

**Dixon Sand
Haerses Road Quarry, Maroota
Annual Review
2022 - 2023**



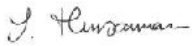
File Name: J16-001_AR_HR_2022-23

Version 1.0

Client: Dixon Sand (No. 1) Pty Ltd

Prepared by: Project Environmental Services Pty Ltd

Document Control

Name of Operation	Haerses Road Quarry, Maroota
Name of Operator	Dixon Sand (No. 1) Pty Ltd
Development Consent / Project Approval #	DA165-7-2005 (Modification 5) – Haerses Road Quarry
Annual Review Start Date	1 July 2022
Annual Review End Date	30 June 2023
Name of Authorised reporting officer	Hunsamon Churcher
Title of Authorised reporting officer	Environmental Advisor
Signature of Authorised reporting officer	
Date	30/09/2023

File name	J16-001_AR_HR_2022-23	Version	1.0
Report name	Dixon Sand - Haerses Road Quarry Annual Review 2022 - 2023		
Cover Page Image	Haerses Road Quarry – Emerging Darwinia biflora in Stage 2 rehabilitation area (Photograph courtesy: South East Environmental, 2023)		
Prepared by:	Hunsamon Churcher	Date:	30/09/2023
Authorised by:	David Dixon	Date:	30/09/2023

Table of Contents

1. Statement of Compliance	1
2. Introduction.....	2
2.1 Project Background.....	2
2.2 Scope of this document	2
2.3 Haerses Road Quarry Approvals	3
3. Operations Summary	8
3.1 Production and Vehicle Movements.....	8
3.2 Submission of Quarry Production Data to MEG.....	9
4. Actions Required from Previous Annual Review	9
5. Environmental Performance	11
5.1 Air Quality	11
5.1.1 Dust Sources and Mitigation Measures	11
5.1.2 Compliance Limits	11
5.1.3 Results	12
5.1.4 Analysis.....	19
5.1.5 Discrepancies between Predicted and Actual Air Quality Impacts	21
5.2 Noise Management.....	22
5.2.1 Noise Sources and Mitigation Measures	22
5.2.2 Compliance Limits	23
5.2.3 Results	26
5.2.4 Analysis.....	28
5.2.5 Noise Trend.....	28
5.2.6 Discrepancies between Predicted and Actual Noise Impacts.....	31
5.2.7 Changes to Environmental Procedures	31
5.3 Traffic and Transport.....	32
5.3.1 Ongoing Management Measures	32
5.3.2 Traffic Related Complaints	32
5.3.3 Compliance	32
5.3.4 Analysis.....	37
5.3.5 Findings.....	37
5.3.6 Changes to Environmental Procedures	37

5.4	Waste Management.....	37
5.4.1	Waste Generation	37
5.4.2	VENM and ENM Importation	38
5.4.3	Changes to Environmental Procedures	38
6.	Water Management.....	39
6.1	Monitoring and Compliance Limits	39
6.1.1	Groundwater Levels and Criteria / Trigger Levels	39
6.1.2	Groundwater Quality and Criteria / Trigger Levels	40
6.1.3	Surface Water Monitoring and Discharge Criteria	41
6.2	Extraction Limits.....	42
6.3	Results	43
6.4	Analyses	64
6.5	Review of Maximum Extraction Depth Map	65
6.6	Water Access License Usage	66
6.7	Water Balance Monitoring.....	66
6.8	Groundwater Monitoring Program for Bores located in the 100m MTSGS Buffer	67
6.9	Chages to Environmental Procedures	68
7.	Ecological Monitoring and Rehabilitation.....	68
7.1	Vegetation Clearing	68
7.2	Bush Regeneration and Weed Management	68
7.2.1	Translocation Site and Original Offset.....	70
7.2.2	Haerses Road and Porters Road Biobank Sites (BSA Agreement).....	70
7.2.3	Wisemans Ferry Road 30 Metre Buffer	71
7.3	Ecological Monitoring.....	71
7.3.1	Stage 1 Extraction Cell	76
7.3.2	Stage 2 Extraction Cell	77
7.3.3	Extraction Cells A and B.....	79
7.3.4	Wisemans Ferry Road 30 Metre Buffer	79
7.3.5	Buffer to Deerubbin Local Aboriginal Land Council Property.....	81
7.4	Management of Biodiversity Stewardship Sites	81
7.5	Change in Environmental Procedures	82
8.	Community and Social Impacts.....	84

8.1 Compliance	84
8.2 Complaints and Follow-up Actions.....	84
8.3 Community Consultative Committee, Meetings and Guidelines.....	86
8.4 Community and Stakeholder Liaison	87
8.5 Ecologically Sustainable Development	87
8.6 Changes to Social Monitoring Procedures.....	88
9. Bushfire Management	88
9.1 Compliance	88
10. Competency, Training and Awareness	89
11. Incidents and Non-Compliances	90
11.1 Environmental Incidents and Non-Compliances	90
11.2 Notices issued by MEG.....	90
12. Independent Environmental Audit.....	91
12.1 Independent Environmental Audit Requirements.....	91
13. Proposed Actions to be completed in the next Reporting Period	99
13.1 Noise Monitoring	99
13.2 Ground and Surface Water Management	99
13.3 Vegetation Clearing	99
13.4 Rehabilitation and Bush Regeneration.....	99
14. Audits and Improvement Notice	100
15. Conclusion.....	100

Figures

Figure 1 – Locality Plan of the Haerses Road and Old Northern Road Quarries.....	6
Figure 2 – Environmental Monitoring Locations (DA165-7-2005)	7
Figure 3 – Haerses Road Quarry Noise Receiver Locations	25
Figure 4 – Extrapolated noise levels from Haerses Road quarry, based on on-site measurements, December 2022	27
Figure 5 – Extrapolated noise levels from Haerses Road quarry, based on on-site measurements, June 2023	27
Figure 6 – Bush regeneration and weed management within the Biodiversity Offset and Translocation site (source: BushIT 2023)	69

Figure 7 – Bush regeneration and weed management works within the 30m buffer to Wisemans Ferry Road (source: BushIT 2023)	70
Figure 8 – Buffer Zones at Haerses Road Quarry	72
Figure 9 – Locations of Haerses Road Quarry in relation to the Biobank Sites and HRBOA	73
Figure 10 – Haerses Road Biobank Site and HRBOA	74
Figure 11 – Porters Road Biobank Site	75

Tables

Table 1: Statement of Compliance.....	1
Table 2: Non-Compliances.....	1
Table 3: Summary of Haerses Road Quarry Development Consents and Modifications	5
Table 4: Production Data & Truck Movements at Haerses Road Quarry.....	8
Table 5: Summary of Recommendations and Actions from the previous 2021 - 2022 Annual Review.....	9
Table 6: Potential sources of dust and mitigation measures.....	11
Table 7: PM10 and TSP Criteria.....	12
Table 8: Monthly Total Rainfall and Averaged Temperatures.....	13
Table 9: Site location of dust deposition gauges.....	13
Table 10: Dust Deposition Results: July 2022 – June 2023.....	14
Table 11: Calculated Annual Averages of Dust Deposition: June 2022 – June 2023.....	14
Table 12: Elevated PM10 – EPL and NEPM Management criteria	20
Table 13: Potential sources of Noise and mitigation measures.....	22
Table 14: Haerses Road Noise Criteria	23
Table 15: Haerses Road Approved Hours of Operation.....	24
Table 16: Extrapolated Noise Monitoring results, December 2022 and June 2023.....	26
Table 17: Road and Traffic Compliance.....	32
Table 18: Haerses Road – Total Waste Generated, July 2022 to June 2023.....	37
Table 19: Groundwater monitoring bores for Haerses Road quarry site.....	39
Table 20: Baseline Groundwater Level Statistics and Trigger Values.....	40
Table 21: Baseline Groundwater Quality Statistics and Trigger Values	41
Table 22: Baseline surface water quality statistics and trigger values	42
Table 23: Haerses Road Quarry Extraction limits	42

Table 24: SW1 and SW2 laboratory results	64
Table 25: Water usage for Water Access Licences during the Financial Year 2022 - 2023.....	66
Table 26: Quarry Water Balance monitoring in accordance with Soil and Water Management Plan.	66
Table 27: Community related consent conditions	84
Table 28: Complaints received during the reporting period.....	85
Table 29: Environmental Non-compliances and Incidents	90
Table 30: Notices issued by Resources Regulator	90
Table 31: Status of Proposed Action, Implementation Timeframe and Proposed Recommendations arising from 2022 IEA Non-Compliances with DA 165-7-2005.....	92

Charts

Chart 1: 2019 – 2020 Rolling Average of Dust Deposition Results	
Chart 2: 2020 – 2021 Rolling Average of Dust Deposition Results	16
Chart 3: 2021 – 2022 Rolling Average of Dust Deposition Results	
Chart 4: 2022 – 2023 Rolling Average of Dust Deposition Results	16
Chart 5: 2019 - 2020 PM10 Results and Criteria	
Chart 6: 2020 - 2021 PM10 Results and Criteria	17
Chart 7: 2021 – 2022 PM10 Results and Criteria	
Chart 8: 2022 - 2023 PM10 Results and Criteria	17
Chart 9: 2019 – 2020 TSP Results and Criteria.....	18
Chart 10: 2020 - 2021 TSP Results and Criteria.....	18
Chart 11: 2021 - 2022 TSP Results and Criteria.....	18
Chart 12: 2022-2023 TSP Results and Criteria.....	19
Chart 13: Noise Monitoring Results – R3.....	28
Chart 14: Noise Monitoring Results – R4.....	29
Chart 15: Noise Monitoring Results – R6.....	29
Chart 16: Noise Monitoring Results – R7	30
Chart 17: Noise Monitoring Results – R8.....	30
Chart 18: Haerses Road Long Term Groundwater Levels for H-Series, BH4 and BH5.	44
Chart 19: H2 Groundwater Levels for July 2022 – June 2023.....	45
Chart 20: H6 Groundwater Levels for July 2022 – June 2023.....	45
Chart 21: H7 Groundwater Levels for July 2022 – June 2023.....	45

Chart 22: H9 Groundwater Levels for July 2022 – June 2023.....	46
Chart 23: H12 Groundwater Levels for July 2022 – June 2023.....	46
Chart 24: H14 Groundwater Levels for July 2022 – June 2023.....	46
Chart 25: BH01A Groundwater Levels for July 2022 – June 2023.....	47
Chart 26: BH01B Groundwater Levels for July 2022 – June 2023.....	47
Chart 27: BH01C Groundwater Levels for July 2022 – June 2023.....	47
Chart 28: BH02A Groundwater Levels for July 2022 – June 2023.....	48
Chart 29: BH02B Groundwater Levels for July 2022 – June 2023.....	48
Chart 30: BH02C Groundwater Levels for July 2022 – June 2023.....	48
Chart 31: BH03A Groundwater Levels for July 2022 – June 2023.....	49
Chart 32: BH03B Groundwater Levels for July 2022 – June 2023.....	49
Chart 33: BH03C Groundwater Levels for July 2022 – June 2023.....	49
Chart 34: BH4 Groundwater Levels for July 2022 – June 2023	50
Chart 35: BH05 Groundwater Levels for July 2022 – June 2023	50
Chart 36: BH05B Groundwater Levels for July 2022 – June 2023.....	50
Chart 37: BH06A Groundwater Levels for July 2021 – October 2021	51
Chart 38: BH06B Groundwater Levels for July 2021 – October 2021	51
Chart 39: BH06C Groundwater Levels for July 2021 – October 2021.....	51
Chart 40: Haerses Road Long Term pH – H series, BH4 and BH5.....	52
Chart 41: H2 pH Results July 2022 – June 2023.	53
Chart 42: H6 pH Results July 2022 – June 2023.	53
Chart 43: H7 pH Results July 2022 – June 2023.	53
Chart 44: H9 pH Results July 2022 – June 2023.	54
Chart 45: H12 pH Results July 2022 – June 2023.	54
Chart 46: H14 pH Results July 2022 – June 2023.	54
Chart 47: H14 pH Results July 2022 – June 2023.	55
Chart 48: BH4 pH Results July 2022 – June 2023.....	55
Chart 49: BH01A, BH01B and BH01C pH Results July 2022 – June 2023.....	56
Chart 50: BH02A, BH02B and BH02C pH Results July 2022 – June 2023.....	56
Chart 51: BH03A, BH03B and BH03C pH Results July 2022 – June 2023.....	57
Chart 52: BH5 and BH05B pH Results July 2022 – June 2023.....	57
Chart 53: Haerses Road Long Term Electrical Conductivity – H series, BH4 and BH5	58

Chart 54: H2 Electrical Conductivity Results July 2022 – June 2023.....	59
Chart 55: H6 Electrical Conductivity Results July 2022 – June 2023.....	59
Chart 56: H7 Electrical Conductivity Results July 2022 – June 2023.....	59
Chart 57: H9 Electrical Conductivity Results July 2022 – June 2023.....	60
Chart 58: H12 Electrical Conductivity Results July 2022 – June 2023.....	60
Chart 59: H14 Electrical Conductivity Results July 2022 – June 2023.....	60
Chart 60: BH4 Electrical Conductivity Results July 2022 – June 2023.	61
Chart 61: BH5 Electrical Conductivity Results July 2022 – June 2023.	61
Chart 62: BH01A, BH01B and BH01C Electrical Conductivity Results July 2022 – June 2023.	62
Chart 63: BH02A, BH02B and BH02C Electrical Conductivity Results July 2022 – June 2023.	62
Chart 64: BH03A, BH03B and BH03C Electrical Conductivity Results July 2022 – June 2023.	63
Chart 65: BH5 and BH05B Electrical Conductivity Results July 2022 – June 2023.	63
Chart 66: Long term complaints monitoring data.	86

Plates

Plate 1 - Active quarry operation in Stage 1 with rehabilitation material stockpiled on site (South East Environmental, 2023).	76
Plate 2 - Rehabilitation area in Stage 1 (South East Environmental, 2023).	77
Plate 3 – Farm dam located in Stage 2 west (South East Environmental, 2023).	78
Plate 4 – Stage 2 west rehabilitation area west of the farm dam (South East Environmental, 2023).	78
Plate 5 – Western side of 30m buffer to Wisemans Ferry Road (South East Environmental, 2023).	80
Plate 6 – Eastern side of 30m buffer to Wisemans Ferry Road (South East Environmental, 2023).	81

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 Compliance Report
Appendix E	Monthly Site Inspection
Appendix F	Truck Movement Data
Appendix G	Bush Regeneration Report
Appendix H	Annual Biodiversity & Rehabilitation Management Report
Appendix I	Annual Management Reports for Year 4 - Passive Management of Stewardship Sites
Appendix J	Example of S94 Contribution
Appendix K	Community Engagement and CCC Meeting Minutes
Appendix L	Complaints Register
Appendix M	Waste and ENM/VENM Registers

Abbreviations

Annual Review	This document (also formerly known as 'Annual Environmental Management Report')
Biodiversity Stewardship Agreements	BSA
Biodiversity Conservation Trust	BCT
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 (No.1) Pty Ltd
DRG	Department of Planning, Industry and Environment – Resources Regulator
DPE	Department of Planning and Environment
DPE (Resources Regulator)	Department of Planning, Industry and Environment – Resources Regulator
DPE Water	Department of Planning, Industry and Environment – Water Division
EIS	Environmental Impact Statement
EPA	NSW Environment Protection Authority
EP&A Act	NSW <i>Environment Planning and Assessment Act 1979</i>
EPL12513	Environment Protection Licence 12513 for the Haerses Road quarry
LALC	Local Aboriginal Land Council
MEG	Mining, Exploration and Geoscience, within the Department of Regional NSW
MTSGS	Maroota Tertiary Sands Groundwater Source
NRAR	Department of Planning and Environment – Natural Resources Access Regular
PIRMP	Pollution Incident Response Management Plan
PM10	Particulate matter <10um
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?		
Haerses Road Quarry	DA165-7-2005	No
	EPL12513	Yes
	WAL 25941	Yes
	WAL 25956	Yes

Table 2: Non-Compliances

Relevant Approval	Condition #	Condition description (summary)	Compliance Status	Section addressed in Annual Review
DA 164-7-2005	Cond. 12 of Sch.5	Submission of Annual Review later than end of March 2022, however DPE approved an alternative date	Non-compliant	Sections 2.2 and 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: <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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 at 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 quarries are located approximately 40 kilometres north of Parramatta. The locations of the quarries are shown in Figure 1.

Extraction commenced at Haerses Road quarry in 2006. Sand is being transferred to Old Northern Road quarry for processing, blending and sales. Products are also permitted to be sold directly to the market from Haerses Road quarry. Modification to the development approval under Section 75W of the *Environmental Planning and Assessment Act 1979* was granted on 22 January 2018 which permits the expansion of the extraction areas. DA165-7-2005 Modification 4 permits a varied sequence of extraction and Modification 5 permits the relocation of the approved and to construct site facilities. Current extractions are occurring in Stage 1, Stage 2 and Cells 1A, 1B, 2A, 2B and 3B.

Environmental Monitoring locations for Haerses 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 and management of the operations and compliance of Haerses Road Quarry with the consent conditions issued by the Secretary of NSW Department of Planning and Environment (DPE). The reporting period is from 01 July 2022 to 30 June 2023, which is in line with the reporting period for Old Northern Road Quarry. Reporting for the rehabilitation assessment and ecological monitoring extends outside the specified period due to seasonal timing requirement for surveys.

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

Condition 12 of Schedule 5 of DA165-7-2005 (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 DPE for the submission deadline of the Annual Review to be adjusted to reflect the financial year reporting. Approval was granted by the DPE 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 DA165-7-2005 (Modification 4), Environment Protection License (EPL) # 12513 and Water Access Licenses (WALs) 25941 and 25956. The Annual Review has been prepared in accordance with *Post-approval requirements for State Significant mining developments – Annual Review Guideline* (DP&E, 2015).

2.3 Haerses Road Quarry Approvals

Development consent was granted by the Minister for Planning on 14 February 2006 (DA165-7-2005) for the extraction of sand from Dixon Sand's properties at Lot 170 DP 664767, Lots A and B DP 407341, and Lots 176 and 177 DP 752039 Haerses Road in Maroota. Haerses Road quarry is approximately two kilometres south of the existing Old Northern Road quarry. Sand extracted from the Haerses Road site has been trucked, processed and stockpiled at the existing processing plant on Lot 196 DP 752025 (Lot 196) at Old Northern Road quarry. The development involves the blending and processing of variable quality sands from the Haerses Road site at the plant on Lot 196, and uses the existing processing plant and ancillary facilities such as the workshop, weighbridge and office, as well as the existing haul roads via the intersection with Old Northern Road. Direct sale of sandstone products (sand and sandstone block products) to local and regional markets from Haerses Road site commenced in 2015.

Under the original DA165-7-2005 Haerses Road quarry is permitted a maximum extraction quantity of 250,000 tonnes per annum, of which 190,000 tonnes may be transported to the Old Northern Road quarry for processing per annum.

Dixon Sand lodged a modification application to modify DA165-7-2005 to expand the quarry extraction area, process products on site and to extend the life of the quarry (Modification 1). Approval for DA165-7-2005 Modification 1 was granted on 22 January 2018.

A modification under Section 4.55(1) of the *Environment Planning and Assessment Act 1979* (EP&A Act) was subsequently lodged to correct an administrative error in Appendix 2 of the development consent. Approval for DA165-7-2005 Modification 2 was granted on 29 January 2019.

DA165-7-2005 Modification 3 was lodged to seek approval to increase:

- the extraction rate from 250,000 tpa to 495,000 tpa,

- overall truck movements from 56 movements to 180 movements per day,
- the disturbance footprint by 1 hectare in Stage 5 and accessing an additional 250,000 tonnes of resource,
- the maximum rate of VENM/ENM importation from 100,000 tpa to 250,000 tpa, for the purposes of site rehabilitation and reprocessing to produce blended products,
- altering some site plant and equipment, and
- increasing the number of full-time employees.

Modification 3 was approved on 23 July 2021.

DA165-7-2005 Modification 4 was lodged to seek approval to change the consented initial sequence of extraction to allow Dixon Sand to next access the more commercially viable sand in extraction Cell 1B instead of Cell 2A.

Modification 4 was granted on 30 June 2021.

Modification 5 was lodged to seek approval to:

- relocate the approved site office, workshop and weighbridge to a new site infrastructure location within the Tertiary Sand Extraction Area Stage 2 south of the current approved location,
- construct additional buildings (first aid room, lunchroom, weighbridge office, sandstone cutting shed), associated hardstand areas and carpark within the new site infrastructure envelope,
- introduce a new extraction method within the Sandstone Extraction Areas A and B involving sandstone cutting using an excavator fitted with a hydraulic circular saw attachment (enclosed or hollow drum saw) to produce large blocks of sandstone to supplement the approved dozer ripping extraction method,
- carried out final cutting of the large blocks of extracted sandstone using additional stone cutting saws (wet cutting) within a new dedicated sandstone cutting shed,
- increase the footprint of the site infrastructure envelope to accommodate new buildings, and
- updating figures associated with Porters Road Biobank site and Conceptual Final Landform.

Modification 5 was approved on 29 June 2022.

DA 165-7-2005 Modification 6 was lodged under section 4.55(3) of the EP&A Act to seek approval to relocate the approved site building envelope on Lot 177 approximately 90 metres to the north within Lot 176. Modification 6 was approved on 7 September 2023.

A summary of the development consents and modifications is provided in Table 3.

For the purpose of the reporting period which falls within this Annual Review, Development consent DA165-07-2005 Modification 5 is applicable to the timeframe and is the consent used for the assessment of Dixon Sand's environmental compliance and performance.

Table 3: Summary of Haerses Road Quarry Development Consents and Modifications

Development Consents	Status	Date of Determination	Comments
DA165-7-2005	Approved and superseded by Modification 1	14 February 2006	Approval for sand extraction, processing and rehabilitation for extraction stages 1 to 6 (inclusive)
DA165-7-2005 Modification 1	Approved and superseded by Modification 2	22 January 2018	Approval for the expansion of the quarry and additional sand extraction in Cells 1 to 5 (inclusive).
DA165-7-2005 Modification 2	Approved and superseded by Modification 4	29 January 2019	Correction applied to an administrative error in Appendix 2 of DA165-7-2005 Modification 1 consent conditions.
DA165-7-2005 Modification 4	Approved and superseded by Modification 3	30 June 2021	Approval for altering the sequence of approved extraction cell, by accessing Cell 1B instead of Cell 2A. Modification 4 was approved before Modification 3
DA165-7-2005 Modification 3	Approved and superseded by Modification 5	23 July 2021	Approval for the increased in extraction rate, truck movements, VENM/ENM importation quantity, expansion of disturbance footprint in Stage 5, and modifying site plant, equipment and number of employees.
DA165-7-2005 Modification 5 *	Approved and superseded by Modification 6	29 June 2022	Approval to construct approved and new site infrastructure and administration buildings (including sandstone cutting shed, weighbridge, weighbridge office, First Aid and lunchroom and carpark) to a new location
DA 165-7-2005 Modification 6	Approved and current	9 September 2023	Approval to relocate the previously approved site building envelope in Modification 5 on Lot 177 approximately 90m north within Lot 176.

*Note *: DA 165-7-2005 Modification 5 is applicable to the period that this Annual Review falls within the timeframe and therefore will be used as the basis for compliance assessment and reporting.*

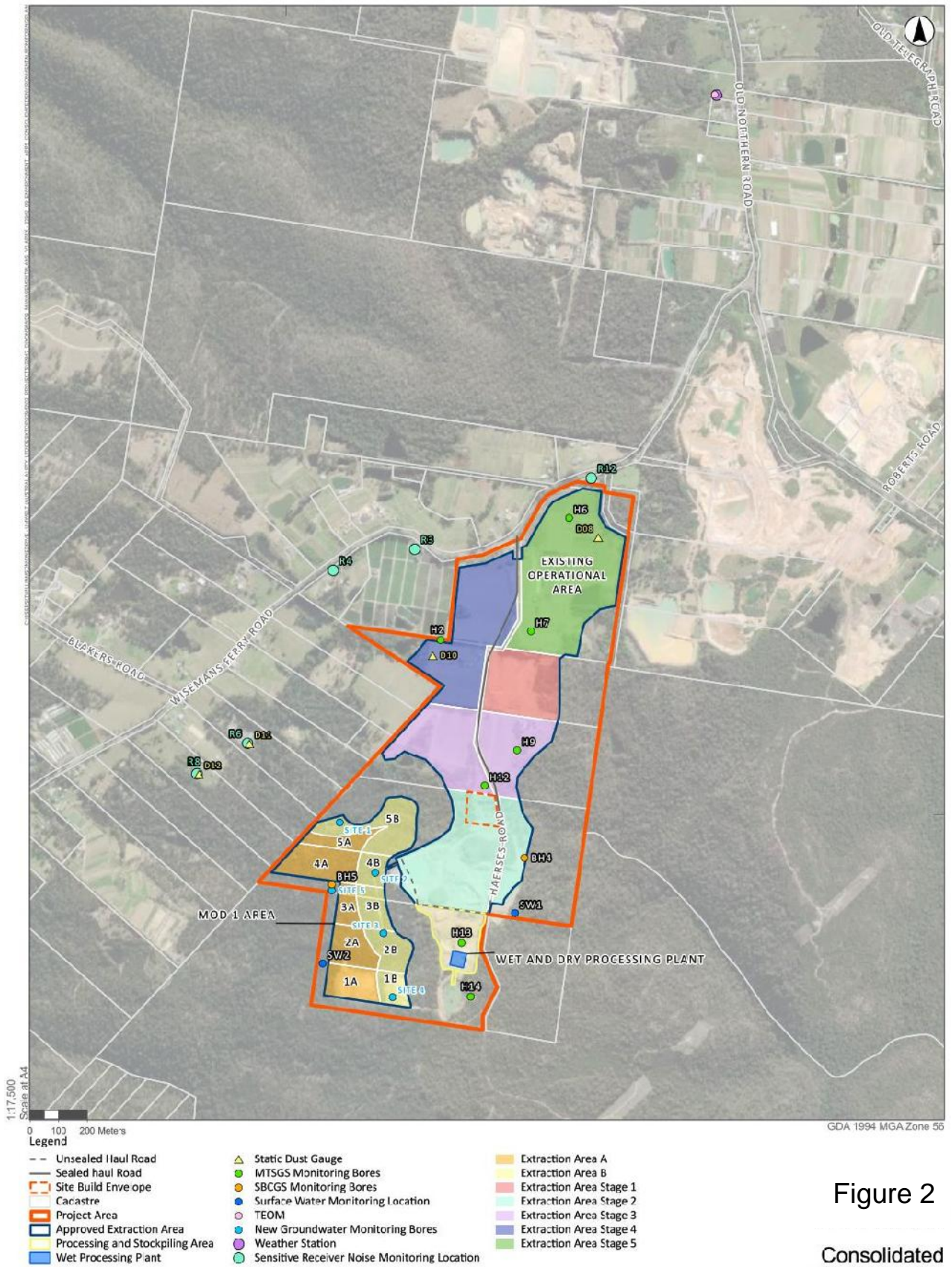


Figure 2

Consolidated
Environmental
Monitoring Plan

Image Source: ESRI Basemap (2021) Data source: NSW LPI (2021), NSW DSE (2021), NPWS Estate (2019)

3. Operations Summary

3.1 Production and Vehicle Movements

All bulk sand truck movements from the Haerses Road quarry since commencement of extraction in November 2006 have delivered raw product to the Old Northern Road quarry for processing. Products have also been sold directly from Haerses Road quarry since 2015.

