hydrocarbon waste	300	litres	Greaseaters	Treatment	102972
8/04/2025	Hydrocarbon waste	300	litres	Greaseaters	Treatment	103319
5/05/2025	Hydrocarbon waste	300	litres	Greaseaters	Treatment	103588
20/06/2025	Hydrocarbon waste	300	litres	Greaseaters	Treatment	103945
01/07/24 - 30/06/25	Printer Ink Catridge	0.1	cubic metre	Post Office or Officeworks	Disposal	N/A
12/02/2024	Scrap Metal	8.26	tonne	Westland Metals	Recycle	WM 25650
12/03/2024	Scrap Metal	9.1	tonne	Westland Metals	Recycle	WM 25650
20/04/2025	Scrap Metal	7.52	tonne	Westland Metals	Recycle	WM 26523
15/05/2024	Scrap Metal	6.06	tonne	Westland Metals	Recycle	WM 25650
30/05/2024	Scrap Metal	6.82	tonne	Westland Metals	Recycle	WM 25650
12/06/2024	Scrap Metal	3.11	tonne	Westland Metals	Recycle	WM 25650
18/07/2024	Scrap Metal	6.64	tonne	Westland Metals	Recycle	WM 26347
18/07/2024	Scrap Metal	6.28	tonne	Westland Metals	Recycle	WM 26347
23/07/2024	Scrap Metal	5.06	tonne	Westland Metals	Recycle	WM 26347
23/07/2024	Scrap Metal	5.22	tonne	Westland Metals	Recycle	WM 26347
01/07/24 - 30/06/25	Sewage	anufacturer's specification		Onsite treatment	Treatment	N/A
29/11/2024	Scrap Tyres (25" and over)	9.12	tonne	Marathon Tyres	Recycle	223836
17/04/2025	Scrap Tyres (25" and over)	0.435	tonne	Marathon Tyres	Recycle	229902
16/05/2025	Scrap Tyres (25" and over)	0.634	tonne	Marathon Tyres	Recycle	231306
29/07/2025	Scrap Tyres (25" and over)	1.74	tonne	Marathon Tyres	Recycle	234396
29/07/2025	Scrap Tyres (25" and over)	0.317	tonne	Marathon Tyres	Recycle	234399
29/07/2025	Scrap Tyres (up to 22.5")	0.188	tonne	Marathon Tyres	Recycle	234102
01/07/24 - 30/06/25	Batteries	<0.1	cubic metre	Officeworks/Post Office	Recycle	N/A
01/07/24 - 30/06/25	Coffee Pods	<0.1	cubic metre	Return to manufacturer for recycling and composting	Recycle	N/A

Total	Scrap Metal	64.07	tonnes
	Non-Putrescible	38	m3
	Hydrocarbon waste	3900	litres
	Council Putrescible	37	m3
	Council Recycle	12	m3
	Printer Ink Catridge	0.1	m3
	Liquid Waste	6500	litres
	Coffee Pods	<0.1	m3
	Sewage	As per manufacturer's specification	
	Waste Tyre Disposal	12.4	tonne
	Batteries	<0.1	m3

Appendix G – Bush Regeneration Report



Dixon Sand Pty Ltd
Old Northern Road Quarry
(Development Consent DA 250-09-01)



Annual Report

July 2024 – June 2025

Assisted bush regeneration and rehabilitation works

Author: Pat Walsh

Date amended: 22/07/2025

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INTRODUCTION

This report summarises the assisted bush regeneration work undertaken by Bush-it Pty Ltd for Dixon Sand Pty Ltd between July 2024 and June 2025 as part of the Old Northern Development Consent DA 250-09-01. A total of 371.5 hours (\$19,173.99 excluding GST) were worked throughout the financial year with an average team size of four per visit, not including the preparation of this report. The distribution of hours over the financial year are not uniform, as resources are focused on undertaking primary/planting works in the cooler months and targeting exotic grasses from seeding and spreading at the tail end of summer.

Dixon Sand Pty Ltd operate a mineral sand quarry on the Old Northern Road at Maroota, NSW. On their behalf Bush-it manages the native vegetation of 8.4 hectares at the Old Northern Road (ONR) quarry as illustrated in Figure 1. The area managed by Bush-it at the ONR quarry is comprised of a mix of remnant native vegetation; rehabilitated quarry sand and abandoned agricultural land.

The vegetation at the ONR quarry site is managed according to the operating requirements of the quarry. As the quarry expands its area of extraction, existing native vegetation will be cleared, and the soil translocated to rehabilitate other areas.

In carrying out our work for Dixon Sand, Bush-it:

- Practices low impact weed management techniques such as manual removal in plant communities containing threatened species.
- Regularly identifies and maps the density and extent of weed infestations especially those covering an area of greater than 25 m²
- Undertakes appropriate, targeted weed control activities to ensure minimum disturbance to natives and minimum off-target damage.
- Conducts site specific induction training for staff working at the quarry, including field identification of all threatened species.
- Routinely assesses the effectiveness of the control programs and in response makes necessary modifications.
- We undertake monthly inspections noting the presence of weeds in drainage lines, and along access tracks.
- And we follow industry standard protocols for bushland hygiene by ensuring all our tools, boots and equipment are clean before entering the work site.

OVERVIEW OF MANAGEMENT ZONES AND WORK AREAS

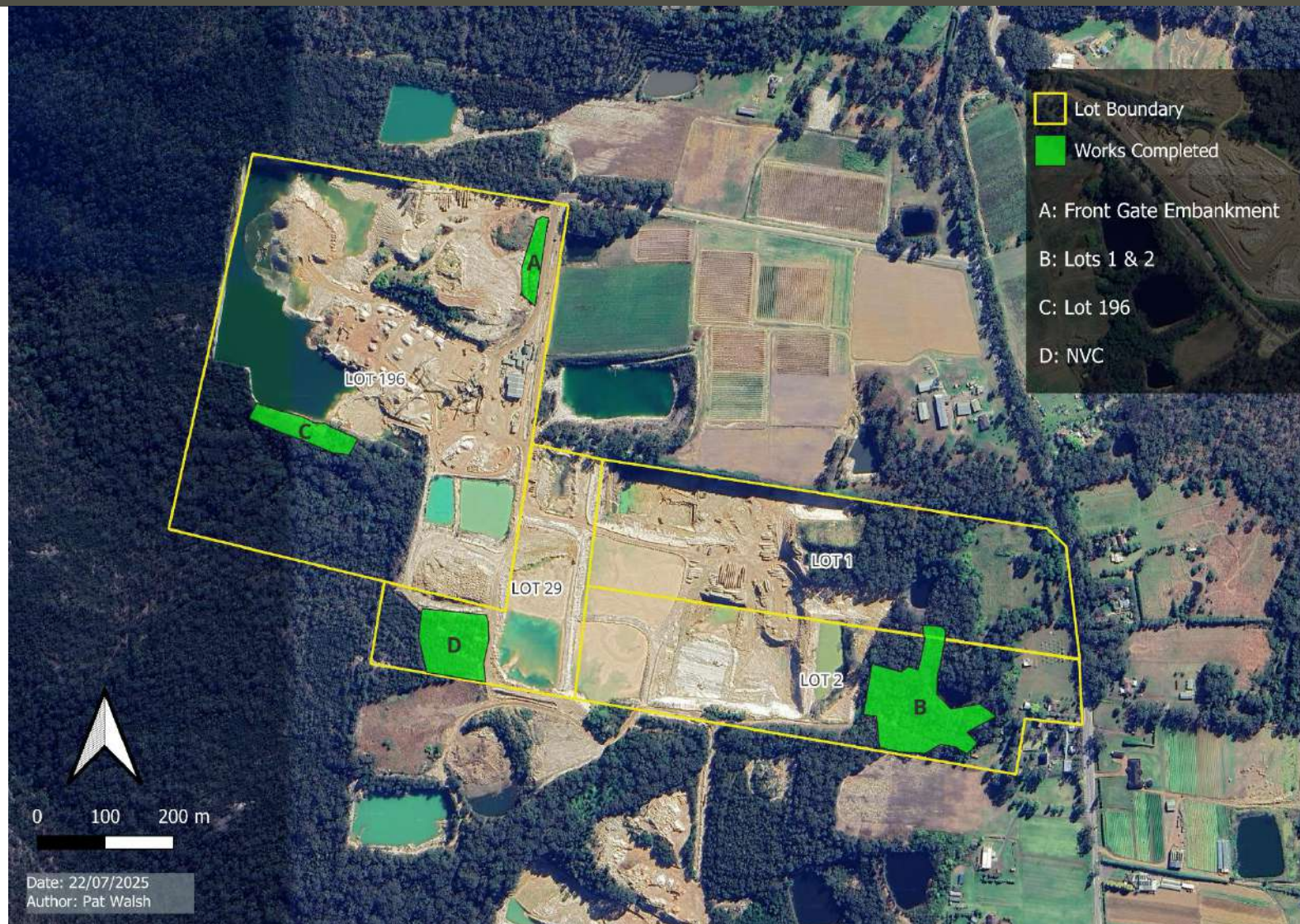


Figure 1a. – Old Northern Road Quarry – area of works 2024-2025.



Figure 1b – Old Northern Road Quarry– type of works 2024-2025.



Figure 2a - ONR Biodiversity Offset Area at Haerses Rd - areas of work for 2024-25.

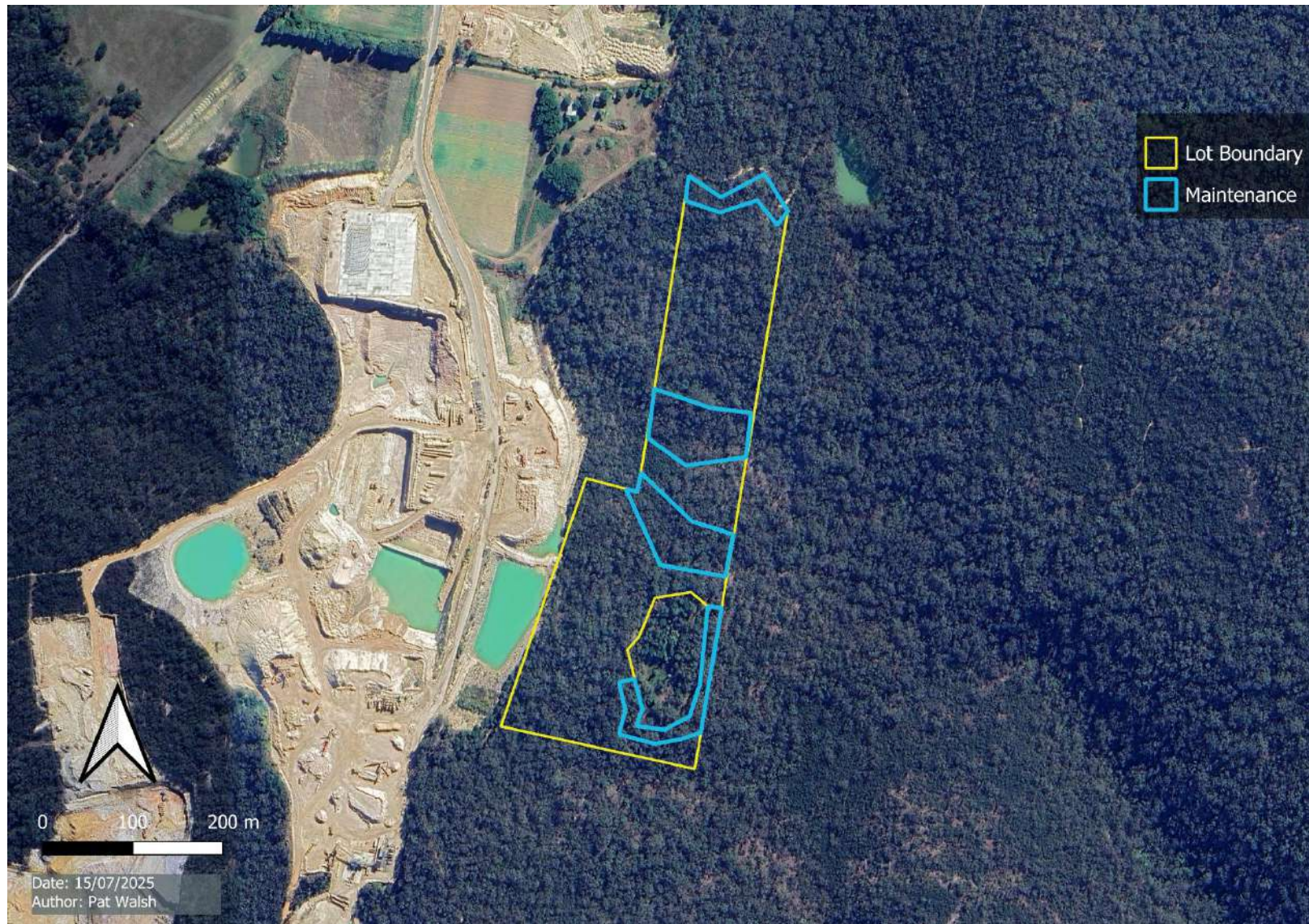


Figure 2b - ONR Biodiversity Offset Area at Haerses Rd – type of works 2024-2025.

OLD NORTHERN ROAD QUARRY

EMBANKMENT AT FRONT GATE

SCOPE

The embankment at the front gate (Area A in **Figure 1a**) is an exposed area of the quarry located between the roadway and an area used to stockpile quarry products and machinery.

The embankment is roughly 100m long and 20 m wide. A mix of native shrubs have been planted to stabilise the soil and improve the appearance of the mound.

RESOURCES – 3 HOURS

The zone was regularly monitored as it is visible from the access road into the main quarry. A thorough sweep was complete in March 2025 where *Cortaderia selloana* and other exotic grass species were treated via cut and paint and manual removal.

RECOMMENDATIONS

Ongoing maintenance of exotic grasses via brush cut, manual removal and spot spraying before they set seed. A small planting with some remnant canopy and shrub species in the area would also prove beneficial, especially in exposed areas prone to the spread of invasive grasses.

SCOPE

Lot 1 (Area B in **Figure 1a**) is a 1.4 ha bush block located on the eastern side of the extraction site. It is an example of Shale-Sandstone Forest with a dry sclerophyll understorey. The canopy consists of red bloodwood (*Corymbia gummifera*) and smooth-barked apple (*Angophora costata*). There are also species here, such as the woody pear (*Xylomelum pyraform*) and the Graceful Bush Pea (*Pultenea gracilis*) that favour residual shale or laterite soils.

As Dixon Sand expands its quarry operations, Lot 1 will be cleared of vegetation and the topsoil will be stored for future rehabilitation or direct along the designated native vegetation corridor to form a connection between existing areas of bushland roughly 6.8 ha in size. *Old Northern Road Quarry BRMP* (2020).

In the meantime, the vegetation on Lot 1 is conserved in its current natural state. The work undertaken by Bush-it ensures that the biodiversity of the vegetation remains intact and free from invasive species. Bush-it also works to preserve important habitat elements on the site by minimising soil disturbance or the relocation of deadwood or other plant material.

Lot 2 (Area B in **Figure 1a**) is a 3.4 ha block also located on the eastern side of the excavation area. The canopy here is composed of grey gums (*Eucalyptus punctata*) and peppermint gums (*Eucalyptus piperita*) intergrading with black she oak (*Allocasuarina littoralis*) and *Acacia parramattensis*.

There are two water storage dams located in Lot 2 and a service trail connecting the quarry and the Old Northern Road runs along the southern side. The core areas of Lot 2 are to be conserved in their current natural state. The abandoned farm and orchards that currently harbors *Lantana camara* and various exotic grass will be steadily revegetated. Areas to be conserved and restored in some places are within the 250m buffer of the school.

A noise bund on the western end of Lot 2 was constructed in 2023, which allowed Bush-it to recommence works in the lot. Since then, there has been a large focus on primary and secondary work, and the revegetation of the areas cleared of *Lantana*.



Figure 3 – Areas cleared of Lantana where plantings have occurred – Lot 2



Figure 4 – Example of Lantana stands before treatment.

RESOURCES – 114.5 HRS

Works in Lot 1 were very minimal this financial year, as efforts were especially focused on the ongoing reduction of Bell Minor habitat and revegetation of Lot 2. However, the lot was periodically scanned to ensure no new weed incursions were going unnoticed.

The majority of works were focus within Lot 2, where 250 specimens were planted in May 2024 following on from previous primary and secondary works. This was implemented as a long-term strategy to rehabilitate the shrub and canopy structure of Lot 2 where large areas of Lantana have been cleared. Watering and maintenance of the plantings were routinely undertaken into this financial year. A supplementary planting of shrubs and canopy species was undertaken in September 2024, located near original plantings in areas where additional areas of Lantana had been cleared. The 171 specimens consisted of species; *Acacia myrtifolia*, *Acacia ulicifolia*, *Callitris sp.*, *Hakea dactyloides*, *Hakea sericea*, *Ozothamnus diosmifolius*, *Viminaria juncea*, *Syncarpia glomulifera* and *Corymbia gummifera*. The rate of predation of the plantings in Lot 2 was underestimated, as such, larger tree guards were implemented. In addition, annual exotic species were preserved to lower the impact of

predation on the plantings. Owing to the predation rates and the harsh conditions (dry and exposed soil), survival rates were lower than anticipated.

Primary and secondary works continued into this financial year for the aforementioned removal of Bell Minor habitat, i.e. *Lantana camara*. Various techniques were used, namely drilling, spraying with 9:1 glyphosate and cut/painting.

Routine slashing of exotic grass species such as *Eragrostis curvula*, *Andropogon virginicus* and *Paspalum dilitatum* (as well as flowering *Ageratina adenophora*) was undertaken. *Ageratina Adenophora* was also removed manually or with the cut-paint method.

Pellaea viridis was detected within Lot 2 in areas of previous Lantana primary works. The outbreak was sprayed with a trans-mix of Glyphosate 50:1 and Metsulfuron-methyl (1.5 g per 10L). The outbreak is being closely monitored.

RECOMMENDATIONS

As primary works of Lantana with Lot 2 has been extensive, in addition to the Bell minor canopy dieback, exposed areas still exist that would benefit from revegetation of native trees and shrubs. Owing to the dry and exposed soil, upholding survival rates in these areas is challenging. Translocation of soil-laden seed from Lot 1 with the aid of machinery may also assist the rehabilitation of Lot 2. Installation of steel mesh guards would also help protect plantings, although it is costly.

Significant areas of Lantana within Lot 2 have been cleared, therefore the focus in the immediate future is chiefly on secondary and maintenance of Lantana and exotic species establishing following the primary works of the Lantana. Some patches of Lantana near the eastern dam remain that should be addressed to reduce habitat for the Bell Minors, reducing the risk of canopy dieback.

Lot 1 would benefit from continued monitoring and targeted works around areas prone to weed invasion, in particular areas facing the large mounds. The same can be said of the areas close to the bunds in Lot 2, although Lantana stands there should be preserved to a narrow buffer to aid in the suppress germination of new invasive specimens.

Exotic grasses should continue to be routinely brush cut and suppressed.

SCOPE

The vegetation at Lot 196 (Area C in **Figure 1a**) resembles Coastal Enriched Sandstone Dry Forest intergrading with Sandstone Gully Forest containing *Angophora costata*, *Corymbia gummifera*, *Eucalyptus piperita* with scattered *Eucalyptus haemastoma*. The understory is comprised of *Ceratopetalum gummiferum* and *Banksia serata*, and a grove of *Kunzea ambigua* has established itself on the old nursery site.

An old access road on the most northern edge of the parcel of bushland, referred to as the old commander, is now dominated by exotic perennial grass species *Andropogon virginicus* and *Eragrostis curvula*. The area requires regular maintenance to suppress seed dispersal of the aforementioned grasses.

RESOURCES – 54.5 HOURS

Works focused on revegetating the commander area with fast growing shrubs aiming to improve soil condition for future revegetation projects by breaking up soil compaction and increase soil enrichment through the plantings. 150 viro-tube specimens were planted within late September and early October 2024 including shrub species; *Acacia falcata*, *Acacia longifolia*, *Acacia suaveolens*, *Angophora hispida*, *Banksia ericifolia*, *Hakea dactyloides*, *Hakea sericea*, *Ozothamnus diosmifolius*. The guarded plantings were regularly watered in the following months, owing to the exposed conditions of the commander. Despite the regular watering and maintenance, the planting had a survival rate of 50%. Herbivore predation is also a key factor in plant survival here.

A supplementary planting was undertaken at the commander in May 2025, when conditions were considered favourable for planting for the exposed location. 210 shrub species were planted among the original plantings including species; *Acacia falcata*, *Acacia suaveolens*, *Acacia ulicifolia*, *Hakea sericea* and *Isopogon anethifolius*. 50 guards were installed for the plantings considered vulnerable to predation.

Regular brush-cutting and slashing of exotic grasses, primarily *Andropogon virginicus*, was conducted throughout the year in efforts to suppress spread of seed throughout the area. Hand removal techniques were also used around more sensitive enrichment nodes comprised of juvenile *Kunzea ambigua*. Hand removal was also conducted for emerging *Ageratina adenophora* in the area.

RECOMMENDATIONS

Follow-up maintenance and monitoring of newly planted shrub species is required.

The long-term goal is to revegetate the compact and exposed areas of the site. Bush-it recommends that further plantings of remnant canopy species and competitive native grasses such as *Imperata cylindrica* be established along the strip adjoining Lot 196. Such a plantings provide competition for exotic grasses and prevent them spreading into the better areas.

Regular slashing of *Andropogon virginicus* prior to seeding is recommended in addition to hand removal of any emerging *Ageratina adenophora*.



Figure 5 – Example of supplementary shrub plantings conducted in May 2025.



Figure 6 – Example of *Andropogon virginicus* control around plantings

NATIVE VEGETATION CORRIDOR (NVC)

SCOPE

The Native Vegetation Corridor (NVC) as shown in Area D in **Figure 1a**. native heath in the rehabilitation area continues to flourish and the soil translocation in this area has been very successful. The locally threatened *Darwinia fascicularis subsp. oligantha* has established itself well, as have the *Melaleuca deanei* cuttings that were planted in 2017. The more recent *M. deanei* plantings have put on new growth and were able to have their guards removed.

The biomass of the mother *Melaleuca deanei* was relocated from a developed area to the NVC. Despite appearing otherwise dead, it had small shoots emerging from it. Although chances of revival are most improbable, this shall be monitored for further evidence of remaining life.

RESOURCES – 53.5 HOURS

The largest threat to the NVC continues to be exotic perennial grass species, namely *Andropogon virginicus* and *Cortaderia selloana* blowing in from neighbouring properties. Bush-it has been successful in preventing any new infestations of the exotic grass species through regular sweeps of the NVC and adjacent mounds.

A new infestation of *Cynodon dactylon* was identified within the vegetated mounds abutting the NVC. The incursion was treated with the selective herbicide Fusilade forte 70:1 in October 2024 when the species was actively growing. A follow-up spray was undertaken in January 2025.

Bush-it continues to routinely thin out dominating shrubs, namely *Banksia ericifolia*, aiming to promote biodiversity. The excess material was used to brush mat on exposed bare ground throughout the site, aiming to create microclimates that promote further regeneration from the seed bank. Additionally, seeds were collected from *Acacia suaveolens* and *Acacia linifolia* specimens for propagation at Harvest Nursery.

RECOMMENDATIONS

Continue to monitor and manage competitive native shrubs and trees in the translocation, especially where they overshadow and/or encroach on the threatened species. Bush-it will selectively cull or cut back growth to encourage the most diverse assemblage of plants possible.

Continued monitoring of exotic perennial grasses throughout and bordering NVC. Regular monitoring of previously treated *Cynodon dactylon* outbreaks is recommended.

Establish a buffer planting on the southern boundary that catches wind-driven seed before it reaches the site. Bush-it has regularly picked invasive grasses out of the embankment and brush cut tussocks before they can ripen but, a dense row of *Imperata cylindrica* along this fence line would be ideal.



Figure 7 – Example of areas where scans for and hand removal of minor exotic grass invasions are regularly conducted.



Figure 8 – Example of juvenile *Melaleuca deanei* in NVC



Figure 9 – Example of edge of NVC, free from exotic grasses.

HAERSES ROAD BIODIVERSITY OFFSET AREA (HRBOA)

SCOPE

The vegetation communities represented at Haerses Road Biodiversity Offset Area (HRBOA) (Area E in **Figure 2a**) include Sydney Sandstone Ridgetop Woodland, Sydney Sandstone Gully Forest, and Sydney Sandstone Heath.

The dominant canopy species include *Corymbia gummifera* and *Eucalyptus racemosa*. While on the lower portions of the site, *Angophora costata* and *Eucalyptus piperita* overshadow an understorey of *Syncarpia glomulifera* and *Ceratopetalum gummiferum*. The sandstone heath is prominent throughout the areas close to Haerses Road. The dominant species here include *Angophora hispida*, *Banksia ericifolia* and, *Leptospermum trinervium*.

The HRBOA is an example healthy of remnant native vegetation. Its connected to an area of natural bushland and evidence suggests the trophic complexity and abundance of characteristic native species is high.

The threats to the HRBOA are well managed. On casual observation the soils on site are undisturbed and capable of supporting a diverse range of plants at various life stages. There is also evidence of colonisation of native plants around the perimeter of the HRBOA in areas that have been previously cleared of vegetation.

Given the protection it receives from the HR offset, the number of non-native invasive or undesirable species is low.

RESOURCES – 12 HOURS

Works undertaken within the last twelve months was primarily throughout the creeklines of the site, scouting and treating *Ageratina adenophora* and any other weed incursion. No significant outbreaks were found.

Visits to HRBOA are limited in frequency to minimise the risk of introducing weed incursions and causing damage to the largely good quality bushland.

RECOMMENDATIONS

Continued work in the HRBOA would be assisted by identifying the successional stages of the floristic community and the habitat needs of resident fauna conducive to an ecological burn. A burn would need to be undertaken in accordance with EHG's guidelines with RFS support.

APPENDIX

WEED SPECIES CONTROLLED AT ONR

Common name	Scientific name
Crofton Weed	<i>Ageratina adenophora</i>
Mistflower	<i>Ageratina riparia</i>
Whisky Grass	<i>Andropogon virginicus</i>
Moth vine	<i>Araujia sericifera</i>
sFleabane	<i>Conyza bonariensis</i>
Pampas Grass	<i>Cortaderia selloana</i>
Common Couch	<i>Cynodon dactylon</i> var. <i>dactylon</i>
Summer Grass	<i>Digitaria ciliaris</i>
African Lovegrass	<i>Eragrostis curvula</i>
Cat's Ear	<i>Hypochaeris radicata</i>
Lantana	<i>Lantana camara</i>
Mickey Mouse Plant	<i>Ochna serrulata</i>
Paspalum	<i>Paspalum dilatatum</i>
Green Cliff Brake	<i>Pellaea viridis</i>
Blackberry	<i>Rubus fruticosus</i>
Fireweed	<i>Senecio madagascariensis</i>
Wild Tobacco	<i>Solanum mauritianum</i>
Purpletop	<i>Verbena bonariensis</i>

REGISTER OF HERBICIDE RECORDS

Date	Operator name	Herbicide name	Wind speed (km/h)	Direction	Notes	Application method	Qty (ml/g)	Volume (L)	Start time	End time
24/10/2024	Zoe	Fusilade Forte 128 g/L Fluazifop-P	16.7	SSE	Targeting Couch in mounds near NVC	Spray	105	7	7:30:00	9:30:00
21/01/2024	Zoe	Fusilade Forte 128 g/L Fluazifop-P	0	N	Targeting Couch in mounds near NVC	Spray	165	11	7:30:00	9:30:00
10/04/2025	Pat	Glyphosate 360g/L and Metsulfuron-methyl 600g/kg	3.7	NNE	Trans-mix of glyphosate and Mets targeting <i>Pellaea viridis</i>	Spray	60/0.45	3	11:30:00	12:30:00

DISTRIBUTION OF HOURS ACROSS MANAGEMENT ZONES

Zone	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Admin	12	1	2	2.75	2.75	0.5	0.5	1.5	0.5	0.5	1.5	0.5	26
ONR – Embankment at Front Gate	0	0	0	0	0	0	0	0	3	0	0	0	3
ONR – Lot 1 & 2	14	35	73	33	10	0	0	27.5	9	2	4	7	214.5
ONR – Lot 196	0	2	7.5	22	0	0	0	9	3	0	11	0	54.5
ONR – NVC	12	8	3	17	2	12	7.5	0	0	0	0	0	61.5
ONR - HRBOA	0	4.5	0	7.5	0	0	0	0	0	0	0	0	12
TOTAL	38	50.5	85.5	82.25	14.75	12.5	8	38	15.5	2.5	16.5	7.5	371.5

Appendix H - Annual Biodiversity & Rehabilitation Management Report

**ANNUAL
BIODIVERSITY
&
REHABILITATION
MANAGEMENT
REPORT
Old Northern Road
2025**

Prepared for Dixon Sand Pty Ltd

August 2025 V.1



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**Annual Biodiversity
&
Rehabilitation Management
Report
Old Northern Road
2025
Dixon Sand Pty Ltd**

This assessment has been prepared by

Melissa Mass

August 2025 V.1

Date

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Abbreviations

Abbreviation	Description
BC Act	<i>Biodiversity Conservation Act 2016</i>
EEC	Endangered Ecological Community
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
HRBOA	Haerses Road Biodiversity Offset Area
HTW	High Threat Weed
KPI	Key Performance Indicators
KTP	Key Threatening Process
LEP	Local Environmental Plan
Mod 4	Modification 4
Mod 5	Modification 5
NSW OEH	New South Wales Office of Environment and Heritage
NVC	Native Vegetation Corridor
ONR	Old Northern Road
PCT	Plant Community Type
SEPP	State Environmental Planning Policy
THSC	The Hills Shire Council
VIS	Vegetation Information System
WoNS	Weed of National Significance

1 INTRODUCTION

This report presents the findings of the annual monitoring of the biodiversity value and rehabilitation effort within the Dixon Sand operation at Old Northern Road Maroota and the biodiversity value of the offset vegetation at Haerses Road Maroota.

1.1 BACKGROUND

Dixon Sand Pty Ltd operates a sand extraction and processing operation across 58.4 hectares on Lot 29 DP752025, Lot 196 DP752025, Lot 1 DP547255 and Lot 2 DP547255 Old Northern Road Maroota. The quarry operates in compliance to Development Consent 250-09-01 issued by the Land and Environment Court in 2004.

Several modifications have been made to the Development Consent, the most recent being described as Modification 5. A previous modification, known as Mod 4, involved the clearing of native vegetation for continued sand extraction resulting in consent conditions requiring the management of biodiversity values and impacts. Thus, a Biodiversity Offset Strategy for the Old Northern Road quarry site was established which includes a Native Vegetation Corridor (NVC) and the Haerses Road Biodiversity Offset Area (HRBOA).

1.2 OBJECTIVES

The objectives of this Annual Biodiversity and Rehabilitation Management Report are to describe the current condition of the NVC and the HRBOA and to advise Dixon Sand on the appropriate management measures required to be implemented in order to meet the expectations of the Old Northern Road Quarry Biodiversity and Rehabilitation Management Plan (2018) prepared by Umwelt (Australia) Pty Ltd.

This report will:

- identify native flora and fauna species, populations and ecological communities known to or likely to occur within the NVC and HRBOA;
- describe the native vegetation and habitats within the NVC and HRBOA;
- describe the current condition of the threatened flora and its habitat found outside of the NVC at Old Northern Road;
- discuss the ongoing monitoring of threatened flora and fauna previously recorded at both ONR and HRBOA;
- determine the legislative and conservation significance of species, populations and ecological communities known or likely to occur within the NVC and HRBOA with reference to the Commonwealth *EPBC Act 1999* and the *NSW BC Act 2016*;
- recommend appropriate biodiversity and environmental management measures that should be implemented to reach criteria for monitoring success set by the Old Northern Road Quarry Biodiversity and Rehabilitation Management Plan (2018);
- provide an independent monitoring report for inclusion as part of the external reporting for the quarry Annual Review.

2 METHODOLOGY

2.1 SITE HISTORY

2.1.1 Old Northern Road Native Vegetation Corridor

The NVC on the Old Northern Road quarry site is 6.83 hectares, approximately 100m wide and 650m in length in an east-west direction. Approximately half the area of the NVC has been, or is currently, disturbed for sand and sandstone extraction and areas dedicated as silt ponds. Approximately 0.8 hectares is currently under active rehabilitation as will be discussed further in this report.

The remaining vegetation within the NVC is disturbed and modified. Livestock grazing, timber removal and fruit orchards in the immediate and adjacent lands have contributed to the ongoing disturbance over many years within this area. As a result, exotic weed species had become prolific and at times dominated the landscape. Committed long term weed management has decreased the weed burden significantly. Farm dams had been dug which once provided irrigation to the fruit orchards and watered livestock. They now provide a water source for native and exotic species which occur in the immediate area.

Unsealed tracks are found throughout the NVC and 200m buffer to the Maroota Primary School which currently provide easy access for vehicles or pedestrians.

2.1.2 Haerses Road Biodiversity Offset Area

The HRBOA is relatively undisturbed native vegetation which covers an area of 8.7 hectares. Four vegetation communities have been identified within the offset which includes habitat for threatened species known to occur in the area. Old vehicle tracks occur within the site although over time, with very little use, the tracks are now suitable for pedestrian access only.

2.1.3 Threatened flora habitat

An area to the west of the Old Northern Road NVC contains threatened flora habitat which has previously been identified and monitored. This area has had very little disturbance due to its location and unsuitability for grazing, farming or logging. A haul road had previously been constructed adjacent to the site however this road is no longer in use and most likely had very minimal impact upon the threatened flora habitat.

2.2 FIELD SURVEY

Botanical surveys of the study area were conducted over several days spread throughout June and July 2025. Fixed quadrat locations from previous annual surveys were revisited for annual flora comparison. Quadrat locations in the HRBOA were each marked with a permanent steel post and a yellow cap in the centre location along the western edge of the quadrat. The Old Northern Road NVC quadrats were marked with flagging tape given that some vegetation within the NVC is still subject to disturbance by sand extraction.

Each quadrat was 20m x 50m which included a subplot of 20m x 20m and five smaller nested plots of 1m x 1m, in line with the NSW Biodiversity Assessment Method flora survey assessment. A random meander was conducted through most other areas of native vegetation within the study area, to search for threatened flora species, and to record information on habitat condition.

All flora species recorded are listed in Appendix A, B and C of this report.

Vegetation communities were identified and described with reference to the vegetation maps developed by THSC, the NSW Vegetation Information System (VIS), The Eastern NSW PCT Classification, the descriptions in Tozer et al (2010), and with reference to vegetation descriptions included by the Scientific Committee final determinations to list threatened communities under the *BC Act 2016* and the *EPBC Act 1999*.

An assessment of fauna habitat was conducted within each survey quadrat to identify suitability for potential threatened fauna species known to occur in the local area.

The habitat assessment included the suitability of landscape features, hollow-bearing trees, stags, fallen timber and logs, rocky outcrops and boulders, flowering Eucalypts, specific feed trees for Glossy Black Cockatoo's, Swift Parrot, Koalas, Grey-headed Flying Fox, site connectivity, vegetation structure and vegetation types.

Searches were also undertaken for indirect evidence of native fauna, including scratches, scats, nests, hollows in use, camps, roosts, den sites etc. Opportunistic sightings of all fauna species were recorded throughout the survey period.

The following fauna survey methods were performed to target threatened species known to occur or likely to occur in the local area:

- General search with direct observation of any fauna species present within the study area, including diurnal call identifications;
- Early morning dedicated bird surveys;
- Unbaited motion detection infra-red digital camera left within the NVC and HRBOA for a total of 30 survey nights at each location;
- Anabat recording device left within the NVC and HRBOA for a total of 30 survey nights at each location.

A list of fauna species recorded across all sites is provided in appendix D and E.

Within each 50m x 20m quadrat the following information was recorded:

- centre of western edge GPS location
- aspect and slope of midline
- photograph of midline from western centre edge
- IBRA region
- vegetation class
- Plant Community Type (PCT)
- stem class including recruitment
- standing hollow count
- overall length of logs

The quadrats 20m x 20m recorded:

- every flora species identified
- abundance of each species recorded
- count of stratum richness
- percentage of High Threat Weed (HTW) cover

From within the five 1m x 1m plots the following information was recorded:

- litter cover
- native overstorey foliage cover

- native midstorey foliage cover
- native groundcover foliage cover
- cryptogam cover
- rock cover
- bare ground

Results collected from the 1m x 1m plots at each site is displayed as an average.

2.3 CRITERIA TO MONITOR SUCCESS OF REHABILITATION

The Key Performance Indicators (KPI) to measure success of the biodiversity and rehabilitation effort of the Old Northern Road NVC and the vegetation management within the HRBOA have been outlined by Umwelt (Australia) Pty Ltd 2018. The following tables depict the performance and completion criteria for both locations.

Table 1. Performance and completion criteria for Old Northern Road NVC (taken from Umwelt Pty Ltd 2018)

<i>Rehabilitation Performance and Completion Criteria</i>	
<i>Native Vegetation</i>	Revegetation areas contain flora species assemblages characteristic of the desired native vegetation communities Second generation tree seedlings are present or likely to be, based on monitoring in comparable older rehabilitation sites (i.e. evidence of fruiting of native species observed) More than 75 percent of trees are healthy and growing as indicated by long term monitoring More than 50 percent of translocated or propagated threatened flora species survive as indicated by long term monitoring There is no significant weed infestation such that weeds do not comprise a significant proportion of species in any stratum
<i>Weeds and Pests</i>	Regular inspections indicate a decline in weed diversity, density and abundance and a decline in signs of feral animal activity There is no significant weed infestation such that weeds do not comprise a significant proportion of species in any stratum There is no evidence of significant damage resulting from feral animal activity

Table 2. Performance and measurable indicators for HRBOA (taken from Cumberland Ecology 2016)

<i>Performance and measurable indicators</i>	
<i>Native Vegetation</i>	Maintenance of current level of native species diversity and abundance Maintenance of current level of canopy regeneration Measurable increase in habitat features
<i>Weeds</i>	Measurable decrease in impacts from feral fauna activity Measurable decline in weed density and distribution Measurable decline in weed diversity Limited recruitment of new weed species

<i>Feral Animals</i>	Observable reduction in decline of native fauna populations due to either predation by feral species, habitat degradation caused by feral fauna or competition with feral fauna
	Limited recruitment of new feral species
<i>General</i>	Measurable increase in the condition of vegetation
	Observable reduction in signs of erosion (if any)
	Evidence of restrictions to site access
	Observable decrease in bushfire risk

Furthermore, threatened flora species KPI for the translocated individuals and the flora species in-situ are to maintain or increase resident species population from the baseline levels which will be determined from this report.

Threatened fauna species previously identified at the Old Northern Road site and HRBOA are to be maintained or increase in population size based on a presence or absence survey each year following the baseline information within the Biodiversity Rehabilitation Management Plan (Umwelt Pty Ltd 2018).

2.4 SURVEY LIMITATIONS

The flora survey was conducted within a short timeframe during winter. Therefore some plant species may not have been identified due to the survey being performed when not in flower, or when dormant. It is noted that some flora species are seasonal and may not have been visible at the time of the surveys.

The survey limitations have been addressed through:

- consideration of flora and fauna species known to occur in the locality (including number of records from Bionet);
- consideration of habitat suitability present within the study areas and connectivity to other areas of habitat in the local landscape;
- consideration of current weather conditions;
- a conservative approach in assuming the presence of a species that could potentially be present in the study areas.

Where the study area contains potential habitat for threatened fauna species known to occur in the locality, and where survey areas support a likelihood of occurrence, it has been assumed on a conservative approach that such species may occur in the study area.

3 RESULTS

Results from the field surveys conducted over June and July 2025 have been separated into four distinct areas to enable quantification of condition for each specific location and its monitoring objectives.

3.1 OLD NORTHERN ROAD

The Old Northern Road NVC is currently in the mid stage of its rehabilitation strategy. Rehabilitation has begun within Lot 29 while extraction continues in Lot 1 and 2. Collection of propagation material from threatened flora species, *Melaleuca deanei* and *Darwinia fascicularis subsp oligantha*, has taken place with enough successful clone individuals been successfully raised to meet the approved quota. The *M. deanei* individuals were required to be established and actively growing in the ground before the removal of the parent plant could be undertaken. This was achieved in May 2022 with a total of 52 cloned *M. deanei* successfully transplanted into the rehabilitation area showing signs of active growth. An attempt to translocate the parent plant into the active rehabilitation area was undertaken in June 2022.

Dedicated rehabilitation of native vegetation on Lot 29 begun in late 2017. An area of approximately 0.8 hectares was selected and prepared for three rehabilitation methods to use as a comparison for future reference. The larger area (approximately 0.4 hectares) has been planted out using local provenance stock and plants derived from material collected from threatened species onsite. In total 47 species have been planted within the rehabilitation area, including two threatened species. Artificial habitat structures such as rock, logs and plant debris have been placed around the rehabilitation site to provide habitat for small birds and reptiles.

Two adjacent areas, of approximately similar sizes, have undergone rehabilitation in conjunction with the planted rehabilitation. The area to the immediate south of the planted rehabilitation has undergone translocation of plant material, including root balls of several species together. This is a particularly successful conservation tool when used for threatened species which have little chance of survival in their current location. This approach has been used here to relocate *Darwinia fascicularis subsp. oligantha* along with flora species found within immediate and close proximity of each cluster of the threatened plants. Habitat features such as rocks, logs and plant debris have also been placed around the site to provide habitat for small birds, reptiles and to create microhabitats for dependant flora species.

The far western area of the NVC rehabilitation area has been spread with soil containing native seed bank and supplementary planting of threatened flora species. Habitat features have also been provided in this location.

Monitoring of vegetation condition has begun in other areas of the NVC, including areas which will be subjected to disturbance from sand extraction. The information gained from the pre-disturbance monitoring will provide Dixon Sand with quantitative data which can be used to rehabilitate the NVC back to, or close to, its pre-disturbance state.

Other areas of vegetation monitoring outside of the established rehabilitation corridor has also taken place to determine the effects of the sand extraction project on retained vegetation.

3.1.1 Rehabilitation area – Planted

The planted rehabilitation area is approximately 0.4 hectares in size and has been planted with 47 native species including 2 species listed on the *BC Act 2016* as being species of significance, *Melaleuca deanei* (vulnerable) and *Darwinia fascicularis subsp. Oligantha* (endangered population). In addition to the revegetation planting several species have emerged from seed bank storage from the sub-soil which was spread over the rehabilitation site before planting commenced or from seed migration into the site from wind, birds, ants or mammal carriers. In total 49 native species which were not recorded as planted within the rehabilitation site were identified during the 2025 survey period including the vulnerable species *Tetratheca glandulosa*. This is a decrease of 16 species since last year most of which the recorded losses are forbs and ferns. The return to average climatic conditions has likely resulted in the short lived and moisture dependant small forbs and ferns being out competed by hardier shrubs and grasses. In some cases the species which were not recorded during the 2025 survey period may have been outside of their active growing and flowering season and therefore difficult to identify. There was one weed species identified within the planted revegetation area in very low density, Whiskey Grass *Andropogon virginicus*.

There were 14 live specimens of *Melaleuca deanei*, 10 live specimens of *Darwinia fascicularis subsp. Oligantha* and 6 live specimens of *Tetratheca glandulosa* located within the planted rehabilitation area. The previously identified threatened species which had self-germinated in 2020, *Acacia bynoeana* and *Pimelea curviflora var. curviflora*, could not be located during the 2025 flora survey. This could suggest the species responded to the abundance of moisture present over the 2020-2022 period and was short lived, or it may have been preyed upon by herbivores which are present within the rehabilitation area.

The overall condition of the planted rehabilitation area is very good. The canopy trees have reached reproductive maturity with flowering buds present during the July survey period. Species diversity appears to have reached its peak with slight reduction in forbs, ferns and grasses noted. Native mammal species which have been recorded this year as being present including macropods, bandicoots and possums. Bird diversity appears to have remained the same as the previous year with 10 species recorded again in 2025 within the rehabilitation site during vegetation surveys.



Image 1. View of planted rehabilitation area from north-west corner looking east 2024



Image 2. Comparison view of planted rehabilitation area from north-west corner looking east 2025



Image 3. View of planted rehabilitation area from south-east corner looking west 2024



Image 4. Comparison view of planted rehabilitation area from south-east corner looking west 2025



Image 5. *Melaleuca deanei* planted in 2017 within the planted rehabilitation area 2025



Image 6. *Darwinia fascicularis subsp. Oligantha* planted in 2017 within the planted rehabilitation area 2025



Image 7. *Tetratheca glandulosa* within the planted rehabilitation area 2025

3.1.2 Rehabilitation area – Translocated

The translocated rehabilitation area was not subjected to a flora survey, as per the vegetation survey site locations suggested in the Biodiversity Rehabilitation Management Plan 2018. However, a random meander through the area recording flora species was undertaken. Species identified and recorded can be found in Appendix B. Photo monitoring should, over time, be sufficient to determine the rehabilitation success of this area.