A total of **289,769.14** tonnes of product has been extracted at Haerses Road quarry, of which **118,385** tonnes were transferred to Old Northern Road and **171,384** tonnes of products have been sold directly to local and regional markets from the Haerses Road quarry during this reporting period. The quarry did not receive any ENM/VENM during this reporting period. Table 4 provides a summary of the annual production quantities, truck movement, direct sales and material transfers between Haerses Road and Old Northern Road quarries during the reporting period.

Table 4: Production Data & Truck Movements at Haerses Road Quarry.

<i>Month</i>	<i>Total Transfers from Haerses Rd to Old Northern Road (t)</i>	<i>Total Sales from Haerses Rd (t)</i>	<i>Total Extraction (t)</i>	<i>Total Processed Materials (t)</i>	<i>Total ENM / VENM received (t)</i>	<i>Max Total Daily Truck (inclusive of transfers, direct sales and ENM/VENM import, in and out bound)</i>	<i>Max Daily Morning Truck between 6:00-7:00am (in and out bound)</i>
Jul 2022	4,410	1,265.30	5,675	0	0	36	0
Aug 2022	6,048	3,476.93	9,525	0	0	56	0
Sep 2022	2,993	4,030.96	7,024	0	0	46	0
Oct 2022	3,087	3,831.43	6,918	2,249	0	48	6
Nov 2022	3,119	12,662.14	15,781	9,984	0	70	10
Dec 2022	1,481	12,157.78	13,639	9,961	0	78	20
Jan 2023	12,090	14,810.65	26,901	12,772	0	146	18
Feb 2023	16,865	18,847.84	35,713	15,902	0	176	20
Mar 2023	15,639	22,747.69	38,387	17,220	0	178	20
Apr 2023	12,338	17,487.44	29,825	12,876	0	162	20
May 2023	19,266	36,873.40	56,139	29,298	0	178	20
Jun 2023	21,049	23,192.58	44,242	16,776	0	172	18
Totals / Maximum	118,385	171,384.14	289,769.14	127,038	0	178	20
Annual Limit	190,000		495,000	320,000	250,000		
Daily Max Criteria						180	20

3.2 Submission of Quarry Production Data to MEG

Condition 16 of Schedule 2 of DA 165-7-2005 requires Dixon Sand to submit calendar year annual production data to the MEG (formerly DRG) using the standard form, and include a copy of this data in the Annual Review.

The MEG (formerly DRG) Minerals Return forms require reporting of extractive materials for the financial year, and not for the calendar year as specified in the consent condition above.

The Minerals Return form for the financial year 2022 - 2023 will be submitted to DRG once the form is made available on the online Portal. The same production data contained in Table 4 will form the basis for calculations for MEG Minerals Return reporting.

4. Actions Required from Previous Annual Review

The proposed recommendations contained in the previous 2021 - 2022 Annual Review and relevant actions undertaken by Dixon Sand are summarised in Table 5.

Table 5: Summary of Recommendations and Actions from the previous 2021 - 2022 Annual Review.

Recommendation from the 2021 – 2022 Annual Review	Actions
Noise Monitoring	
<ul style="list-style-type: none"> Continue with 6-monthly noise monitoring at nominated receivers as quarry operations are currently active in Modification 1 extraction cells. 	<ul style="list-style-type: none"> 6-monthly noise monitoring undertaken in December 2022 and June 2023.
Ground and Surface Water Management	
<ul style="list-style-type: none"> Continue with the review and submission of buffer zone groundwater monitoring data to be undertaken as per NRAR's recommendation. Water sampling and laboratory analysis of surface water at SW1 and SW2 to continue when there is sufficient flow after rain events 	<ul style="list-style-type: none"> Reviewed groundwater data submitted to NRAR (now DPE Water) in accordance with the recommendation Sampling at SW1 and SW2 undertaken when possible. Sampling was not possible after some storm events due to excessive rainfall leading to unsafe access to the sampling locations.
Vegetation Clearing	
<ul style="list-style-type: none"> Continue to implement the pre-clearing survey and multistage habitat tree felling procedures prior to any vegetation felling. 	<ul style="list-style-type: none"> Pre-clearing survey and multistage habitat tree felling procedures implemented.
Rehabilitation and Bush Regeneration	

Recommendation from the 2021 – 2022 Annual Review	Actions
<p>Stage 1 Extraction Area</p> <ul style="list-style-type: none"> • Undertake screening of stockpiled rehabilitation material to remove unsuitable larger rocks and boulders • Spread out screened material to final landform to enable rehabilitation to Class 4 Agriculture. • First agricultural planting event <p>Stage 2 Extraction Area</p> <ul style="list-style-type: none"> • Continue to monitor the native vegetation growth to the west of the water storage dam. • Dam wall repair / mitigation <p>Wisemans Ferry Road 30 metre Buffer Area</p> <ul style="list-style-type: none"> • Assisted rehabilitation of eastern side of Haerses Road intersection buffer area where disturbance has taken place <p>Buffer to Deerubbin LALC Property</p> <ul style="list-style-type: none"> • Continue bush regeneration maintenance in the previously disturbed area • Baseline monitoring locations established <p>Extraction Cells A and B</p> <ul style="list-style-type: none"> • Continue monitoring of vegetation quadrats for establishment of baseline data. <p>Weed Management</p> <ul style="list-style-type: none"> • Continue with weed management as per the recommendations contained in the Bush Regenerator and Ecologist's reports. <p>Haerses Road and Porters Road Biobank Sites</p> <ul style="list-style-type: none"> • Monitoring and Management of the Haerses Road and Porters Road biobank sites to be undertaken in accordance with the Biobanking Agreement and BCD reporting 	<ul style="list-style-type: none"> • Screen of stockpiled rehabilitation material commenced and will continue into the next reporting period. • Materials that were screened have not been spread out due to material deemed unsuitable • Agricultural planting will commence after suitable material has been placed to ensure cover crop can be supported. <ul style="list-style-type: none"> • Native vegetation growth to the west of the water storage dam being monitored. • Dam wall repaired. <ul style="list-style-type: none"> • Remediation undertaken in the disturbed area and on-going monitoring and maintenance being undertaken. <ul style="list-style-type: none"> • On-going regeneration maintenance undertaken in the previously disturbed area • Baseline monitoring locations established. <ul style="list-style-type: none"> • Vegetation survey being undertaken in accordance with the Biodiversity and Rehabilitation Management Plan <ul style="list-style-type: none"> • Ongoing weed management undertaken as per Bush Regenerator and Ecologist's reports. <ul style="list-style-type: none"> • Haerses Road and Porters Road biobank sites are currently subject to Passive Management in accordance with the Biobanking Agreement. Passive Monitoring and Management Report submitted to BCD.

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 Haerses Road quarry Air Quality Management Plan.

The following potential sources of dust generated from Haerses 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
<ul style="list-style-type: none"> • topsoil stripping; • ripping with a bulldozer; • extraction with an excavator and truck; • sandstone cutting with saw attachment • sandstone cutting within the designated sandstone cutting shed • crushing and screening • wind erosion from stockpiles; • loading sand products into trucks; • vehicle movement and haulage on site; • product transportation along unsealed haul roads; and • occasional haul road grading. • Rehabilitation and placement of VENM/ENM in the disturbed areas. 	<ul style="list-style-type: none"> • minimising the area of disturbance by only clearing areas immediately prior to extraction; • progressive rehabilitation; • 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; • sealing Haerses Road; • limiting vehicle speed to 20 km/hr on internal unsealed access tracks; • ensuring all loads leaving the site are covered; and • regularly maintaining mobile and fixed equipment to minimise exhaust emissions. • Utilisation of wet technique for sandstone cutting

5.1.2 Compliance Limits

Condition 10 of Schedule 3, DA165-7-2005 require 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 180° and 240°)

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
EPL12513	M2.3	42 µg/m ³ with prevailing wind direction from 180°-240°	Rolling average 24-hour PM10 criteria for enacting management plan strategies to notify the EPA, reduce dust emissions immediately and cease operations
DA165-7-2005	Sch. 3, Cond. 9	30 µg/m ³	Annual average – long term impact assessment
EPL12513	O3.6		
DA165-7-2005	Sch. 3, Cond. 9	50 µg/m ³	24 hour average – short term impact assessment
EPL12513	O3.6		
EPL12513	O3.3	42 µg/m ³	Trigger value for PM ₁₀ automatic alarm and management plan strategies
DA165-7-2005	Sch. 3, Cond. 9	90 µg/m ³	Annual average criteria for TSP
EPL12513	O3.6		

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 EPL 12513. These results are shown in Table 8.

Table 8: Monthly Total Rainfall and Averaged Temperatures.

Month	Jul 2022	Aug 2022	Sep 2022	Oct 2022	Nov 2022	Dec 2023	Jan 2023	Feb 2023	Mar 2023	Apr 2023	May 2023	Jun 2023
Ave Temp (°C)	10.9	12.7	13.7	16.2	17.3	18.8	20.6	21.8	20.7	16.3	12.9	12.2
Total Rainfall (mm)	297.8	28.4	90.6	117.8*	20.8	41.8	168.8	114.8	52.6	68.6	18.2	13.0

*Note * Monthly rainfall was obtained from the Weather Station # 67105 located at Richmond RAAF due to the weather station at the Maroota Public School being offline for 5 days during storm events and therefore yielding inaccurate total monthly rainfall data.*

Data presented in Table 8 shows that the highest monthly rainfall of 297.8 mm was recorded in July 2022 and the lowest monthly rainfall of 13.0 mm was recorded in June 2023. The total annual rainfall recorded during this reporting period is 915.4 mm, in comparison to the previous two reporting periods which recorded 1527mm (2021 - 2022) and 1090.4mm (2020 - 2021).

From the recorded monthly temperature data, February 2023 experienced the highest average temperature at 21.8°C with July 2022 experiencing the lowest average temperature at 10.9°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 phenomenon.

Dust Deposition

Four dust deposition gauges are located at Haerses Road quarry. Table 9 lists the locations of these dust gauges.

Table 9: Site location of dust deposition gauges

Dust Gauge I.D.	Location Reference
D08	Hitchcock Road, Olive Grove
D10	Haerses Road (EPL#12513, Monitoring Point 3)
D11	Haerses Road Receiver R6
D12	Haerses Road Receiver R8 (located on the boundary of R7 and R8)

Dust deposition results are collected and analysed monthly by a NATA accredited laboratory. Table 10 presents the monthly dust deposition results between July 2022 and June 2023. Table 11 contains the calculated rolling annual averages for the deposited dust.

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

Charts 1 to 4 illustrate the annual average dust deposition results for the reporting periods of 2019 - 2020, 2020 - 2021, 2021 - 2022 and 2022 - 2023 respectively.

Table 10: Dust Deposition Results: July 2022 – June 2023.

Dust Gauge Location	29/06/22	27/07/22	24/08/22	21/09/22	19/10/22	16/11/22	14/12/22	11/01/23	08/02/23	08/03/23	05/04/23	31/05/23
	27/07/22	24/08/22	21/09/22	19/10/22	16/11/22	14/12/22	11/01/23	08/02/23	08/03/23	05/04/23	31/05/23	28/06/23
D08 Hitchcock Rd / Olive Grove	0.5	0.7	2.9	0.8	1.4	1.5	0.5	0.9	0.9	0.7	0.6	0.3
D10 Haerses Rd (Pt 3, EPL12513)	0.6	0.5	1.0	1.6	1.0	0.9	0.2	0.4	0.4	1.3	2.0	3.6
D11	0.8	1.0	0.8	2.6	1.2	2.4	2.1	0.8	1.0	0.7	1.2	0.3
D12	0.3	0.2	0.8	0.3	1.7	0.5	0.6	0.5	0.9	1.5	0.5	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

Table 11: Calculated Annual Averages of Dust Deposition: June 2022 – June 2023.

Dust Gauge Location	29/06/22	27/07/22	24/08/22	21/09/22	19/10/22	16/11/22	14/12/22	11/01/23	08/02/23	08/03/23	05/04/23	31/05/23
	27/07/22	24/08/22	21/09/22	19/10/22	16/11/22	14/12/22	11/01/23	08/02/23	08/03/23	05/04/23	31/05/23	28/06/23
D08 Hitchcock Rd / Olive Grove	0.7	0.7	0.7	0.9	0.8	0.9	0.9	0.9	0.9	0.9	1.0	1.6
D10 Haerses Rd (Pt 3, EPL12513)	2.4	2.0	2.0	1.5	1.5	1.6	1.6	1.5	1.5	1.4	1.4	1.4
D11	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.3	1.3	1.2
D12	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.5	0.5	0.6	0.6	0.7

TEOM PM₁₀

In accordance with Condition 10 of Schedule 3, DA165-7-2005, 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 180° - 240° quadrat (southerly to south-westerly) indicate potential airborne contributions from Haerses Road Quarry. Chart 8 illustrates the PM₁₀ results for this reporting period, in comparison with relevant consent criteria. Charts 5 to 8 show the PM₁₀ results for the reporting periods of 2019 - 2020, 2020 - 2021, 2021 – 2022 and 2022 - 2023 respectively.

One elevated 24-hour average PM₁₀ level was recorded on 7 March 2023 at 43.3 µg/m³. However, the rolling 24-hour average PM₁₀ level did not exceed the EPL rolling 24-hour average PM₁₀ of 42 µg/m³ criteria or the NEPM criteria of 30 µg/m³ at the end of the day.

The annual average PM₁₀ criteria of 30 µg/m³ and 24-hour average NEPM criteria of 50 µg/m³ have not been exceeded during this reporting period.

Reporting of TSP results commenced in December 2017 and are shown in Charts 9 to 12. No TSP exceedance occurred in this reporting period.