Overall coverage of vegetation from the translocation and continued recruitment from seed bank storage appears to be ample. Translocated *Darwinia fascicularis subsp. Oligantha* is numerous, particularly on the western side of the site, although some losses are evident where shading from nearby trees and shrubs are impacting the habitat requirements for the species. All age classes were observed from small seedlings to adult shrubs which had limited flower at the time of the survey period.

A single *Tetratheca glandulosa* which was translocated in 2021 appears in a healthy state with flower buds present during July suggesting flowering will begin in the coming months.

Three *Melaleuca deanei* which were planted within this area in 2017 are still present and appear healthy. A further 32 *M. deanei* have been planted within this area during 2020-2022. Only 18 were able to be located due to plant guards being removed during the reporting period and no other means of locating the plants provided. It is highly likely that all plants are still present as the 18 plants which

were located all appeared to be doing well with most showing signs of active growth. These plants will continue to be closely monitored. The parent plant was translocated into this area following the quota of replacement plants being met. The plant was translocated using a loader with a large bucket picking up as much soil and root ball as possible. Unfortunately the main tap root was broken during this process and the plant material died back. The two soil mounds which remain each had a single seedling emerging which appeared to be *M. deanei* during last years flora survey. Unfortunately these seedlings were not present during the 2025 survey period suggesting they have perished or been predated upon by herbivores.

There is currently no upper canopy within this area however *Eucalyptus sp.*, *Corymbia sp.* and *Angophora hispida* recruits were observed. Shrubs and ground cover plants are abundant throughout the area.



Image 8. Translocated *Tetratheca glandulosa* flowering within the translocation area 2025

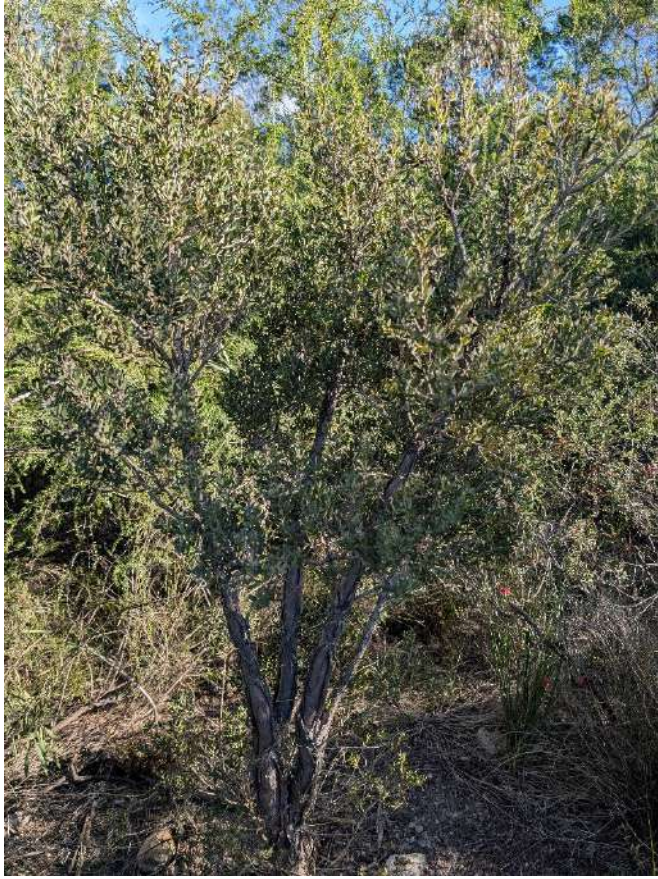


Image 9. *Melaleuca deanei* planted in 2017 within the translocation area 2024



Image 10. *Melaleuca deanei* planted in 2021 within the translocation area



Image 11. *Darwinia fascicularis subsp. oligantha* within the translocation area 2025

3.1.3 Rehabilitation area – Soil seed bank

The soil seed bank rehabilitation area was not subjected to a flora survey, as per the vegetation survey site locations suggested in the Biodiversity Rehabilitation Management Plan 2018. A random meander through the area recording flora species was undertaken and a count of living planted threatened species was recorded. Photo monitoring of the area will determine rehabilitation success.

Ample natural recruitment of native species is occurring across the site with recruitment of *Darwinia fascicularis subsp. Oligantha* evident. Canopy stratum is becoming more dominant with *Eucalyptus sp* and *Corymbia sp.* observed. *Banksia ericifolia* dominates the recovering shrub layer with *Grevillea buxifolia* and *Acacia suaveolens* also widespread. Previously *Acacia suaveolens* had dominated this area however the Banksia has outgrown most of the other species present. Ground cover species are present throughout although due to the density of the shrub layer the ground cover is sporadically distributed.

There were 20 *Darwinia fascicularis subsp. oligantha* identified scattered throughout the site, some of which are new recruits. A single planted *Melaleuca deanei* was located during the survey period and was measured to stand approximately 2m tall. The density of the shrub regrowth is suspected of hampering the efforts to locate other individuals. All the surviving threatened species which were located as present appear to be healthy.

3.1.4 Front gate rehabilitation

The front gate rehabilitation was initially planted in 2017. The hot dry conditions between 2017 and 2020 resulted in a number of losses and slow growth to the surviving plants despite regular watering and maintenance. Since the return to regular rainfall the front gate rehabilitation area has thrived with many shrubs flowering well and new recruitments evident, although weed density has also increased. Recruitment from natural regeneration has occurred minimising the gaps between flora coverage and providing more ample soil coverage. Leaf litter is beginning to increase which will provide soil moisture and protection over time. Two *Melaleuca deanei* were planted in this area during 2023 however neither has survived due to lack of watering and the compacted ground.



Image 12. View of translocated rehabilitation area from south-west looking east 2024



Image 13. Comparison view of translocated rehabilitation area from south-west looking east 2025



Image 14. View of soil seed bank rehabilitation area from north looking south 2024



Image 15. Comparison view of soil seed bank rehabilitation area from north looking south 2025



Image 16. View of soil seed bank rehabilitation area from south looking north 2024



Image 17. Comparison view of soil seed bank rehabilitation area from south looking north 2025



Image 18. Front gate rehabilitation area 2025

3.1.5 Vegetation monitoring within NVC

The Biodiversity Rehabilitation Management Plan 2018 indicates that nine vegetation monitoring sites should be established across the Old Northern Road site. Five of these sites occur within the NVC including one site within the planted rehabilitation area discussed in 3.1.1 of this report.

From the remaining four sites only one could be safely accessed for monitoring as the other three monitoring sites are currently under sand and sandstone extraction operations.

The vegetation in the surveyed area is described in the Biodiversity Rehabilitation Management Plan 2018 as being *Eucalyptus punctata* woodland. The species recorded within the survey site came to the determination that the VIS classification for this PCT best fit is 1328 - *Yellow Bloodwood - Narrow-leaved Apple heathy woodland on hinterland plateaux of the Central Coast, Sydney Basin Bioregion*. In 2023 the Eastern NSW PCT Classification was officially endorsed by the NSW State Government which oversaw the reclassification of all PCT's along the east coast. PCT1328 was split into several PCT's which had association with the species present. The most relevant and best suited PCT for the NVC survey plot is now considered PCT3622 – Sydney Hinterland Yellow Bloodwood Woodland. Information collected during the survey period has been summarised in Table 3 while a full list of flora recorded can be found in Appendix A.

The overall health of the vegetation and biodiversity within the remaining NVC is moderate. There has been historic disturbance in the area most likely from livestock grazing and timber removal. Recent average rainfall in the local area has assisted in the stabilization of vegetation from the previous drought and then wet conditions.

The remaining areas throughout the NVC continue to be impacted from the presence of *Lantana camara*. An effort to remove and control the species has been ongoing for several years however due to the distribution and density it will require further long term management to completely remove the species across the entire site. Locations where Lantana has been removed and controlled are recovering well with ground cover grasses and forbs beginning to establish a moderate ground cover.

During the 2022 reporting period it was determined that the required ratio of clone *Melaleuca deanei* had been successfully transplanted into the rehabilitation area allowing for the removal of the parent plant(s). An attempt was made to translocate the parent plant into the rehabilitation area via digging around the root ball and carrying the plant with the root ball attached in a loader bucket. The root system for the parent plant was extensive and had coiled around large sandstone boulders and through the cracks of others. Therefore during retrieval of the plant much of the root system was unfortunately damaged. The parent plant was placed within the rehabilitation area with the root ball and immediate surrounding soil. Unfortunately the parent plant perished following translocation with the two seedlings which emerged from the root ball also appearing to have died within the 2024-2025 reporting period.

Table 3. Survey summary from NVC survey site location ONR quadrat 2.

3622- Sydney Hinterland Yellow Bloodwood Woodland					
AGD Zone 56 Easting – 0313182		Northing – 06296257		Midline - 89°	
Vegetation Layer		Height Range	Vegetation Layer		
Trees	15 – 20m	Corymbia gummifera, Eucalyptus punctata, Eucalyptus haemastoma, Angophora bakeri, Allocasuarina littoralis			
Shrubs	0.5 – 2m	Acacia linifolia, Grevillea buxifolia, Hakea sericea, Pimelea linifolia, Bossiaea obcordata, Platysace linearifolia			
Groundcover	0.1 – 0.5m	Pratia purpurascens, Lomandra longifolia, Entolasia stricta, Themeda australis,			
Stem Class		Hollows			
Dbh	Eucalyptus	Non-Eucalypt	<20cm	>20cm	
80cm+					
50-79cm	✓		1	2	
30-49cm	✓		2		
20-29cm	✓				
10-19cm	✓				
5-9cm	✓	✓			
<5cm	✓	✓			
Composition & Structure		Composition Count		Structure cover %	
Trees		6		41	
Shrubs		18		47	
Grasses etc		8		33	
Forbs		5		2	
Ferns		1		2	
Other		3		3	
High Threat Weeds		0		0	
Ecosystem Functions					
Length of habitat logs					40 m
Litter cover					42%
Bare ground cover					5%
Cryptogam cover					20%
Rock cover					5%
Overstorey foliage cover					40%
Mid-storey foliage cover					47%
Groundcover foliage cover		40%			



Image 19. Midline view of NVC survey quadrat 2 2025

3.1.6 Vegetation monitoring outside NVC

There were four monitoring sites identified outside of the NVC which were proposed to be surveyed. Two of these locations were unable to be accessed due to sand extraction currently taking place. Another of the locations was not able to be accessed due to impenetrable thickets of *Lantana camara*. The remaining monitoring site and an additional monitoring site were selected for surveying to provide baseline data for ongoing assessment over the site.

The vegetation within Plot 1 was previously determined to be PCT 1181 – *Smooth-barked Apple – Red Bloodwood – Sydney Peppermint heathy open forest on slopes of dry sandstone gullies of western and southern Sydney, Sydney Basin Bioregion*. The Eastern NSW PCT Classification has split this PCT into several PCT's with PCT 3617 – *Sydney Hinterland Peppermint-Apple Forest* being the best fit for the vegetation located in Plot 1. This survey location is outside of the NVC although within the 250m buffer area to Maroota Public School in the southeast corner of the site. This area has had historic disturbance most likely from timber harvesting. An abundance of *Eucalyptus piperita* are regenerating within this quadrat at around the same age class which suggests at some stage the area was once cleared. Despite this, the diversity within the survey site is reasonable and the biodiversity values are moderate. The area where this quadrat is located will not be subjected to clearing so will therefore provide an opportunity for monitoring the effects of sand extraction in nearby retained vegetation.

The additional survey site, Plot 4, was undertaken within an area of vegetation determined to also be PCT 3617 – *Sydney Hinterland Peppermint-Apple Forest*. This survey location is just within the 250m buffer to the Maroota Public School in the centre of the site and will not be subject to clearing for quarry activities. It is therefore likely to provide good baseline data for rehabilitation of the vegetation community for future reference. The vegetation within the survey plot appears to have very little disturbance and contains no exotic weed species.

The remaining vegetation within the 250m buffer area appeared to have some impacts from the spread and growth of *Lantana camara* therefore a third survey quadrat within the recommended survey area was not undertaken. Efforts have been made to reduce the impacts from the invasive species however the progress is slow and favourable weather conditions for growth have made control difficult. It is expected that as the *Lantana* thickets are removed or reduced in density a further survey plot will be added to the annual monitoring to ensure ample recovery of the area.

The vegetation within these two survey areas have seen a slight reduction in shrub, forb and grass diversity over the survey period. This is likely due to the stabilisation of competing species following the three good years of growing conditions from 2021-2023. The reporting period has experienced dry periods and wet periods which are likely to have contributed to the reduction and loss of some species which are better suited to stable climatic conditions. Overall, the vegetation within the quadrats remains stable with persisting species well established and increasing in density.

Table 4. Survey summary for area outside NVC Survey site location ONR quadrat 1

3617 – Sydney Hinterland Peppermint-Apple Forest				
AGD Zone 56 Easting – 0313250 Northing – 06296390 Midline - 230°				
Vegetation Layer		Height Range		
Vegetation Layer		Vegetation Layer		
Trees	20 – 30m	<i>Eucalyptus piperita, Eucalyptus punctata, Angophora costata, Allocasuarina littoralis, Ceratopetalum gummiferum</i>		
Shrubs	0.5 – 2m	<i>Leptospermum polygalifolium, Kunzea ambigua, Banksia spinulosa, Bossiaea obcordata, Epacris pulchella</i>		
Groundcover	0.1 – 0.5m	<i>Lomandra filiformis, Xanthosia pilosa, Lomandra longifolia, Themeda australis, Entolasia stricta, Microleana stipoides</i>		
Stem Class		Hollows		
Dbh	Eucalyptus	Non-Eucalypt	<20cm	>20cm
80cm+				
50-79cm				
30-49cm	✓		1	
20-29cm	✓			
10-19cm	✓			
5-9cm	✓	✓		
<5cm	✓	✓		
Composition & Structure		Composition Count		Structure cover %
Trees		6		55
Shrubs		11		33
Grasses etc		9		40
Forbs		6		1
Ferns		1		2
Other		4		2
High Threat Weeds		0		0
Ecosystem Functions				
Length of habitat logs		16.5m		
Litter cover		480%		
Bare ground cover		0%		
Cryptogam cover		30%		
Rock cover		5%		
Overstorey foliage cover		55%		
Mid-storey foliage cover		33%		
Groundcover foliage cover		45%		

Table 5. Survey summary for area outside NVC Survey site location ONR quadrat 4

3617 – Sydney Hinterland Peppermint-Apple Forest				
AGD Zone 56 Easting – 0313263 Northing – 06296592 Midline - 90°				
Vegetation Layer		Height Range		
Vegetation Layer		Vegetation Layer		
Trees	20 – 30m	<i>Eucalyptus piperita, Eucalyptus pilularis, Angophora costata, Allocasuarina littoralis, Ceratopetalum gummiferum, Corymbia gummifera</i>		
Shrubs	0.5 – 2m	<i>Banksia spinulosa, Persoonia linearis, Acacia ulicifolia, Bossiaea obcordata, Hakea sericea, Leucopogon parviflorus</i>		
Groundcover	0.1 – 0.5m	<i>Pteridium esculentum, Lomandra multiflora, Themeda australis, Entolasia stricta, Smilax glycyphylla</i>		
Stem Class		Hollows		
Dbh	Eucalyptus	Non-Eucalypt	<20cm	>20cm
80cm+				
50-79cm	✓		2	2
30-49cm	✓		3	
20-29cm	✓			
10-19cm	✓	✓		
5-9cm	✓	✓		
<5cm	✓	✓		
Composition & Structure		Composition Count		Structure cover %
Trees		7		50
Shrubs		18		33
Grasses etc		8		17
Forbs		8		2
Ferns		2		5
Other		4		2
High Threat Weeds		0		0
Ecosystem Functions				
Length of habitat logs		32m		
Litter cover		350%		
Bare ground cover		1%		
Cryptogam cover		20%		
Rock cover		20%		
Overstorey foliage cover		50%		
Mid-storey foliage cover		33%		
Groundcover foliage cover		26%		



Image 20. Midline view of ONR quadrat 1 2025



Image 21. Midline view of ONR quadrat 4 2025

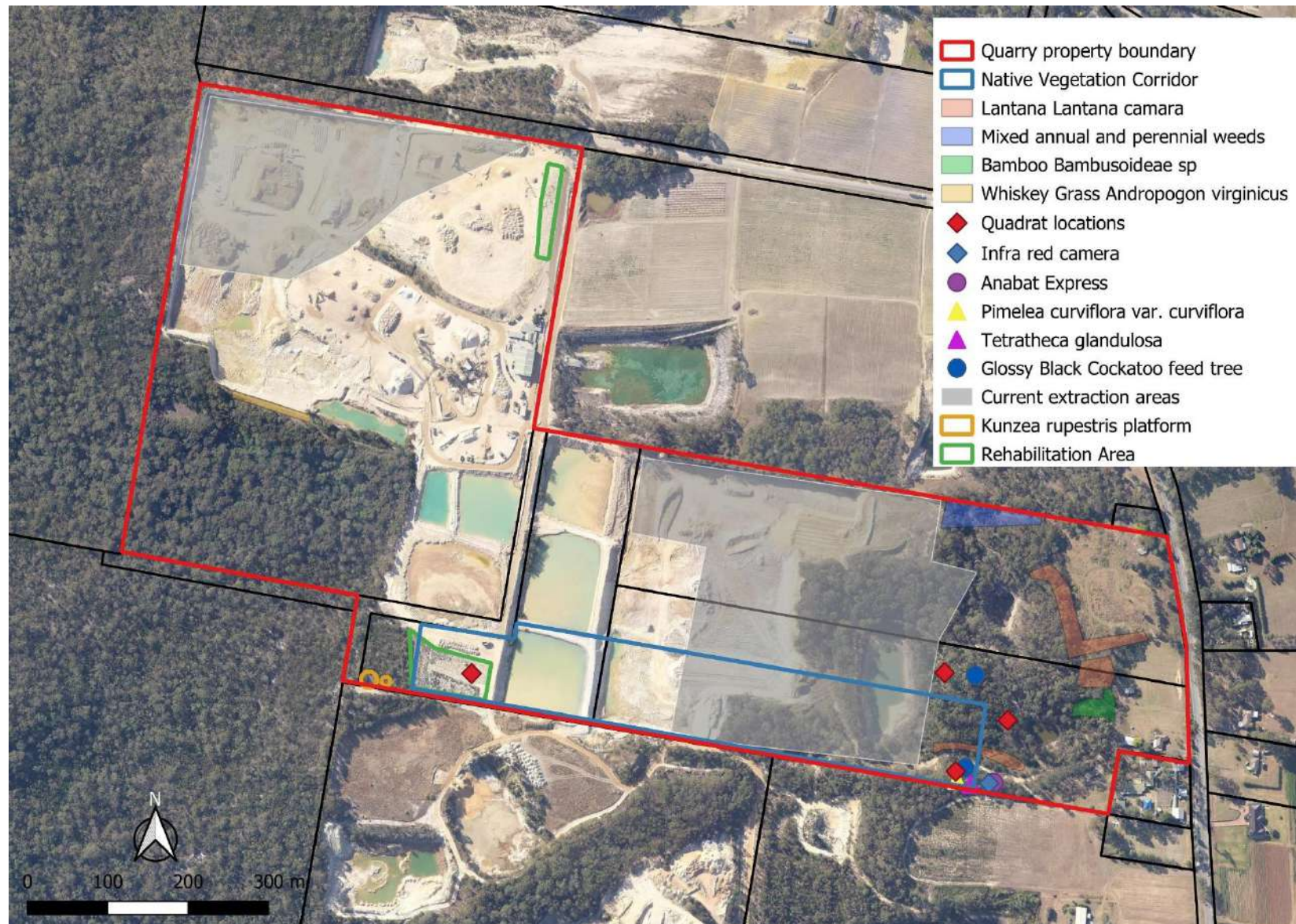


Image 22. ONR survey site locations 2025

3.2 HAERSES ROAD BIODIVERSITY OFFSET AREA

The HRBOA has a total of five monitoring sites specifically to provide benchmark values for the vegetation communities found within the site. Baseline data collected and discussed within this report will enable a measurable value of success for management actions which may be implemented over the life of the offset.

It is expected over time there will be an increase in biodiversity, habitat features, ongoing evidence of natural recruitment and a decrease in exotic fauna and flora presence.

Each of the survey locations has been permanently marked with a steel post and yellow cap indicating the plot identification number.

Cumberland Ecology (2016) had previously identified four vegetation communities onsite as Sydney sandstone Ridgetop Woodland, Sydney Hinterland Transition Woodland, Sydney Sandstone Gully Forest and Sydney Sandstone Heath (Heath/Woodland Complex). Each survey location surveyed was given a best fit PCT based on the classification of the VIS which was determined by the native species most abundant throughout the quadrat. Reassigning PCT to the new Eastern NSW PCT Classification has resulted in the following PCT's being identified:

- Plot 1 – (1181) 3617 – Sydney Hinterland Peppermint-Apple Forest
- Plot 2 – (1641) 3807 - Northern Sydney Heath-Mallee
- Plot 3 – (1181) 3617 – Sydney Hinterland Peppermint-Apple Forest
- Plot 4 – (1627) 3621 – Sydney Hinterland Turpentine-Apple Gully Forest
- Plot 5 – (1643) 3593 – Sydney Coastal Sandstone Bloodwood Shrub Forest

These PCT's are in line with the broader definition given in the Cumberland Ecology Biodiversity Management Plan 2016.

Plot 2 had an abundance of the threatened flora species *Darwinia biflora* present. This shrub was noted to be very well represented throughout the entire area of the PCT 3807.

Overall there was a stabilisation to foliage cover and structure cover in most strata at most survey sites. Grass and ground cover species appear to have adjusted from the previous wet conditions with a slight decrease in density this survey period following the return to average conditions. Extensive Long-nosed Bandicoot digs were again noted in an area close to Quadrat 1. Bird presence and density has remained consistent from last survey period, likely due to the favourable weather conditions.

The following tables (6 – 10) are a summary of the survey results at each of the plot locations across HRBOA.