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

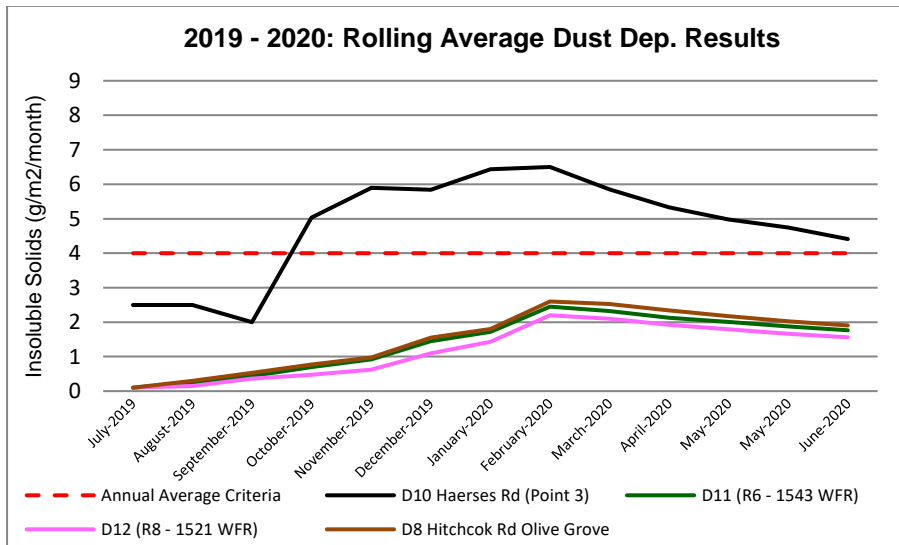


Chart 1: 2019 – 2020 Rolling Average of Dust Deposition Results

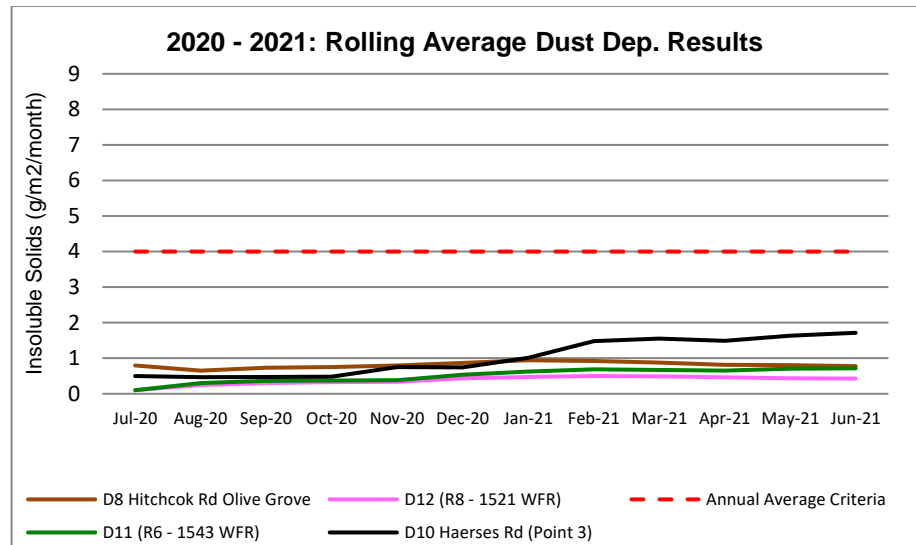


Chart 2: 2020 – 2021 Rolling Average of Dust Deposition Results

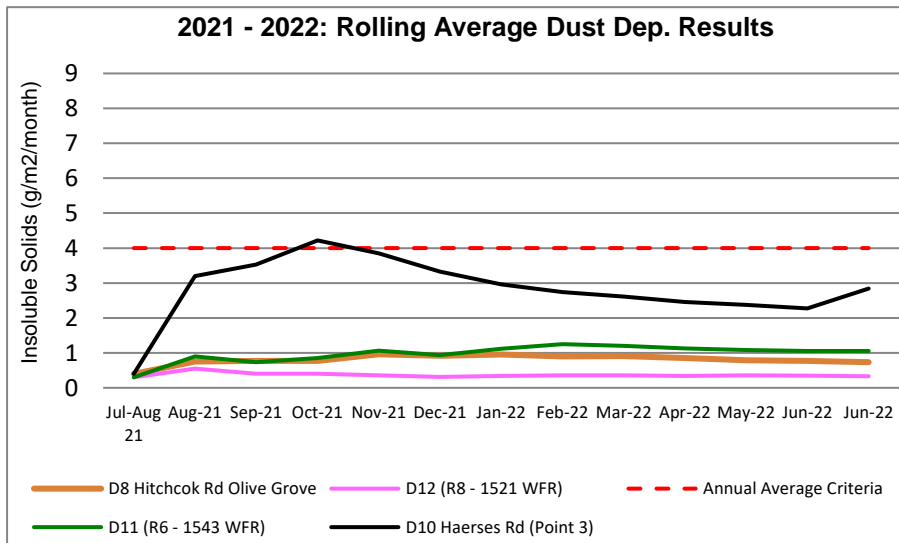


Chart 3: 2021 – 2022 Rolling Average of Dust Deposition Results

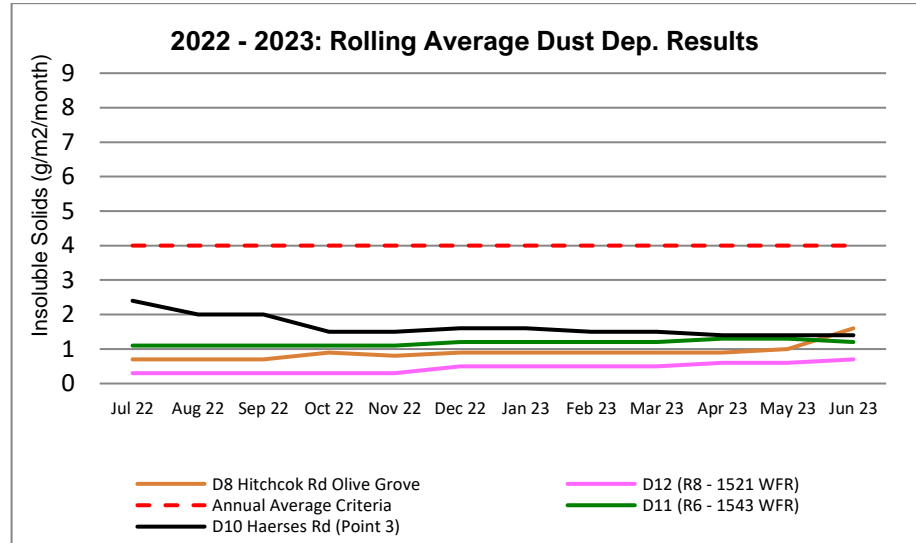


Chart 4: 2022 – 2023 Rolling Average of Dust Deposition Results

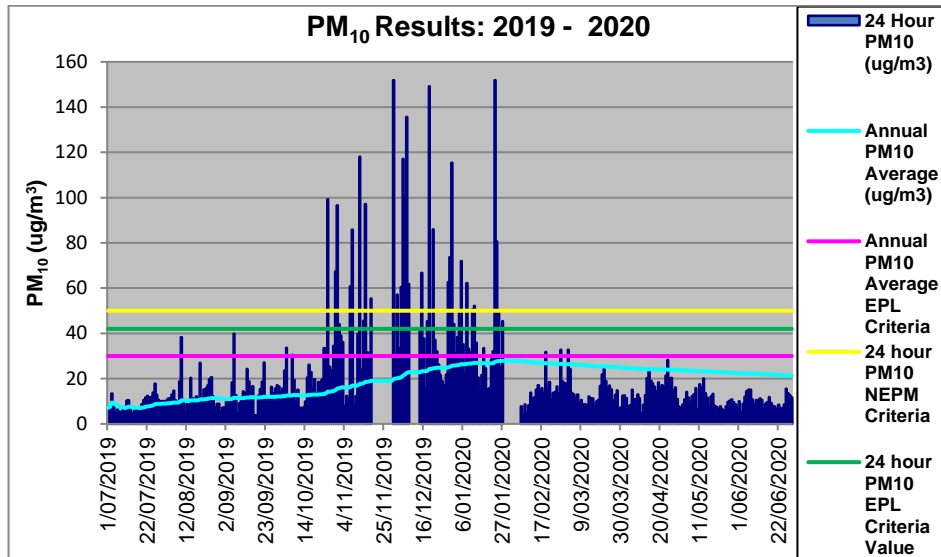


Chart 5: 2019 - 2020 PM10 Results and Criteria

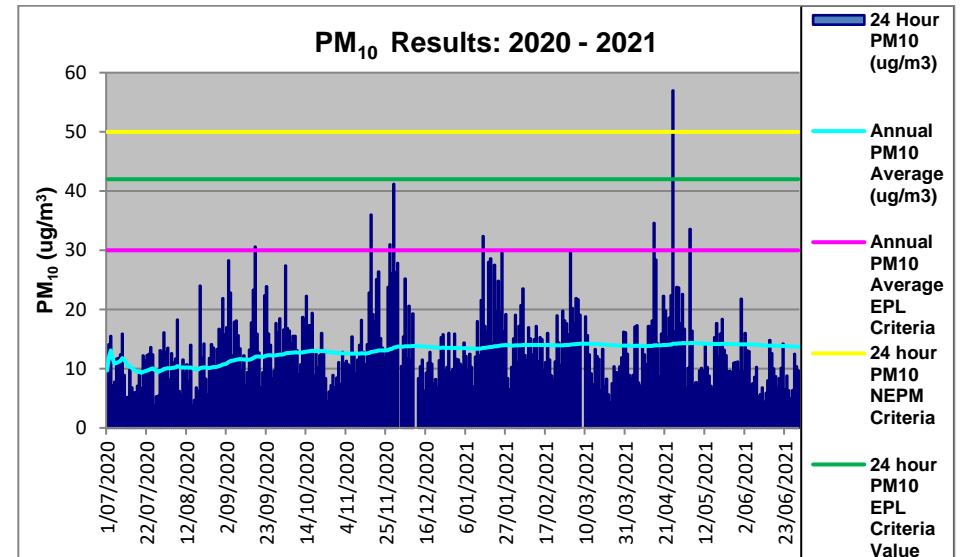


Chart 6: 2020 - 2021 PM10 Results and Criteria

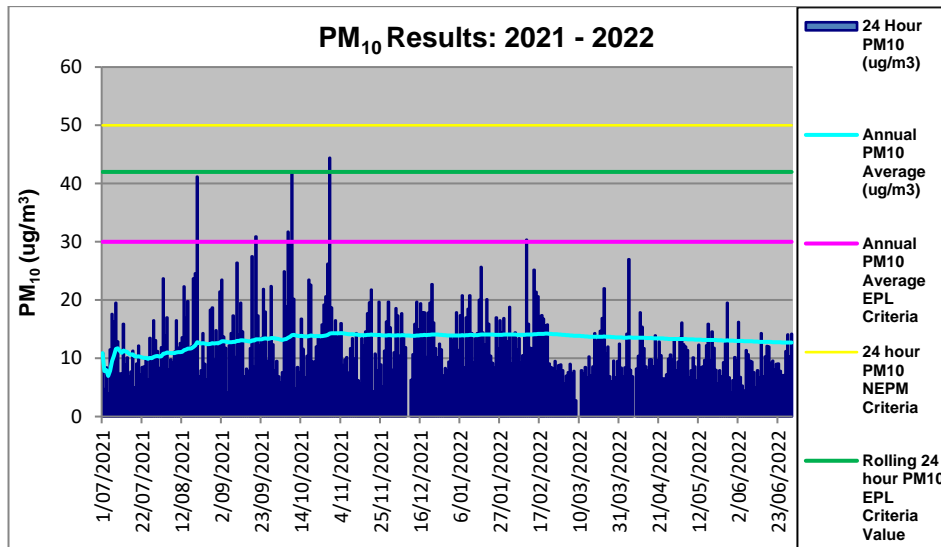


Chart 7: 2021 - 2022 PM10 Results and Criteria

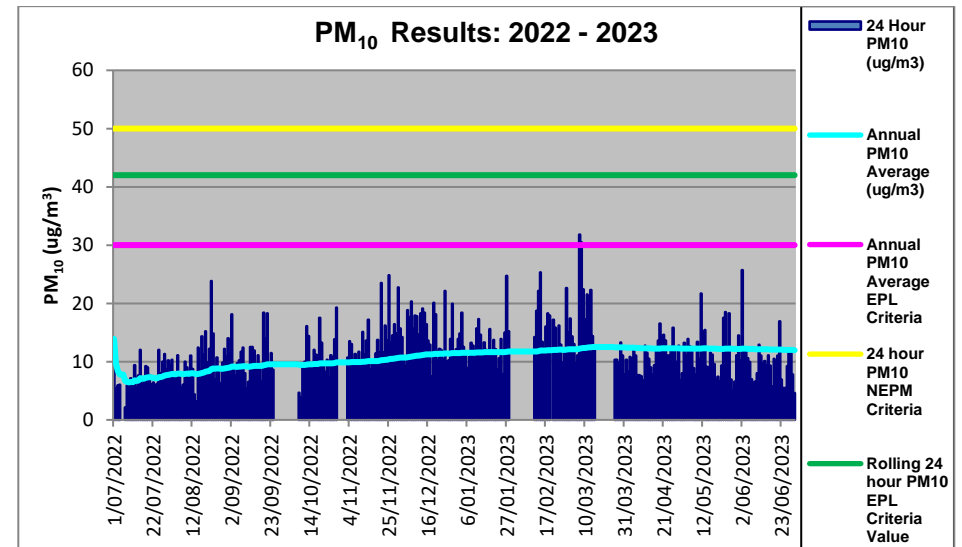


Chart 8: 2022 - 2023 PM10 Results and Criteria

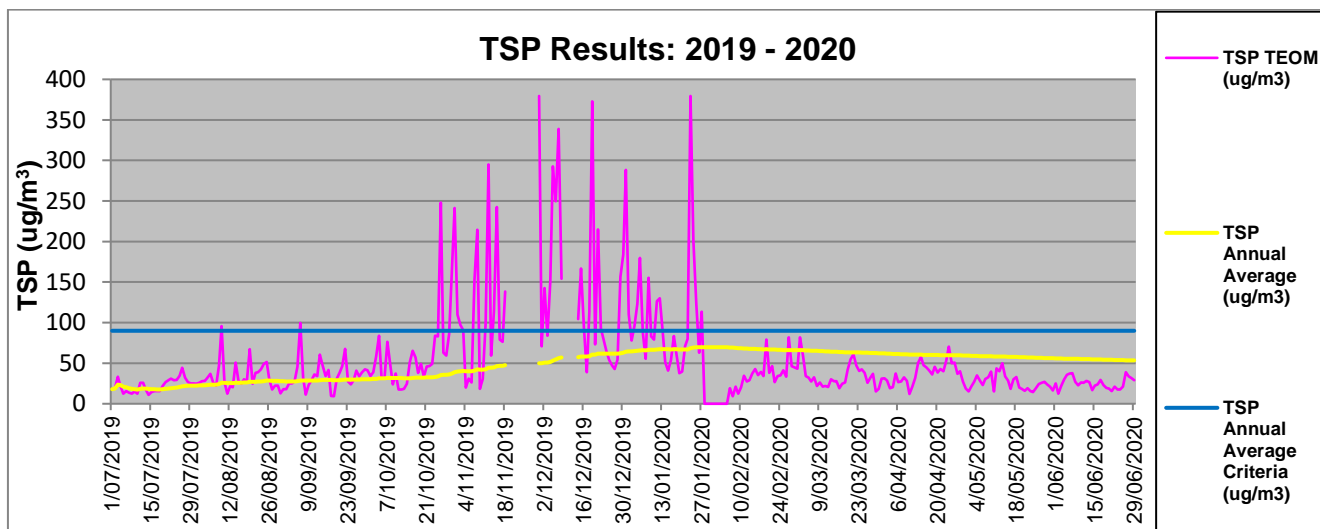


Chart 9: 2019 – 2020 TSP Results and Criteria

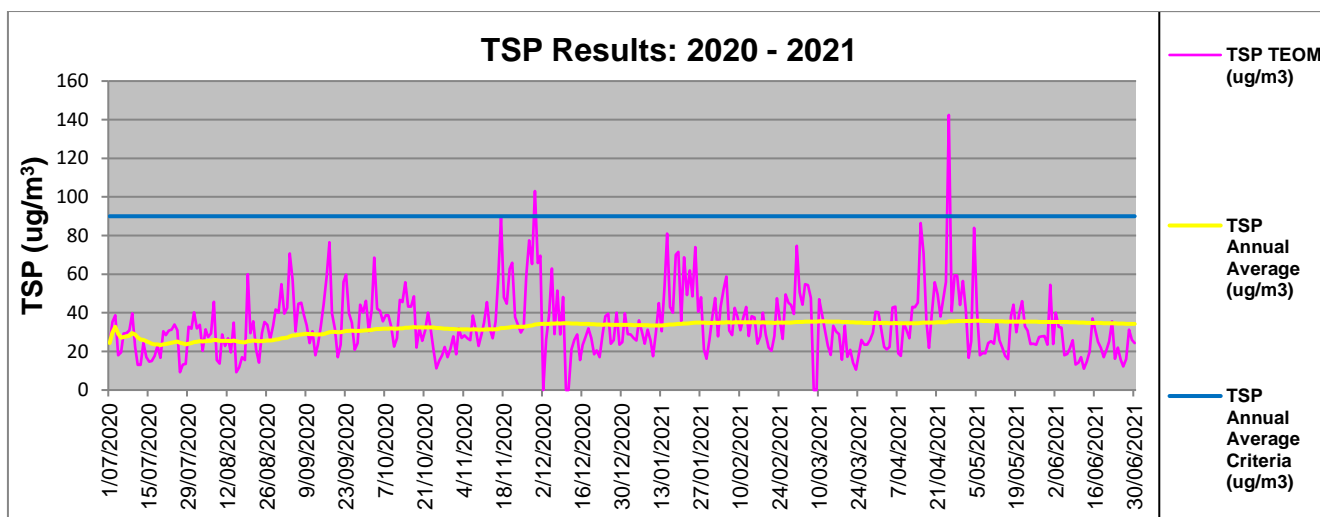


Chart 10: 2020 - 2021 TSP Results and Criteria

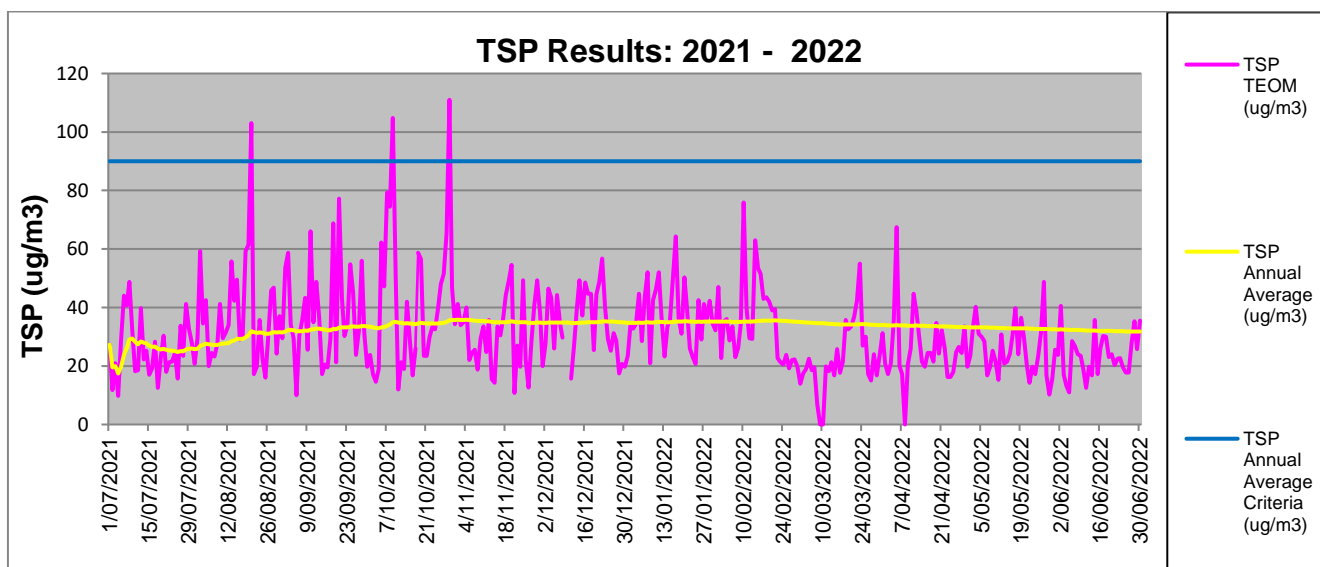


Chart 11: 2021 - 2022 TSP Results and Criteria

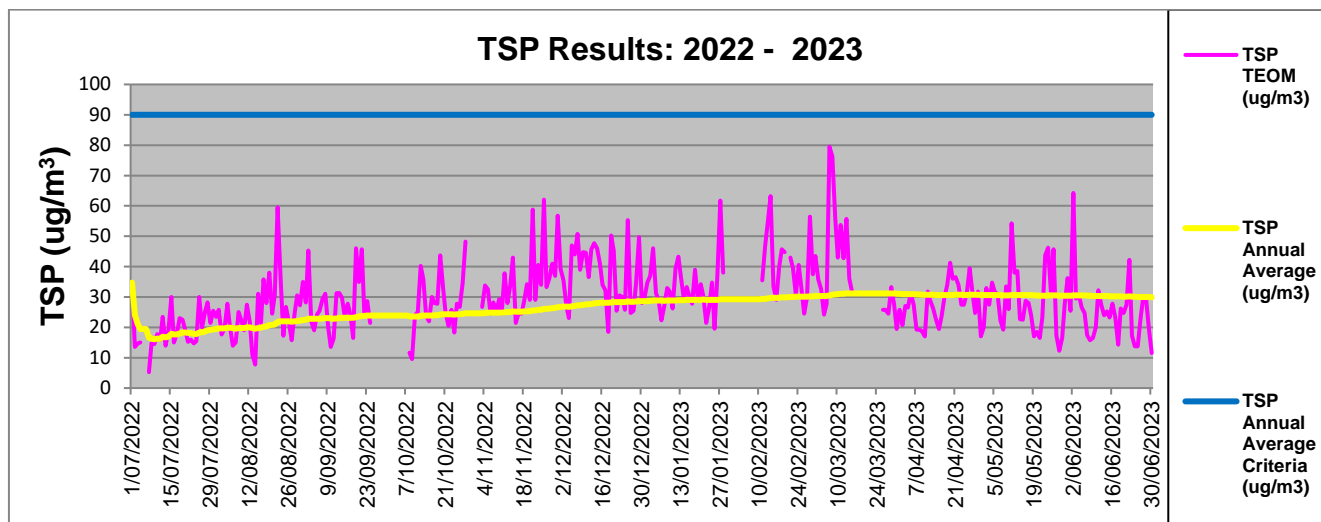


Chart 12: 2022-2023 TSP Results and Criteria

5.1.4 Analysis

Dust Deposition

Reporting Period 2022-2023

Four dust deposition gauges monitor potential dust impacts from Haerses Road quarry.

Monthly results and annual dust deposition averages for all dust gauges D08 (Olive Grove, Hitchcock Road), D10 (EPL Monitoring Point 3), D11 (Receiver R6) and D12 (Receiver R8) for the July 2022 to June 2023 period were in compliant. All annual averages were in compliant with the 4 g/m²/month criteria.

An Air Quality Assessment (ERM, 2019) undertaken for the Modification Report MR3 (Umwelt, 2019) specifies the annual average dust deposition of 1.5 g/m²/month. All dust gauges returned rolling annual averages lower than the predicted level, with the exception of a minor elevated result at D8 concluding at 1.6 g/m²/month in June 2023.

Historical Data

It can be seen from Charts 1 to 4 that the majority of the dust deposition results are in compliance over the previous 4 years of monitoring. Annual average dust deposition at dust gauge D10 were exceeded through the 2019 – 2020 and for one month during the 2021 – 2022 monitoring periods due to impacts from prolonged earthwork activities, exposed ground surface in the neighbouring property, paddock slashing and poor air quality from bushfires and hazard reduction burns.

PM10

Reporting Period 2022-2023

An Air Quality Assessment (ERM, 2019) undertaken for the Modification Report MR3 (Umwelt, 2019) specifies the long term annual average PM10 concentration to be 13.8 µg/m³, based on a 5-year average data collected at the TEOM located adjacent to the Maroota Public School. The annual average PM10 concentration for this reporting period is 12.7 µg/m³ which is lower than the long-term average.

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) during this reporting period.

One elevated 24hr average PM₁₀ level was recorded on 7 March 2023 due to a number of bushfire events located north-west of the quarry. This elevated 24hr average PM₁₀ level was reported to the EPA and no further action was required as no PM₁₀ criteria had been exceeded. In addition, any exceedance associated with bushfire events are considered 'extraordinary events' in accordance with Notes to Table 3 of Condition 7, Schedule 3, DA 250-09-01 which therefore would not constitute a non-compliance.

Table 12: Elevated PM₁₀ – EPL and NEPM Management criteria

Event No.	Event Date	Air Quality value	Applicable Criteria (ug/m ³)	Comment
No PM ₁₀ criteria have been exceeded during this reporting period.				

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. Exceedances recorded during the 2019-2020 period was highly influenced by cumulative poor air quality associated with bushfires in the local, regional and inter-state areas. Exceedances during the 2020-2021 period were attributed to forecast windy conditions and a number of hazard reduction burns across the region. Exceedance during the 2021-2022 period was associated with forecasted warm and windy conditions together with a local bushfire event occurring in Maroota.

The annual PM₁₀ average for the 2022-2023 reporting period is 12.0 µg/m³, which is lower than the EPA criterion of 30µg/m³ but almost double of the predicted value of 7 µg/m³ in the EIS. In comparison, this annual average is lower than the recorded historical values of 12.7 µg/m³ (2021-2022), 13.7 µg/m³ (2020-2021) and 21.3 µg/m³ (2019-2020) and 16.0 µg/m³ (2018-2019). The cause of the lower annual average for this reporting period is likely caused by the return to average weather cycle and less frequent extraordinary events such as the number of bushfire and hazard reduction burn events.

Total Suspended Particles

Reporting Period 2022-2023

The Total Suspended Particles (TSP) results are reported in Charts 9 to 12 inclusive. The annual average TSP for this reporting period is 29.9 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) and 34.3 µg/m³ (2020-2021) and 31.8 µg/m³ (2021-2022).

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, regional and inter-state areas.

5.1.5 Discrepancies between Predicted and Actual Air Quality Impacts

Dust Deposition

The EIS (ERM, 2005) prepared for the original DA 165-7-2005 predicted dust deposition during quarrying Stages 1 and 5 to be between 2.2 and 3.0 g/month/m² for all receptors. During this reporting period, no extraction was undertaken in Stage 1, extraction was undertaken in Stage 2 west and stockpiling was undertaken in Stage 2 east. The most recent Air Quality Assessment undertaken for Modification Report MR 3 (Umwelt, 2019) predicted that quarry operations will not exceed the predicted EPA criterion of 2 g/m²/month and annual average of 4 g/m²/month.

The EA (Umwelt, 2016) prepared for DA 165-7-2005 (Modification 1) predicted that no privately owned receivers are projected to experience ground level concentration of dust deposition above the assessment criteria, due to emissions from the modification only (Extraction Cells 1A-B to 5A-B inclusive). The highest predicted impacts occur at receivers R1, R3 and R13 with predicted incremental annual average dust deposition of 0.04 g/month/m². The Modification Report MR 3 (Umwelt, 2019) determined that quarry operations proposed under Modification 3 would not result in the EPA dust deposition criteria to be exceeded.

Monthly dust deposition at D8 ranged from 0.3 to 2.9 g/m²/month which in are line with the predicted air quality impacts, with one higher monthly dust result of 3.6 g/m²/month in June 2023. The annual average dust deposition at D8 concluded at 1.6 g/m²/month which falls within the predicted dust levels.

Monthly dust deposition at D10 ranged from 0.2 to 3.6 g/m²/month with all monthly results being in line with the predicted air quality impacts, with the exception of one high monthly dust result of 3.6 g/m²/month in June 2023. Field observations for this elevated monthly dust result indicated that the paddock had been recently slashed with major vegetation, bird droppings and algae being present in the dust gauge. The annual average dust deposition at D10 concluded at 2.4 g/m²/month which falls within the predicted dust levels.

Monthly dust deposition at D11 ranged from 0.3 to 2.6 g/m²/month and the annual average dust deposition being 1.3 g/m²/month, which fall within the predicted dust impact levels, and compliant with the annual average criteria of 4.0 g/m²/month.

Monthly dust deposition at D12 ranged from 0.2 to 1.7 g/m²/month with the annual average dust deposition being 0.7 g/m²/month, with all dust levels falling within the predicted dust impact levels and compliant with the annual average criteria of 4.0 g/m²/month.

PM10

Earlier PM10 predictions contained in the EIS (ERM, 2005) prepared for the original DA 165-7-2005 showed ground level concentrations of 24-hour average PM10 of 13 µg/m³ and an annual average PM10 to be 12 µg/m³. Recent Air Quality Assessment undertaken for Modification Report MR 3 (Umwelt, 2019) specifies a slightly higher 24-hour average PM10 of 13.8 µg/m³ and an annual average PM10 to be 12 µg/m³. The Modification Report MR 3 (Umwelt, 2019) also predicted that under worst-case operational scenarios, the predicted combined background and quarry increment particulate levels would remain below the 24-hour average PM10 criteria of 50 µg/m³ which has been complied with during this reporting period.

Total Suspended Particle (TSP)

TSP predictions contained in the EIS (ERM, 2005) prepared for the original DA 165-7-2005 showed ground level concentrations of 24-hour average TSP of 26 $\mu\text{g}/\text{m}^3$ and an annual average TSP to be 25 $\mu\text{g}/\text{m}^3$. The EA (Umwelt, 2016) prepared for DA 165-7-2005 (Modification 1) predicted that no privately owned receivers will experience TSP above the assessment criteria. The highest predicted TSP will occur at receiver R4 as a result of Modification 1 extraction where the predicted incremental 24-hour TSP concentration is 1.5 $\mu\text{g}/\text{m}^3$. Further to this, the Modification Report MR 3 (Umwelt, 2019) predicted an annual average TSP concentration of 34.5 $\mu\text{g}/\text{m}^3$ which was calculated based on the assumption that 40% of the TSP is PM10.

During this monitoring period, the annual average of TSP of 29.9 $\mu\text{g}/\text{m}^3$ was recorded, which is lower than the predicted levels in the Air Quality Assessment undertaken for the Modification Report MR 3 (Umwelt, 2019).

5.1.6 Changes to Environmental Procedures

No changes to the environmental procedures are proposed or deemed necessary for air quality management. In the event significant amount of visible dust is present on the premise, follow the steps outlined in the Air Quality Management Plan.

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 potential sources of noise from Haerses Road quarry and mitigation measures have been identified in Table 13.

Table 13: Potential sources of Noise and mitigation measures.

Potential Noise Sources	Mitigation Measures
<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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. Sealed sections of Haerses Road

The Noise Management Plan requires attended noise monitoring to be undertaken every six months during the first two years of operation once extraction in Modification 1 area has commenced. After two years a review of the monitoring results will be undertaken and if deemed appropriate, approval will be sought from the DPE to revert to annual attended noise monitoring for the remainder of operations in the Mod 1 extraction area.

During this reporting period, extraction has taken place in Stage 2 west (original extraction area) and Cells 1A, 1B, 2A, 2B and 3B (Modification 1 extraction area). Noise monitoring were undertaken in December 2022 and June 2023.

The main sources of noise generated from Haerses Road quarry during the attended noise monitoring were sand processing and truck loading (utilising a screen, front end loaders and dump trucks) and rock grinding and sawing.

5.2.2 Compliance Limits

Haerses Road's new noise criteria determined during DA Modification 3 are listed in Table 14. The locations of noise receivers are displayed in Figure 3. Noise criteria in Table 14 do not apply if the quarry has an agreement with the relevant landowner to exceed the noise criteria. Dixon Sand currently has a noise agreement in place with the following receivers:

- R2 (E. H. Ramm),
- identified receivers on Hitchcock Road to the east of Haerses Road quarry, and
- R12 (F. & J. Roberts)

Approved hours of operation are contained in Table 15. Noise monitoring for the quarry is based on these criteria.

Table 14: Haerses Road Noise Criteria

Consent	Conditions																				
DA165-7-2005, Condition 3 of Schedule 3	<p>The Applicant must ensure that operational noise generated by the development (excluding acoustic bund construction) does not exceed the criteria in Table 2 at any residence on privately-owned land.</p> <p><i>Table 2: Operational noise criteria dB(A)</i></p> <table><tr><th rowspan="2">Receiver</th><th>Day</th><th colspan="2">Shoulder (6.00 am to 7.00 am)</th></tr><tr><th><i>L_{Aeq} (15 minute)</i></th><th><i>L_{Aeq} (15 minute)</i></th><th><i>L_A(max)</i></th></tr><tr><td>R05, R06</td><td>41</td><td>35</td><td rowspan="4">52</td></tr><tr><td>R03</td><td>40</td><td>37</td></tr><tr><td>R13, R14</td><td>40</td><td>36</td></tr><tr><td>All other receivers</td><td>40</td><td>35</td></tr></table> <p>Noise generated by the development must be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the <i>NSW Noise Policy for Industry</i>.</p> <p>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.</p> <p><i>Note:</i></p> <ul style="list-style-type: none">• <i>Should an agreement with a landowner be terminated for any reason, the Applicant must comply with the noise criteria in Table 2.</i>	Receiver	Day	Shoulder (6.00 am to 7.00 am)		<i>L_{Aeq} (15 minute)</i>	<i>L_{Aeq} (15 minute)</i>	<i>L_A(max)</i>	R05, R06	41	35	52	R03	40	37	R13, R14	40	36	All other receivers	40	35
Receiver	Day		Shoulder (6.00 am to 7.00 am)																		
	<i>L_{Aeq} (15 minute)</i>	<i>L_{Aeq} (15 minute)</i>	<i>L_A(max)</i>																		
R05, R06	41	35	52																		
R03	40	37																			
R13, R14	40	36																			
All other receivers	40	35																			

Table 15: Haerses Road Approved Hours of Operation.

Consent Condition	Condition										
DA165-7-2005, Condition 1 of Schedule 3	<p>The Applicant must comply with the operating hours set out in Table 1.</p> <p><i>Table 1: Operating hours</i></p> <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, loading and dispatch</td><td>6.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays</td></tr> <tr> <td>Acoustic bund construction and road and intersection works on Haerses Road and Wisemans Ferry Road</td><td>8.00 to 5.00 pm Monday to Friday At no time on Saturdays, Sundays or public holidays</td></tr> <tr> <td>Maintenance</td><td>At any time, provided that these activities are not audible at any privately-owned residence outside of permissible hours for quarrying operations</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, loading and dispatch	6.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays	Acoustic bund construction and road and intersection works on Haerses Road and Wisemans Ferry Road	8.00 to 5.00 pm Monday to Friday At no time on Saturdays, Sundays or public holidays	Maintenance	At any time, provided that these activities are not audible at any privately-owned residence outside of permissible hours for quarrying operations
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, loading and dispatch	6.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays										
Acoustic bund construction and road and intersection works on Haerses Road and Wisemans Ferry Road	8.00 to 5.00 pm Monday to Friday At no time on Saturdays, Sundays or public holidays										
Maintenance	At any time, provided that these activities are not audible at any privately-owned residence outside of permissible hours for quarrying operations										
DA165-7-2005, Condition 2 of Schedule 3	<p>The following activities may be carried out outside the hours specified in condition 1 above:</p> <ul style="list-style-type: none"> (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. <p>In such circumstances, the Applicant must notify the Secretary and affected residents prior to undertaking the activities, or as soon as is practical thereafter.</p>										

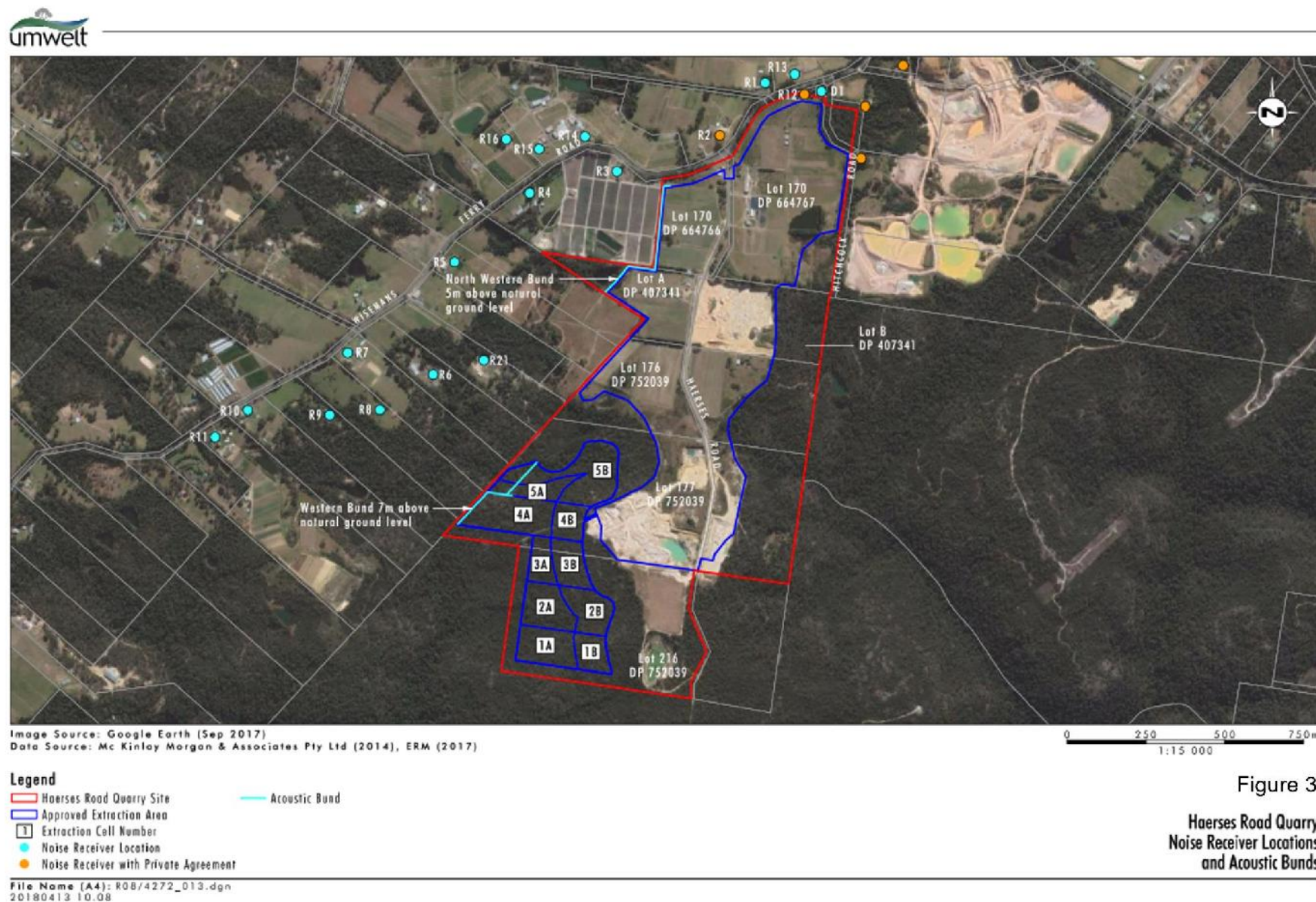


Figure 3
Haerses Road Quarry
Noise Receiver Locations
and Acoustic Bunds

5.2.3 Results

Attended noise monitoring for Haerses Road quarry was undertaken in December 2022 and June 2023. Attended noise monitoring was conducted at receivers (where permission to enter the property was granted) and at-source, in accordance with the staging requirement of the Noise Management Plan. In instances where extraneous noise such as road traffic and insects were 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.

During the December 2022 and June 2023 monitoring, Quarry operations were inaudible to faintly audible at all residential receivers prior to 7:00am, with other noise sources such as traffic noise, creek flowing and rooster calls being the dominant noise sources. No LA_{max} noise levels were attributable to quarry operations during the shoulder period. During daytime monitoring, quarry noises were also inaudible to faintly audible at the nominated receivers.

On-site noise measurements were taken to determine the noise level of various noise sources without the influence of traffic noise. Measurements were taken to determine the LA_{eq}15min to establish representative sound power levels of the quarry operation to facilitate calculation of extrapolated noise levels at receivers where background noise was too high to enable quarry noise contribution to be determined. Extrapolated noise results were calculated and are presented in Table 16. The full noise monitoring reports for December 2022 and June 2023 are contained in Appendix D.

Table 16: Extrapolated Noise Monitoring results, December 2022 and June 2023.

Receiver	Noise Criteria		Extrapolated Daytime noise level (LA _{eq} 15 min) December 2022	Extrapolated Daytime noise level (LA _{eq} 15 min) June 2023	Comment
	Shoulder (dBA)	Daytime (dBA)			
R12	35	40	31	<35	Predicted noise levels correlate well with measured noise levels and all locations shown to comply with noise limits.
R3	37	40	35	37	
R4	35	40	36	37	
R6	35	41	37	40	
R7	35	40	35	<35	
R8	35	40	37	39	
R13, R14	36	40	25 - 30	<35	
All other receivers	35	40	See Figure 4	See Figure 5	

*Note: A noise agreement between Dixon Sand and receivers R2, receivers located on Hitchcock Road and R12 are in place and therefore the noise criteria do not apply to these receivers.

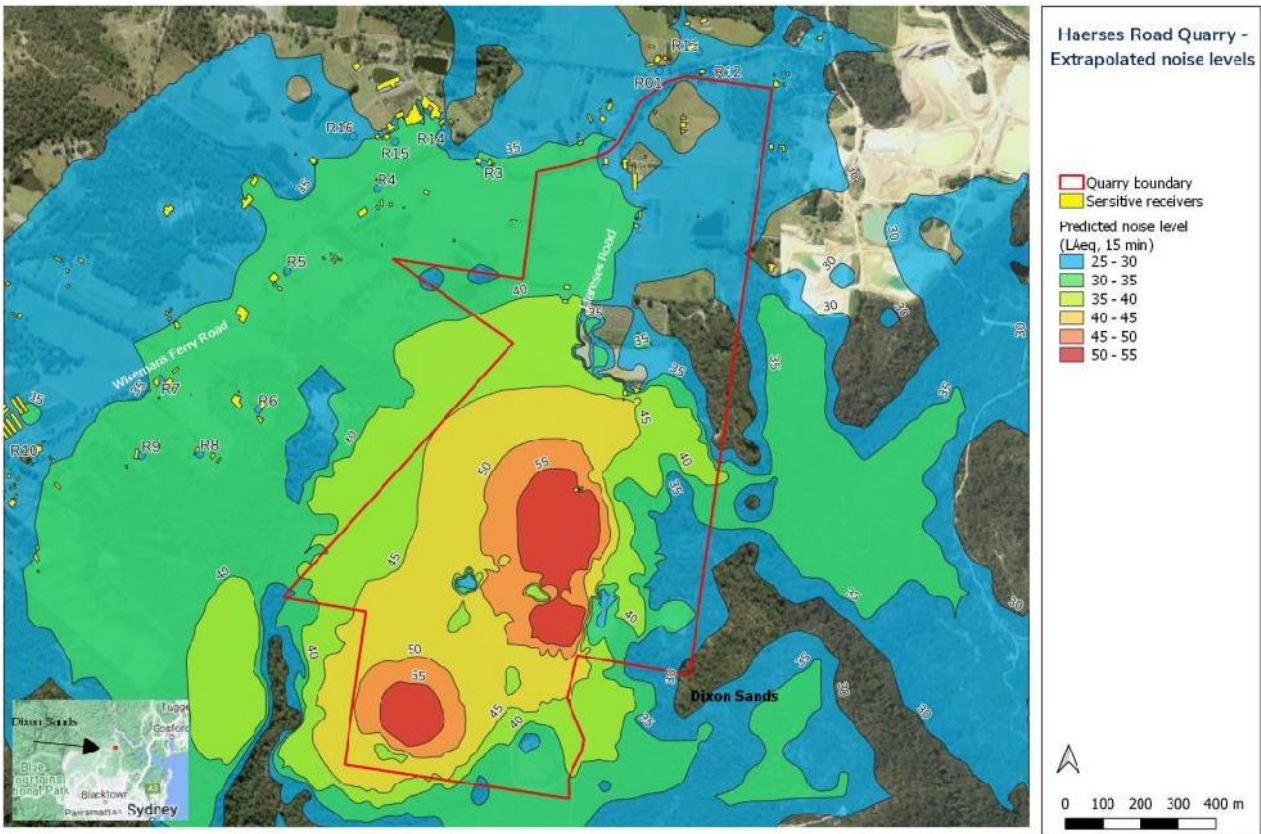


Figure 4 – Extrapolated noise levels from Haerses Road Quarry based on on-site measurements, December 2022.

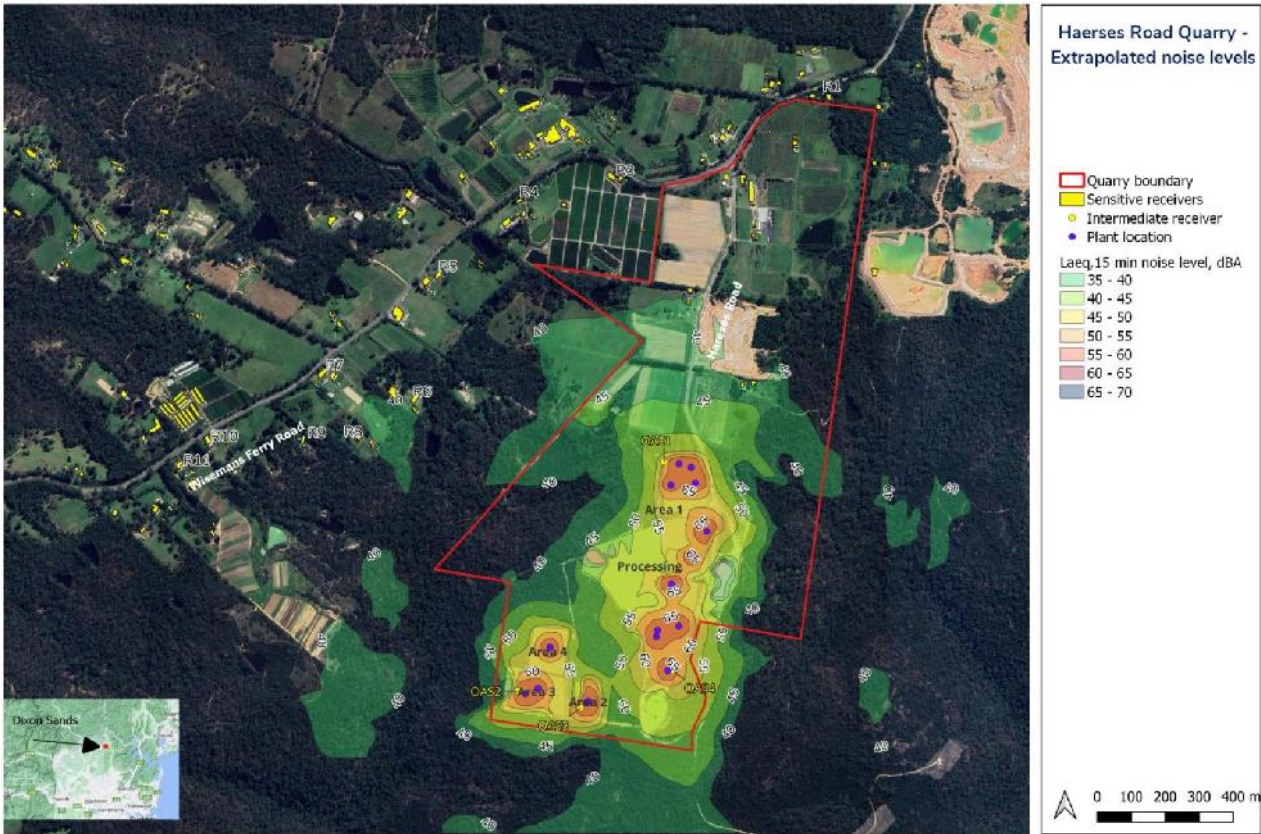


Figure 5 – Extrapolated noise levels from Haerses Road Quarry based on on-site measurements, June 2023.

5.2.4 Analysis

Results of attended noise monitoring and extrapolated noise levels indicate that Haerses Road quarry operations are compliant with shoulder and daytime noise criteria under the meteorological conditions at the time of monitoring in December 2022 and June 2023.

5.2.5 Noise Trend

Dixon Sand has a noise agreement in place with receiver R2, R12 and properties belonging to PF Formations along Hitchcock Road and therefore, noise criteria do not apply at these locations.

New noise criteria were established during DA Modification 3. Therefore, this marks the starting point for a new long term trend for quarry noise. Attended noise monitoring results and extrapolated noise levels from the December 2022 and June 2023 monitoring are displayed in Charts 13 to 17, inclusive. All attended noise monitoring results and extrapolated noise levels are compliant for both shoulder and daytime period at all receivers.

Additional noise results, to be obtained from future noise monitoring, will be required to establish new noise trends for quarry operations.

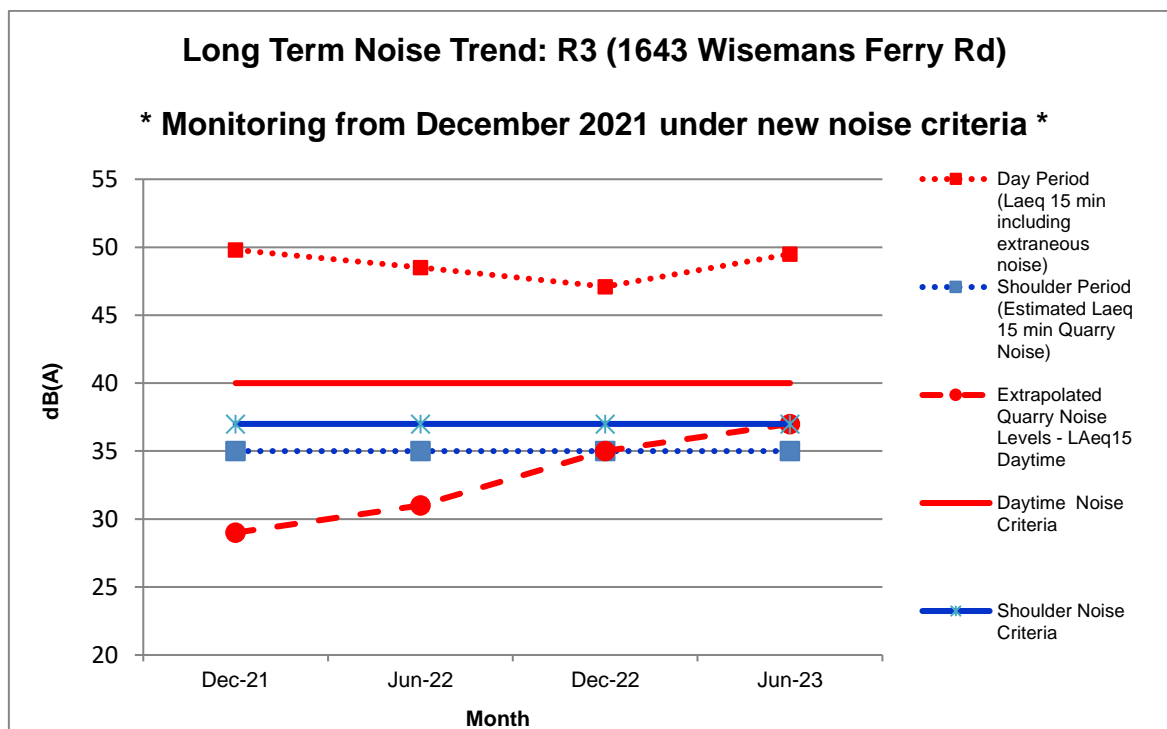


Chart 13: Noise Monitoring Results – R3

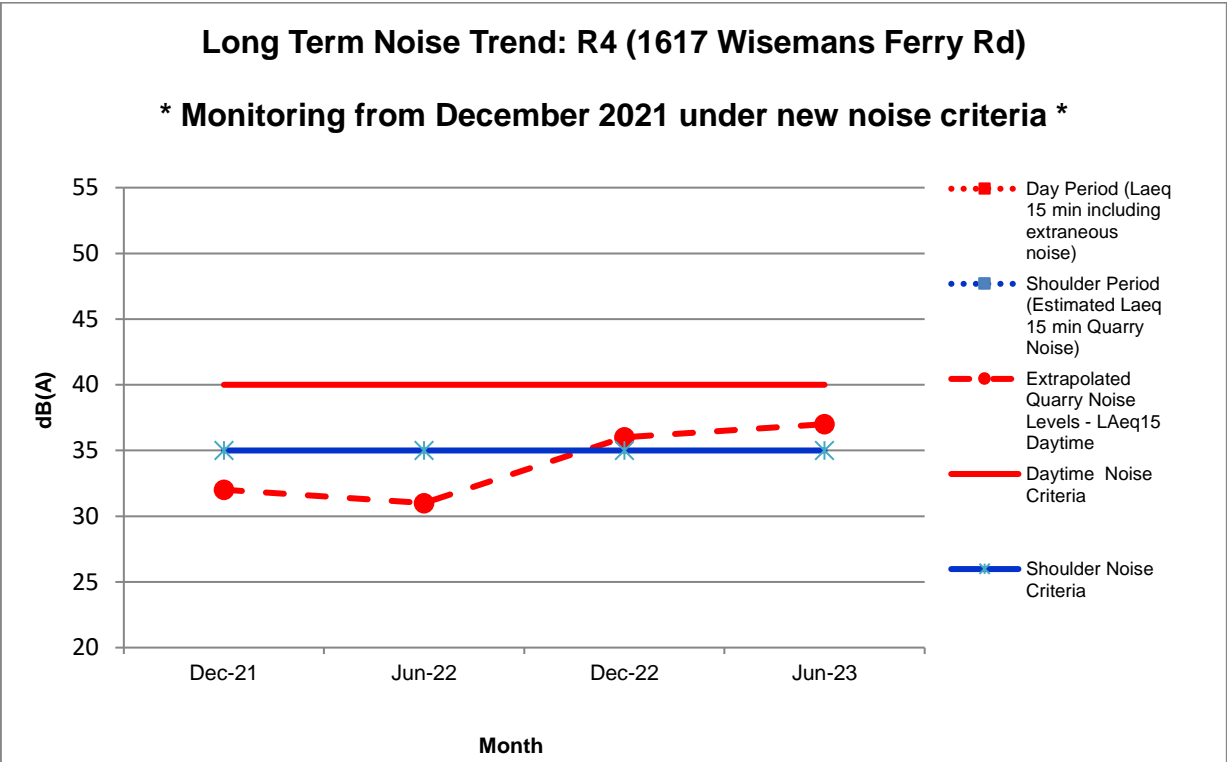


Chart 14: Noise Monitoring Results – R4

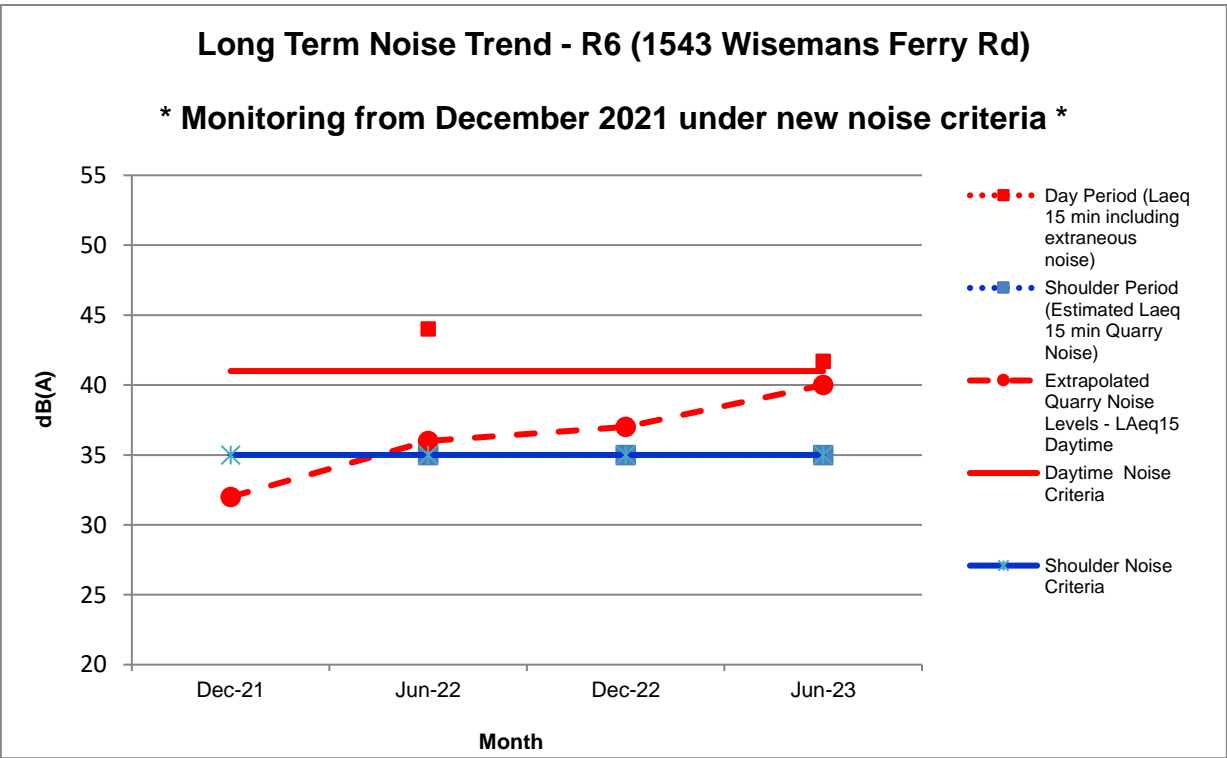


Chart 15: Noise Monitoring Results – R6

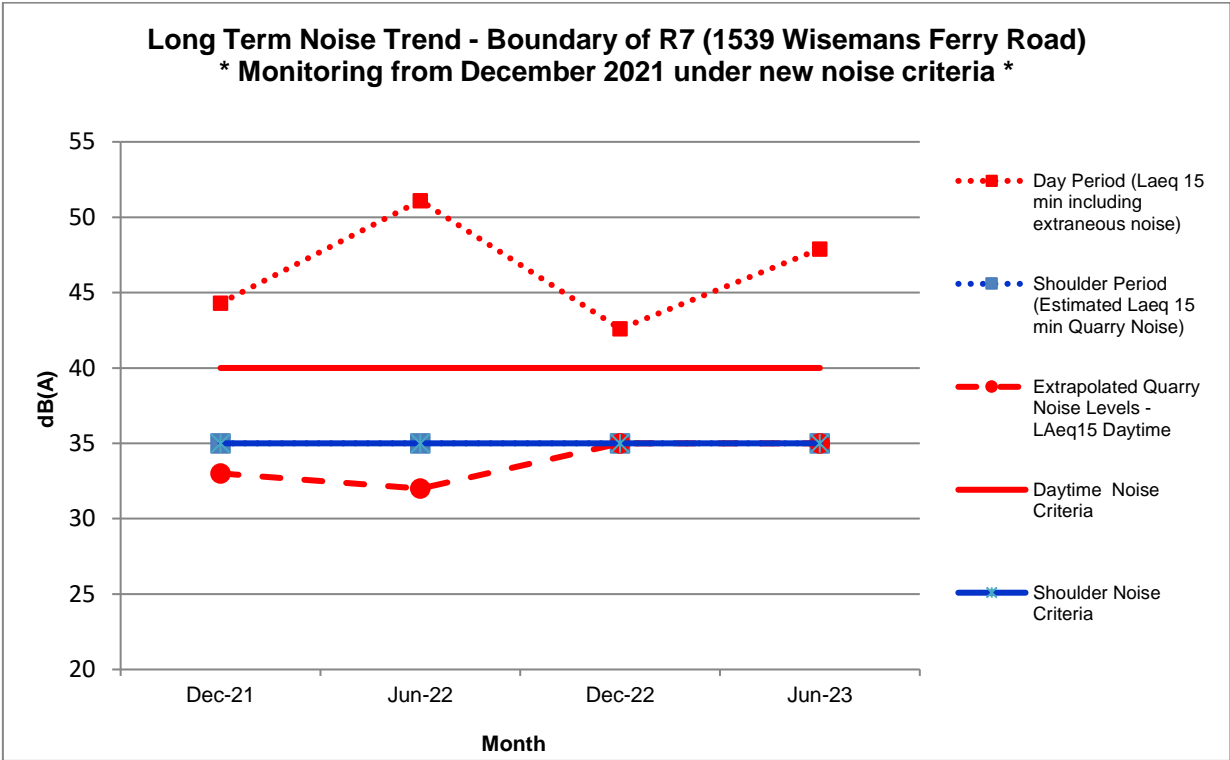


Chart 16: Noise Monitoring Results – R7

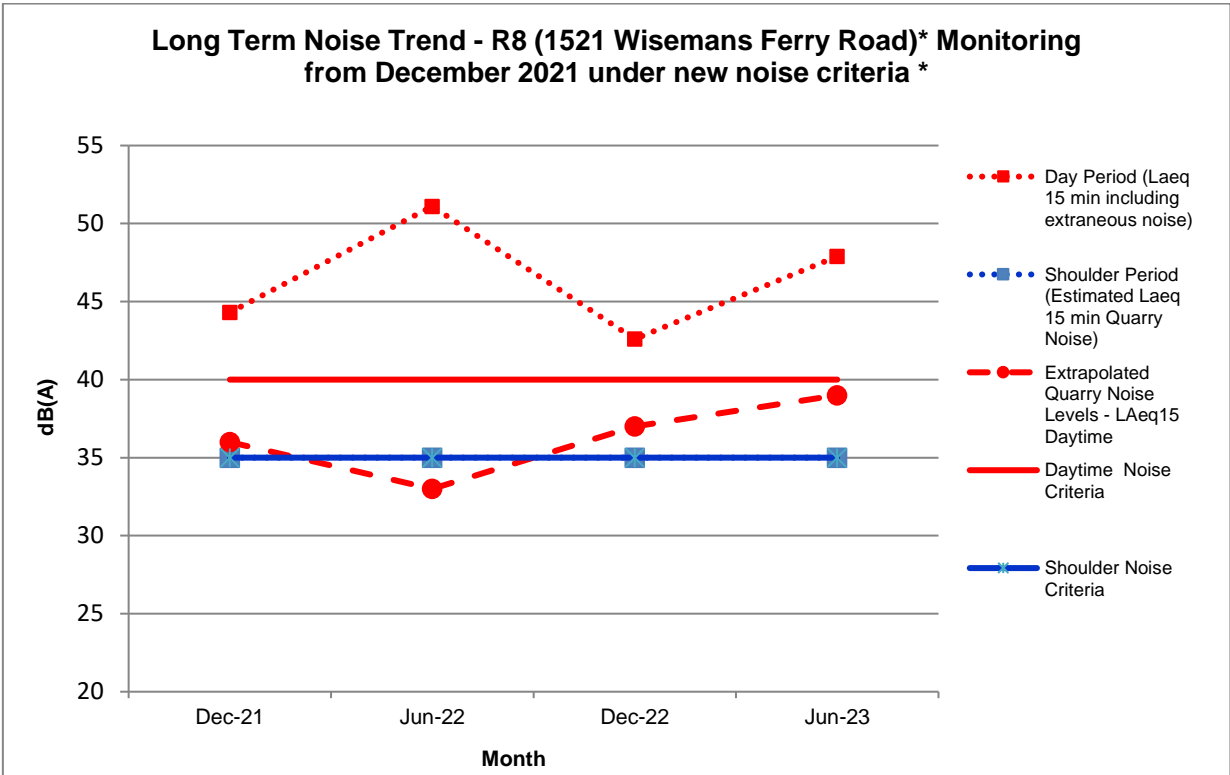


Chart 17: Noise Monitoring Results – R8

5.2.6 Discrepancies between Predicted and Actual Noise Impacts

The EIS (ERM, 2005) prepared for the original development consent DA 165-7-2005 contains predictions for noise impacts during quarry operations in the following extraction Stages:

- Stage 1,
- Stage 4 (scenario a),
- Stage 4 (scenario b), and
- Stage 5.

The EA (Umwelt, 2016) prepared for development consent DA 165-7-2005 (Modification 1) contains predictions for noise impacts for quarry activities in the newly approved extraction cells:

- early extraction in Cells 4,
- early extraction in Cells 5,
- clearing, pre-stripping and early extraction for Cell 1,
- clearing, pre-stripping and early extraction for Cell 3, and
- bund construction in Cell 4.

The Modification report MR3 (Umwelt, 2019) prepared for DA Modification 3 included a new Noise Impact Assessment which considered the potential noise emissions of the Quarry against the Project Noise Trigger Levels established in accordance with the Noise Policy for Industry (EPA 2017) which considered noise emissions over the remaining life of the Quarry including the proposed Modification under this DA Modification.

During this monitoring period, the main source of noise from quarry operations on Lot 216 were mobile sand processing and loading of haulage trucks for transfer to Old Northern Road quarry (front end loaders, mobile screener and haulage trucks) and extraction operation in the Modification 1 area. There is an upward trend in the measured noise levels at receivers R3, R4, R6, R7 and R8 since the last reporting period due to quarry operations moving in the northward directions closer to the receivers. Nevertheless, extrapolated daytime noise levels for receivers R3, R4, R6, R7, R8 and other receivers from noise monitoring in December 2022 and June 2023 are below the daytime noise criteria and compliant. This result is as predicted and in line with the NIA in the Modification Report (Umwelt, 2019) where noise modelling results are based on worst-case meteorological conditions and conservatively modelled scenarios demonstrating that noise emission from quarry operations can be managed to maintain compliance with the Project Noise Trigger Levels throughout the life of the quarry. Until quarry operations progress to Stage 4 of the Tertiary Sand Extraction Area (original extraction area), no change to the existing management and monitoring measures implemented by the Quarry are required.

Future noise monitoring results will enable a better understanding of the actual noise impacts associated with quarry operations in the new extraction cells of Modification 1 as the quarry moves into different extraction cells.

5.2.7 Changes to Environmental Procedures

Undertake noise monitoring in accordance with the Noise Management Plans and continue with the 6-monthly monitoring frequency.

Noise bund walls are to be constructed and maintained as per the strategies outlined in the Haerses Road Acoustic Bund Construction Noise Management Plan.

5.3 Traffic and Transport

5.3.1 Ongoing Management Measures

Vehicle Movements

Vehicle movements are recorded in the truck register. Records have been sent to Council 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

Dixon Sand received one traffic related complaint for Haerses Road Quarry during this reporting period.

A copy of the complaint register is contained in Appendix L. Details of the complaint is discussed in Section 8.2.

5.3.3 Compliance

Assessment of compliance with the relevant conditions is summarised in Table 17.

Table 17: Road and Traffic Compliance.