Table 6. Survey summary for survey site location HRBOA quadrat 1

3617 – Sydney Hinterland Peppermint-Apple Forest					
AGD Zone 56 Easting – 0312740 Northing – 06293489 Midline - 130°					
Vegetation Layer		Height Range	Vegetation Layer		
Trees	20 – 30m	Angophora costata, Corymbia gummifera, Allocasuarina littoralis, Ceratopetalum gummiferum, Banksia Serrata			
Shrubs	0.5 – 2m	Leptospermum trinervium, Persoonia pinifolia, Lambertia Formosa, Boronia floribunda, Grevillea speciosa, Acacia ulicifolia			
Groundcover	0.1 – 0.5m	Caustis flexosa, Cyathochaeta diandra, Pteridium esculentum, Entolasia stricta, Smilax glyciphylla, Xanthorrhoea media			
Stem Class		Hollows			
Dbh	Eucalyptus	Non-Eucalypt	<20cm	>20cm	
80cm+					
50-79cm	✓		1	1	
30-49cm	✓		1		
20-29cm	✓	✓			
10-19cm	✓	✓			
5-9cm	✓	✓			
<5cm	✓	✓			
Composition & Structure		Composition Count		Structure cover %	
Trees		6		40	
Shrubs		17		18	
Grasses etc		7		56	
Forbs		5		2	
Ferns		2		2	
Other		3		2	
High Threat Weeds		0		0	
Ecosystem Functions					
Length of habitat logs					8.4m
Litter cover					42%
Bare ground cover					0%
Cryptogam cover					2%
Rock cover					30%
Overstorey foliage cover					18%
Mid-storey foliage cover					40%
Groundcover foliage cover		62%			



Image 23. Midline view of HRBOA quadrat 1 2025

Table 7. Survey summary for survey site location HRBOA quadrat 2

3807 - Northern Sydney Heath-Mallee				
AGD Zone 56 Easting – 0312750 Northing – 06293649 Midline - 100°				
Vegetation Layer		Height Range		
Trees	2 – 10m	<i>Angophora hispida, Eucalyptus haemastoma, Banksia serrata</i>		
Shrubs	0.5 – 2m	<i>Banksia ericifolia, Hakea sericea, Leptospermum trinervium, Dillwynia floribunda, Lambertia Formosa, Calytrix tetragona, Grevillea speciosa, Boronia ledifolia, Persoonia pinifolia</i>		
Groundcover	0.1 – 0.5m	<i>Caustis pentandra, Actinotus minor, Austrostipa pubescens, Lepidosperma laterale, Cassytha glabella, Entolasia stricta, Schoenus melanostachys, Xanthosia tridentata.</i>		
Stem Class		Hollows		
Dbh	Eucalyptus	Non-Eucalypt	<20cm	>20cm
80cm+				
50-79cm	✓		1	
30-49cm		✓		
20-29cm	✓			
10-19cm	✓	✓		
5-9cm	✓	✓		
<5cm	✓	✓		
Composition & Structure		Composition Count		Structure cover %
Trees		3		20
Shrubs		29		100
Grasses etc		5		27
Forbs		6		6
Ferns		2		2
Other		2		2
High Threat Weeds		0		0
Ecosystem Functions				
Length of habitat logs		3.2m		
Litter cover		18%		
Bare ground cover		0%		
Cryptogam cover		10%		
Rock cover		5%		
Overstorey foliage cover		20%		
Mid-storey foliage cover		80%		
Groundcover foliage cover		67%		



Image 24. Midline view of HRBOA quadrat 2 2025



Image 25. Flowering *Darwinia biflora* located within HRBOA quadrat 2 2025

Table 8. Survey Summary of survey location HRBOA quadrat 3

3617 – Sydney Hinterland Peppermint-Apple Forest					
AGD Zone 56 Easting – 0312877		Northing – 06293628		Midline - 110°	
Vegetation Layer		Height Range	Vegetation Layer		
Trees	20 – 30m	Corymbia gummifera, Eucalyptus piperita, Eucalyptus punctata, Banksia serrata, Ceratopetalum gummiferum, Allocasuarina littoralis			
Shrubs	0.5 – 2m	Leptospermum trinervium, Persoonia levis, Persoonia pinifolia, Bossiaea obcordata, Epacris pulchella			
Groundcover	0.1 – 0.5m	Dianella prunina, Pteridium esculentum, Lindsaea microphylla, Lomandra filliformis, Entolasia stricta, Caustis flexosa			
Stem Class		Hollows			
Dbh	Eucalyptus	Non-Eucalypt	<20cm	>20cm	
80cm+					
50-79cm	✓		3		
30-49cm	✓		1		
20-29cm	✓				
10-19cm	✓				
5-9cm	✓	✓			
<5cm	✓	✓			
Composition & Structure		Composition Count		Structure cover %	
Trees		7		53	
Shrubs		21		34	
Grasses etc		8		34	
Forbs		5		2	
Ferns		3		7	
Other		4		2	
High Threat Weeds		0		0	
Ecosystem Functions					
Length of habitat logs					18m
Litter cover					48%
Bare ground cover					0%
Cryptogam cover					15%
Rock cover					20%
Overstorey foliage cover					53%
Mid-storey foliage cover					34%
Groundcover foliage cover		45%			



Image 26. View of midline HRBOA quadrat 3 2025

Table 9. Survey Summary of survey location HRBOA quadrat 4

3621 – Sydney Hinterland Turpentine-Apple Gully Forest				
AGD Zone 56 Easting – 0312847 Northing – 06293808 Midline - 100°				
Vegetation Layer		Height Range	Vegetation Layer	
Trees	20 – 30m	Corymbia gummifera, Eucalyptus resinifera, Angophora costata, Callicoma serratifolia, Ceratopetalum gummiferum, Allocasuarina littoralis		
Shrubs	0.5 – 2m	Leptospermum trinervium, Telopea speciosissima, Persoonia pinifolia, Bossiaea lenticularis, Lambertia formosa, Banksia spinulosa, Acacia suaveolens		
Groundcover	0.1 – 0.5m	Pteridium esculentum, Gahnia sieberiana, Lomandra multiflora, Dacophyllum secundum, Entolasia stricta, Caustis flexosa		
Stem Class		Hollows		
Dbh	Eucalyptus	Non-Eucalypt	<20cm	>20cm
80cm+	2		2	1
50-79cm	✓		2	3
30-49cm	✓		2	
20-29cm	✓			
10-19cm	✓			
5-9cm	✓	✓		
<5cm	✓	✓		
Composition & Structure		Composition Count		Structure cover %
Trees		7		48
Shrubs		20		56
Grasses etc		8		37
Forbs		7		12
Ferns		2		3
Other		4		2
High Threat Weeds		0		0
Ecosystem Functions				
Length of habitat logs		32m		
Litter cover		54%		
Bare ground cover		10%		
Cryptogam cover		40%		
Rock cover		5%		
Overstorey foliage cover		48%		
Mid-storey foliage cover		56%		
Groundcover foliage cover		52%		



Image 27. View of midline HRBOA quadrat 4 2025

Table 10. Survey Summary of survey location HRBOA quadrat 5

3593 – Sydney Coastal Sandstone Bloodwood Shrub Forest				
AGD Zone 56 Easting – 0312938 Northing – 06293983 Midline - 130°				
Vegetation Layer	Height Range	Vegetation Layer		
Trees	20 – 30m	<i>Eucalyptus punctata</i> , <i>Eucalyptus haemastoma</i> , <i>Angophora hispida</i> , <i>Banksia serrata</i> , <i>Allocasuarina littoralis</i>		
Shrubs	0.5 – 2m	<i>Lambertia formosa</i> , <i>Persoonia pinifolia</i> , <i>Bossiaea scolopendra</i> , <i>Woollsia pungens</i> , <i>Banksia ericifolia</i> , <i>Boronia floribunda</i> , <i>Epacris pulchella</i> , <i>Petrophile pulchella</i> , <i>Platysace linearifolia</i>		
Groundcover	0.1 – 0.5m	<i>Actinotus minor</i> , <i>Xanthosia pilosa</i> , <i>Lomandra multiflora</i> , <i>Austrostipa pubescens</i> , <i>Entolasia stricta</i> , <i>Xanthorrhoea resinosa</i>		
Stem Class			Hollows	
Dbh	Eucalyptus	Non-Eucalypt	<20cm	>20cm
80cm+				
50-79cm				
30-49cm	✓		3	
20-29cm	✓			
10-19cm	✓	✓		
5-9cm	✓	✓		
<5cm	✓	✓		
Composition & Structure		Composition Count		Structure cover %
Trees		5		40
Shrubs		22		80
Grasses etc		8		42
Forbs		7		6
Ferns		3		5
Other		3		3
High Threat Weeds		0		0
Ecosystem Functions				
Length of habitat logs		2m		
Litter cover		48%		
Bare ground cover		1%		
Cryptogam cover		20%		
Rock cover		30%		
Overstorey foliage cover		40%		
Mid-storey foliage cover		80%		
Groundcover foliage cover		56%		



Image 28. View of midline HRBOA quadrat 5 2025

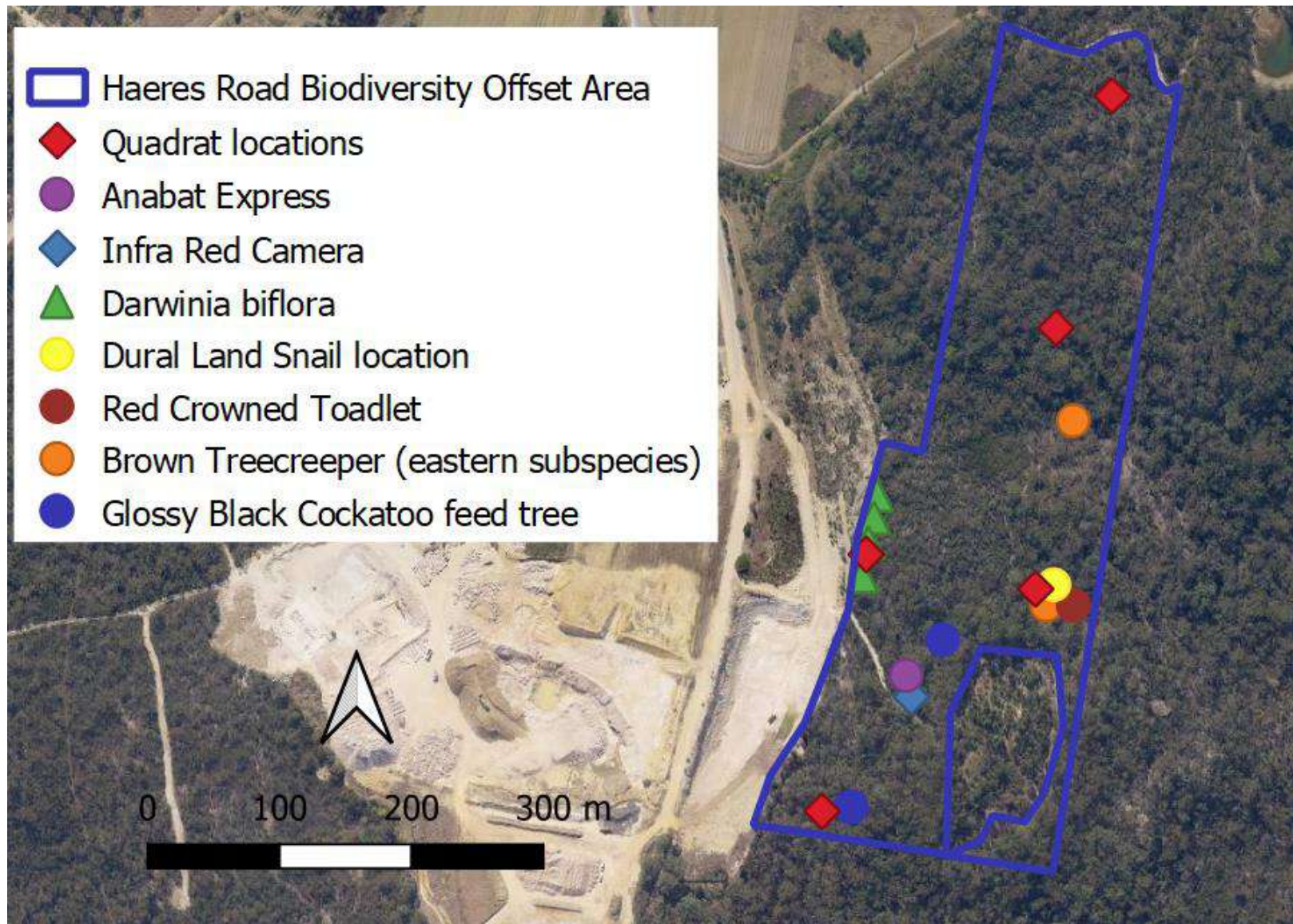


Image 29. HRBOA site location 2025 (note no change to the previous reporting period)

3.3 THREATENED FLORA MONITORING

The threatened flora monitoring details the current condition of the four threatened flora species and their immediate habitat which has been previously recorded at the ONR site. The far western area of Lot 29 contains a significant rock platform which supports *Kunzea rupestris* and *Darwinia fascicularis subsp oligantha*. Lot 2 contains *Pimelea curviflora var curviflora* and *Tetratheca glandulosa*.

The overall health of the *Kunzea rupestris* population is good following the ideal climatic conditions in the local area over the past 12 months. New recruitment in available soil pockets is evident with new growth on most established plants again observed during the survey period, some with flower buds present. Mosses and lichens were present in each patch on both platforms.

The eastern rock platform has been divided into four individual patches. Much of the surrounding vegetation has suffered die back including the *Banksia ericifolia* and *Calytrix tetragona*. This may be attributed to the dry conditions during the 2017-2019 drought followed by extreme wet conditions from 2020-2022. Recruitment seedlings from various species are emerging in available soil.

Patch one had previously identified twenty six individual plants. During the July 2025 survey period twenty two individuals were counted. The dry conditions over 2017 and 2019, and in particular the extreme heat days which were experienced during the summer months throughout that time, is the expected cause for loss of plant density. The remaining patch is in relatively good health with flower buds present on mature growth. *Darwinia fascicularis subsp oligantha* is also present within this patch.

Patch two is much smaller with only three plants present, patch three has two persistent plants while in patch four there are five plants remaining. All these plants are healthy with new growth buds and some flower buds present at the time of survey.

The western rock platform has been divided into five individual patches which are much more widely distributed than the patches on the eastern rock platform. Within this section the *Kunzea rupestris* grows within a vegetation community with far more flora diversity than what is present on the eastern rock platform. Some of the shrubs are therefore much larger as soil depth and protection from external influences (such as wind and radiant heat) is more readily available.

Patch one has six plants present. *Calytrix tetragona* and *Darwinia fascicularis subsp oligantha* were also present within this patch. Patch two is a long patch which runs down the length of the rock platform. This patch is well established and grows with neighbouring species such as *Calytrix tetragona*, *Acacia hispidula*, *Grevillea buxifolia*, *Caustis flexuosa* and *Darwinia fascicularis subsp oligantha*. New recruits are abundant particularly on the edge of the soil profile. In total forty six individual plants were identified within this patch. All plants in this location are low growing and all appear in good health with the larger individuals having some flower bud present. Some outlying small patches were noted which appear to be newly created from soil run off during heavy rainfall periods. New recruits have persisted in these locations since 2023 although due to the very shallow soil profile they are not expected to survive should dry or wet weather return.

Patch three does not contain any *Kunzea rupestris* plants. The patch is considered for monitoring over time with the hope that new recruits will eventually appear. A single *Leucopogon parviflorus* is currently the only species within this patch.

Patch four currently has twenty nine *Kunzea rupestris* plants with several of those being juvenile recruits. Mature plants have growth and flower buds present. Other flora species identified within the

patch were *Calytrix tetragona*, *Grevillea buxifolia*, *Caustis flexuosa*, *Darwinia fascicularis subsp oligantha*, *Banksia ericifolia*, *Isopogon anethifolius*, *Bossiaea scolopendria* and *Petrophile pulchella*.

Patch five had twenty six *Kunzea rupestris* growing within a diverse mix of shrub species. Several of the counted individuals appear to be new recruits close to the old haul track. It was noted that some *Banksia ericifolia*, *Isopogon anethifolius* and *Calytrix tetragona* had died. Other species within this patch include *Acacia ulicifolia*, *Corymbia eximia*, *Dianella revoluta*, *Grevillea buxifolia*, *Grevillea speciosa*, *Leucopogon parviflorus*, *Angophora hispidula*, *Caustis flexuosa*, *Persoonia levis*, *Isopogon anethifolius* and *Petrophile pulchella*.

Other threatened species located onsite were observed and inspected for current health and condition. As previously mentioned an attempt was made to translocate the original parent plant of the *Melaleuca deanei*. Prior to translocation the plant health was checked and it appeared to not have suffered any ill effects from previous multiple small branch removal during clone recruitment. No flowers were observed throughout the 2021-2022 period before translocation. In total there were 31 stems in 18 clumps covering an area of 25m². The highest peak of the shrub was approximately 2.5m tall. Once removed it appeared that the plant was one individual connected by a single root system, not multiple plants as once thought. New recruits had been observed growing from the translocated root stock however these recruits have since perished. The root ball will continue to be monitored over time for new recruits or growth which may occur when climatic seasons are ideal.

Darwinia fascicularis subsp oligantha was observed as being plentiful in the location of the *Kunzea rupestris* population and surrounding area. Plants were flowering well and new recruits were evident throughout the area. They were also very well represented throughout the rehabilitation areas. There were several *Tetratheca glandulosa* plants identified within Quadrat 2 during the 2024 flora survey period. In addition to this an abundance of flowering *Pimelea curviflora var curviflora* was also identified within the same quadrat site. The threatened species within this location will continue to be monitored each year they remain present onsite.



Image 30. *Kunzea rupestris* monitoring eastern rock platform photo location 1 2025



Image 31. *Kunzea rupestris* monitoring eastern rock platform photo location 2 2025





Image 32. 2025 eastern rock platform patch number 1-3, top 1 - bottom 3



Image 33. *Kunzea rupestris* monitoring western rock platform photo location 1 2025



Image 34. *Kunzea rupestris* monitoring western rock platform photo location 2 2025



Image 35. *Kunzea rupestris* monitoring western rock platform photo location 3 2025



Image 36. 2025 western rock platform patch number 1-5, top left 1 top right 2 middle left 3 middle right 4 bottom 5



Image 37. *Kunzea ruprestis* new growth on eastern rock platform July 2025



Image 38. *Tetratheca glandulosa* with flower buds within Quadrat 2 2025

3.4 THREATENED FAUNA MONITORING

Threatened fauna previously located within the Old Northern Road site included four species of microchiropteran bat and a Glossy Black Cockatoo.

A search was undertaken for Glossy Black Cockatoo feed trees throughout the site. Feed tree location was confirmed within transect 2 of the NVC and within the 250m buffer from Maroota Public School in the same locations as previous years. It is common for this species to return to the same stand of feed trees repetitively. There were no birds observed feeding in trees within the 250m buffer from Maroota Public School during this reporting period however they have been noted flying overhead at various times throughout the year.

An AnaBat Express sound recorder was left in place over 30 survey nights during April/May 2025 to survey for microchiropteran bat species. The site recorded five different microchiropteran bat species which could be confidently identified within the survey period including the threatened Eastern Coastal Free-tailed Bat *Mormopterus norfolkensis* (listed as vulnerable under the BC Act). In addition to this the Eastern Falsistrelle *Falsistrellus tasmaniensis*, Greater Broad-nosed Bat *Scoteanax rueppellii*, Little Bent-winged Bat *Miniopterus australis* and Eastern Cave Bat *Vespadelus troughtoni* (all listed as vulnerable under the BC Act) potentially occurred within the site however the recorded calls could not be confidently identified. This survey was undertaken slightly out of ideal survey season for bats (Oct-Apr) indicating that a strong microchiropteran bat presence occurs within the local area, including the NVC and 250m buffer from Maroota School.

An infra-red motion detection camera was also installed during autumn months for 30 days and nights to monitor for ground dwelling fauna species and pest species movement such as foxes.

No other threatened fauna were observed within or immediately surrounding the Old Northern Road site during the survey period. The resident pair of Wedged-tailed Eagles were observed flying over the site several times throughout the year. A White Breasted Sea Eagle was also observed flying over the site during the reporting period. A deceased Brown Goshawk was found within the NVC which may have eaten a baited rodent. Diggings from Long-nosed Bandicoots has increased within the 250m buffer suggesting that numbers are increasing.

The HRBOA previously had two threatened fauna species recorded on the property, although outside of the offset area. A historic Bionet record of a Koala and Glossy Black Cockatoo sighting to the north of the property towards Hitchcock Road was not investigated any further for the purpose of this report. Koala sightings in the area, particularly around Glenorie, have increased since the Wollemi/Yengo mega-bushfire over the spring/summer of 2019/2020. A search for Koala scat under *Eucalyptus punctata* within all survey quadrats at the HRBOA was undertaken. No Koala scats were found.

Glossy Black Cockatoo feed trees were observed within quadrat 1. Several Brown Treecreepers were observed foraging again during the 2025 survey period within the site at various locations indicating these are permanent residents within the site. An infra-red motion detection camera was installed within the HRBOA for 30 nights. The camera was successful in capturing images of the Swamp Wallaby.

The Dural Land Snail *Pommerhelix duralensis* was successfully located during the 2019 and 2024 flora survey period in the HRBOA. A search for the species under leaf litter, particularly around rocks and crevices, during the 2025 flora survey period was unsuccessful at locating any shell casings or live animals. There has been no environmental change or disturbance to the HRBOA during the survey period so it is expected the species remains present within the site.

A survey for microchiropteran bat species using an AnaBat Express sound recorder was undertaken during February 2025. Seven species were identified including the Eastern Coastal Free-tailed Bat *Mormopterus norfolkensis* and the Large-eared Pied bat *Chalinolobus dwyeri* (listed as vulnerable under the EPBC Act and BC Act) via the sound recordings analysed by Dr Anna McConville. In addition to this the Eastern Falsistrelle *Falsistrellus tasmaniensis*, Greater Broad-nosed Bat *Scoteanax rueppellii*, Little Bent-winged Bat *Miniopterus australis*, Large Bent-winged Bat *Miniopterus orianae oceanensis*, Eastern Cave Bat *Vespadelus troughtoni* and Southern Myotis *Myotis Macropus* (all listed as vulnerable under the BC Act) potentially occurred within the site however the recorded calls could not be confidently identified. This result is similar to that of previous survey years with many of the same species repeatedly identified suggesting that quarry activities in the nearby area does not appear to impact upon the local distribution of micro bats.

The fauna survey results can be seen in Appendix D and E.