DA165-7-2005 (Mod 2)	Condition	Compliance	Comments
Condition 8 of Schedule 2	Truck movements at the site (i.e. either arrival or dispatch), including truck movements between the site and the Old Northern Road Quarry, must not exceed: (a) 180 per day; and (b) 20 between 6.00 am and 7.00 am.	Yes	Refer to Truck Record
Condition 10 of Schedule 2	The Applicant must: (a) maintain accurate records of all VENM and ENM received at the site (including the date, time and quantity received); and (b) include a copy of this data in the Annual Review.	Yes	No VENM/ENM importation during this reporting period. Refer to Section 5.4.2

DA165-7-2005 (Mod 2)		Condition	Compliance	Comments													
Condition 15 of Schedule 2	The Applicant must pay Council a monthly financial contribution toward the maintenance of local roads used for haulage of quarry products. The contribution must be determined in accordance with <i>The Hills Shire Council Contributions Plan No. 6 Extractive Industries</i> , or any subsequent relevant contributions plan adopted by Council.	Yes	Refer to Appendix J for an example of s.94 monthly contribution for sales from Haerses Road Quarry. Note these contributions are not inclusive of products sold at Old Northern Road Quarry.														
Condition 1 of Schedule 3	The Applicant must comply with the operating hours set out in Table 1.	Yes	Refer to truck record														
<div>Table 1: Operating hours</div> <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, loading and dispatch</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 rowspan="2">Acoustic bund construction and road and intersection works on Haerses Road and Wisemans Ferry Road</td><td>8.00 to 5.00 pm Monday to Friday</td></tr><tr><td>At no time on Saturdays, Sundays or public holidays</td></tr><tr><td>Maintenance</td><td>At any time, provided that these activities are not audible at any privately-owned residence outside of permissible hours for quarrying operations</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, loading and dispatch	6.00 am to 6.00 pm Monday to Saturday	At no time on Sundays or public holidays	Acoustic bund construction and road and intersection works on Haerses Road and Wisemans Ferry Road	8.00 to 5.00 pm Monday to Friday	At no time on Saturdays, Sundays or public holidays	Maintenance	At any time, provided that these activities are not audible at any privately-owned residence outside of permissible hours for quarrying operations
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, loading and dispatch	6.00 am to 6.00 pm Monday to Saturday																
	At no time on Sundays or public holidays																
Acoustic bund construction and road and intersection works on Haerses Road and Wisemans Ferry Road	8.00 to 5.00 pm Monday to Friday																
	At no time on Saturdays, Sundays or public holidays																
Maintenance	At any time, provided that these activities are not audible at any privately-owned residence outside of permissible hours for quarrying operations																
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														
Condition 20 of Schedule 3	Prior to carrying out any development, the Applicant must upgrade Haerses Road to meet the requirements for 'internal haul roads', under Baulkham Hills Development Control Plan No. 16 – Extractive Industries, to the satisfaction of Council.	Yes	Completed														

DA165-7-2005 (Mod 2)	Condition	Compliance	Comments
Condition 21 of Schedule 3	<p>The Applicant must:</p> <p>(a) maintain safe access to the site for the public and emergency services for the duration of the development; and</p> <p>(b) reinstate the extracted length of Haerses Road to the satisfaction of Council.</p> <p>Notes:</p> <ul style="list-style-type: none"> • The Applicant must ensure that the final alignment and design of Haerses Road is approved by Council prior to the commencement of the development. • The Applicant must bear the full costs associated with the design, survey and construction of the road works, including the relocation of utilities, if required. • All works are to be in accordance with Council's Design Guidelines and Work Specifications for Subdivisions and Developments. • Following the reconstruction of Haerses Road, the Applicant must rehabilitate any temporary access roads that were established on site. 	Yes	<p>Ongoing</p> <p>Condition not yet triggered</p> <p>Completed</p> <p>Completed</p> <p>Completed</p> <p>Condition not yet triggered</p>
Condition 22 of Schedule 3	<p>Prior to carrying out any development, the Applicant must:</p> <p>(a) provide for appropriate sight distances at the intersection of Haerses Road and Wisemans Ferry Road, by clearing and/or lopping vegetation along the eastern approach of Wisemans Ferry Road; and</p> <p>(b) provide warning signage ("Truck Turning") on the eastern and western approaches of Wisemans Ferry Road,</p> <p>to the satisfaction of TfNSW.</p>	Yes	Completed

DA165-7-2005 (Mod 2)	Condition	Compliance	Comments
Condition 23 of Schedule 3	<p>Within 12 months of the commencement of the development, the Applicant must construct a Type 'AUR' treatment at the intersection of Haerses Road and Wisemans Ferry Road to the satisfaction of TfNSW. Until the intersection works have been completed to the satisfaction of TfNSW, the Applicant must limit the number of trucks entering the site to 15 truck movements per day.</p> <p>Notes:</p> <ul style="list-style-type: none">• <i>Prior to the Construction Certificate being released the Applicant must:</i><ul style="list-style-type: none">- <i>enter into a Memorandum of Understanding with the TfNSW that the Type 'AUR' intersection treatment shall be fully constructed and handed over to the TfNSW within 12 months of the commencement of the development; and</i>- <i>issue a bank guarantee in favour of the TfNSW for the total cost of the intersection works (the cost to be determined following the approval of detailed design plans by the TfNSW).</i>• <i>The Applicant shall ensure that the intersection works comply with the TfNSW Road Design Guide.</i>• <i>The Applicant shall bear the full costs associated with the design, survey and construction of the works, including the relocation of utilities, if required.</i>	Yes	Completed
Condition 24 of Schedule 3	<p>Prior to transporting any quarry products derived from quarrying operations within the Mod 1 extraction area, the Applicant must construct a channelised right-turn 'CHR' treatment at the intersection of Haerses Road and Wisemans Ferry Road to the satisfaction of TfNSW. The Applicant must:</p> <p>(a) submit detailed design plans to TfNSW for approval prior to the issue of a construction certificate by Council or the commencement of road works; and</p> <p>(b) design and construct the intersection treatment in accordance with the Austroads <i>Guide to Road Design</i>.</p>	Yes	Completed in May 2021
Condition 24A of Schedule 3	<p>The Applicant must monitor trucks queuing within the right turn bay at the quarry intersection on Wisemans Ferry Road and, in the instance that there are trucks regularly queuing at the intersection, extend the length of the right turn bay to the satisfaction of TfNSW.</p>	Yes	Monitoring of truck queuing at the intersection is undertaken during monthly site inspection. Refer to Appendix E.
Condition 25 of Schedule 3	<p>Prior to commencement of the works referred to in condition 24 above, the Applicant must prepare and implement a Traffic Control Plan for the development to the satisfaction of the TfNSW.</p>	Yes	Completed by Civil Contractor

DA165-7-2005 (Mod 2)		Condition	Compliance	Comments
Condition 26 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 these records on its website every 6 months.	Yes	Refer to Traffic Management Plan and Truck Records
Condition 27 of Schedule 3		The Applicant must: (a) ensure that all laden trucks have their loads covered when arriving at or leaving the site; (b) ensure that all laden trucks are cleaned of material that may fall from vehicles, before leaving the site; and (c) 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	Refer to Traffic Management Plan
Condition 28 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 TfNSW and Council; (b) be submitted to the Secretary for approval within 6 months of the determination of Modification 1, 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 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 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 2022 - 2023 reporting period.

One traffic related complaint was received by Haerses Road Quarry during this reporting period.

5.3.5 Findings

The findings show that mitigation measures proposed in the EIS and Management Plans are being implemented adequately. The permitted truck movements and hours of operations have been adhered to.

5.3.6 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

During this reporting period, refuelling of plant and machinery at Haerses Road quarry was carried out using a fuel truck. A spill kit is located on site. Maintenance and servicing of Haerses Road quarry plant and machinery were undertaken in the dedicated workshop located at the Old Northern Road Quarry. Chemicals, hazardous materials, hydrocarbon wastes and diesel fuel are stored in appropriate bunded and/or designated areas. Spill response kits and fire extinguishers are located at vantage locations on site.

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 solid waste associated with the operations were disposed of in skip bins and transported offsite by a licensed waste transporter.

The amount of waste transported off site from Haerses Road for disposal, recycled and processed during the monitoring period is contained in Table 18.

Table 18: Haerses Road – Total Waste Generated, July 2022 to June 2023.

Waste Type	Disposal / Recycling / Processing	Amount of Waste Generated
Putrescible	The Hills Shire Council Waste Contractor weekly pickup (1 x 240L Red bin)	Approx. 26 m ³
Recyclables	The Hills Shire Council Waste Contractor fortnightly pickup (1 x 240L Yellow bin)	Approx. 26 m ³
General Waste – Non-putrescible	Skip bins provided by a licensed Waste Contractor	70 m ³

The waste tracking registers are contained in Appendix M.

5.4.2 VENM and ENM Importation

Condition 9 of Schedule 2 of DA165-7-2005 permits the importation of up to 250,000 tonnes of Excavated Natural Material (ENM) and Virgin Excavated Natural Material (VENM) per calendar year to Haerses Road quarry. Importation of VENM commenced in June 2019 with the following quantity of ENM and VENM imported:

- A total of *nil* tonnes of VENM/ENM was imported to Haerses Road Quarry during the 2022 calendar year,
- A total of *nil* tonnes of VENM/ENM was imported to Haerses Road Quarry from January 2023 to June 2023,
- A total of *nil* tonnes of VENM/ENM was imported to Haerses Road Quarry during the 2022 - 2023 financial year (Annual Review reporting period).

A copy of the ENM / VENM Material Transport Register is contained in Appendix M. The ***VENM / ENM Material Transport Register*** records:

- Transport Company name
- Truck Registration number
- Date of transport
- Material tip time
- Testing Certificate demonstrating compliance with the Waste Classification
- Quantity of material received
- Total annual quantity

5.4.3 Changes to Environmental Procedures

No changes to the waste management procedure are proposed.

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

6. Water Management

6.1 Monitoring and Compliance Limits

DA165-7-2005 Modification 1 requires 13 additional monitoring wells to be installed (in clusters) in the 100m buffer zone to the Maroota Tertiary Sand Groundwater Source (MTSGS) in the expanded extraction area. These new monitoring bores have been installed in May 2018 and are an addition to the nine existing bores. Groundwater monitoring for bores in the buffer zone commenced in July 2018.

6.1.1 Groundwater Levels and Criteria / Trigger Levels

Out of the fourteen boreholes originally installed at Haerses Road quarry, six of the original boreholes are currently active and being monitored. Boreholes H1, H4, H5, H8, H10, H11 and H13 have been decommissioned due to their locations being obsolete or in the active quarry operational areas. Monitoring ceased at borehole H3 due the bore running dry. In 2011 two additional boreholes BH4 and BH5 were added to Haerses Road quarry water monitoring program. Additional 13 boreholes (Cluster bores located in the MTSGS 100m buffer) were required to be installed by DA165-7-2005 Modification 1. Cluster bores in the MTSGS buffer zone were installed in May 2018 with groundwater levels (utilising continuous data loggers) and quality monitoring program commencing in July 2018 with continuous data loggers installed. Active groundwater bores at the Haerses Road quarry are listed in Table 19. The adopted 20th and 80th percentile water levels as site specific trigger values in the Soil and Water Management Plan are listed in Table 20.

Table 19: Groundwater monitoring bores for Haerses Road quarry site.

Monitoring Bore	Location Reference	Aim of Monitoring
H2	Stage 4, adjacent to the dam	MTSGS
H6	Stage 5, northern boundary	MTSGS
H7	Stage 5, southern boundary	MTSGS
H9	Stage 3, behind tomato vines	MTSGS
H12	Stage 3, adjacent to the shed	MTSGS
H14	Fire trail, south of quarry boundary	MTSGS
BH4	South-west of quarry, outside Stage 2.	SCBGS
BH5	Stage 2, western boundary	SCBGS
BH01A	100m MTSGS Buffer – Site 1	Perched groundwater in weathered Hawkesbury sandstone
BH01B	100m MTSGS Buffer – Site 1	Perched groundwater in unweathered Hawkesbury sandstone
BH01C	100m MTSGS Buffer – Site 1	SCBGS
BH02A	100m MTSGS Buffer – Site 2	Perched groundwater in weathered Hawkesbury sandstone
BH02B	100m MTSGS Buffer – Site 2	Perched groundwater in unweathered Hawkesbury sandstone
BH02C	100m MTSGS Buffer – Site 2	SCBGS

Monitoring Bore	Location Reference	Aim of Monitoring
BH03A	100m MTSGS Buffer – Site 3	Perched groundwater in weathered Hawkesbury sandstone
BH03B	100m MTSGS Buffer – Site 3	Perched groundwater in unweathered Hawkesbury sandstone
BH03C	100m MTSGS Buffer – Site 3	SCBGS
BH05B	Lot 216, adjacent to BH5	Perched groundwater in unweathered Hawkesbury sandstone
BH06A	100m MTSGS Buffer – Site 4	Perched groundwater in weathered Hawkesbury sandstone
BH06B	100m MTSGS Buffer – Site 4	Perched groundwater in unweathered Hawkesbury sandstone
BH06C	100m MTSGS Buffer – Site 4	SCBGS

Table 20: Baseline Groundwater Level Statistics and Trigger Values.

Monitoring Bore	Minimum	20 th Percentile	50 th Percentile	80 th Percentile	Maximum
H2	178.1	179.4	180.0	180.9	182.4
H6	179.4	181.2	181.4	182.4	184.7
H7	178.2	180.2	180.4	180.5	182.6
H9	182.6	184.9	185.0	185.3	186.9
H12	178.2	181.0	181.1	181.2	184.0
H14	171.9	174.7	174.9	175.1	177.2
BH4	139.3	140.5	140.6	140.7	141.2
BH5	121.4	123.2	123.2	123.3	123.4

6.1.2 Groundwater Quality and Criteria / Trigger Levels

Groundwater quality analyses for H-series bores, BH4 and BH5 were undertaken 6-monthly in December 2022 and June 2023, in accordance with the Soil and Water Management Plan. Groundwater quality monitoring for the were undertaken on a monthly basis. Groundwater samples were obtained and analysed by a NATA qualified laboratory for analysis of electrical conductivity and total suspended solids. pH measurements were undertaken in the field due to short sample holding time. The baseline groundwater quality statistics and trigger values for H-series, BH4 and BH5 are listed in Table 21 below.

Table 21: Baseline Groundwater Quality Statistics and Trigger Values

Monitoring Bore	pH			Electrical Conductivity (µS/c)		
	20th Percentile	50th Percentile	80th Percentile	20th Percentile	50th Percentile	80th Percentile
H2	4.3	4.4	4.6	56	69	108
H6	4.2	4.3	4.4	161	182	205
H7	4.2	4.3	4.4	114	189	298
H9	4.4	4.6	4.7	116	127	145
H12	4.5	4.6	4.8	133	182	210
H14	4.3	4.6	4.7	94	117	193
BH4	4.4	4.7	4.9	89	97	114
BH5	5.1	5.6	6.1	126	137	158

6.1.3 Surface Water Monitoring and Discharge Criteria

The EPL 12513 does not require any surface water monitoring and no surface water discharge is permitted at Haerses Road quarry. The Soil and Water Management Plan stipulates the requirement to monitor surface water quality at the Little Cattai Creek – “SW1” (located east of Stage 2 east extraction cell) and a tributary of Stone Chimney Creek – “SW2” (located west of the extraction Cell 1A) to achieve surface water quality baseline data downstream of quarry operations. Monitoring at these locations were to commence in September 2018 however, due to prolonged drought conditions and the fact that these monitoring points are located in ephemeral tributaries, water samples can only be obtained when there has been sufficient rainfall to generate flows in the tributaries. Up until the 2020 – 2021 reporting, only four sampling events for SW1 and SW2 were carried out. Since then, 3 additional sampling events were carried out during this 2021 – 2022 reporting period. No sampling had been taking during this 2022 – 2023 reporting period due to unsuitable sampling condition. The surface water quality statistics presented in Table 22 were derived from these seven sampling events and consequently, these trigger values represent the interim baseline values which will be subjected to on-going review once additional surface water quality results have been obtained.

Surface water quality monitoring for quarry basins commenced during this reporting period and the interpretation of data and identification of any trends will be carried out during the next reporting period when more data has been obtained. A copy of the surface water quality results for quarry basins are contained in Appendix C.

Table 22: Baseline surface water quality statistics and trigger values

Parameter	Minimum		20 th Percentile		50 th Percentile		80 th Percentile		Maximum	
	SW1	SW2	SW1	SW2	SW1	SW2	SW1	SW2	SW1	SW2
pH	5.5	5.1	6.0	5.2	6.5	5.8	6.6	5.9	6.7	6.1
TSS (mg/L)	5.0	5.0	7.8	13.2	12.0	16.0	58.8	41.6	90.0	84.0
Turbidity (NTU)	82.1	9.0	97.0	25.7	193.0	54.4	357.4	95.9	475.0	160.0

6.2 Extraction Limits

Extraction limits for Haerses Road quarry are defined by DA165-7-2005 and listed in Table 23 below.

Table 23: Haerses Road Quarry Extraction limits

DA165-7-2005 Conditions	Extraction limit
Condition 19 of Schedule 2	The Applicant must not undertake any extraction within 2 metres of the highest recorded wet weather groundwater level of both the MTSGS and the SCBGS.
Condition 20 of Schedule 2	<p>Within 6 months of the determination of Modification 1, the Applicant must:</p> <ul style="list-style-type: none"> (a) establish the highest recorded wet weather groundwater levels for the site based on all available local and site-specific groundwater monitoring data; and (b) engage a suitably qualified and experienced person to prepare a Maximum Extraction Depth Map (contour map or similar) for the development to ensure compliance with condition 19 above and submit this map to the Secretary for approval. <p>Within 14 days of the approval of the Maximum Extraction Depth Map, the Applicant must submit a copy of the approved map and the supporting groundwater monitoring data to DPE Water.</p>
Condition 21 of Schedule 2	The Applicant must comply with the extraction depths specified in the approved Maximum Extraction Depth Map, to the satisfaction of the Secretary.
Condition 22 of Schedule 2	<p>The Applicant must review and update the Maximum Extraction Depth Map:</p> <ul style="list-style-type: none"> (a) annually, for the duration of the baseline groundwater monitoring program (see condition 17 of Schedule 3); and (b) within 3 months of the completion of each Independent Environmental Audit (see condition 13 of Schedule 5), to the satisfaction of the Secretary.

6.3 Results

Groundwater Levels

Chart 18 depicts the long term recorded groundwater levels which commenced in June 2003 for H-series, BH4 and BH5. Charts 19 to 39 (inclusive) illustrate the groundwater levels for all bores during this reporting period.

Groundwater Quality

Chart 40 depicts the long term recorded groundwater pH which commenced in June 2003. Charts 41 to 52 (inclusive) illustrate the groundwater pH across all bores during this reporting period.

Chart 53 depicts the long term recorded groundwater electrical conductivity commencing June 2003. Charts 54 to 65 (inclusive) illustrate the groundwater electrical conductivity across all bores during this reporting period.

As cluster bores 06A, 06B and 06C were decommissioned in October 2021, no pH and EC results are presented.

Surface Water Quality

Table 24 contains the laboratory analyses results for water samples obtained at SW1 and SW2 to date.

Haerses Road Long HTerm Groundwater Levels 2006 - June 2023

H-Series, BH4 and BH5

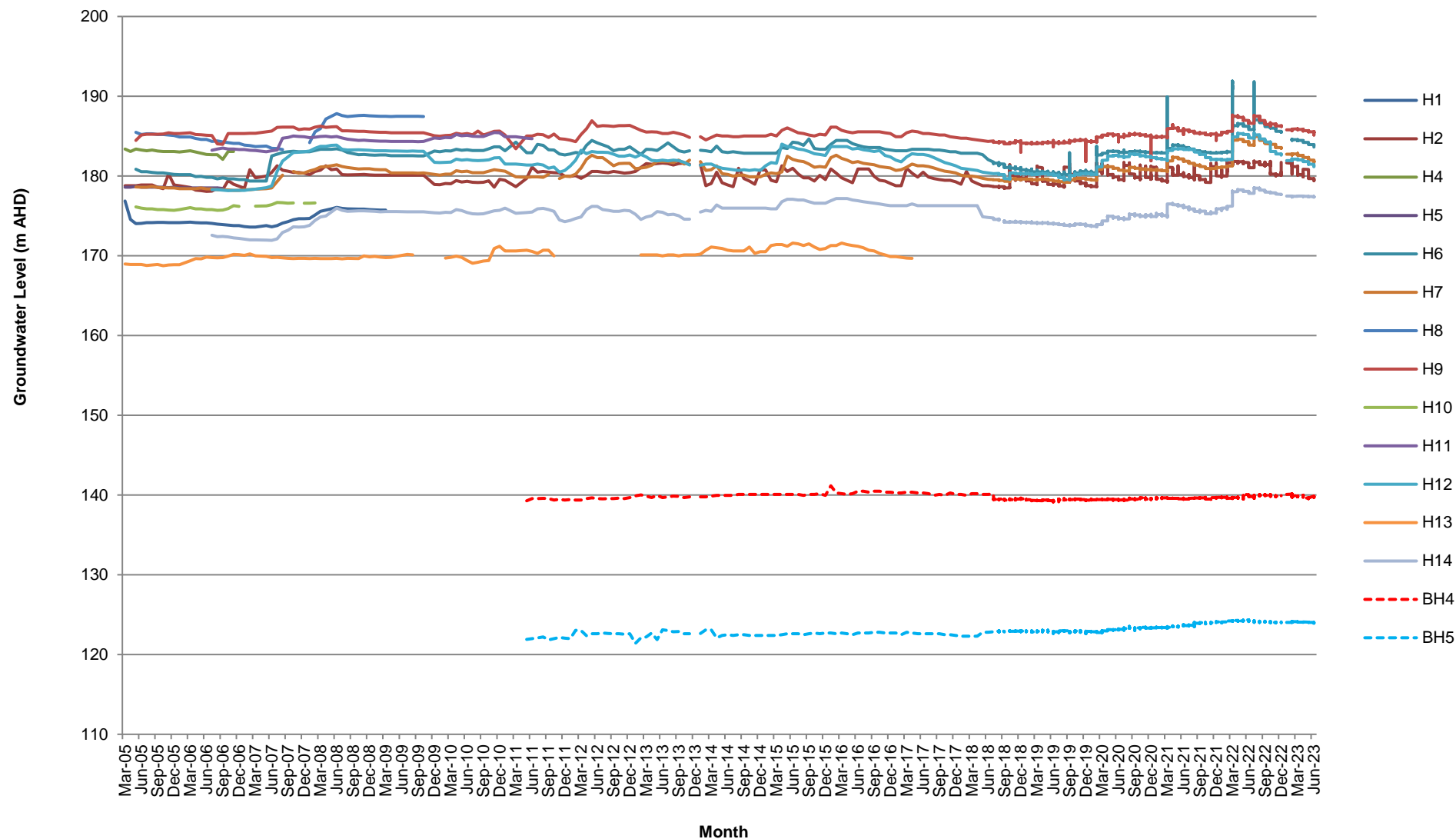


Chart 18: Haerses Road Long Term Groundwater Levels for H-Series, BH4 and BH5.

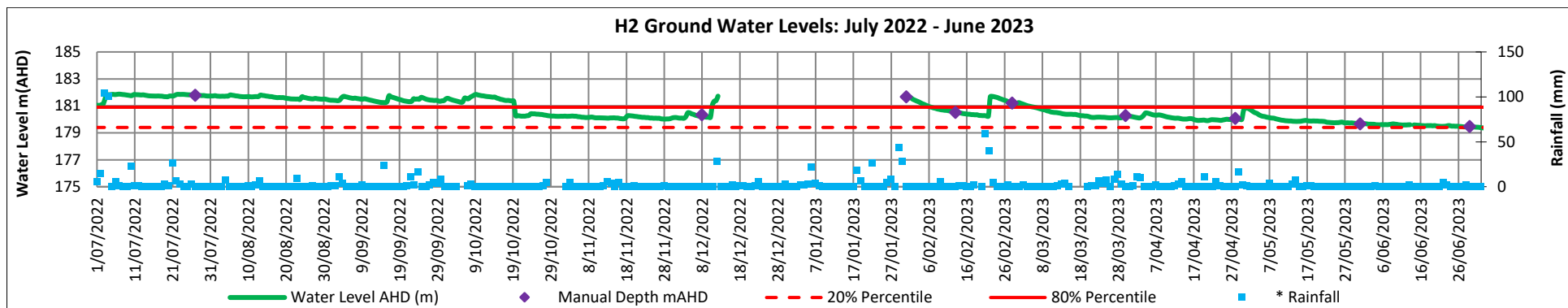


Chart 19: H2 Groundwater Levels for July 2022 – June 2023.

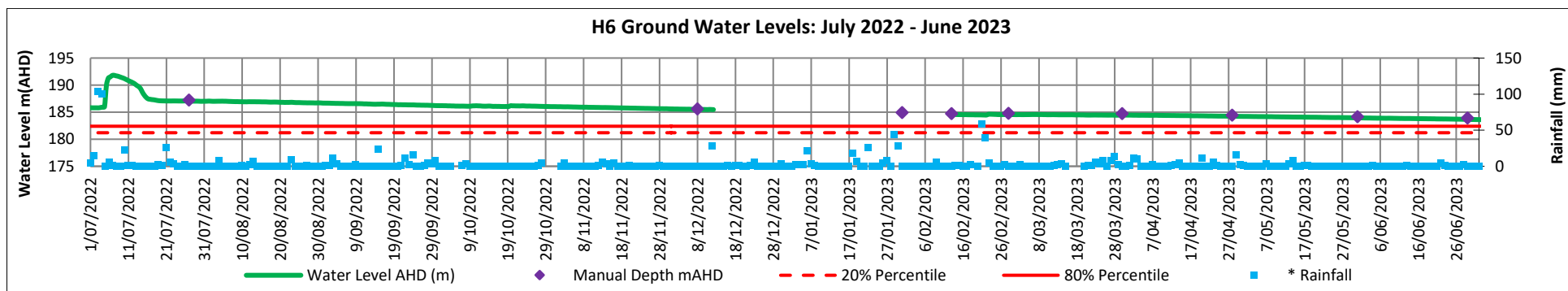


Chart 20: H6 Groundwater Levels for July 2022 – June 2023.