Figure 39. Bandicoot digs at HRBOA

3.5 EXOTIC SPECIES

Exotic flora species were identified within the NVC and 250m buffer area at the Old Northern Road site. Six species considered as High Threat Weeds (HTW) under the *Biosecurity Act 2015* occur on the property, Crofton Weed *Ageratina adenophora*, Whiskey Grass *Andropogon virginicus*, Cobblers Pegs *Bidens pilosa*, Paspalum Grass *Paspalum dilatatum*, Fireweed *Senecio madagascariensis* and the most widespread on the property Lantana *Lantana camara*. Two of those weed species, Fireweed and Lantana, are also listed as Weeds of National Significance (WoNS) as determined by the Commonwealth Government. A weed management program is currently in place and will continue throughout the life of the rehabilitation plan. There was one HTW identified within the HRBOA, Whiskey Grass *Andropogon virginicus*, which occurs in the rehabilitation area located in the south east area of the site. It is likely seed has been spread to the walking trails of the site via the clothing and shoes of the bush regenerators undertaking weed management in the rehabilitation area. Annual sweeps of the property are recommended to ensure any outbreaks are managed and controlled before species become established.

A weed distribution map has been developed which will be updated yearly to allow for annual comparison. The weed management contractor should aim to reduce the size of these areas on an annual basis with the ultimate goal of eradication, particularly of WoNS and HTW. The weed

distribution map has changed slightly from the previous reporting period with a committed effort to reduce the Lantana footprint within the NVC and 250m buffer.

Exotic fauna species were identified within the NVC at the Old Northern Road site. Infra-red cameras were left in place for 30 survey nights although no images of pest fauna were recorded within the survey period this year. Fauna prints were recorded at several locations where sand and mud were present within the site. Foxes, dog, macropods and bandicoot were confidently recorded.

European Rabbit scats were observed in several locations within the NVC and 250m buffer in low density. It could then be assumed that carnivore scats also observed onsite were most likely from the European Red Fox. As no Rabbits were observed feeding during the day, scats were not in high density and large warrens were not observed the population can be considered to be low and likely to be kept under control by biological means such as predation from foxes, dogs, cats and birds of prey such as the Wedge-tailed Eagle observed flying nearby. Should the number of rabbits become problematic then it may be necessary to engage in a control program to reduce or eliminate the population.

The Noisy Minor, *Manorina melanocephala*, was also observed within the NVC and 250m buffer area at the Old Northern Road Site in lower numbers during 2025 than previous years. Although this bird is a native species to eastern Australia it is worth mentioning here as the species is considered a pest in high density and a Key Threatening Process to many threatened species of small bird including the Brown Treecreeper, which was identified at HRBOA. The population of Noisy Minor appeared to be less than previous years which could be attributed to the ongoing management of Lantana in the area and the rehabilitation effort of understory diversity. The noisy Minor prefers to inhabit areas with an open understory or an understory of one dominant species which enables them to intimidate other bird species which may venture into their home range. The diversity of understory flora species encourages a broader range of bird species, thereby making the domineering patrols of the Noisy Minor less effective. A variety of small and medium sized birds were observed within the NVC and 250m buffer during the survey period. The Noisy Minor population should be monitored over time to ensure the species does not become dominant and eliminate other bird species from the vegetation.



Figure 40. Sand plot monitoring results showing European Fox and Swamp Wallaby prints



Image 41. *Lantana camera* treatment area within NVC 2025

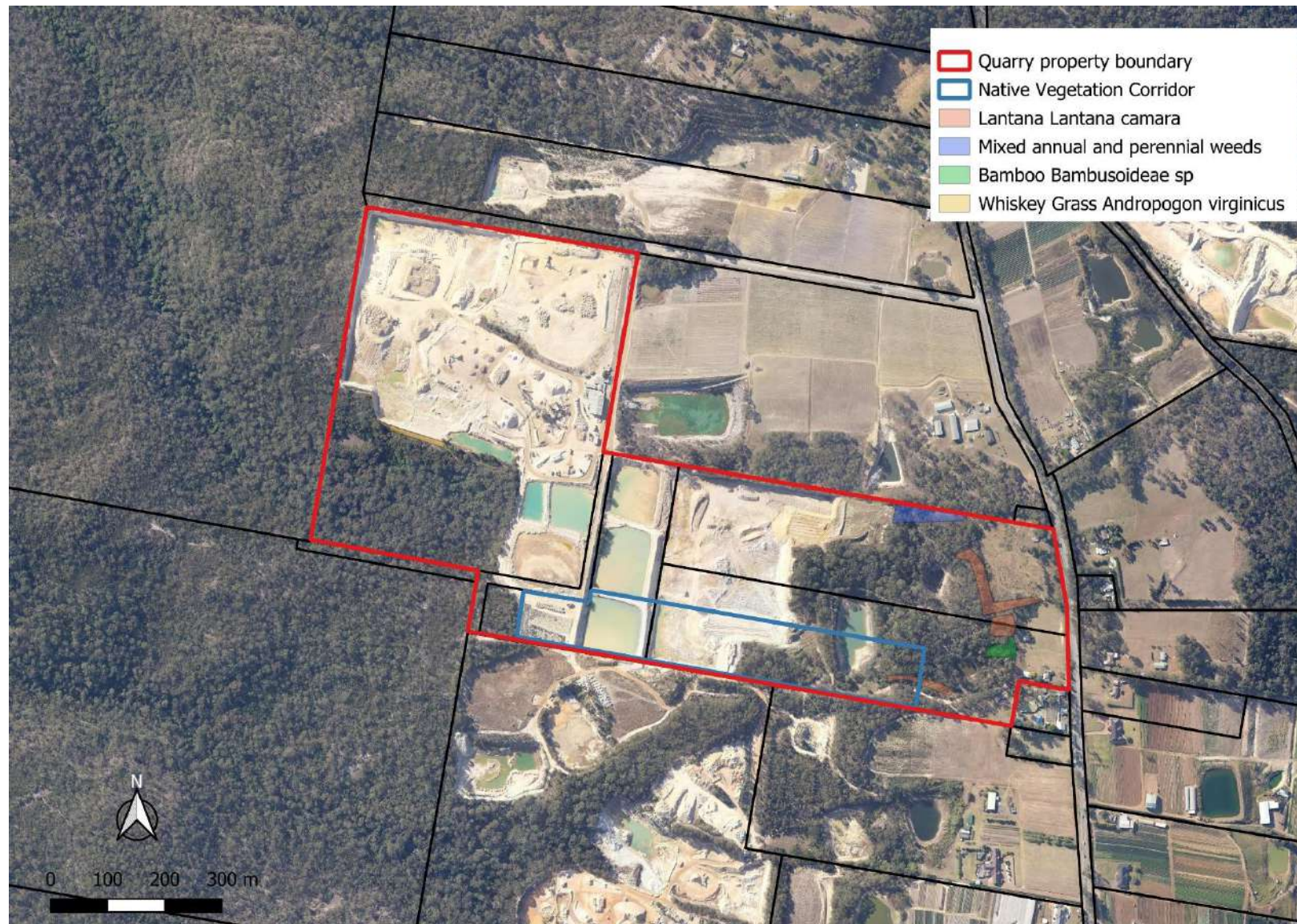


Figure 42. Annual weed distribution map ONR 2025

3.6 ASSESSMENT AGAINST CRITERIA

The results of the field survey were assessed against the criteria for successful rehabilitation (Table 11).

Table 11. Assessment against criteria to monitor success of rehabilitation

Category	Performance Criteria	Target Achieved	Comments
Native Vegetation	More than 75% of trees are healthy and growing as indicated by long term monitoring	YES	More than 75% of the native vegetation within the active rehabilitation area is healthy and is growing as expected for long term survival. All shrub and ground cover species have reached maturity with flowering and seed production observed. Some species have begun self-propagation within rehabilitation sites. Some of the older <i>Eucalyptus</i> , <i>Angophora</i> and <i>Corymbia</i> species have reached maturity and have been observed during flowering stages.
	More than 50% of translocated or propagated threatened flora species survive as indicated by long term monitoring	YES	More than 50% of translocated and planted propagated threatened flora species has survived despite the extreme weather conditions of the past reporting periods. To date at least 45 propagated <i>Darwinia fascicularis subsp. Oligantha</i> and 52 propagated <i>Melaleuca deanei</i> have survived transplanting in the rehabilitation area. A complete count of translocated <i>Darwinia fascicularis subsp. Oligantha</i> was not undertaken at the time of relocation however it appears that any losses that may have occurred were minimal and new recruits are evident throughout much of the rehabilitation area.
Vegetation Structure	Revegetation areas contain flora species assemblages characteristic of the desired native vegetation communities	N/A	At this stage it is too early in the rehabilitation process to determine if the desired vegetation community is being established. Species planted have been specifically chosen to recreate a Banksia Heath community. The community developing within the soil seed bank rehabilitation area is starting to demonstrate a characteristic vegetation assemblage of a Banksia Heath community.
Ecosystem Function	Second generation tree seedlings are present or likely to be, based on monitoring comparable older rehabilitation sides (evidence of fruiting of native species observed)	N/A	It is too early in the rehabilitation process for second generation tree seedlings. Fruiting of tree species is has only just commenced therefore this KPI is likely to be achieved within the next 2-3 years. The far south western edge of the translocated rehabilitation area

			does have some new recruit canopy species emerging from mature trees located adjacent to the site.
	Habitat values retained or beginning to develop and improve over time (leaf litter, fallen timber etc)	YES	Habitat values have been added to the rehabilitation site in the form of logs and vegetation debris. Leaf litter is continuing to develop and organic material is establishing well.
Weeds and Pests	Regular inspections indicate a decline weed diversity, density and abundance and a decline in signs of feral animal activity	YES	There were very few weed species identified within the rehabilitation area. There are no signs of feral animal activity.
	There is no significant weed infestation such that weeds do not comprise a significant proportion of the species in the stratum	YES	There is no significant weed infestation within the rehabilitation area. Significant weed infestations are located within the NVC outside of the rehabilitation area. These areas are being actively addressed by weed management contractors.
	There is no evidence of significant damage resulting from feral animal activity	YES	There is no evidence of significant damage caused from feral animal activity within the rehabilitation area. Native herbivores such as Wallabies and Possums are active within the rehabilitation area with some predation noted, however not so severe its considered problematic.

4 DISCUSSION AND RECOMMENDATIONS

This is the eighth Annual Biodiversity and Rehabilitation Management Report produced for Dixon Sand Modification 5. Rehabilitation work is in the mid to early stages and will increase with both intensity and measurable criteria in the years that follow.

This report provides information which will allow for measurable and quantifiable data to be compared over time as the rehabilitation and monitoring continues.

The rainfall over this reporting period was slightly higher than the average, the average being 1127.9mm, with the yearly total for the reporting period (July-June) being 1519mm. This has provided continued ideal growing conditions for the rehabilitation areas of the NVC. All strata of flora within the rehabilitation areas have increased in size, maturity and density during the past twelve month period. New juvenile recruits are evident from shrub and ground cover species a slight decrease in species diversity was also recorded. This could be due to the species richness reaching its peak with more dominant species out competing some species for resources. Climatic conditions may have also influenced the slight decrease in diversity recorded. Canopy species are growing well and have reached reproductive maturity during this reporting period with several of the larger individuals noted to have flowered.

The remaining vegetation areas within the ONR site have recovered well from the drought conditions of 2017-2019 and wet conditions of 2020-2022. The above average rainfall over the past 12 month period has once again provided ideal growing conditions. The native vegetation areas with no weedy growth have demonstrated their resilience with no new weed growth or establishment evident following the return to regular and average rainfall events.

Vegetation within the HRBOA has had very little vegetation changes observed throughout the site demonstrating the hardiness of native vegetation stands with minimal historic disturbances. Shrub and ground cover species density and diversity continued to incur a slight decrease, likely due to sustained wet weather conditions providing the ideal climate for dominant species to out compete species who prefer a drier environment. The slight decrease is expected to plateau as weather conditions return to average.

Threatened species located within the NVC have persisted despite the harsh drought conditions of 2017-2019 followed by the wet climate of 2020-2023. The *Kunzea rupestris* was adversely impacted by the drought, particularly from radiant heat reflection from the surrounding sandstone. Although the species is well suited to enduring dry seasons and limited water resources some losses did occur to individuals within the population. New juvenile recruitment is evident thanks to the continuation of regular rainfall. All other threatened species previously recorded onsite were located and appear healthy.

Weed species, particularly *Lantana camara*, within the NVC and 250m school buffer area of the Old Northern Road site should remain a priority management species for removal and control over the next twelve month period. Management of the species has commenced by the bush regeneration contractors however the average rainfall has provided the species with ideal growing conditions. Without management this species is likely to spread over a larger area, in turn supporting habitat for exotic fauna species such as the European Rabbit and the European Red Fox. Suitable techniques for removal have been provided in appendix F.

Rehabilitation efforts have continued in earnest with native plant relocation, propagation and planting taking place throughout the reporting period. Continued supplementary planting within the NVC and 250m school buffer where Lantana is removed will continue over the next reporting period.

A silt pond is currently being rested immediately to the east of the rehabilitation area within the NVC. This silt pond was expected to be ready for rehabilitation during this reporting period however continued rainfall has resulted in the pond not drying to a suitable standard. Capping has commenced therefore it is expected rehabilitation of the NVC in the location of the silt pond will occur during the next twelve month period.

During the next twelve month period weed treatment and control will continue throughout the NVC, 250m buffer area and the HRBOA as a priority. Seed collection from within the NVC, 250m buffer and the rehabilitation areas will commence for rehabilitation planting in the location of the capped silt pond.

It is recommended that all *Melaleuca deanei* planted within the NVC be marked with a highly visible identification tag or posts for ease of location in a developing community which is emerging as a dense heath ecosystem. This will ensure all individual plants can be accurately monitored for growth and success over time.

5 LIMITATIONS AND ASSUMPTIONS

This study was limited by the timing and frequency of the survey. There may be flora and/or fauna species present at the site that were not recorded due to their seasonal, territorial or cryptic nature.

It can never be proven that threatened species have not, do not or will not use the site as habitat. The conclusions drawn in this report are a result of testing, observation and experience.

This report describes the habitat and vegetation of the site at the time of the field survey. Vegetation and habitat will change over time and therefore the findings of this report are only relevant for the current proposal and for the duration of the application.

6 QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR AND FIELD ECOLOGIST

The Author and Field Ecologist, Melissa Mass, has formal qualifications including a Bachelor of Applied Science (B. App. Sc.), majoring in Ecology, and a Certificate 3 in Horticulture. Her current Scientific Licence number issued from the NSW OEH is SL101441 with expiry date 31st Oct 2025. Furthermore an Animal Research Authority issued by the NSW Animal Care and Ethics Committee is current to undertake general survey work in THSC local government area with expiry 23rd Mar 2026. Melissa is an accredited Biodiversity Assessor conforming to the requirements as imposed by OEH with Accreditation number being BAAS18053.

Melissa has been working as an Ecologist for 15 years. Her work has included targeted threatened species assessment and management, reviews of environmental factors, bush regeneration, environmental impact assessments, and environmental survey and monitoring.

Melissa has a strong focus on threatened species ecology and has actively contributed to the Long-nosed Potoroo National Recovery Plan.

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8 APPENDIX

APPENDIX A – FLORA SPECIES IDENTIFIED WITHIN THE ONR STUDY AREA

Status	Botanical Name	Common Name	Plot 1	Plot 4	Plot 2 - NVC
	<i>Acacia linifolia</i>	White Wattle		2	4a
	<i>Acacia myrtifolia</i>	Red-stemmed Wattle			
	<i>Acacia parramattensis</i>	Parramatta Wattle	1		3
	<i>Acacia suaveolens</i>	Sweet Wattle			1
	<i>Acacia ulicifolia</i>	Prickly Moses		1	1
	<i>Actinotus minor</i>	Lesser Flannel Flower	1	2	
	<i>Allocasuarina littoralis</i>	Black She-oak	4b	4a	4a
	<i>Allocasuarina torulosa</i>	Forest She-oak	1		
HTW	<i>Andropogon virginicus</i>	Whiskey Grass			
	<i>Angophora bakeri</i>	Narrow-leaved Apple			1
	<i>Angophora costata</i>	Smooth Barked Apple	1	1	
	<i>Aristida stipitata</i>	Three-awned Grass		2	
	<i>Austrostipa pubescens</i>	Spear Grass	2	2	2
	<i>Banksia serrata</i>	Old Man Banksia		1	
	<i>Banksia spinulosa</i>	Hairpin Banksia	1	2	1
	<i>Billardiera scandens</i>	Hairy Apple Berry	1	2	2
	<i>Boronia ledifolia</i>	Sydney Boronia		2	1
	<i>Bossiaea heterophylla</i>	Variable Bossiaea		2	
	<i>Bossiaea obcordata</i>	Spiny Bossiaea	4a	3	4a
	<i>Bursaria spinosa</i>	Sweet Bursaria			1
	<i>Cassytha glabella</i>	Slender Devils Twine	1		1
	<i>Ceratopetalum gummiferum</i>	NSW Christmas Bush	4b	4b	
	<i>Cheilanthes sieberi</i>	Mulga Fern			
	<i>Corymbia eximia</i>	Yellow Bloodwood		3	1
	<i>Corymbia gummifera</i>	Red Bloodwood		4b	4b
	<i>Cyathochaeta diandra</i>	Sheath Rush	3	2	
	<i>Desmodium varians</i>	Slender Tock-trefoil			
	<i>Dianella caerulea</i>	Blue Flax Lily	1	2	1
	<i>Dianella prunina</i>	Native Flax Lily		1	
	<i>Dichondra repens</i>	Kidney Weed	1		
	<i>Dillwynia retorta</i>	Heathy Parrot Pea			
	<i>Drosera peltata</i>	Sundew		3	
	<i>Entolasia marginata</i>	Bordered Panic	4b		
	<i>Entolasia stricta</i>	Wiry Panic	4b	4b	4b
	<i>Epacris pulchella</i>	Wallum Heath	2		
	<i>Eragrostis brownii</i>	Brown's Lovegrass			2
	<i>Eucalyptus haemastoma</i>	Scribbly Gum			
	<i>Eucalyptus pilularis</i>	Blackbutt		1	
	<i>Eucalyptus piperita</i>	Sydney Peppermint	4b	1	
	<i>Eucalyptus punctata</i>	Grey Gum	1	1	4b
	<i>Exocarpos cupressiformis</i>	Cherry Ballart		1	1

	<i>Gompholobium grandiflorum</i>	Large Wedge Pea	1	1	
	<i>Gonocarpus teucroides</i>	Raspwort			2
	<i>Goodenia bellidifolia</i>	Daisy-leaved Goodenia			
	<i>Grevillea buxifolia</i>	Grey Spider Flower			2
	<i>Hakea sericea</i>	Needlebush	1	2	2
	<i>Hardenbergia violacea</i>	False Sarsaparilla		1	
	<i>Hovea linearis</i>	Common Hovea		2	
	<i>Isopogon anemonifolius</i>	Broad-leaved Drumsticks			1
	<i>Jacksonia scoparia</i>	Dogwood			1
	<i>Kunzea ambigua</i>	Tickbush	4b		
	<i>Lambertia formosa</i>	Mountain Devil		1	2
WoNS HTW	<i>Lantana camara</i>	Lantana			
	<i>Leptospermum polygalifolium</i>	Tantoon	1		
	<i>Leucopogon parviflorus</i>	Coastal Beard-heath		2	2
	<i>Lindsaea microphylla</i>	Lacy Wedge Fern		2	
	<i>Lomandra brevis</i>	Tufted Mat-rush			
	<i>Lomandra filiformis</i>	Wattle Mat-rush	1		
	<i>Lomandra gracilis</i>	Lomandra gracilis			
	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush	3	1	2
	<i>Lomandra multiflora</i>	Many Flowered Mat-rush	2	2	1
	<i>Lomandra obliqua</i>	Fish Bones	2	2	3
	<i>Lomatia silaifolia</i>	Crinkle Bush		1	
	<i>Microlaena stipoides</i>	Weeping Grass		2	2
	<i>Ozothamnus diosmifolius</i>	Rice Flower	1	2	1
	<i>Parsonsia straminea</i>	Common Silkpod	1		
W	<i>Paspalum</i>	Paspalum			
	<i>Persoonia levis</i>	Broad Leaved Geebung		1	1
	<i>Persoonia linearis</i>	Narrow Leaved Geebung		1	
	<i>Persoonia pinifolia</i>	Pine-leaved Geebung		2	2
	<i>Petrophile pulchella</i>	Conesticks		1	1
	<i>Phyllanthus hirtellus</i>	Thyme Spurge	3	3	3
W	<i>Phytolacca octandra</i>	Inkweed			
V	<i>Pimelea curviflora</i> var. <i>Curviflora</i>	Pimelea curviflora var. curviflora			2
	<i>Pimelea linifolia</i>	Slender Rice Flower		1	1
W	<i>Plantago lanceolata</i>	Plantain			
	<i>Platysace linearifolia</i>	Carrot Tops	1	2	
	<i>Pomax umbellata</i>	Pomax		1	2
	<i>Pratia purpurascens</i>	Whiteroot	2	2	2
	<i>Pteridium esculentum</i>	Bracken Fern	2	2	1
	<i>Rytidosperma racemosum</i>	Wallaby Grass			1
	<i>Scaevola ramosissima</i>	Purple Fan-flower		2	1
	<i>Senecio linearifolius</i>	Fireweed Groundsel		1	

	<i>Smilax glycyphylla</i>	Sweet Sarsaparilla	1	1	
	<i>Stylidium lineare</i>	Slender Trigger Grass		1	
V	<i>Tetratheca glandulosa</i>	Glandular Pink Bells			1
	<i>Tetratheca thymifolia</i>	Black-eyed Susan		1	
	<i>Themeda australis</i>	Kangaroo Grass	2	3	3
	<i>Trema tomentosa</i> var. <i>aspera</i>	Native Peach		1	
	<i>Xanthorrhoea resinosa</i>	Grass Tree		1	1
	<i>Xanthosia pilosa</i>	Woolly Xanthosia	2	2	
	<i>Xanthosia tridentata</i>	Rock Xanthosia	2		1
	<i>Xylomelum pyrifforme</i>	Woody Pear		1	

V – Vulnerable Species , **W** – Weed , **WoNS** – Weed of National Significance , **HTW** – High Threat Weed

Key

Braun-Blanquet scale.