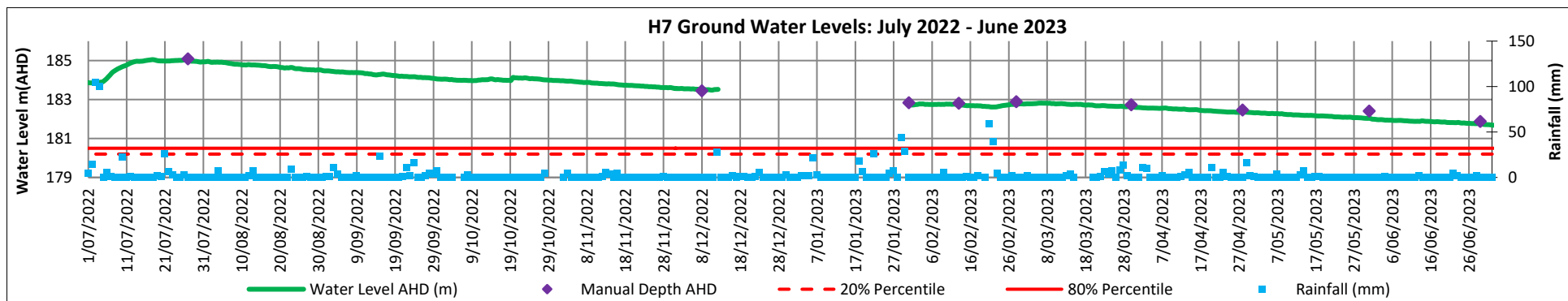


Chart 21: H7 Groundwater Levels for July 2022 – June 2023

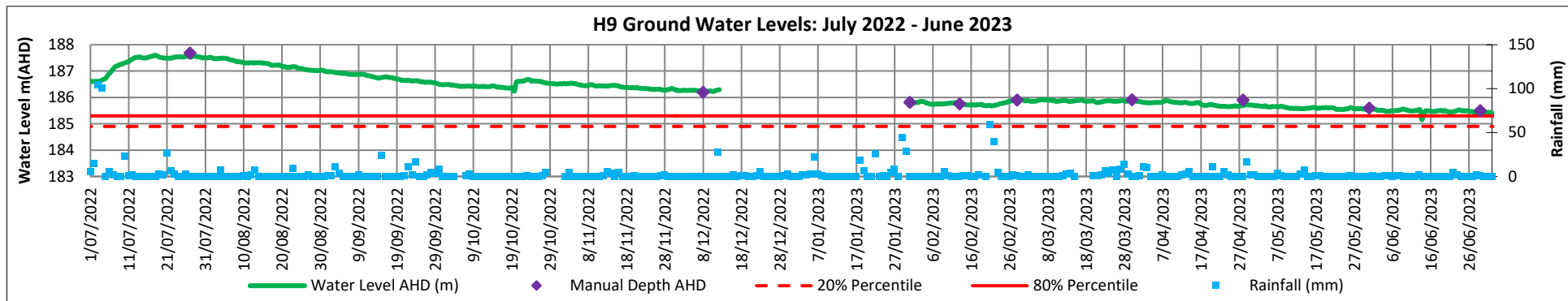


Chart 22: H9 Groundwater Levels for July 2022 – June 2023

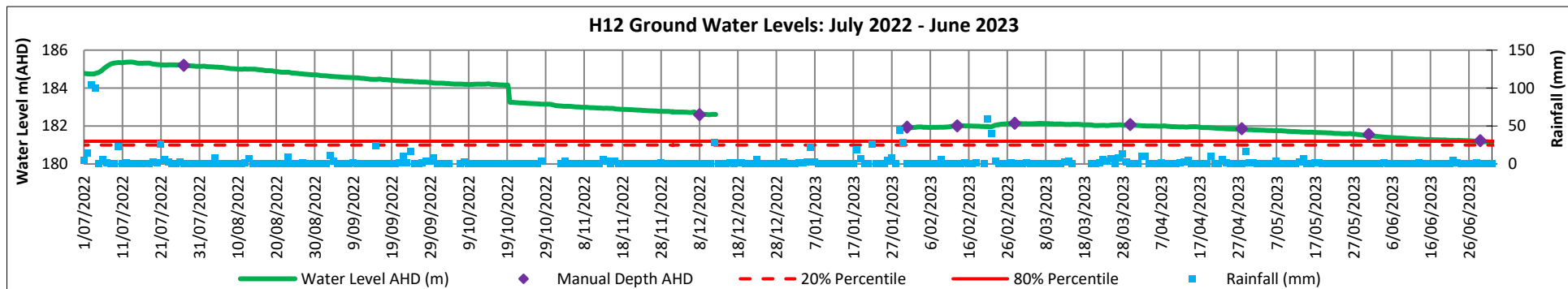


Chart 23: H12 Groundwater Levels for July 2022 – June 2023

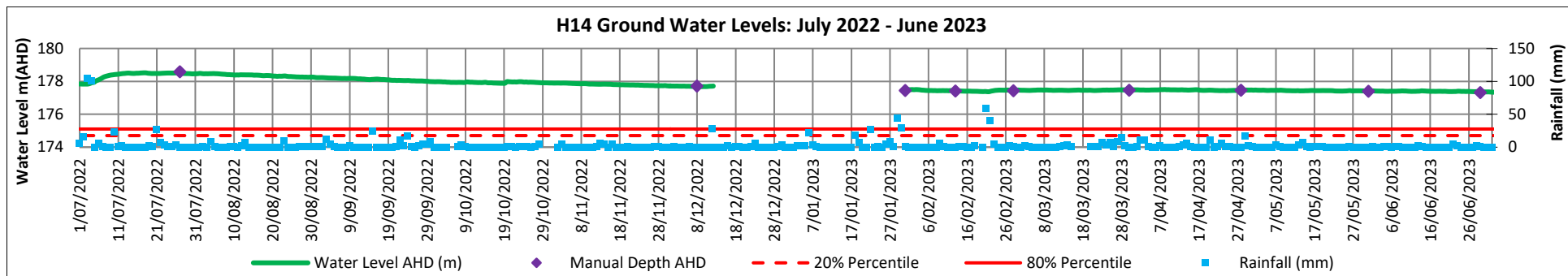


Chart 24: H14 Groundwater Levels for July 2022 – June 2023

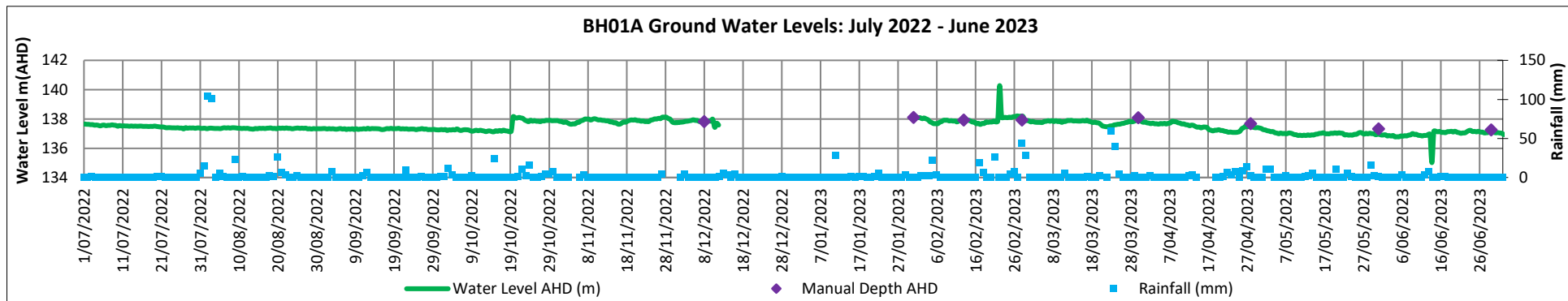


Chart 25: BH01A Groundwater Levels for July 2022 – June 2023

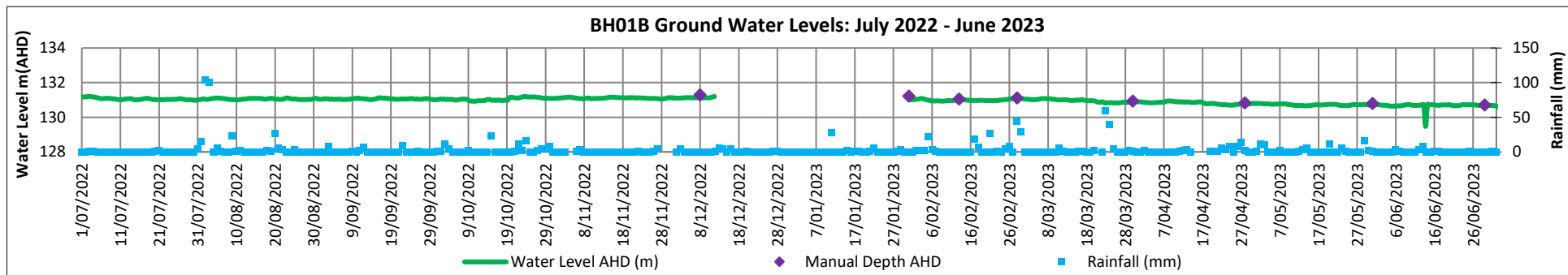


Chart 26: BH01B Groundwater Levels for July 2022 – June 2023

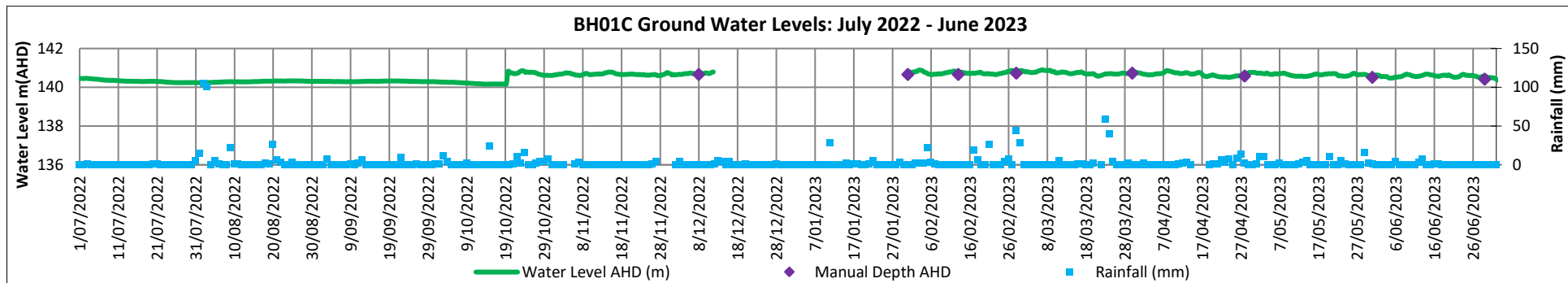


Chart 27: BH01C Groundwater Levels for July 2022 – June 2023

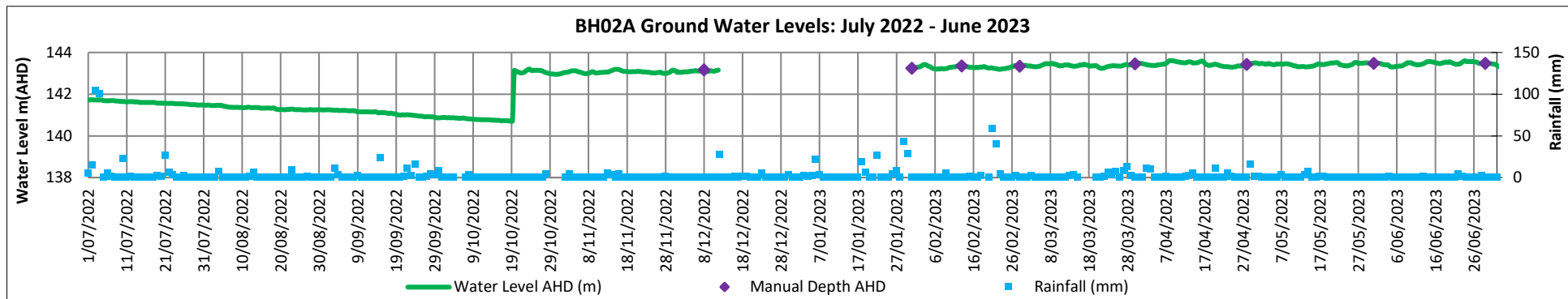


Chart 28: BH02A Groundwater Levels for July 2022 – June 2023

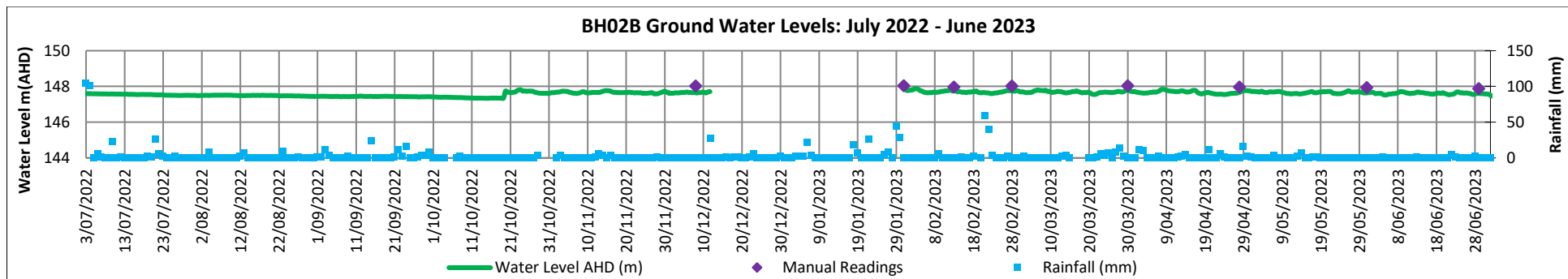


Chart 29: BH02B Groundwater Levels for July 2022 – June 2023

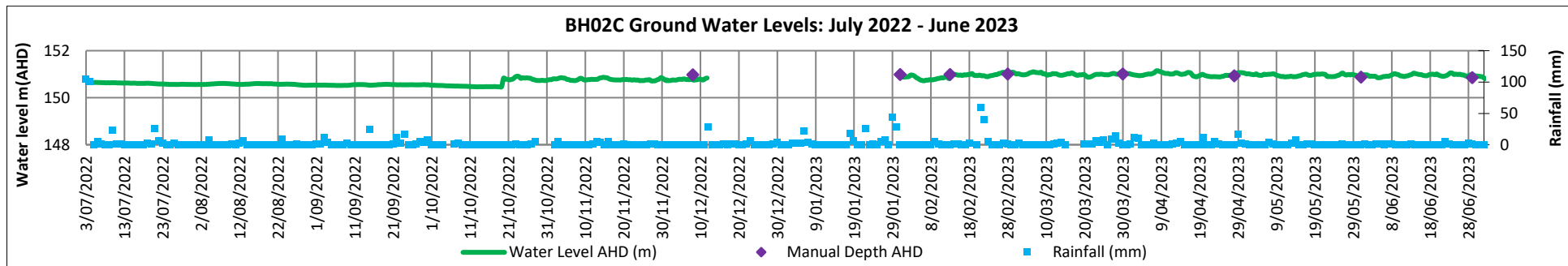


Chart 30: BH02C Groundwater Levels for July 2022 – June 2023

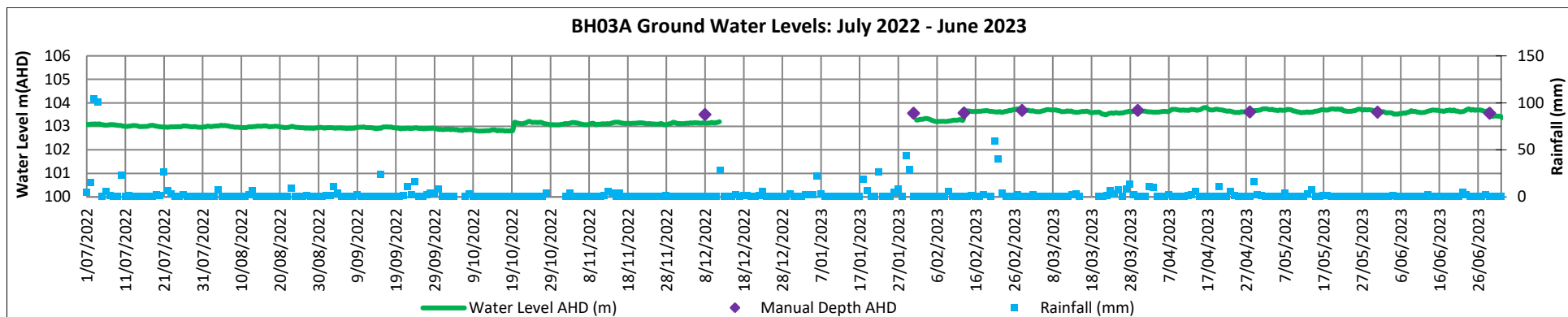


Chart 31: BH03A Groundwater Levels for July 2022 – June 2023

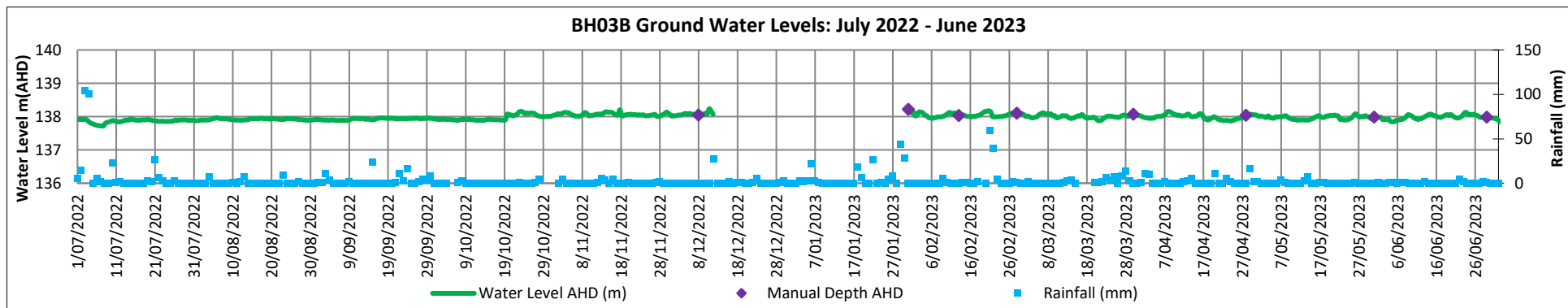


Chart 32: BH03B Groundwater Levels for July 2022 – June 2023

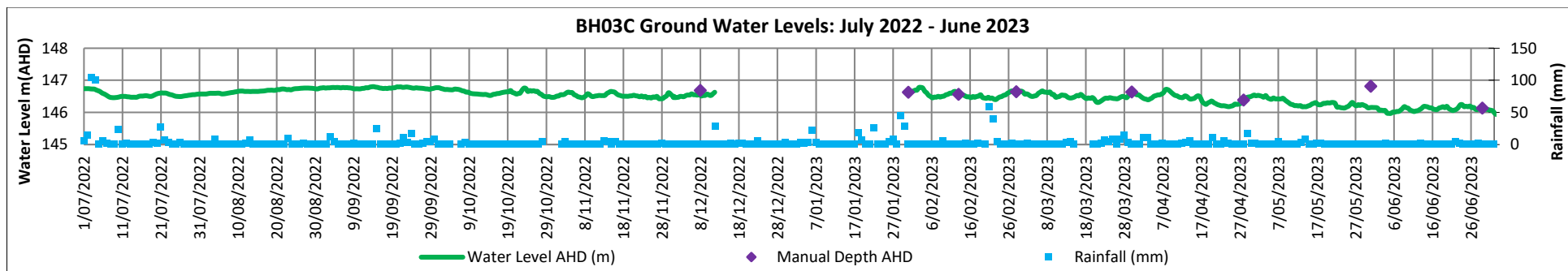


Chart 33: BH03C Groundwater Levels for July 2022 – June 2023

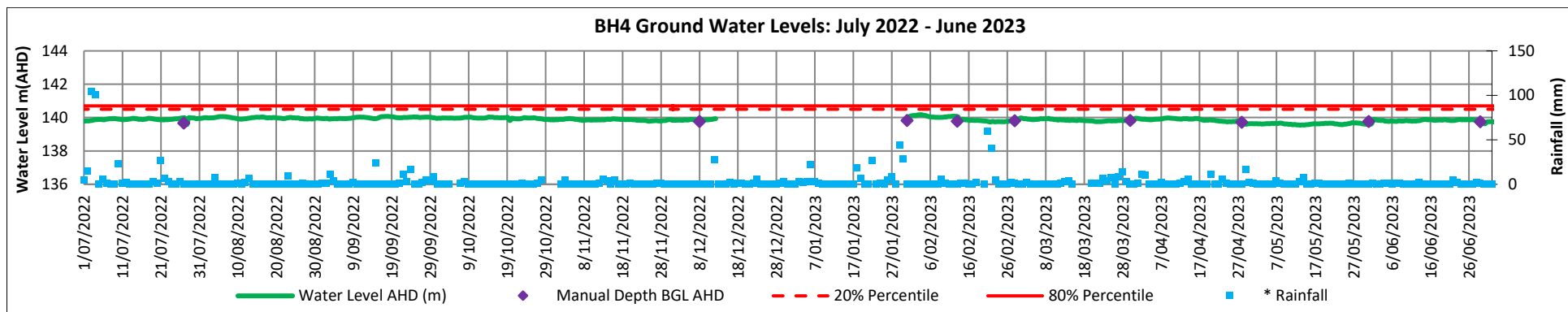


Chart 34: BH4 Groundwater Levels for July 2022 – June 2023

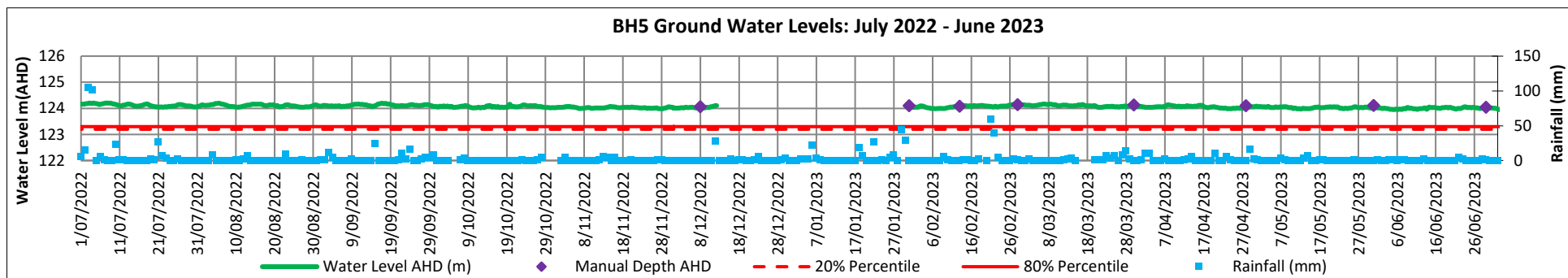


Chart 35: BH05 Groundwater Levels for July 2022 – June 2023

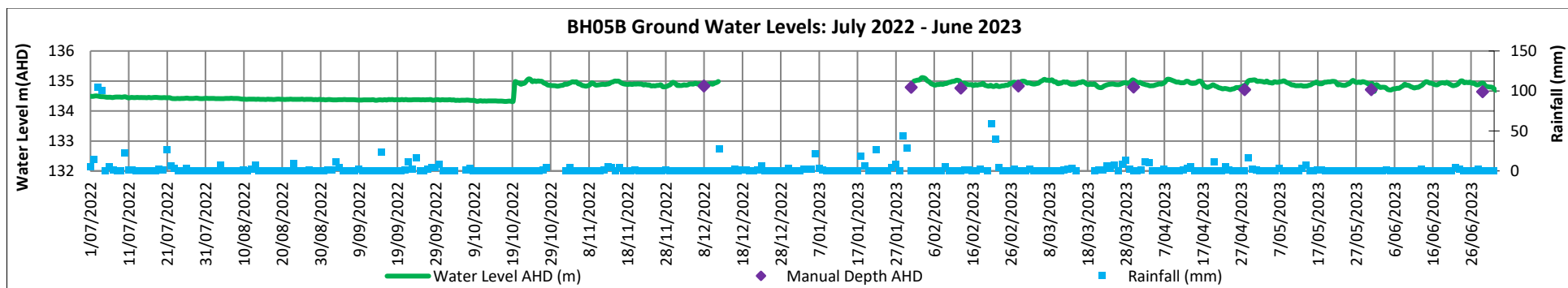


Chart 36: BH05B Groundwater Levels for July 2022 – June 2023

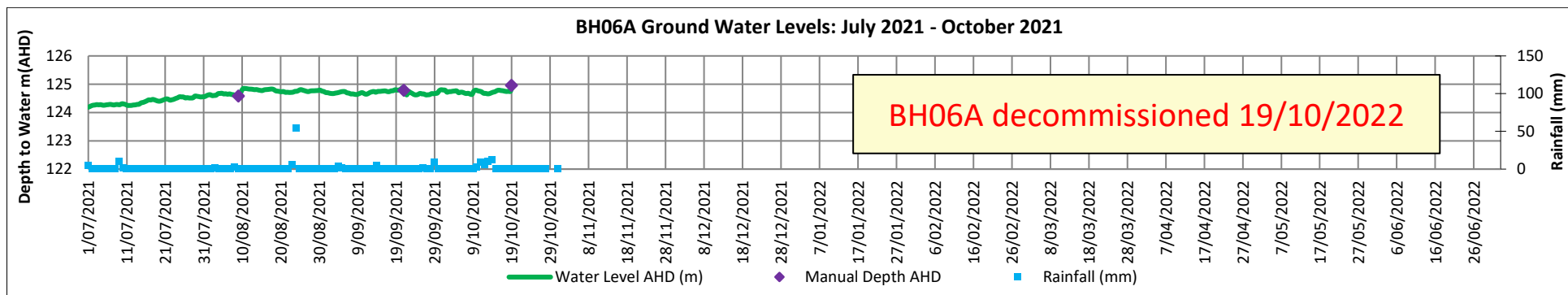


Chart 37: BH06A Groundwater Levels for July 2021 – October 2021

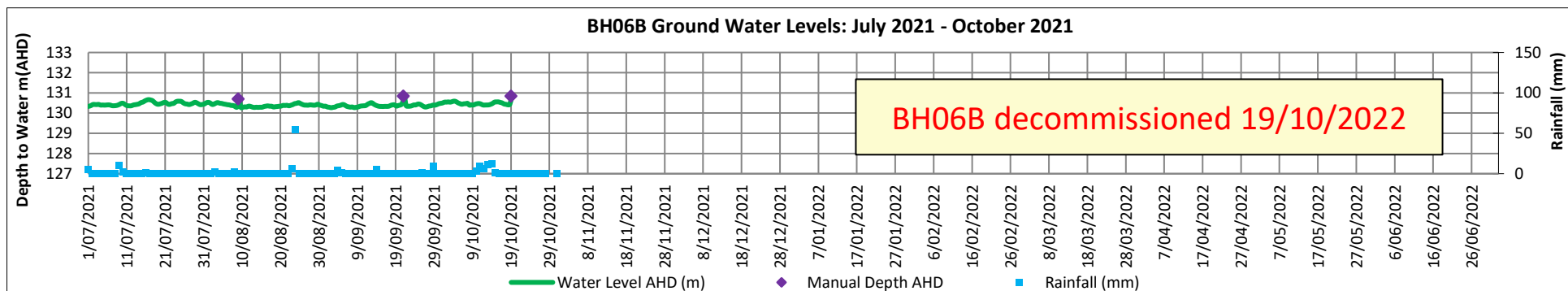


Chart 38: BH06B Groundwater Levels for July 2021 – October 2021

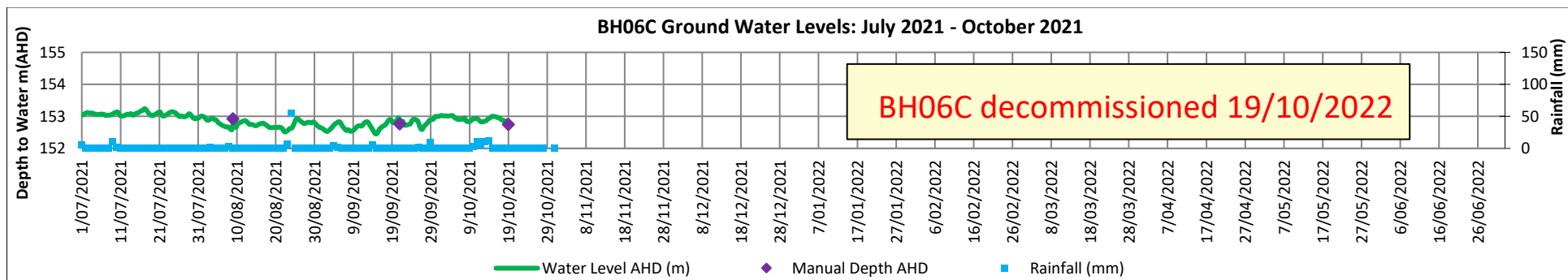


Chart 39: BH06C Groundwater Levels for July 2021 – October 2021

Haerses Road Groundwater Quality - pH Nov 2010 - Jun 2023

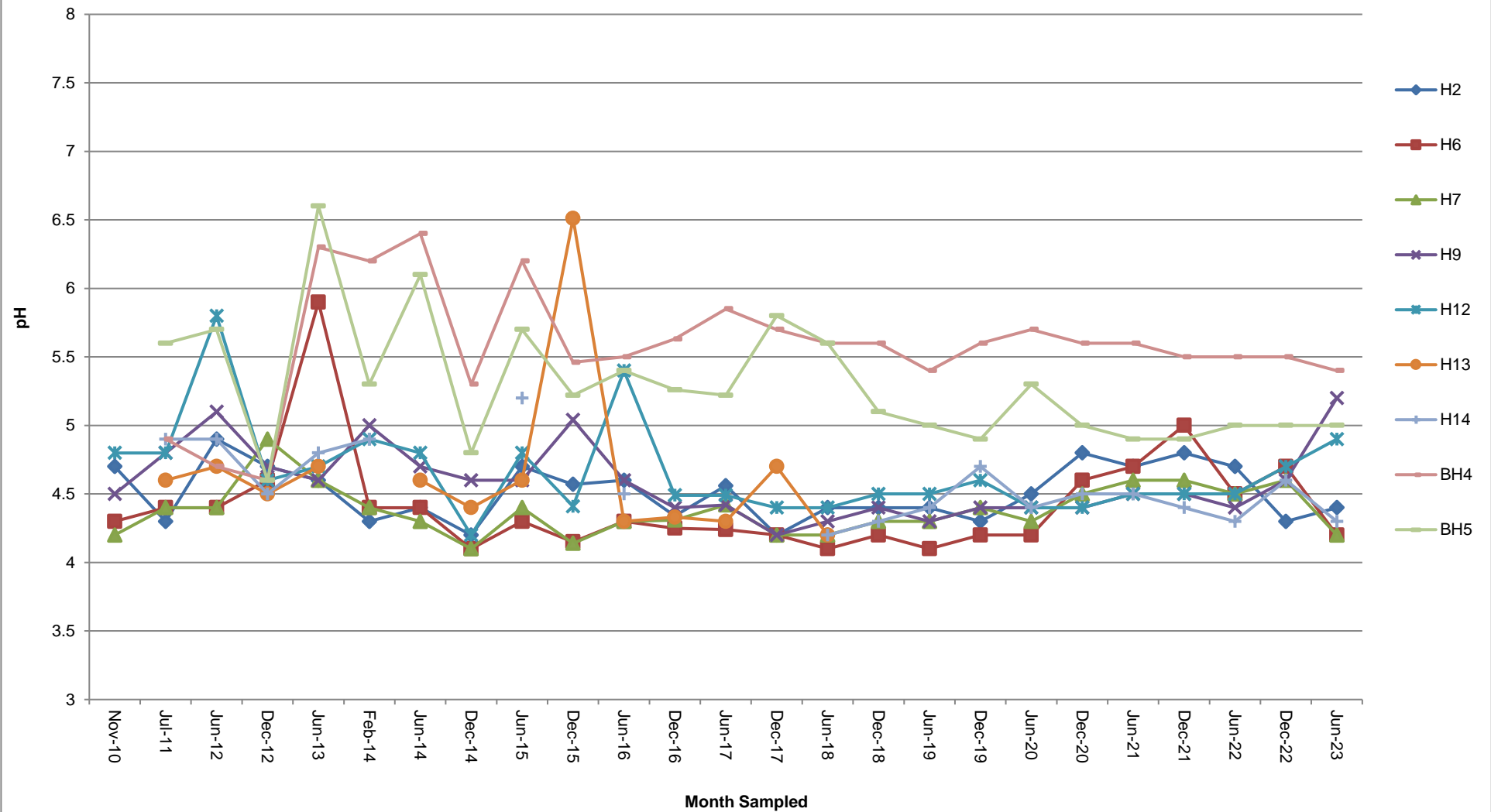


Chart 40: Haerses Road Long Term pH – H series, BH4 and BH5

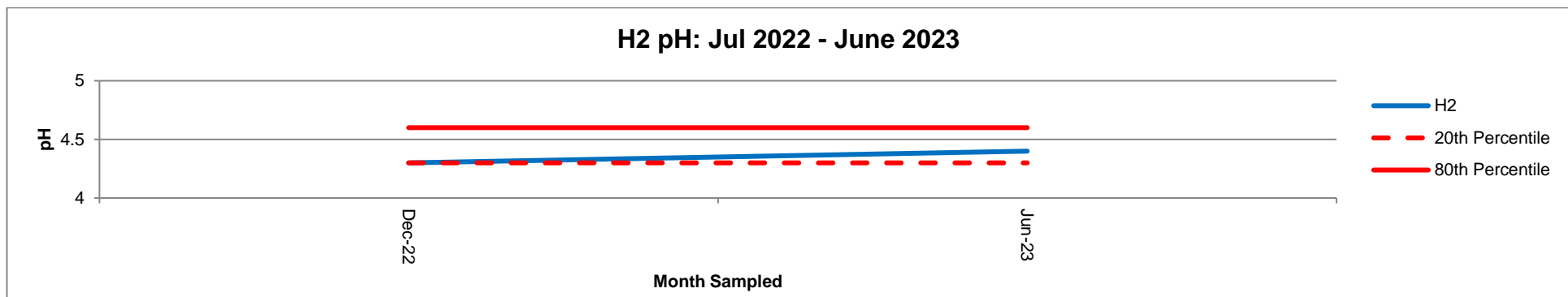


Chart 41: H2 pH Results July 2022 – June 2023.

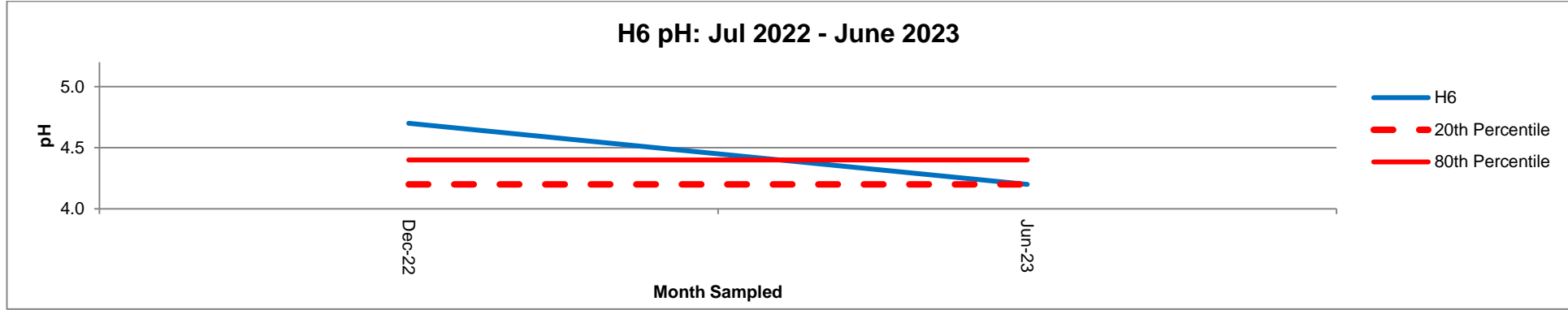


Chart 42: H6 pH Results July 2022 – June 2023.

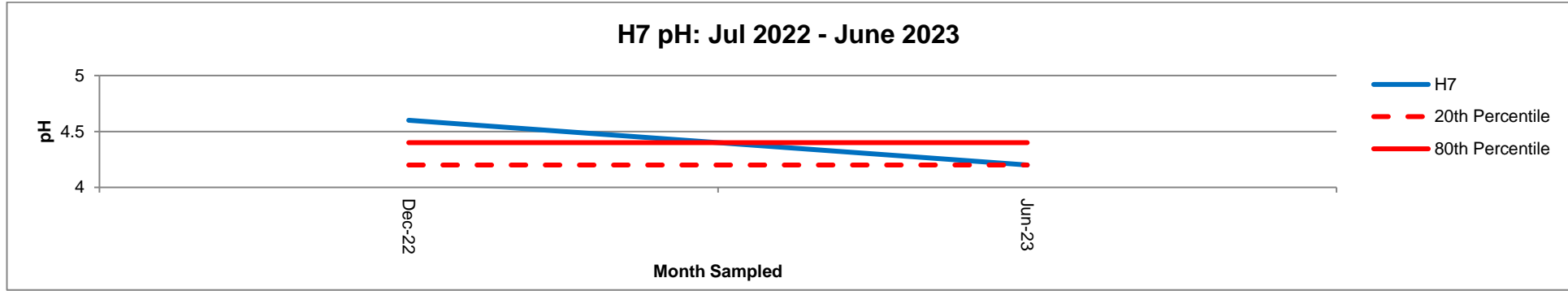


Chart 43: H7 pH Results July 2022 – June 2023.

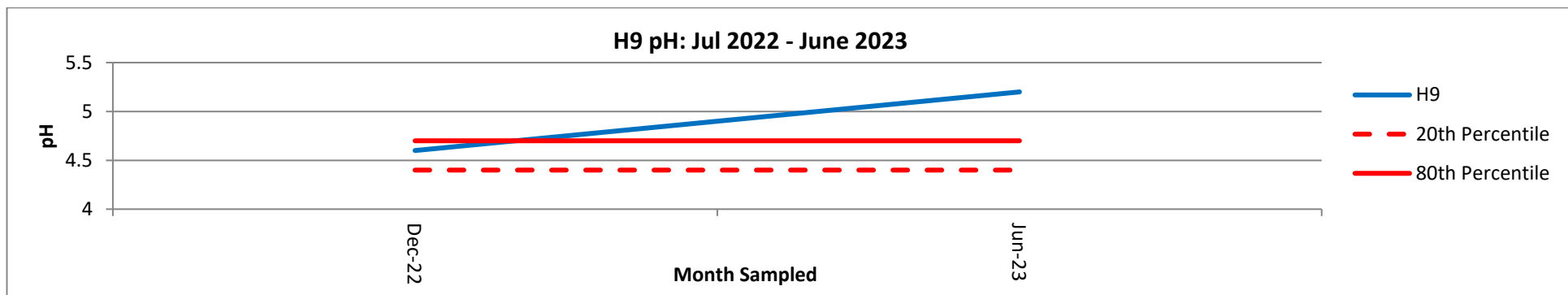


Chart 44: H9 pH Results July 2022 – June 2023.

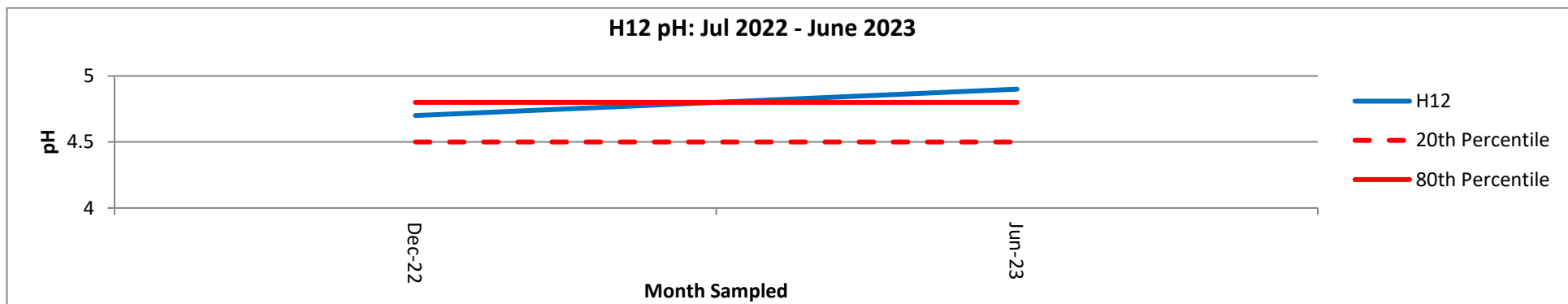


Chart 45: H12 pH Results July 2022 – June 2023.

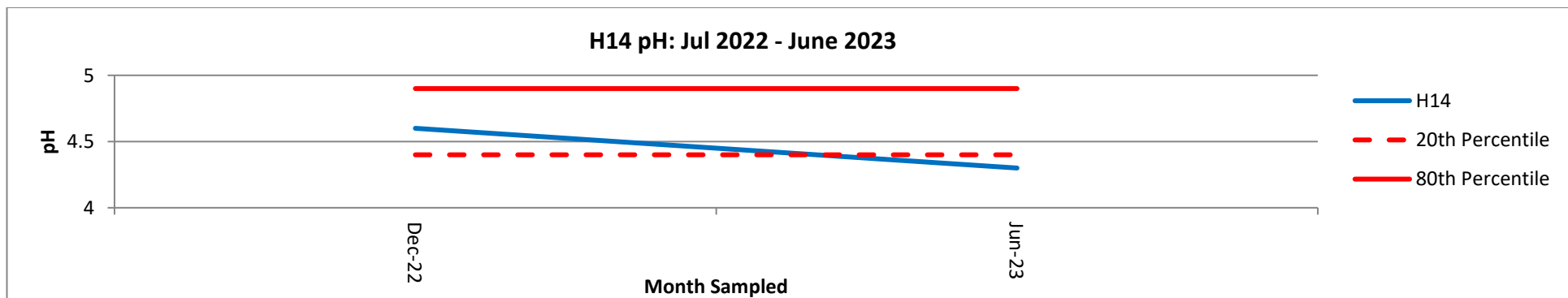


Chart 46: H14 pH Results July 2022 – June 2023.

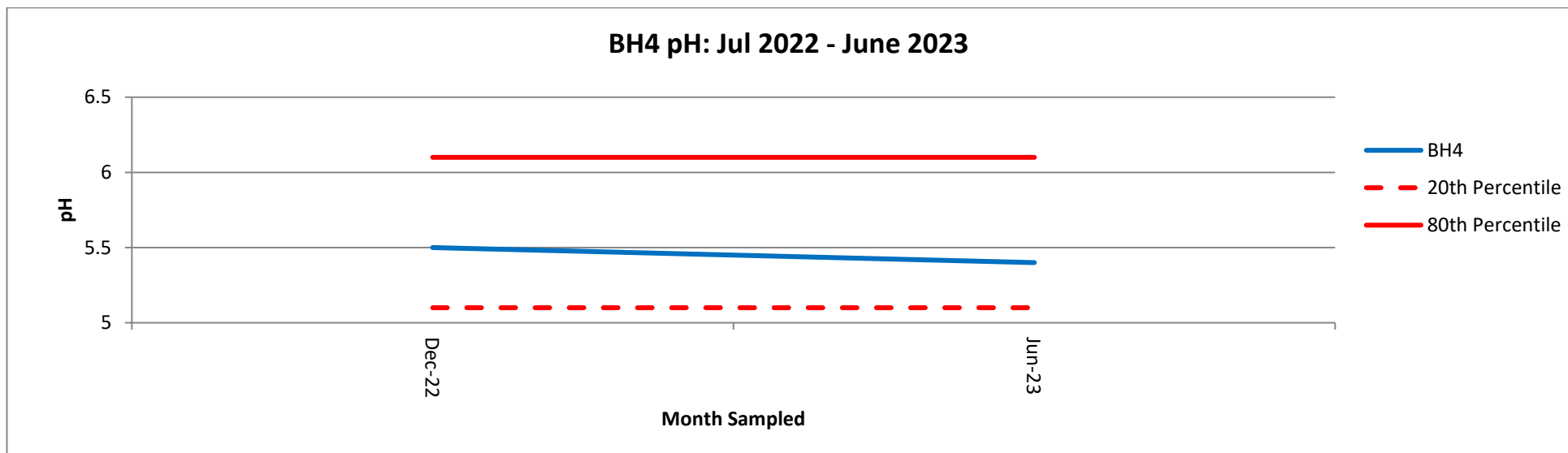


Chart 47: H14 pH Results July 2022 – June 2023.

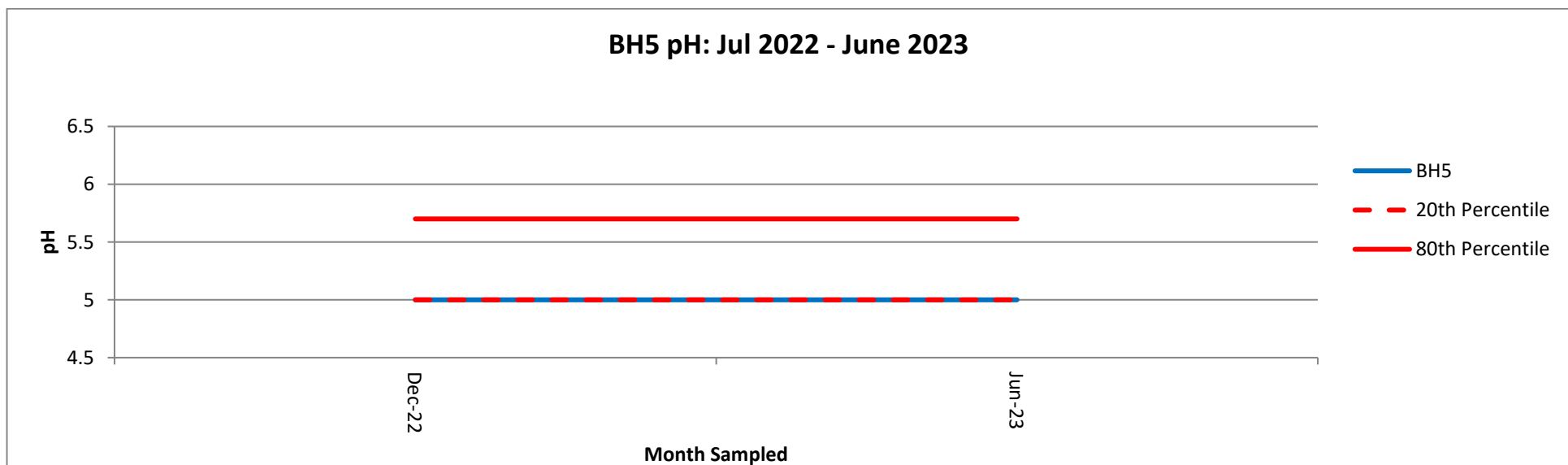


Chart 48: BH4 pH Results July 2022 – June 2023.

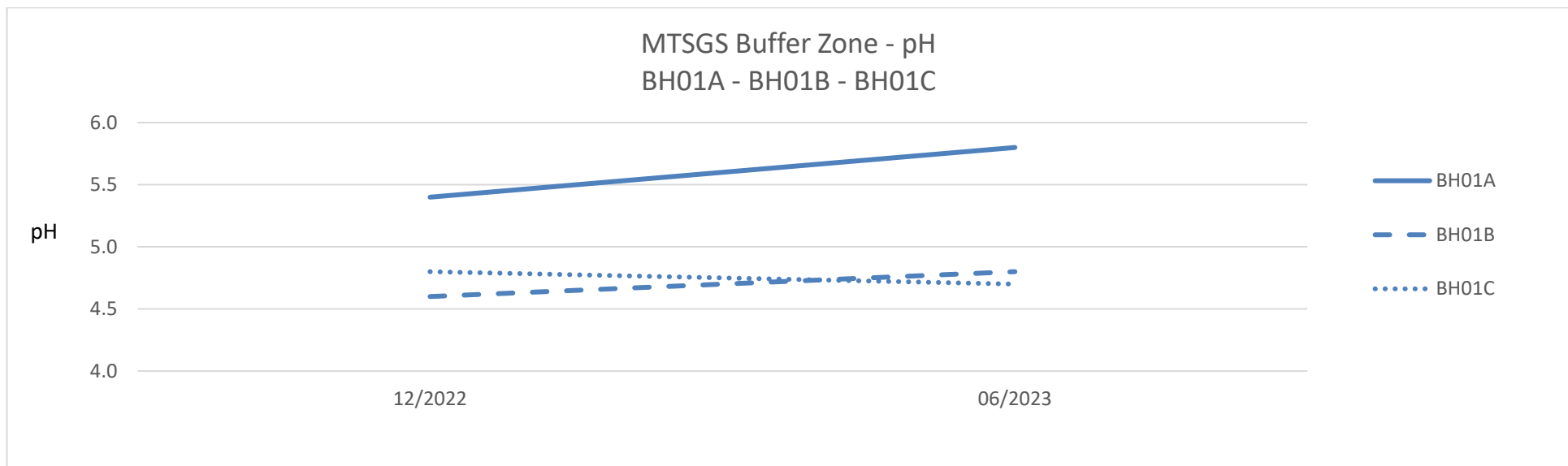


Chart 49: BH01A, BH01B and BH01C pH Results July 2022 – June 2023.

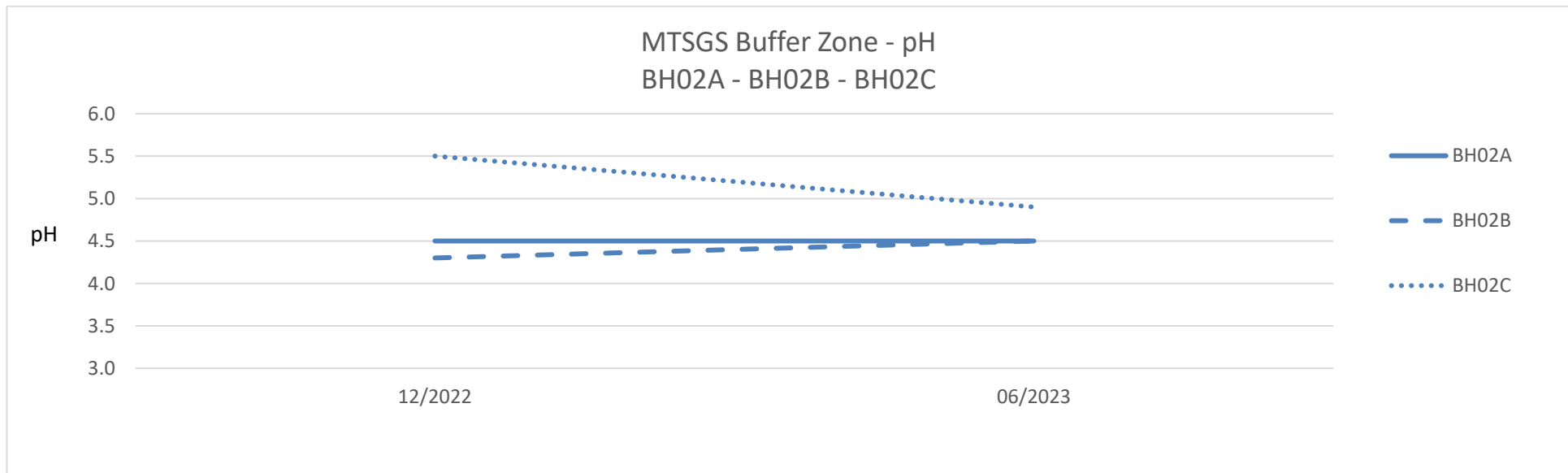


Chart 50: BH02A, BH02B and BH02C pH Results July 2022 – June 2023.

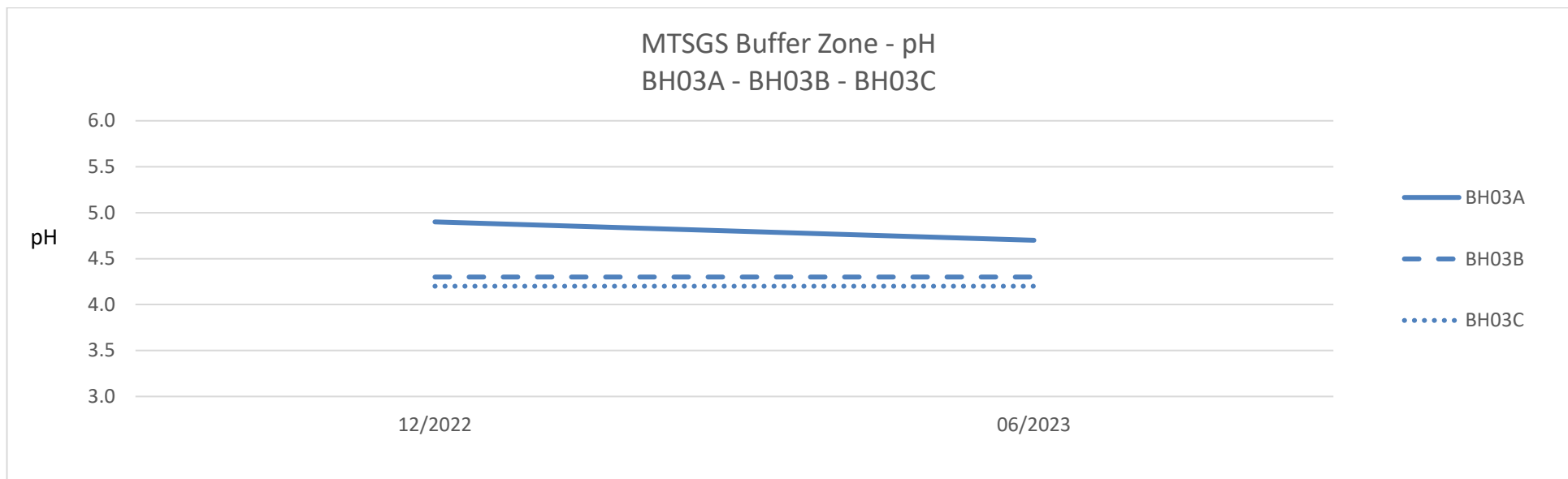


Chart 51: BH03A, BH03B and BH03C pH Results July 2022 – June 2023.

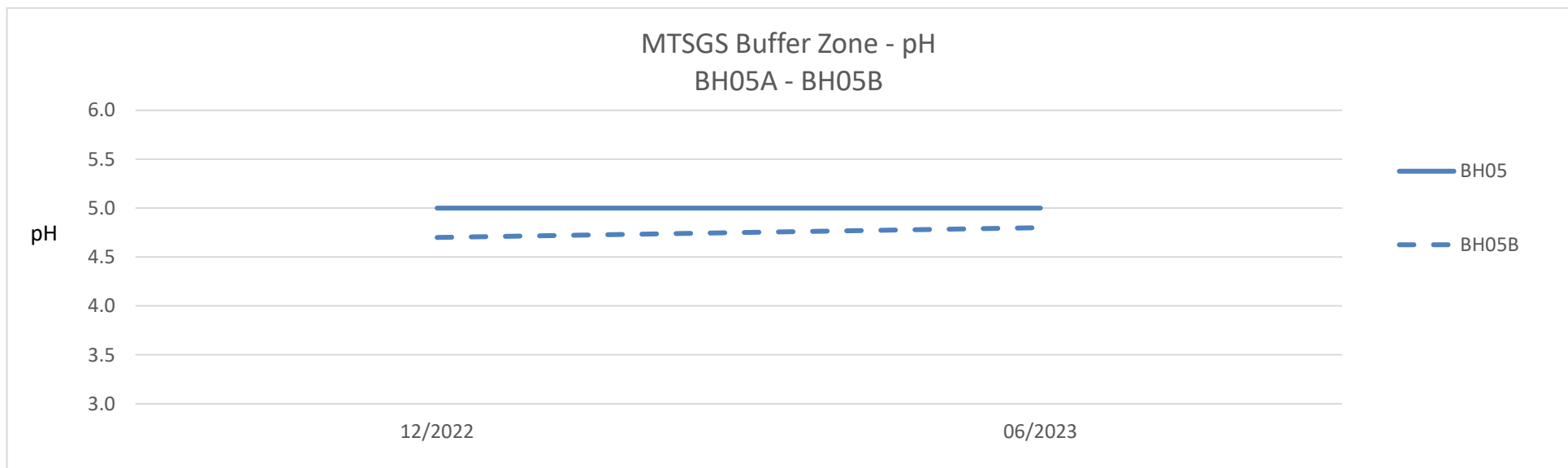


Chart 52: BH5 and BH05B pH Results July 2022 – June 2023.