- 1 <5% cover & 3 or less individuals
- 2 <5% cover & more than 3 individuals sparsely scattered
- 3 <5% cover common and consistent
- 4a <5% cover & very abundant many individuals
- 4b 5 – 25% cover
- 5 25 – 50% cover
- 6 50 – 75% cover
- 7 75% - 100% cover

APPENDIX B – FLORA SPECIES IDENTIFIED WITHIN ONR REHABILITATION AREA

Status	Botanical Name	Common Name	Rehab 1	Translocate	Soil seedbank
	<i>Acacia linifolia</i>	White Wattle	Seed bank	*	*
	<i>Acacia myrtifolia</i>	Red-stemmed Wattle	Seed bank	*	
	<i>Acacia parramattensis</i>	Parramatta Wattle	Seed bank	*	*
	<i>Acacia suaveolens</i>	Sweet Wattle	Planted	*	*
	<i>Acacia ulicifolia</i>	Prickly Moses	Planted	*	*
	<i>Actinotus minor</i>	Lesser Flannel Flower	Seed bank	*	*
	<i>Allocasuarina littoralis</i>	Black She-oak	Planted	*	*
HTW	<i>Andropogon virginicus</i>	Whiskey Grass	Seed bank	*	*
	<i>Angophora bakeri</i>	Narrow-leaf Apple	Seed bank	*	
	<i>Angophora costata</i>	Smooth Barked Apple	Planted		
	<i>Angophora hispida</i>	Dwarf Apple	Planted	*	*
	<i>Anisopogon avenaceus</i>	Oat Spear Grass	Seed bank	*	*
	<i>Aristida vagans</i>	Threeawn Speargrass	Planted	*	*
	<i>Aristida warburgii</i>	Fine-leaved Wire Grass	Seed bank	*	*
	<i>Asplenium trichomanes</i>	Common Spleenwort	Seed bank	*	*
	<i>Austrostipa pubescens</i>	Spear Grass	Seed bank	*	*
	<i>Banksia ericifolia</i>	Heath-leaved Banksia	Planted	*	*
	<i>Banksia serrata</i>	Old Man Banksia	Planted	*	*
	<i>Banksia spinulosa</i>	Hairpin Banksia	Planted	*	
	<i>Billardiera scandens</i>	Hairy Apple Berry	Seed bank	*	*
	<i>Boronia floribunda</i>	Pale Pink Boronia	Seed bank	*	*
	<i>Boronia ledifolia</i>	Sydney Boronia	Seed bank	*	*
	<i>Bossiaea heterophylla</i>	Variable Bossiaea	Seed bank	*	*
	<i>Bossiaea lenticularis</i>	Bossiaea	Seed bank	*	
	<i>Bossiaea obcordata</i>	Spiny Bossiaea	Planted	*	
	<i>Calytrix tetragona</i>	Common Fringe Myrtle	Planted	*	*
	<i>Cassytha glabella</i>	Slender Devils Twine	Seed bank	*	*
	<i>Caustis pentandra</i>	Curly Wig	Seed bank	*	
	<i>Cheilanthes seiberi</i>	Mulga Fern	Seed bank	*	
	<i>Corymbia eximia</i>	Yellow Bloodwood	Planted		
	<i>Corymbia gummifera</i>	Red Bloodwood		*	
	<i>Cyanthochaeta diandra</i>	Sheath Rush	Seed bank	*	*
EnP	<i>Darwinia fascicularis</i> <i>subsp. oligantha</i>		Planted	Planted	Planted
	<i>Desmodium varians</i>	Slender Tock-trefoil	Seed bank	*	
	<i>Dianella caerulea</i>	Blue-flax Lily	Seed bank	*	
	<i>Dianella prunina</i>	Native Flax Lily	Planted	*	
	<i>Dichelachne</i> <i>inaequiglumis</i>	Short-hair Plume Grass		*	
	<i>Dillwynia floribunda</i>	Showy Parrot Pea	Seed bank	*	
	<i>Dillwynia retorta</i>	Parrot Pea	Seed bank	*	
	<i>Drosera pelata</i>	Sundew	Seed bank	*	
	<i>Echinopogon caespitosus</i>	Bushy Hedgehog Grass	Planted	*	
	<i>Entolasia marginata</i>	Bordered Panic	Planted		
	<i>Entolasia stricta</i>	Wiry Panic	Seed bank	*	*
	<i>Epacris microphylla</i>	Coral Heath		*	*
	<i>Epacris pulchella</i>	Wallum Heath	Seed bank	*	*

	<i>Eragrostis brownii</i>	Brown's Lovegrass	Seed bank	*	*
	<i>Eucalyptus haemastoma</i>	Scribbly Gum	Planted	*	*
	<i>Eucalyptus punctata</i>	Grey Gum	Seed bank		
	<i>Eucalyptus tereticornis</i>	Forest Redgum	Planted		
	<i>Exocarpos cupressiformis</i>	Cherry Ballart		*	
	<i>Gahnia sieberiana</i>	Red-fruit Saw-sedge		*	*
	<i>Gompholobium grandiflorum</i>	Large Wedge Pea	Seed bank	*	*
	<i>Gonocarpus teucrioides</i>	Raspwort	Planted	*	*
	<i>Goodenia bellidifolia</i>	Daisy-leaved Goodenia		*	
	<i>Goodenia hederacea</i>	Forest Goodenia	Planted	*	
	<i>Goodenia rotundifolia</i>	Star Goodenia	Seed bank		
	<i>Grevillea buxifolia</i>	Grey Spider Flower	Planted	*	*
	<i>Grevillea mucronulata</i>	Green Spider Flower	Planted		*
	<i>Grevillea sericea</i>	Pink Spider Flower	Planted		
	<i>Grevillea speciosa</i>	Red Spider Flower	Planted	*	*
	<i>Hakea dactyloides</i>	Broad-leaved Hakea	Seed bank	*	
	<i>Hakea sericea</i>	Needlebush	Planted	*	*
	<i>Hardenbergia violacea</i>	False Sarsparilla	Seed bank	*	
	<i>Hibbertia aspera</i>	Rough Guinea Flower	Planted	*	
	<i>Hibbertia diffusa</i>	Wedge Guinea Flower	Planted	*	*
	<i>Hovea linearis</i>	Common Hovea	Seed bank	*	
	<i>Imperata cylindrica</i>	Blady Grass	Seed bank	*	*
	<i>Isopogon anemonifolius</i>	Broad-leaved Drumsticks	Planted	*	*
	<i>Jacksonia scoparia</i>	Dogwood		*	
	<i>Juncus usitatus</i>	Common Rush	Seed bank	*	
	<i>Kunzea ambigua</i>	Tick Bush	Seed bank	*	*
	<i>Kunzea capitata</i>	Pink Kunzea	Planted		
	<i>Lambertia Formosa</i>	Mountain Devil		*	*
	<i>Laxmannia gracilis</i>	Slender Wire Lily	Seed bank	*	*
	<i>Lepidosperma neesii</i>	Stiff Rapier-sedge	Seed bank	*	
	<i>Leptospermum polygalifolium</i>	Tantoon		*	*
	<i>Leptospermum trinervium</i>	Flaky-barked Tea-tree	Planted	*	*
	<i>Leucopogon juniperinus</i>	Prickly-beard Heath	Planted	*	
	<i>Leucopogon microphyllus</i>	Small-leaved White Beard	Seed bank	*	*
	<i>Lindsaea microphylla</i>	Lacy Wedge Fern	Seed bank	*	
	<i>Lomandra brevis</i>	Tufted Mat-rush	Seed bank		
	<i>Lomandra glauca</i>	Pale Mat-rush	Seed bank	*	*
	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush	Planted	*	*
	<i>Lomandra multiflora</i>	Many Flowered Mat-rush	Seed bank	*	*
	<i>Lomandra obliqua</i>	Fishbones	Seed bank	*	*
	<i>Lomatia silaifolia</i>	Crinkle Bush	Seed bank	*	*
V	<i>Melaleuca deanei</i>	Deane's Paperbark	Planted	Planted	Planted
	<i>Microlaena stipoides</i>	Weeping Grass	Seed bank	*	*
	<i>Micromyrtus ciliata</i>	Fringed Heath Myrtle		*	*
	<i>Mirbelia rubiifolia</i>	Heath Mirbelia	Seed bank	*	*
	<i>Mirbelia speciosa</i>	Mirbelia	Seed bank	*	

	<i>Ozothamenus diosmidifolius</i>	Rice Flower	Seed bank	*	*
	<i>Patersonia sericea</i>	Purple Flag Flower	Seed bank		
	<i>Persoonia lanceolata</i>	Lance-leaved Geebung	Seed bank	*	*
	<i>Persoonia levis</i>	Broad-leaved Geebung	Seed bank	*	
	<i>Persoonia pinifolia</i>	Pine-leaved Geebung	Seed bank	*	*
	<i>Petrophile pulchella</i>	Conesticks		*	*
	<i>Petrophile sessilis</i>	Prickly Conesticks	Planted		
	<i>Phyllanthus hirtellus</i>	Thyme Spurge	Planted	*	*
	<i>Phyllota phyllicoides</i>	Heath Phyllota		*	*
V	<i>Pimelea curviflora</i> var. <i>curviflora</i>			*	
	<i>Pimelea linifolia</i>	Slender Rice Flower	Seed bank	*	
	<i>Platysace linearifolia</i>	Carrot Tops	Seed bank	*	*
	<i>Pomax umbellata</i>	Pomax	Seed bank	*	
	<i>Poranthera microphylla</i>	Small Poranthera	Seed bank	*	
	<i>Pratia purpurascens</i>	White Root	Seed bank	*	*
	<i>Pteridium esculentum</i>	Bracken Fern		*	
	<i>Pultenaea flexilis</i>	Graceful Bush Pea		*	
	<i>Rytidosperma racemosum</i>	Wallaby Grass	Seed bank	*	
	<i>Scaevola ramosissima</i>	Purple Fan Flower	Seed bank	*	
	<i>Schoenus ericetorum</i>	Heath Bog Rush	Seed bank	*	*
	<i>Stylidium graminifolium</i>	Grass Trigger Plant		*	
V	<i>Tetratheca glandulosa</i>	Glandular Pink Bells	Seedbank	Translocated	
	<i>Themeda australis</i>	Kangaroo Grass	Seedbank	*	*
	<i>Trema tomentose</i>	Native Peach	Seed bank	*	*
	<i>Xanthosia pilosa</i>	Woolly Xanthosia	Seed bank	*	

EnP – Endangered Population

V – Vulnerable species

HTW – High Threat Weed

APPENDIX C – FLORA SPECIES IDENTIFIED AT HRBOA

Status	Botanical Name	Common Name	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
	<i>Acacia hispidula</i>	Little Harsh Acacia	1		1		
	<i>Acacia linearifolia</i>	Narrow-leaved Wattle					
	<i>Acacia linifolia</i>	White Wattle			1		
	<i>Acacia suaveolens</i>	Sweet Wattle		1		1	1
	<i>Acacia ulicifolia</i>	Prickly Moses	1				1
	<i>Acianthus sinclairii</i>	Pixie Cap Orchid	2	2		2	2
	<i>Actinotus helianthi</i>	Flannel Flower					
	<i>Actinotus minor</i>	Lesser Flannel Flower	1	3		1	2
	<i>Allocasuarina distyla</i>	Scrub She-oak		4b			1
	<i>Allocasuarina littoralis</i>	Black She-oak	2			1	4b
	<i>Angophora costata</i>	Smooth Barked Apple	4b			1	
	<i>Angophora hispida</i>	Dwarf Apple	1	4b			4b
	<i>Aristida vagans</i>	Threeawn Speargrass		1		3	
	<i>Aristida warburgii</i>	Fine-leaved Wire Grass	3	3	3		2
	<i>Asplenium trichomanes</i>	Common Spleenwort		3		1	2
	<i>Austrostipa pubescens</i>	Spear Grass	1	3	4b		3
	<i>Banksia ericifolia</i>	Heath-leaved Banksia	1	4b	1		4b
	<i>Banksia oblongifolia</i>	Fern-leaved Banksia		4b			
	<i>Banksia serrata</i>	Old Man Banksia	4b	1	4b	1	2
	<i>Banksia spinulosa</i>	Hairpin Banksia				2	
	<i>Billardiera scandens</i>	Hairy Apple Berry			1		1
	<i>Boronia floribunda</i>	Pale Pink Boronia	3	2	1		4b
	<i>Boronia ledifolia</i>	Sydney Boronia		2	1	1	3
	<i>Bossiaea hetrophylla</i>	Variable Bossiaea			1		
	<i>Bossiaea lenticularis</i>	Bossiaea				2	
	<i>Bossiaea obcordata</i>	Spiny Bossiaea	2		2	4b	
	<i>Bossiaea scolopendra</i>	Sword Bossiaea	1	2			1
	<i>Callicoma serratifolia</i>	Black Wattle			1	4b	
	<i>Calochlaena dubia</i>	Soft Braken Fern			3		
	<i>Calytrix tetragona</i>	Common Fringe Myrtle		4b			
	<i>Cassytha glabella</i>	Slender Devils Twine	1	2	1	1	1
	<i>Caustis flexuosa</i>	Curly Wig	4b	3	2	3	2
	<i>Caustis pentandra</i>	Thick Twist Rush		2			
	<i>Ceratopetalum gummiferum</i>	NSW Christmas Bush	2		3	3	
	<i>Cheilanthes seiberi</i>	Mulga Fern		2			2
	<i>Corymbia eximia</i>	Yellow Bloodwood			1		1
	<i>Corymbia gummifera</i>	Red Bloodwood	1		4b	2	1
	<i>Cyathochaeta diandra</i>	Sheath Rush	4b	4b	4b		4b
	<i>Cymbidium sp</i>	Orchid				1	
V	<i>Darwinia biflora</i>			2			
	<i>Dianella caerulea var. producta</i>	Blue Flax Lily	1			1	1
	<i>Dianella prunina</i>	Native Flax Lily		1	1		
	<i>Dillwynia floribunda</i>	Showy Parrot Pea		2			
	<i>Dillwynia retorta</i>	Parrot Pea		1			1
	<i>Dodonaea viscosa</i>	Sticky Hop Bush			2		

<i>Dracophyllum secundum</i>	Dracophyllum	1		1	3	
<i>Drosera auriculata</i>	Sundew		2		2	1
<i>Elaeocarpus reticulatus</i>	Blueberry Ash			1	2	
<i>Entolasia stricta</i>	Wiry Panic	3	4b	4b	4b	4b
<i>Epacris pulchella</i>	Wallum Heath		3	2	1	2
<i>Eragrostis brownii</i>	Brown's Lovegrass					
<i>Eucalyptus haemastoma</i>	Scribbly Gum		2			1
<i>Eucalyptus pilularis</i>	Blackbutt	1		1		1
<i>Eucalyptus piperita</i>	Sydney Peppermint	1		4b		
<i>Eucalyptus punctata</i>	Grey Gum			4b		1
<i>Eucalyptus resinifera</i>	Red Mahogany				4b	
<i>Gahnia sieberiana</i>	Red-fruit Saw-sedge				2	
<i>Glochidion ferdinandi</i>	Cheese Tree				1	
<i>Glycine clandestina</i>	Twining Glycine				1	
<i>Gompholobium glabratum</i>	Dainty Wedge Pea					1
<i>Gonocarpus teucroides</i>	Raspwort			1		
<i>Grevillea buxifolia</i>	Grey Spider Flower		3			1
<i>Grevillea mucronulata</i>	Green Spider Flower		2			1
<i>Grevillea speciosa</i>	Red Spider-flower	2	3			
<i>Hakea dactyloides</i>	Broad-leaved Hakea	1	2			1
<i>Hakea propinqua</i>	Large Fruit Hakea		1			
<i>Hakea sericea</i>	Needlebush		2	1	1	
<i>Hibbertia aspera</i>	Rough Guinea Flower		1	1		
<i>Hibbertia diffusa</i>	Wedge Guinea Flower					1
<i>Hovea linearis</i>	Common Hovea			1		
<i>Imperata cylindrica</i>	Blady Grass					
<i>Isopogon anemonifolius</i>	Broad-leaved Drumsticks	1	2			2
<i>Lambertia formosa</i>	Mountain Devil	2	2	2	2	2
<i>Lepidosperma laterale</i>	Variable Swordsedge	2	1		2	2
<i>Leptospermum polygalifolium</i>	Tantoon		1			
<i>Leptospermum trinervium</i>	Flaky-barked Tea-tree	4b	4b	2	2	4b
<i>Leucopogon juniperinus</i>	Prickly-beard Heath	2		1	1	
<i>Leucopogon microphyllus</i>	Small Leaved White Beard		2			
<i>Leucopogon parviflorus</i>	Coastal Beard-heath		1			
<i>Lindsaea microphylla</i>	Lacy Wedge Fern	1		2		
<i>Lomandra brevis</i>	Tufted Mat-rush					
<i>Lomandra filiformis</i>	Wattle Mat-rush			1		
<i>Lomandra glauca</i>	Pale Mat-rush	1	1			
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush				1	
<i>Lomandra multiflora</i>	Many Flowered Mat-rush			2	2	
<i>Lomandra obliqua</i>	Fish Bones	2	2	1	2	1
<i>Lomatia silaifolia</i>	Crinkle Bush	1		1		
<i>Micrantheum ericoides</i>			2			
<i>Micromyrtus ciliata</i>	Fringed Heath-myrtle		2			1

<i>Mirbelia rubiifolia</i>	Heath Mirbelia		2			
<i>Patersonia sericea</i>	Purple Flag Flower					
<i>Persoonia lanceolata</i>	Lance Leaf Geebung		1			1
<i>Persoonia levis</i>	Broad Leaved Geebung			2	1	
<i>Persoonia pinifolia</i>	Pine-leaved Geebung	2	2	3	2	2
<i>Petrophile pulchella</i>	Conesticks	1	2			2
<i>Phyllanthus hirtellus</i>	Thyme Spurge	1		1	1	1
<i>Phyllota phyllicoides</i>	Heath Phyllota					
<i>Pimelea linifolia</i>	Slender Rice Flower				2	
<i>Platysace linearifolia</i>	Carrot Tops	4b	3	2	2	2
<i>Pomax umbellata</i>	Pomax					
<i>Pratia purpurascens</i>	Whiteroot					1
<i>Pteridium esculentum</i>	Bracken Fern	2		2	2	
<i>Rytidosperma racemosum</i>	Wallaby Grass					
<i>Scaevola ramosissima</i>	Purple Fan-flower		1	1		
<i>Schizaea bifida</i>	Forked Comb Fern					2
<i>Schoenus melanostachys</i>	Black Bog Rush		4b	1		1
<i>Smilax glycyphylla</i>	Sweet Sarsaparilla	1		1	1	
<i>Stylidium graminifolium</i>	Grass Trigger Plant					
<i>Telopea speciosissima</i>	NSW Waratah				2	
<i>Tetradlea thymifolia</i>	Black Eyed Susan				2	
<i>Themeda australis</i>	Kangaroo Grass			1		1
<i>Woollisia pungens</i>	Snow Heath					4b
<i>Xanthorrhoea resinosa</i>	Grass Tree	1	1	1	1	1
<i>Xanthosia pilosa</i>	Woolly Xanthosia	1		1	1	1
<i>Xanthosia tridentata</i>	Rock Xanthosia		2	1	1	
<i>Xylomelum pyrifforme</i>	Woody Pear				1	

V – Vulnerable species**Key****Braun-Blanquet scale.**

- 1 <5% cover & 3 or less individuals
- 2 <5% cover & more than 3 individuals sparsely scattered
- 3 <5% cover common and consistent
- 4a <5% cover & very abundant many individuals
- 4b 5 – 25% cover
- 5 25 – 50% cover
- 6 50 – 75% cover
- 7 75% - 100% cover

APPENDIX D – FAUNA SPECIES IDENTIFIED WITHIN ONR SURVEY AREA

	Scientific Name	Common name	Method of observation
BIRDS			
	<i>Acanthorhynchus tenuirostis</i>	Eastern Spinebill	On site observation
	<i>Anthochaera chrysoptera</i>	Little Wattlebird	On site observation
	<i>Aquila audax</i>	Wedge-tailed Eagle	Flying above
V	<i>Calyptorhynchus lathamii</i>	Glossy Black Cockatoo	Chewed cones
	<i>Chenonetta jubata</i>	Australian Wood Duck	On site observation
	<i>Colluricincla harmonica</i>	Grey Shrike-thrush	On site observation/IRC
	<i>Cracticus tibicen</i>	Australian Magpie	On site observation
	<i>Cracticus torquatus</i>	Grey Butcherbird	On site observation
	<i>Dacelo novaeguineae</i>	Laughing Kookaburra	On site observation/IRC
	<i>Eopsaltria australis</i>	Eastern Yellow Robin	On site observation
	<i>Falco cenchroides</i>	Nankeen Kestrel	Flying above
	<i>Haliaeetus leucogaster</i>	White-breasted Sea Eagle	Flying above
	<i>Hirundo neoxena</i>	Welcome Swallow	On site observation
	<i>Lichenostomus leucotis</i>	White-eared Honeyeater	On site observation
	<i>Malurus cyaneus</i>	Superb Fairy Wren	On site observation
	<i>Manorina melanocephala</i>	Noisy Minor	On site observation
	<i>Meliphaga lewinii</i>	Lewin's Honeyeater	On site observation
	<i>Neochmia temporalis</i>	Red-browed Finch	On site observation
	<i>Ocyphaps lophotes</i>	Crested Pigeon	On site observation
	<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater	On Site observation
	<i>Platycercus elegans</i>	Crimson Rosella	On site observation
	<i>Rhipidura albiscapa</i>	Grey Fantail	On site observation
	<i>Rhipidura leucophrys</i>	Willie Wagtail	On site observation
	<i>Sericornis frontalis</i>	White-browed Scrubwren	On site observation
	<i>Strepera graculina</i>	Pied Currawong	On site observation
	<i>Tachyspiza fasciata</i>	Brown Goshawk	Found deceased
	<i>Trichoglossus moluccanus</i>	Rainbow Lorikeet	On site observation
MAMMALS			
	<i>Austronomus australis</i>	White-striped Free-tailed Bat	Anabat Express
P	<i>Canis lupus familiaris</i>	Dog	Scat and prints
	<i>Chalinolobus morio</i>	Chocolate Wattled Bat	AnaBat Express
V	<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	AnaBat Express
	<i>Perameles nasuta</i>	Long-nosed Bandicoot	Digs
P	<i>Oryctolagus cuniculus</i>	European Rabbit	Scat/digs
	<i>Ozimops ridei</i>	Ride's Free-tailed Bat	AnaBat Express

	<i>Rhinolophus megaphyllus</i>	Eastern Horseshoe Bat	AnaBat Express
	<i>Trichosurus vulpecula</i>	Brush-tailed Possum	Scat
P	<i>Vulpes vulpes</i>	European Red Fox	Scat and prints
	<i>Wallabia bicolor</i>	Swamp Wallaby	On site observation/scat/ Sand pad/IRC
	<i>Unknown small mammal</i>	Possibly Mouse, Rat or Antechinus	IRC
AMPHIBIANS			
	<i>Crinia signifera</i>	Common Eastern Froglet	Heard at farm dam
	<i>Litoria peronei</i>	Peron's Tree Frog	Heard in distance
REPTILES			
	<i>Lampropholis guichenoti</i>	Common Garden Skink	On site observation
	<i>Pseudechis porphyriacus</i>	Red-bellied Black Snake	On site observation
INVERTEBRATES			
	<i>Unknown various flying nocturnal insects</i>	Moths/Beetles	IRC

V – Vulnerable species

P – Pest species

APPENDIX E – FAUNA SPECIES IDENTIFIED WITHIN HRBOA SURVEY AREA

	Scientific Name	Common name	Method of observation
BIRDS			
	<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill	On site observation
	<i>Alisterus scapularis</i>	King Parrot	On site observation
	<i>Anas superciliosa</i>	Pacific Black Duck	On site observation
	<i>Anthochaera chrysoptera</i>	Little Wattlebird	On site observation
V	<i>Calyptorhynchus lathamii</i>	Glossy Black Cockatoo	Chewed cones
	<i>Chenonetta jubata</i>	Australian Wood Duck	On site observation
V	<i>Climacteris picumnus</i>	Brown Treecreeper	On site observation
	<i>Colluricincla harmonica</i>	Grey Shrike-thrush	On site observation
	<i>Cracticus tibicen</i>	Australian Magpie	On site observation
	<i>Cracticus torquatus</i>	Grey Butcherbird	On site observation
	<i>Dacelo novaeguineae</i>	Laughing Kookaburra	On site observation
	<i>Eopsaltria australis</i>	Eastern Yellow Robin	On site observation
	<i>Falco cenchroides</i>	Nankeen Kestrel	On site observation
	<i>Hirundo neoxena</i>	Welcome Swallow	On site observation
	<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater	On site observation
	<i>Lichenostomus leucotis</i>	White-eared Honeyeater	On site observation
	<i>Leucosarcia melanoleuca</i>	Wonga Pigeon	On site observation
	<i>Malurus cyaneus</i>	Superb Fairy Wren	On site observation
	<i>Meliphaga lewinii</i>	Lewin's Honeyeater	On site observation
	<i>Neochmia temporalis</i>	Red-browed Finch	On site observation
	<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater	On site observation
	<i>Platycercus elegans</i>	Crimson Rosella	On site observation
	<i>Platycercus eximius</i>	Eastern Rosella	On site observation
	<i>Ptilonorhynchus violaceus</i>	Satin Bowerbird	On site observation
	<i>Rhipidura albiscapa</i>	Grey Fantail	On site observation
	<i>Rhipidura leucophrys</i>	Willie Wagtail	On site observation
	<i>Rhipidura rufifrons</i>	Rufus Fantail	On site observation
	<i>Sericornis frontalis</i>	White-browed Scrubwren	On site observation
	<i>Strepera graculina</i>	Pied Currawong	On site observation
MAMMALS			
	<i>Austronomus australis</i>	White-striped Free-tailed Bat	AnaBat Express
P	<i>Canis lupus familiaris</i>	Dog	Print
V	<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	AnaBat Express
	<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	AnaBat Express
	<i>Chalinolobus morio</i>	Chocolate Wattled Bat	AnaBat Express
V	<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	AnaBat Express
	<i>Ozimops ridei</i>	Ride's Free-tailed Bat	AnaBat Express
	<i>Perameles nasuta</i>	Long-nosed Bandicoot	Digs/scats
	<i>Rhinolophus megaphyllus</i>	Eastern Horseshoe Bat	AnaBat Express
	<i>Trichosurus vulpecula</i>	Brush-tailed Possum	Scat
P	<i>Vulpes vulpes</i>	European Red Fox	Scat/prints

	<i>Wallabia bicolor</i>	Swamp Wallaby	Scat/prints/IRC
AMPHIBIANS			
	<i>Crinia signifera</i>	Common Eastern Froglet	Heard in distance
	<i>Litoria peronei</i>	Peron's Tree Frog	Heard in distance
REPTILES			
	<i>Eulamprus quoyii</i>	Eastern Water Skink	On site observation
	<i>Intellagama lesueurii lesueurii</i>	Eastern Water Dragon	On site observation
	<i>Lampropholis guichenoti</i>	Common Garden Skink	On site observation
	<i>Pseudechis porphyriacus</i>	Red-bellied Black Snake	On site observation
	<i>Pseudonaja textilis</i>	Eastern Brown Snake	On site observation
INVERTEBRATES			
En	<i>Pommerhelix duralensis</i>	Dural Land Snail	On site observation

V – Vulnerable species

P – Pest species

En – Endangered species

APPENDIX F – MELALUECA DEANEI IN REHABILITATION AREA

ID number	Easting	Northing	Condition	Height	Width
Planted Rehabilitation					
1	312588	6296396	Healthy	1.3m	0.8m
2	312592	6296403	Healthy	1.3m	0.7m
3	312589	6296408	Healthy	0.85m	0.3m
4	312580	6296412	Healthy	1.1m	0.4m
5	312563	6296403	Healthy	1.05m	0.4m
6	312560	6296413	Healthy	1.2m	0.5m
7	312556	6296404	Healthy	0.95m	0.3m
8	312584	6296410	Healthy	1.05m	0.5m
9	312558	6296418	Healthy	1.55m	0.7m
10	312502	6296414	Healthy	1m	0.4m
11	312556	6296422	Healthy	1.25m	0.5m
12	312567	6296416	Healthy	1.35m	0.4m
13	312574	6296396	Healthy	1.45m	0.5m
14	312221	6296241	Healthy	1.15m	0.3m
Translocated Rehabilitation					
1b	312539	6296391	Planted 2017 Healthy	1.35m	0.4m
2b	312587	6296378	Planted May 2021	50cm	20cm
3b	312582	6296376	Planted May 2021	40cm	20cm
4b	312581	6296382	Planted May 2021	40cm	20cm
5b	312576	6296379	Planted May 2021	35cm	20cm
6b	312575	6296376	Planted May 2021	40cm	20cm
7b	312573	6296377	Planted May 2021		
8b	312571	6296385	Planted May 2021		
9b	312564	6296387	Planted May 2021		
10b	312564	6296385	Planted 2017 Healthy	1.4m	0.5m
11b	312562	6296380	Planted May 2021	50cm	20cm
12b	312565	6296378	Planted May 2021	40cm	20cm
13b	312561	6296383	Planted May 2021	40cm	20cm
14b	312549	6296390	Planted May 2021	40cm	20cm
15b	312555	6296381	Planted May 2021		

16b	312549	6296385	Planted May 2021	450cm	20cm
17b	312545	6296379	Planted May 2021		
18b	312535	6296387	Planted May 2021	35cm	20cm
19b	312541	6296392	Planted May 2021	40cm	20cm
20b	312547	6296393	Planted May 2021	45cm	20cm
21b	312525	6296400	Planted May 2021		
22b	312531	6296408	Planted May 2021		
23b	312537	6296405	Planted May 2021	40cm	20cm
24b	312540	6296406	Planted May 2021		
25b	312543	6296406	Planted May 2021	40cm	20cm
26b	312586	6296367	Planted Oct 2021		
27b	312580	6296386	Planted Oct 2021		
28b	312527	6296405	Planted Oct 2021	50cm	20cm
29b	312529	6296414	Planted Oct 2021		
30b	312536	6296422	Planted Oct 2021		
31b	312553	6296421	Planted Oct 2021		
32b	312562	6296418	Planted Oct 2021		
33b	312574	6296415	Planted Oct 2021		
34b	312574	6296438	Planted Oct 2021	45cm	20cm
35b	312567	6296406	Planted Oct 2021	40cm	20cm
36			Grown from parent plant		
37			Grown from parent plant		
Seedbank Rehabilitation					
17	312510	6296389	Healthy	2m	0.9m
Lot 196 Rehabilitation					
11	312415	6296903	Planted July 2023	<30cm	<20cm

APPENDIX G – LANTANA CAMARA MANAGEMENT GUIDE

Lantana – Lantana camara

How to control lantana

Quick reference guide

Minimise spread and future impacts

Although lantana is widespread on the east coast of Australia, it is still absent from parts of its potential range. These areas should be protected by:

- preventing the importation of further varieties and species of lantana
- stopping more planting of lantana in gardens
- strategically controlling infestations which threaten uninfested areas.

A control program for dense infestations in pastures

The Queensland Department of Natural Resources and Mines has produced a pest series fact sheet on lantana (PP#34). They advise that herbicides are too expensive to treat large lantana infestations.

A combination of fire and mechanical control makes spot treatment of small patches with herbicides more cost-effective. The following suggested control program for dense infestations in pastures is based on the fact sheet:

- Exclude stock to allow a fuel load to build up.
- Bulldoze, stickrake or plough the infestation to add to the fuel load.
- Burn the infestation after obtaining a permit. Summer burns are more effective than winter burns.
- Sow an improved pasture. Seek advice of local council or state/territory government agencies for selection of non-weedy pasture species.
- Continue stock exclusion until pasture has established and set seed.
- Burn the infestation again after obtaining a permit.

- Spot spray or grub out any regrowth or seedlings. Spraying is most effective between summer and autumn.
- Follow-up burning, spraying and/or grubbing will be required for several years.



Lantana can escape from garden plantings into surrounding bushland.
Photo: Tim Schultz

Control options

Type of infestation	Physical	Mechanical	Chemical	Fire	Biological
Small (few plants, small area)	Hand grubbing only suitable for seedlings.	Not suitable.	Spot spray plants less than 2 m in height between summer and autumn with a registered herbicide.	Not suitable.	There are four useful biological control agents. They are already distributed throughout their potential range.
Medium (medium density, medium total area)	Wear gloves for protection from thorns.	Bulldoze, plough, stick-rake or slash infestations. Soil disturbance will lead to mass seed germination, so follow up with further controls. Do not use mechanical control in areas susceptible to erosion.	Spraying is uneconomical for medium or large infestations. Helicopter spraying is used when there is no access for mechanical control, eg very steep slopes.	Under permit, burn in summer with good fuel load of grass and/or mechanically cleared lantana. Also use as follow-up. Do not burn in rainforests.	
Large (many plants, many ha)		A permit may be required.			

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End Of Report

Appendix I – S94 Contribution

**Old Northern Road Quarry
Section 94 Contribution - Summary**

Month	Tonnage	S94 Paid
Jul-24	23,540.26	\$ 26,129.69
Aug-24	21,884.39	\$ 24,510.52
Sep-24	24,706.73	\$ 27,671.54
Oct-24	21,890.99	\$ 24,517.91
Nov-24	28,144.79	\$ 31,522.16
Dec-24	16,092.93	\$ 18,024.08
Jan-25	16,745.14	\$ 18,754.56
Feb-25	19,567.24	\$ 21,915.31
Mar-25	23,721.46	\$ 26,568.04
Apr-25	17,870.05	\$ 20,014.46
May-25	14,639.35	\$ 16,396.07
Jun-25	16,173.30	\$ 18,114.10
TOTAL	244,976.63	\$ 274,138.44

Appendix J – CCC Meeting Minutes



**MINUTES OF THE BI-ANNUAL
COMMUNITY CONSULTATIVE COMMITTEE
WEDNESDAY 6 NOVEMBER 2024
HAERSES ROAD QUARRY, ADMINISTRATION BUILDING**

PRESENT	NAME	ORGANISATION
	Lisa Andrews (LA)	Independent Chairperson
	David Dixon (DD)	Dixon Sand
	Jamie Baker (JB)	Dixon Sand – Business Development Manager
	Melissa Mass (MM)	Dixon Sand - Ecologist
	Farley Roberts (FR)	Community Representative
	Lisa Aylward (LAy)	Maroota Public School Representative
	Kristine McKenzie (KM)	The Hills Shire Council Representative
	Zoe Ridgeway (ZR)	Bush-It (alternate)
	Pat Schwartz (PS)	Community Representative
	Nathan McDonough (NM)	Dixon Firestone Business Partner (<i>observer</i>)
APOLOGIES	Hunny Churcher (HC)	Environmental Officer, Dixon Sand
	Timothy Baker (TB)	Bush Regeneration Contractor (Bush-It)
	Jemma Roberts (JR)	Community Representative (alternate)

WELCOME & INTRODUCTION	LA opened the meeting at 1.02pm following a light luncheon. All members were welcomed. Nathan McDonough was introduced by DD as Dixon Firestone business partner.			All members introduced themselves to NM.
APOLOGIES	As listed above.			
DECLARATIONS OF INTEREST	LA declared that she is approved by the Department of Planning to chair the meeting and engaged by Dixon Sand.			
BUSINESS ARISING FROM PREVIOUS MEETING (28/5/24)	NO.	ITEM	RESPONSIBILITY	No other business arising.
	1	Send out finalised Terms of Reference. Complete – ratified at the previous meeting and finalised.	LA	
CORRESPONDENCE (as emailed with Meeting Notice on 4/10/24 with 1 additional item)	31/5/24 – Email from FR with his and JR's signed governance forms. Acknowledged. 5/6/24- Email to members with draft minutes for review 12/6/24 – Email to members with the finalised minutes. 3/10/24 – Email from HC advising that Old Northern Road and Haerses Road Quarries: 2023-2024 Annual Reviews have been submitted to DPHI 4/10/24 – Email to members with meeting notice & agenda for 28/5/24.			

	4/11/24 – Email to members with the reminder for this meeting.																	
OPERATIONS & PROGRESS	JB commenced the presentation, advising of the operations and progress with the Old Northern Road Quarry, followed by the Hearses Road Quarry. This included an updated aerial view of Lots 1 & 2 since May 2024. JB advised that the silt ponds have been capped. All biodiversity credits have been retired.	Questions asked and answered throughout the presentation. Slides 6 & 7																
ONR – Proposed DA Mod 6 - Extraction within existing cells to maximise resource	- Increase the depth of extraction within Lot 196 DP752025 to within 2m of the highest recorded regional wet weather groundwater level; - Import up to 250,000 tonnes per annum of virgin excavated natural material (VENM) and excavated natural material (ENM) within existing incoming trucks; and - Extend the quarry life by 11 years until 2053. Timeline <table><tr><th>Date</th><th>Milestone</th></tr><tr><td>January 2023</td><td>Scoping Letter lodged with DPHI</td></tr><tr><td>March 2023</td><td>DPHI confirmed pathway and requests additional traffic assessment and rehabilitation and final landform assessment to be updated</td></tr><tr><td>September 2023</td><td>Consultation with Agencies</td></tr><tr><td>November 2023</td><td>Modification Report submitted to DPHI</td></tr><tr><td>November 2023 – April 2024</td><td>Public Exhibition, received submissions from the community and agencies, submissions report submitted to DPHI</td></tr><tr><td>May 2024</td><td>Received further comments from DCCEEW-Water. Submission report being prepared.</td></tr><tr><td>July 2024</td><td>DPHI issued an RFI</td></tr></table>	Date	Milestone	January 2023	Scoping Letter lodged with DPHI	March 2023	DPHI confirmed pathway and requests additional traffic assessment and rehabilitation and final landform assessment to be updated	September 2023	Consultation with Agencies	November 2023	Modification Report submitted to DPHI	November 2023 – April 2024	Public Exhibition, received submissions from the community and agencies, submissions report submitted to DPHI	May 2024	Received further comments from DCCEEW-Water. Submission report being prepared.	July 2024	DPHI issued an RFI	Sides: 8 & 9
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DEPARTMENT OF PLANNING, HOUSING & INFRASTRUCTURE SITE AUDIT	JB advised that following the submission of the Annual Review documents, DPHI undertook a site inspection at both quarries. There were no issues or items of concerns identified during the audit. The Department has reviewed the Annual Review and considers it to general satisfy the reporting requirements of the consent.																	

	KM asked if DPHI were going to provide Dixon Sand with an audit report. DD responded no. DPHI only notify if there is an issue. JB commented that an email had been received stating everything was okay. LA confirmed that the approved Annual Review is uploaded to the project website.														
ENVIRONMENTAL MONITORING RESULTS	JB commenced the environmental monitoring results, by showing the locations of devices.	Slides: 12 to 16													
TEOM DATA	JB explained the TEOM data and measurement criteria. - TEOM and Meteorological station records PM10 levels and weather data such as rain, temperature, wind etc. - Monitoring Criteria – - Long term: Annual PM10 average (light blue line) should not exceed the annual average criteria (pink line – 30µg/m3) – - Short term: 24hr PM10 average (blue bars) should not exceed the 24hr PM10 NEPM Criteria (yellow line – 50µg/m3) – - Short term: If the 24hr PM10 EPL Criteria Level (green line – 42µg/m3) is exceeded by the 24hr PM10 average (blue bars), and the prevailing wind is from the specific quadrant Dixon Sand is required to: - Notify EPA - Take immediate action to reduce PM10 levels - Stop works if levels do not fall below 42µg/m3 within 1 hour - TEOM station represent the EPL Points 1 & 3	Slide: 18													
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Old Northern Road	D1A Access road														
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	D12 Receiver R8														

	monitors to be relocated to avoid reoccurrences of the spikes from agricultural activities. It was noted that the results at the school were below average.	
NOISE MONITORING	ONR & Haerses Rd: Tables of noise monitoring locations indicating: Receivers, property addresses, descriptions and extrapolated monitoring results. KM enquired about the corner of Wisemans Ferry Rd & Hitchcock Road. MM advised that it was a non-sensitive receiver and the location is noisy & dusty so agreed that it will be affected.	See Slides 30-36 For location of monitoring sites and summary of data.
GROUND WATER MONITORING	GW Monitoring wells • ONR 11 x BH • HR 22 x BH GW levels: • Monthly + continuous data loggers GW quality sampling & lab analysis: • 6 monthly sampling and testing. MM advised that it hasn't rained since March and that most bores are going down slowly.	Graphs explained - See Slides 38-49 (maps)
BIODIVERSITY AND REHABILITATION (Threatened Species Update)	MM commenced the presentation by advising that the site rehabilitation is progressing well and they are getting on top of weed management. Monitoring of fauna & flora on the site continues. Biodiversity and Rehabilitation Annual Report 2024 (AR) 🌈 The Biodiversity and Rehabilitation Annual Report identifies native flora and fauna within the Native Vegetation Corridor and the Haerses Road Biodiversity Offset Area, it monitors the success of the rehabilitation area within the NVC and describes the current condition of threatened flora and fauna and their habitats within the Old Northern Road site and the HRBOA. 🌈 The 2024 Biodiversity and Rehabilitation Annual Report was completed in September 2024 and submitted with the Annual Review on the 30th of September 2024. 🌈 The results found the rehabilitation areas are thriving and increasing in diversity and density. Ideal growing conditions with favourable temperatures and regular rainfall over the past 4 years has improved the overall biodiversity of all rehabilitation and monitoring sites. MM advised that the AR is now available on the website. Monitoring Fauna	See Slides 50 – 64 including photographs

	Fauna monitoring is undertaken in the summer months when activity is at the highest and more likely to be observed ○ Fauna monitoring includes: Recording bat calls via an Anabat sound recorder; ○ The use of unbaited infra-red motion detection cameras on animal trails; ○ Looking for scats, prints and other signs such as diggings, scratches, feed scars; ○ Aural survey for birds; and ○ Visual observation. MM commented on the Dural Land Snail, stating that they only travel 1 metre around their home for their whole life. MM will bring a sample of the snail to the next meeting. Action. Discussions on the kunzia plant on the flat rock. KM asked if they are dug up and moved around. MM responded no, they are left where they are. DD explained that the plant thrives from the radiant heat from the rock. Monitoring flora • Flora monitoring is undertaken in the winter months as many of the threatened species are flowering or budding up preparing for early spring flowering • Vegetation quadrats are repeated annually in monitoring locations. Quadrats are 20m x 50m, 20m x 20m and 1m x 1m which record the following information: ○ Species present and percentage of cover; ○ Stem class including recruitments present or absent; ○ Number of hollow bearing trees; ○ Total length of coarse woody debris; ○ Litter cover, rock surface area, bare ground	
BUSH REGENERATION WORKS	Summary of Assisted Bush Regeneration Work - May 2024 to November 2024- presented by ZR who advised that they have been able to get on top of the weeds. <u>Old Northern Rd Works Areas:</u> <u>Rehabilitation of Lot 196</u> ○ Works over this period focused exclusively on revegetating the Commander area. ○ In late September to early October approx. 150 viro-tube specimens were planted, watered with seasol mix and guarded into Commander, with regular watering follow-up sessions. The plantings covered the following species: Acacia falcata, Acacia longifolia, Acacia suaveolens, Angophora hispida, Banksia ericifolia, Hakea dactyloides, Hakea sericea, Ozothamnus diosmifolius.	See photographs in Slides: 65 - 79

	<u>Assisted Regeneration - Native Vegetation Corridor (NVC)</u> ○ Have effectively maintained the translocation area from having additional weed incursions of exotic grasses. ○ Had a new weed incursion of common couch encroaching from the bare mounds into the vegetated mounds bordering the translocation; this was treated with a selective herbicide (Fusilade forte) in October. ○ Collected seed from <i>Acacia suaveolens</i> to be propagated at the nursery. <u>Rehabilitation of Lot 2</u> ○ Continued large push on lantana, now reduced down to a maintenance level and secondary in small bordering areas. ○ Brush-cut large Crofton patches to prevent them going to seed ○ In September planted approx. 150 viro-tube specimens of the following native shrub and canopy species: <i>Acacia myrtifolia</i>, <i>Acacia ulicifolia</i>, <i>Callitris</i> sp., <i>Corymbia gummifera</i>, <i>Hakea dactyloides</i>, <i>Hakea sericea</i>, <i>Ozothamnus diosmifolius</i>, <i>Syncarpia glomulifera</i>, <i>Viminaria juncea</i>. ○ Regular follow-up watering to mitigate dry conditions at the time. Applied seasol mix to one watering. ○ We underestimated the rate of predation of the aforementioned plantings in Lot 2, and have responded with new strategies of larger guards and preserving annual invasive species to lower the impact of predation on current and future plantings. <u>Rehabilitation of Haerses Rd – Old Dam Area</u> <u>Challenges</u> • Lantana is now at a low maintenance level. <u>Assisted Regeneration - Haerses Road Biodiversity Offset</u> ○ Is in good condition. ○ Have reduced scans for crofton and wild tobacco to a low maintenance level, plans on focusing targets to lantana follow up. <u>Haerses Rd - Translocation</u> ○ Minimal visits over this period ○ Hand removed exotic grasses that were encroaching native ground covers ○ Selectively culled <i>Kunzea ambigua</i> specimens that were growing above high-value Proteaceae	
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	species, such as Banksia serrata, Lambertia formosa or Persoonia linearis. ○ Follow-up works required. <u>Haerses Rd – Visual buffer along Wisemans Ferry Road</u> ○ In September planted 24 Hakeas (sp. sericea and dactyloides) and 25 Acacia longifolias in the buffer to the east of Haerses road ○ In the same month we filled out the established planting area right of Haerses Rd along the swale edge with a border of approx. 20 Angophora hispida specimens and 2 Synocarpia glomulifera specimens.	
PROJECT REPORT, INCLUDING PRODUCTION/ SALES	DD advised that sales are good. Extraction is continuing. Haven't been able to bake the ponds. Weather conditions should be good coming into summer for backfilling over the ponds. MOD 6 is still up in the air as Dixon Sand try to go deeper instead of outwards. The water table is deeper than expected. Still hope to mine the same amount of material, however, over 2 sites, which will be easier to manage, then being full scale just on one side. The diversity of produce has enabled Dixon Sand to be steady with sales. The new operation (Dixon Firestone) is well underway. The sheds are up and following a trip to Northern Italy & USA, equipment has been purchased, installed and commissioned. NM advised that it is cutting edge technology, which doesn't exist elsewhere in the southern hemisphere. The equipment goes a long way to reducing noise and is best practice in terms of safety, including controlled cutting, full suppression, no visual or respiratory dust, use of recycled water, reuse of fines, etc. Fines are processed at the wash plant and sold to USA as product with remanent waste going to the silt pond. KM enquired how many staff were in this area. DD advised 5-6 full time plus contractors. Two men came from the USA to install and commission the equipment, which took 25 days. PS enquired whether many fossils have been found. NM advised that they are working in the Blue Mountains/Central Coast/Pymont part of the Narrabeen pre-Jurassic permian. There is not a lot of fossils. PS advised of a Labyrinthodonts (amphibian) fossil gifted to the Glenorie community, which is 400M years old and located is in the Hall.	

GENERAL BUSINESS	○ LAy asked KM regarding the speed signage associated with subdivision works in the area. Reduced speed limit signs are still showing when there are no works or workmen and sometimes stay there for months, impacting on motorists having to slow down for no reason. LAy acknowledged that it isn't a Dixon Sand CCC issue, but is frustrating for the community. ○ KM confirmed that the speed reductions are associated with the subdivision approval. If signs haven't been removed then contact Council to follow up. LAy will contact the Construction Engineers at Council herself. ○ JB advised that Dixon Sand's Salvation Army Christmas Appeal will be held again this year, following great success in the past. Local residents are invited to drop off any Christmas presents for distribution via the Salvation Army's Christmas appeal. ○ LAy thanked Dixon Sand for bringing the dozer to the school for its Maroota Muster event. ○ PS advised that there is now a breeding population of koalas back in the forest after the 2002 fires. 11 have been formally reported. Whilst there may be more, there needs to be confirmed sightings. ○ PS stated that the endangered Greater Glider has also been found, with the Eucalyptus deanei being their preferred habitat. ○ PS mentioned that there is a controlled burn planned for the gully. Trying to find a better way to undertake burning. Further discussions on cool/cultural burning between PS & NM.	
MEETING SCHEDULE FOR 2025	LA sought consent for the meeting schedule remain as previous. Two meetings a year, one in May and one in November. Accordingly: 📅 Wednesday 7th May; and 📅 Wednesday 5th November 2025. Commencing at 12.30pm with lunch prior to the 1pm start. It was suggested that a site inspection be undertaken at the May meeting to view the new Dixon Firestone facility.	Agreed.

The meeting was closed at 2:19pm with the chair thanking all members for their attendance.

ACTION ITEM:

NO.	ITEM	RESPONSIBILITY
1	Bring Dural Land Snail sample to next CCC	MM
2	Confirm site inspection requirements	LA



**MINUTES OF THE BI-ANNUAL
COMMUNITY CONSULTATIVE COMMITTEE
WEDNESDAY 7 MAY 2025
HAERSES ROAD QUARRY, ADMINISTRATION BUILDING**

PRESENT	NAME	ORGANISATION
	Lisa Andrews (LA)	Independent Chairperson
	Hunny Churcher (HC)	Environmental Officer, Dixon Quarry Group
	Jamie Baker (JB)	Dixon Quarry Group – Business Development Manager
	Melissa Mass (MM)	Dixon Quarry Group - Ecologist
	Farley Roberts (FR)	Community Representative
	Lisa Aylward (LAy)	Maroota Public School Representative
	Kristine McKenzie (KM)	The Hills Shire Council Representative
	Mick Munnoch	Dixon Quarry Group – Quarry Manager
APOLOGIES	Pat Schwartz (PS)	Community Representative
	Timothy Baker (TB)	Bush Regeneration Contractor (Bush-It)
	Jemma Roberts (JR)	Community Representative (alternate)
	David Dixon (DD)	Dixon Quarry Group – Managing Director

WELCOME & INTRODUCTION	LA opened the meeting at 1.06pm following a light luncheon. All members were welcomed.			
APOLOGIES	As listed above.			
DECLARATIONS OF INTEREST	LA declared that she is approved by the Department of Planning to chair the meeting and engaged by Dixon Quarry Group.			
BUSINESS ARISING FROM PREVIOUS MEETING (6/11/24)	NO.	ITEM	RESPONSIBILITY	1 – Complete 2 – Complete
	1	Bring Dural Land Snail sample to next CCC.	MM	
	2	Confirm site inspection requirements.	LA	
	No other business arising.			
CORRESPONDENCE (as emailed with Meeting Notice on 14/4/25 with 1 additional item)	19/11/24 - Email to members with draft minutes for review. 28/11/24 – Email to members with the finalised minutes. 14/4/24 – Email to members with meeting notice & agenda for 7/5/25. 5/5/25 - Email to members with the reminder for this meeting.			

OPERATIONS & PROGRESS	JB commenced the presentation, advising of the operations and progress with the firestone component of the business, including the commissioning of the machines. Firestone has been the biggest growth in the quarry, which is mainly due to residential areas (subdivisions), retaining walls, water courses as well as some commercial and industrial uses. Sand is holding strong with ONR sandstone extraction growing. Two extra people have been employed and the company is in a positive position. Included an updated aerial photos of ONR and HR quarries taken in August 2024	Questions asked and answered throughout the presentation. Slides 6 & 7																		
ONR – Proposed DA Mod 6 - Extraction within existing cells to maximise resource	• Increase the depth of extraction within Lot 196 DP752025 to within 2m of the highest recorded regional wet weather groundwater level; • Import up to 250,000 tonnes per annum of virgin excavated natural material (VENM) and excavated natural material (ENM) within existing incoming trucks; and • Extend the quarry life by 11 years until 2053. Timeline <table><tr><th>Date</th><th>Milestone</th></tr><tr><td>January 2023</td><td>Scoping Letter lodged with DPHI</td></tr><tr><td>March 2023</td><td>DPHI confirmed pathway and requests additional traffic assessment and rehabilitation and final landform assessment to be updated</td></tr><tr><td>September 2023</td><td>Consultation with Agencies</td></tr><tr><td>November 2023</td><td>Modification Report submitted to DPHI</td></tr><tr><td>November 2023 – April 2024</td><td>Public Exhibition, received submissions from the community and agencies, submissions report submitted to DPHI</td></tr><tr><td>May 2024</td><td>Received further comments from DCCEEW-Water. Submission report being prepared.</td></tr><tr><td>July 2024</td><td>DPHI issued an RFI</td></tr><tr><td>Currently</td><td>RFI being addressed</td></tr></table> Currently the quarry is preparing further information to address the Department’s Request for Information, including ground water modelling, supply of VENM & ENM and how the project will be staged.	Date	Milestone	January 2023	Scoping Letter lodged with DPHI	March 2023	DPHI confirmed pathway and requests additional traffic assessment and rehabilitation and final landform assessment to be updated	September 2023	Consultation with Agencies	November 2023	Modification Report submitted to DPHI	November 2023 – April 2024	Public Exhibition, received submissions from the community and agencies, submissions report submitted to DPHI	May 2024	Received further comments from DCCEEW-Water. Submission report being prepared.	July 2024	DPHI issued an RFI	Currently	RFI being addressed	Sides: 8 & 9
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ENVIRONMENTAL MONITORING RESULTS	HC commenced the environmental monitoring results, by showing the locations of devices and explaining/quantifying the outcomes. Data explained.	Slides: 11 to 15																		

TEOM DATA	HC explained the TEOM data and measurement criteria. ○ TEOM and Meteorological station records PM10 levels and weather data such as rain, temperature, wind etc. ○ Monitoring Criteria – • Long term: Annual PM10 average (light blue line) should not exceed the annual average criteria (pink line – 30µg/m3) – • Short term: 24hr PM10 average (blue bars) should not exceed the 24hr PM10 NEPM Criteria (yellow line – 50µg/m3) – • Short term: If the 24hr PM10 EPL Criteria Level (green line – 42µg/m3) is exceeded by the 24hr PM10 average (blue bars), and the prevailing wind is from the specific quadrant Dixon Sand is required to: • Notify EPA • Take immediate action to reduce PM10 levels • Stop works if levels do not fall below 42µg/m3 within 1 hour ○ TEOM station represents the EPL Points 1 & 3	Slide: 16													
DEPOSITIONAL DUST DATA	Dust data for this monitoring period: July 2024 – April 2025: <table><tr><th>Date</th><th>Milestone</th></tr><tr><td rowspan="5">Old Northern Road</td><td>D1A Access road</td></tr><tr><td>D4 Rehab area</td></tr><tr><td>D5 Bundwall</td></tr><tr><td>D6 School</td></tr><tr><td>D7 Mullock Heap</td></tr><tr><td rowspan="4">Haerses Road</td><td>D8 Olive Grove</td></tr><tr><td>D10 Haerses Road (EPL Point 3)</td></tr><tr><td>D11 Receiver R6</td></tr><tr><td>D12 Receiver R8</td></tr></table> Dust exceedances are reported to EPA & DPHI which are usually as a result of nearby agricultural activities. Dixon Quarry are still trying to obtain approval for some of the locations of the monitors to be relocated due to ongoing cumulative impacts from other sources. JB advised that the annual occupational dust and noise monitoring for employees was undertaken last month by the hygienist. Monitoring indicated that all dust and noise levels were acceptable. There was a slight elevation in one of the machines due to a degraded seal, which has since been replaced. All silica dust monitoring is below regulatory limits.	Date	Milestone	Old Northern Road	D1A Access road	D4 Rehab area	D5 Bundwall	D6 School	D7 Mullock Heap	Haerses Road	D8 Olive Grove	D10 Haerses Road (EPL Point 3)	D11 Receiver R6	D12 Receiver R8	See graphs for results. Slides: 17 - 22
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NOISE MONITORING	ONR & Haerses Rd: Tables of noise monitoring locations indicating: Receivers, property addresses, descriptions and extrapolated monitoring results. No noise complaints have been received for quite some time. Predicted noise at one receiver was slightly over the noise criteria (slide 29). However, in accordance with the Noise Policy for Industry (2017), where the predicted noise level minus the project noise trigger level is $\leq 2\text{dB}$, then the significance of the residual noise level is negligible at the receiver. This is supported by observations made during monitoring which indicated Quarry only "intermittently just audible" at the affected receiver.	See Slides 23-30 For location of monitoring sites and summary of data.
GROUND WATER MONITORING	GW Monitoring wells • ONR 11 x BH • HR 16 x BH GW levels: • Monthly + continuous data loggers GW quality sampling & lab analysis: • 6 monthly sampling and testing. Results are very reflective of rain water events/weather.	Graphs explained - See Slides 31-43 (maps)
COMMUNITY CONTRIBUTIONS	HC presented on the contributions that Dixon Quarry make to the community, including, but not limited to:  Maroota Muster  Cattai Public School  Royal Flying Doctor Service  The Last Post @ Wisemans Ferry for Anzac Day  Anzac Day Tribute Sandstone Display  Castlereagh Christian Conference Centre  Sponsorship of Nepean Area Disabilities Organisation  Sponsorship of Sporting Individuals  Glenorie RSL  Glenorie Progress Association  Carols by Candlelight  Salvos Donations/Christmas Toy Appeal LAY advised that the school is seeking assistance for a sound system. JB invited LAY to provide details for consideration.	Slide 44
COMPLAINT	HC provided information on a complaint that was received by the EPA on 31/3/25, when a member of the public reported sediment on the Old Norther Road from sand trucks. Action undertaken by Dixon Quarry staff: ○ Road and Access Road was inspected with photographs provided to the EPA immediately showing no sand on Access road and intersection.	Slide 45

	○ Undertook a re-education campaign with the truck drivers at both quarries during April 2025 ○ Complaint closed out FR commented that a lot of sediment is coming from trucks and cars picking it from the road shoulder following rain events washing it onto the roads, due to poor drainage. JB commented that the road shoulders and verges areas along Old Northern Road contain sediment, which has not been cleared from the local roads and that regular maintenance was required to ensure that the roads drained quickly. HC commented that Old Northern Road was under the control of Transport for NSW and suggested making representations to Transport for NSW to sweep the area and provided maintenance. KM agreed that Old Northern Road was a Transport for NSW road. HC to lobby.	
BIODIVERSITY AND REHABILITATION (Threatened Species Update)	MM commenced the presentation by advising that the site rehabilitation is progressing well and they are getting on top of weed management. Monitoring of fauna & flora on the site continues. Biodiversity and Rehabilitation Annual Report 2024 (AR) 🚩 The Biodiversity and Rehabilitation Annual Report identifies native flora and fauna within the Native Vegetation Corridor and the Haerses Road Biodiversity Offset Area, it monitors the success of the rehabilitation area within the NVC and describes the current condition of threatened flora and fauna and their habitats within the Old Northern Road site and the HRBOA. 🚩 The 2024 Biodiversity and Rehabilitation Annual Report was completed in September 2024 and submitted with the Annual Review on the 30th of September 2024. 🚩 The results found the rehabilitation areas are thriving and increasing in diversity and density. Ideal growing conditions with favourable temperatures and regular rainfall over the past 4 years has improved the overall biodiversity of all rehabilitation and monitoring sites. Currently collecting data for the 2025 report. The flora survey will be carried out in the next few months as things start to flower. Native Vegetation Corridor – Old Northern Road explained. Biodiversity Offset Area – Haerses Road explained.	See Slides 46 – 60 including photographs

	Monitoring Fauna Fauna monitoring is undertaken in the summer months when activity is at the highest and more likely to be observed. Fauna monitoring includes: ○ Recording bat calls via an Anabat sound recorder; ○ The use of unbaited infra-red motion detection cameras on animal trails; ○ Looking for scats, prints and other signs such as diggings, scratches, feed scars; ○ Aural survey for birds; and ○ Visual observation. Long-nosed Bandicoot <i>Perameles nasuta</i> tracks and digs HR observed. Deceased Brown Goshawk <i>Accipiter fasciatus</i> and Red Bellied Black Snake <i>Pseudechis porphyriacus</i> observed at ONR. MM handed around examples of the Dural Land Snail and the Cumberland Plain Land Snail, explaining the difference between the two species, which are both endangered species in state and federal legislation. Monitoring flora • Flora monitoring is undertaken in the winter months as many of the threatened species are flowering or budding up preparing for early spring flowering • Vegetation quadrats are repeated annually in monitoring locations. Quadrats are 20m x 50m, 20m x 20m and 1m x 1m which record the following information: ○ Species present and percentage of cover; ○ Stem class including recruitments present or absent; ○ Number of hollow bearing trees; ○ Total length of coarse woody debris; ○ Litter cover, rock surface area, bare ground	Action Item 1 from previous CCC.
BUSH REGENERATION WORKS	Summary of Assisted Bush Regeneration Work – October 2024 to May 2025 - presented by HC. Porters Rd BCT explained. Management Plan for the control of feral animals and weeds. Need to manage protection from bush fire by undertaking ecological burns. Monitoring the 53.9 hectares for animals, fences, gates, signs. People are using area as a walking track. BCT officer is okay with recreational walking being undertaken, however, no horses or bike riding is allowed. <u>Old Northern Rd Works Areas:</u> <u>Rehabilitation of Lot 196</u>	See photographs in Slides: 61 - - 71

	○ Works over this period focused on suppressing Whisky Grass (<i>Andropogon virginicus</i>) from spreading seed. This was achieved through slashing and hand weeding around native groundcover before the species flowered. ○ The planting in September 2024 was largely unsuccessful. 56 out of the 150 specimens survived (37% survival rate). Large death rates likely owing to exposure and compacted soil. <u>Assisted Regeneration - Native Vegetation Corridor (NVC)</u> ○ Continued maintenance of Whisky grass in and around translocation area achieved through periodic sweeps through the area. ○ Follow-up treatment of common couch encroaching the vegetated mounds next to the translocation area; this was treated through a selective herbicide (<i>Fusilade forte</i>) in January. <u>Rehabilitation of Lot 2</u> ○ Continued works on lantana, largely secondary and maintenance level. ○ Brush-cut large Paspalum patches to prevent them going to seed. ○ New weed incursion of <i>Pellaea viridis</i>, an exotic fern known to be in other areas of works, was detected in a single area of Lot 2. The weed was treated through a Trans-mix of Broadleaf herbicides (<i>Metsulfuron-methyl</i> and <i>Glyphosate</i>) in April. ○ The planting In September of approx. 150 specimens was relatively unsuccessful. The plantings consisted of a mix of native shrub and canopy species endemic to the area. Large guards were used to combat the high density of grazers in the area. However, owing to the dry winter, survival rate was low. <u>Rehabilitation of Haerses Rd – Old Dam Area</u> ○ Whisky Grass (<i>Andropogon virginicus</i>) was slashed along fire trail before flowering. Suppressing the species from spreading into the resilient bush further down the fire trail. ○ Follow-up works on Lantana primary works from last year was undertaken. <u>Assisted Regeneration - Haerses Road Biodiversity Offset</u> ○ Is in good condition. ○ Focus on monitoring edges for highly mobile weed species. Slashing of Whisky Grass in addition to occasional scans through edge was undertaken.	
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	<u>Haerses Rd - Translocation</u> ○ Visits over this period were largely to manage flowering Whisky grass and African Lovegrass. The exotic perennial grasses were slashed to limit seed dispersal. Manual removal was undertaken where densities were low and amongst native ground and shrub cover. ○ Continued selectively culled <i>Kunzea ambigua</i> specimens that were growing above high-value Proteaceae species, such as <i>Banksia serrata</i>, <i>Lambertia formosa</i> or <i>Persoonia linearis</i> <u>Haerses Rd – Visual buffer along Wisemans Ferry Road</u> ○ Maintenance of Fleabane and perennial grasses was the focus during the summer months, undertaking slashing periodically. ○ Maintenance of common couch continued, manual removal of species was undertaken periodically. ○ The planting in September was reasonably successful, with few fatalities west of Haeres Rd. The planting included canopy species <i>Angophora hispida</i> and <i>Synocarpia glomulifera</i> planted along the swale. ○ The planting east of Hearses Rd was less successful. The planting included shrub species including <i>Hakeas</i> (<i>sp. sericea</i> and <i>dactyloides</i>) and <i>Acacia longifolia</i>.	
GENERAL BUSINESS	○ LA read PS's text message to members: <i>The Hills-Hornsby Rural Koala Project has successfully located Koalas in the Hills and Hornsby bushland. They have been found in a number of locations within the Maroota Forest which is downstream from Dixon's operations. Some of the other animals besides koalas that have been observed are very large numbers of healthy wombats, endangered Greater Glider plus many different types of glider and platypus in Little Cattai Creek. Maroota is an area of exceptional bio-diversity and it is wonderful to be able to observe all these different creatures.</i>	
NEXT MEETING	LA advised that the next meeting will be held on:: 📅 Wednesday 5th November 2025. Commencing at 12.30pm with lunch prior to the 1pm start.	Agreed.

The meeting was closed at 2:42pm with the chair thanking all members for their attendance and inviting them to stay for the 'Firestone' – HR Sandstone Cutting Shed Site Visit.

Members toured the facility in two separate vehicles with appropriate PPE.

ACTION ITEMS - NIL

Appendix K – Complaints Register

Dixon Sand Pty Ltd
Old Northern Road Quarry
Complaints Register - Summary

Period	Number of Complaints received	Complaint Register / Summary Published on Website
July 2024	0	6 August 2024
August 2024	0	4 September 2024
September 2024	0	2 October 2024
October 2024	0	1 November 2024
November 2024	0	10 December 2024
December 2024	0	6 January 2025
January 2025	0	3 February 2025
February 2025	0	4 March 2025
March 2025	1	17 April 2025
April 2025	0	6 May 2025
May 2025	0	5 June 2025
June 2025	0	7 July 2025
Total No. of Complaints	1	

Dixon Sand Pty Ltd - Complaints Register

Date Received	31/03/2025	Time	2:40pm	Complaint Received By	Hunny Churcher
Contact Methodology	Email from EPA	Complaint Nature	Sediment tracking onto Old Northern Road		
Issue(s) raised					
- Complaint received by the EPA who contacted the Quarry. - EPA informed the Quarry that EPA had received a complaint from the public in relation to sediment from the Quarry being tracked onto Old Northern Road, with the issue worsening over the past week.					
Recommendation(s)					
Dixon Sand to inspect the access road, intersection and Old Northern Road immediately, take photographs and provide a response as requested by the EPA.					
Outcome / Action(s) / Future Action(s)					
On 31/03/2025: - Quarry Manager inspected the quarry access road, the intersection and Old Northern Road immediately after receiving the complaint through EPA. Photographs of the Quarry access road, the intersection and sections of Old Northern Road heading towards Sydney were taken which show no sand debris on road. - Photographs were supplied to EPA and confirmation that all trucks are required to cover their load prior to leaving site which must be complied with in accordance with the Quarry Traffic Management Plan and Truck Driver Induction. - Undertake a re-education campaign for haulage truck drivers (at both quarries) for the month of April 2025 - EPA responded to the Complainant and no further action is required.					
Closed Out Date	01/04/2022	Closed Out By	Hunny Churcher		

End of document