Haerses Road Groundwater Quality - Electrical Conductivity Jul 2011 - Jun 2023

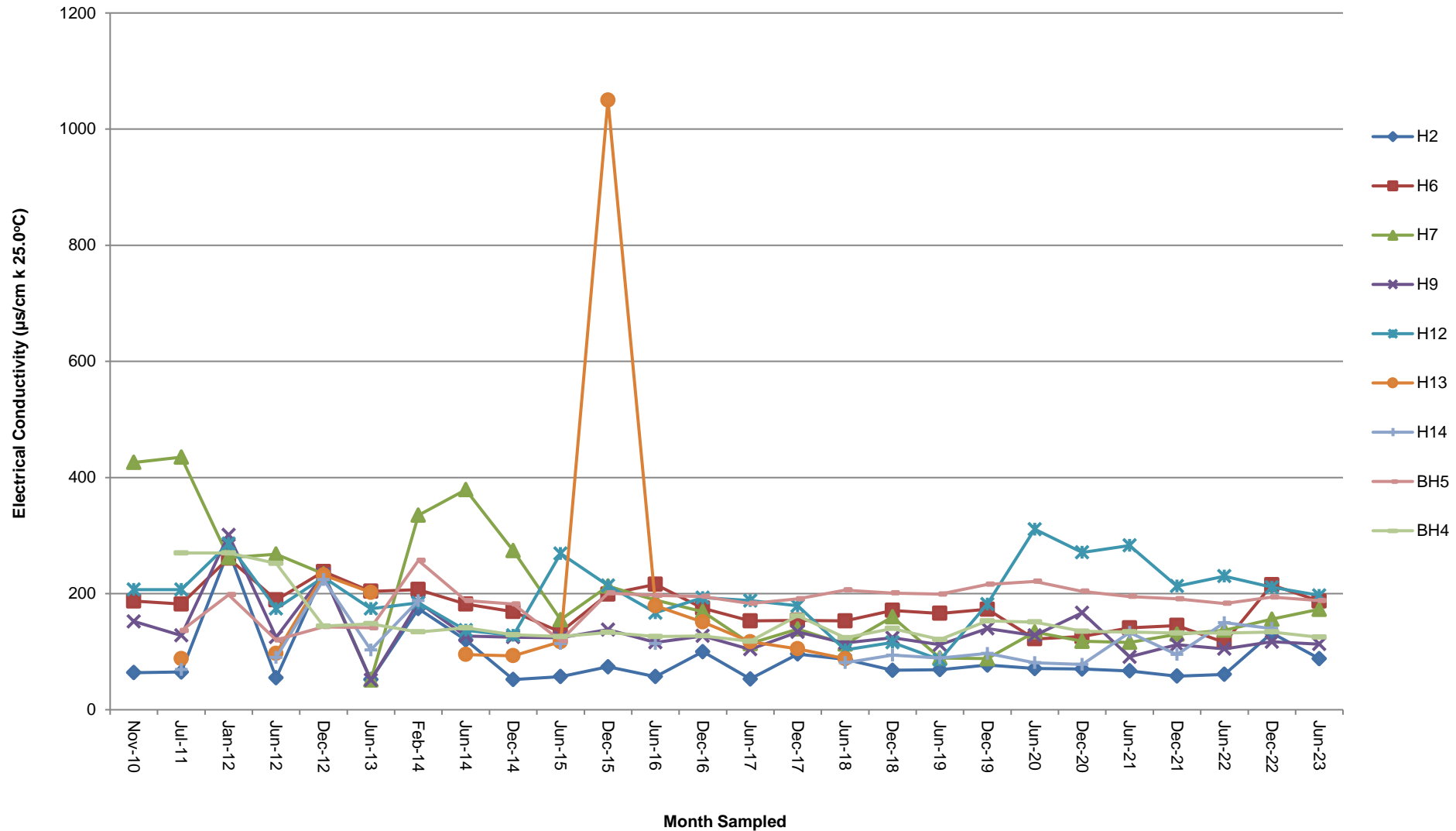


Chart 53: Haerses Road Long Term Electrical Conductivity – H series, BH4 and BH5

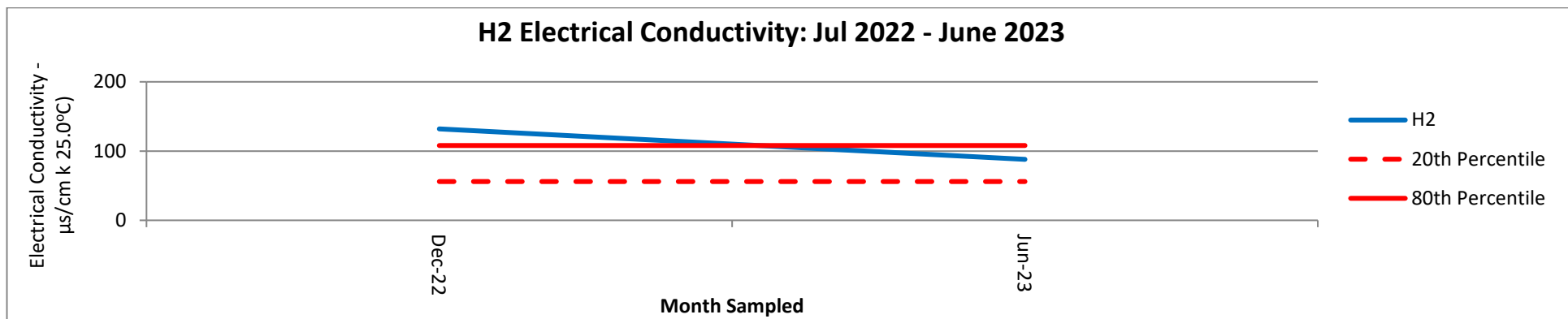


Chart 54: H2 Electrical Conductivity Results July 2022 – June 2023.

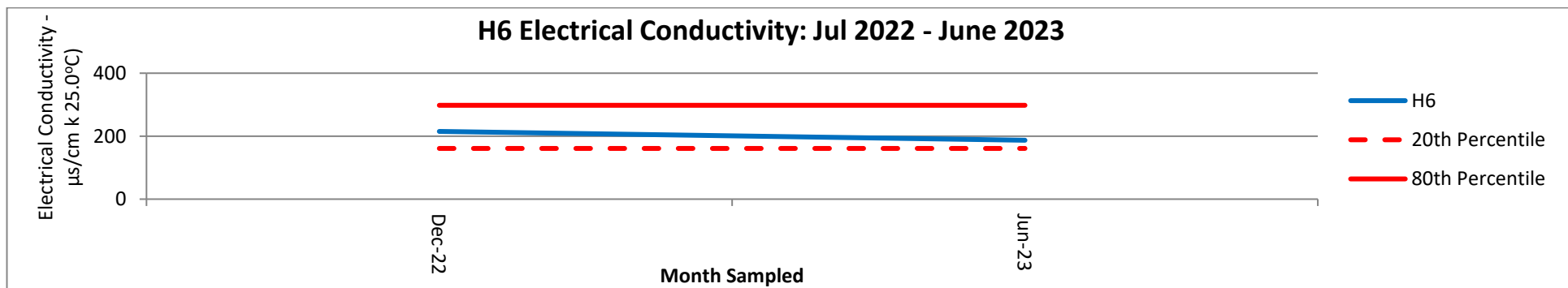


Chart 55: H6 Electrical Conductivity Results July 2022 – June 2023.

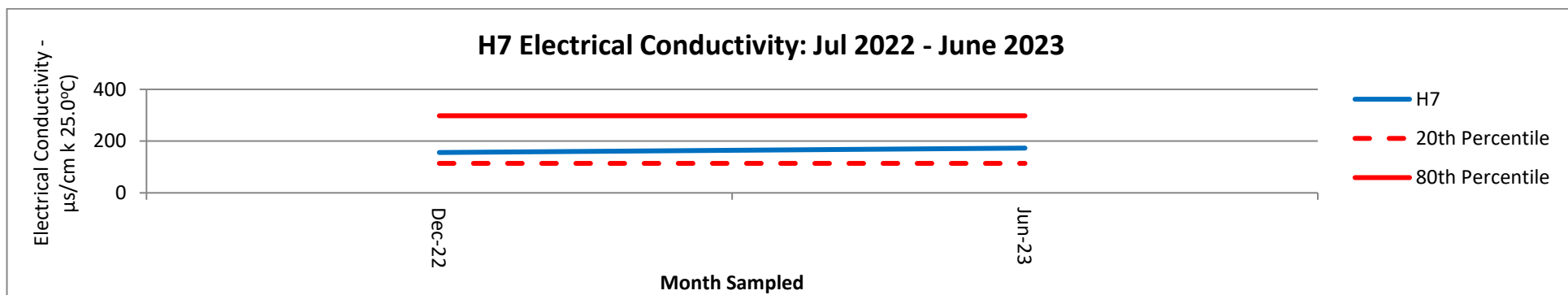


Chart 56: H7 Electrical Conductivity Results July 2022 – June 2023.

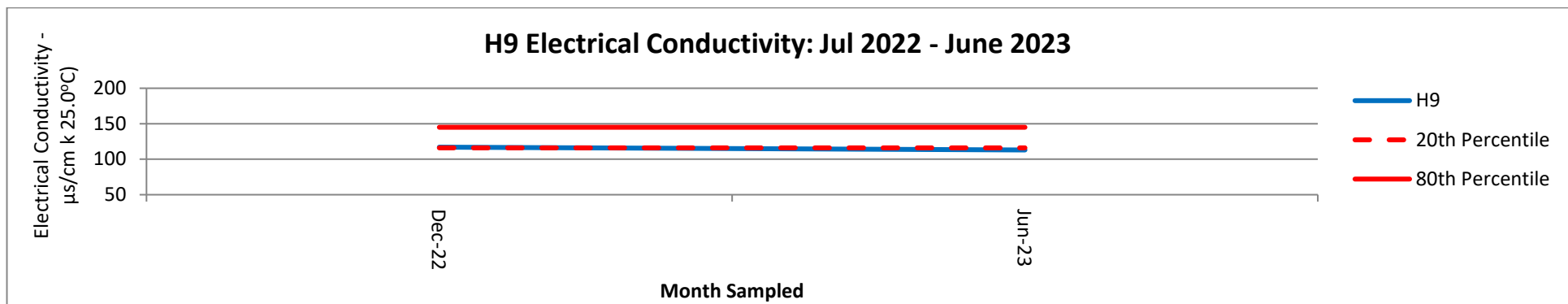


Chart 57: H9 Electrical Conductivity Results July 2022 – June 2023.

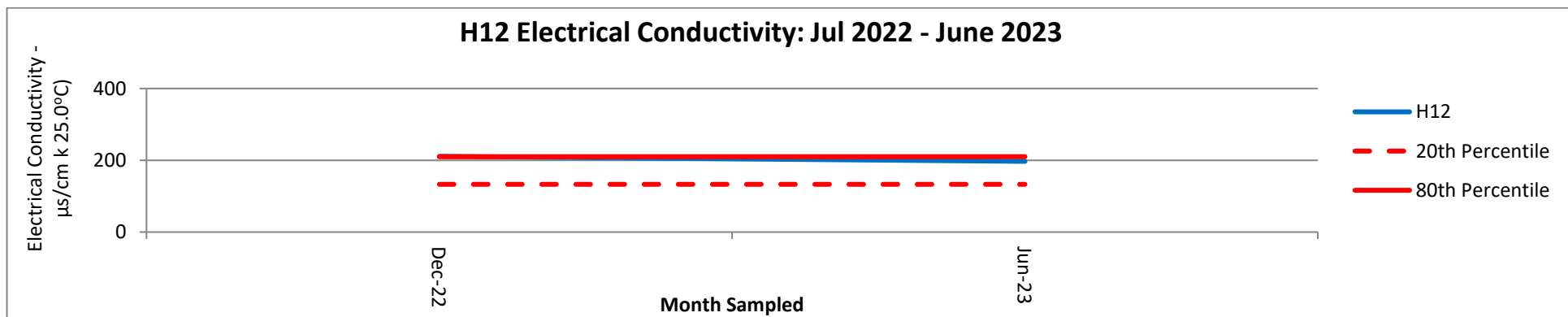


Chart 58: H12 Electrical Conductivity Results July 2022 – June 2023.

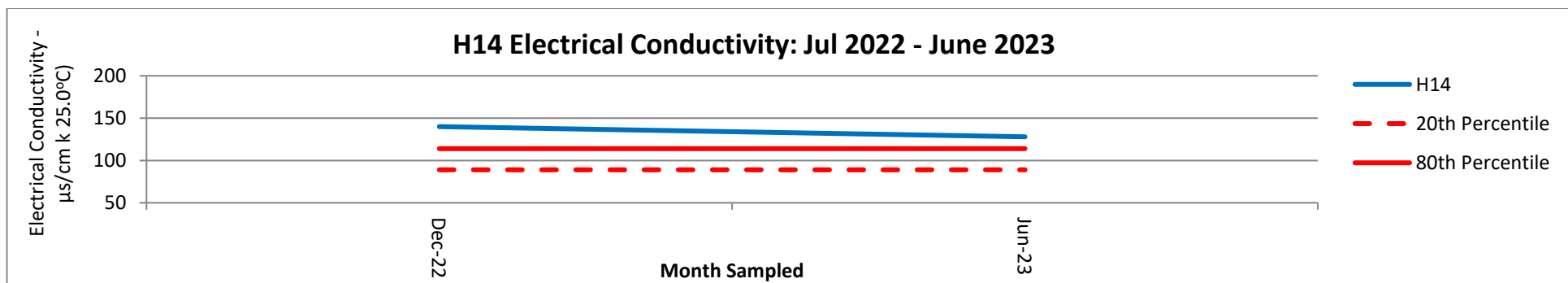


Chart 59: H14 Electrical Conductivity Results July 2022 – June 2023.

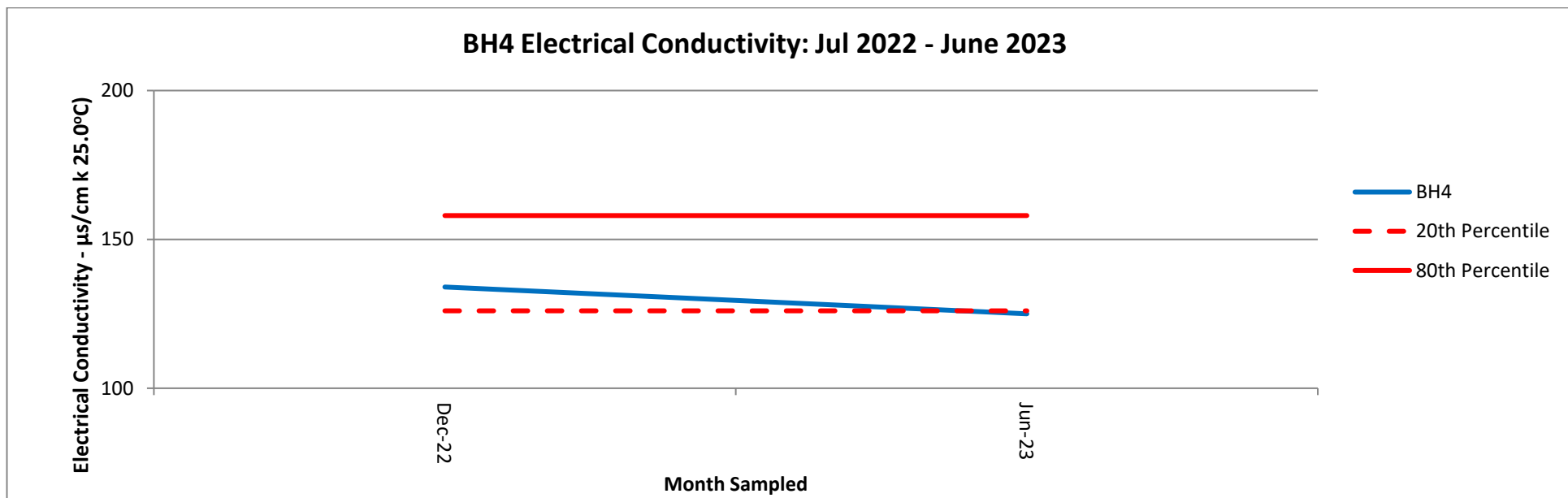


Chart 60: BH4 Electrical Conductivity Results July 2022 – June 2023.

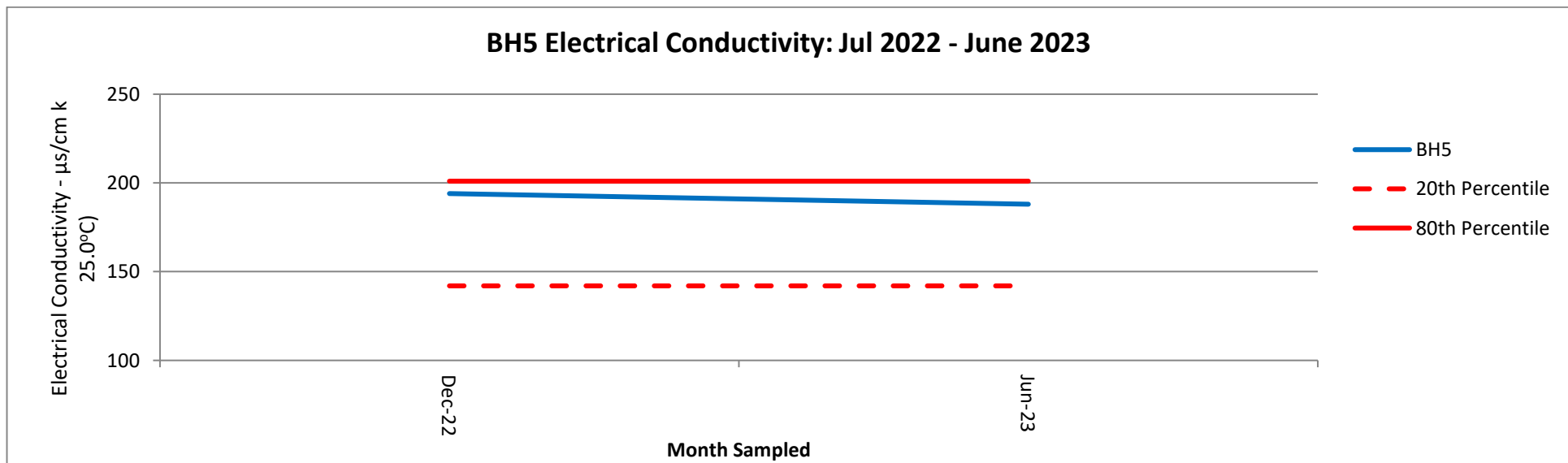


Chart 61: BH5 Electrical Conductivity Results July 2022 – June 2023.

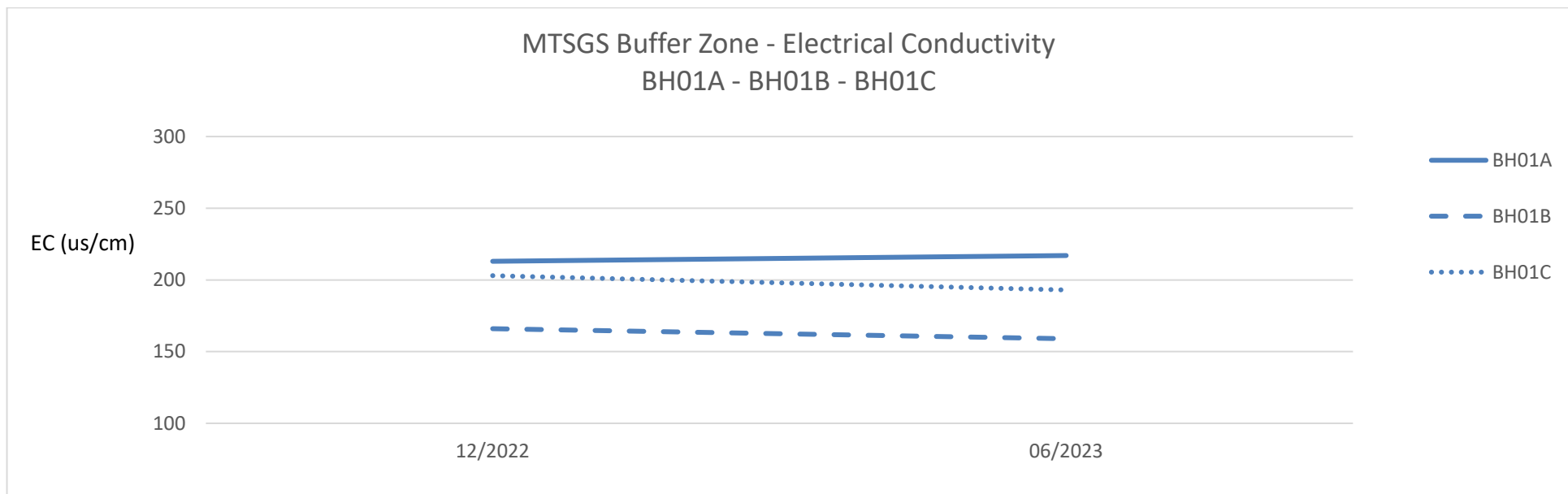


Chart 62: BH01A, BH01B and BH01C Electrical Conductivity Results July 2022 – June 2023.

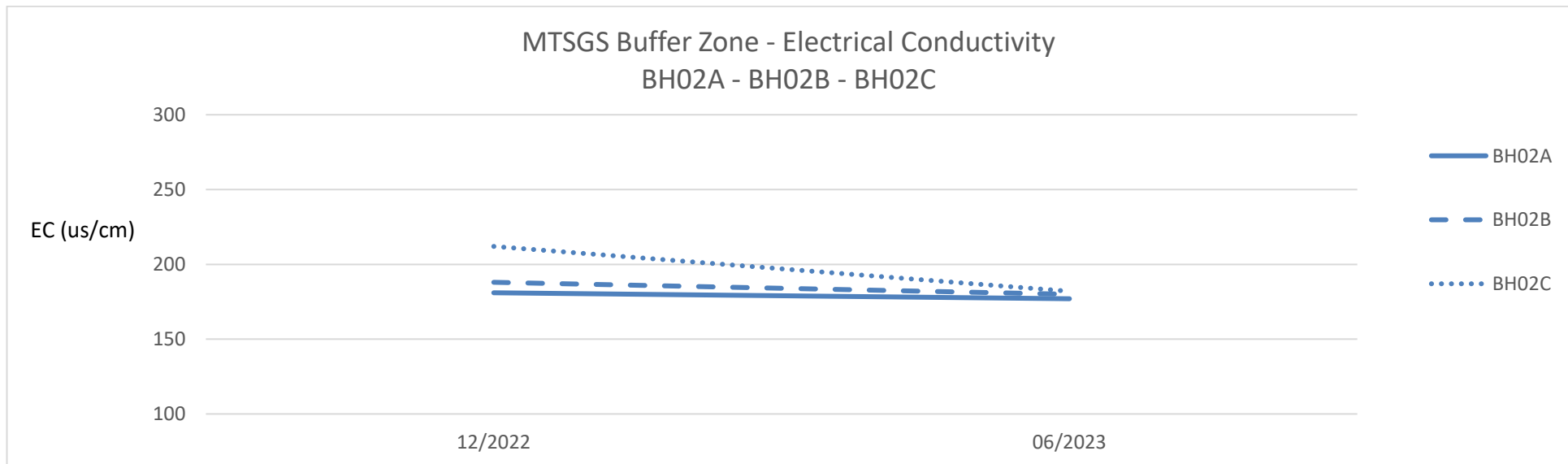


Chart 63: BH02A, BH02B and BH02C Electrical Conductivity Results July 2022 – June 2023.

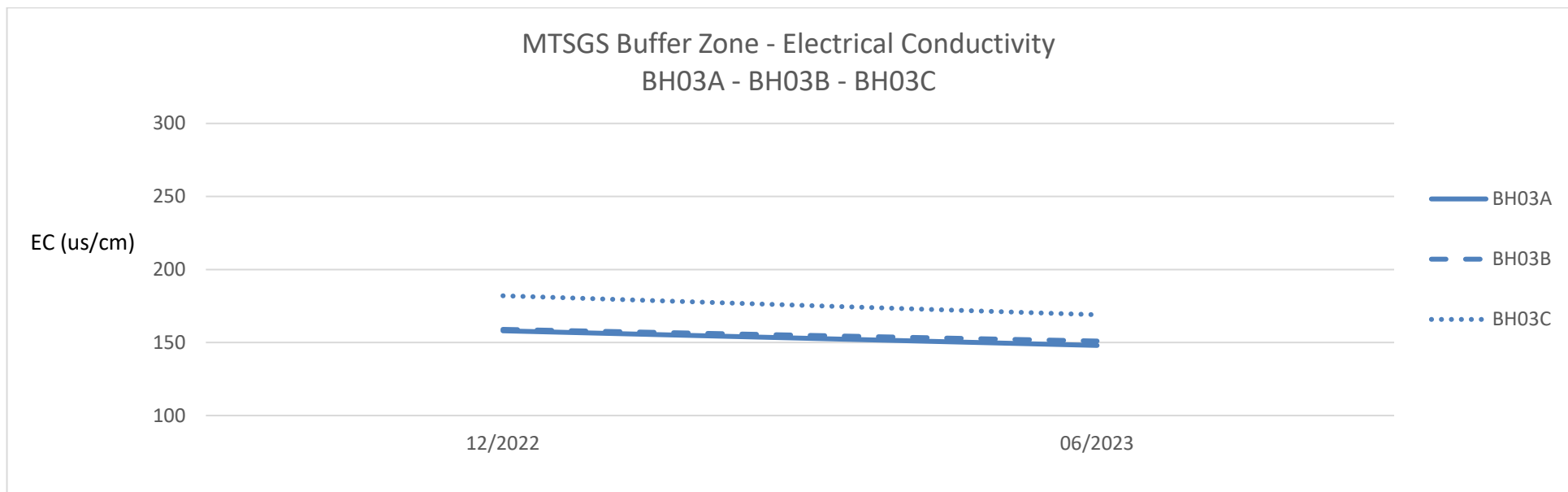


Chart 64: BH03A, BH03B and BH03C Electrical Conductivity Results July 2022 – June 2023.

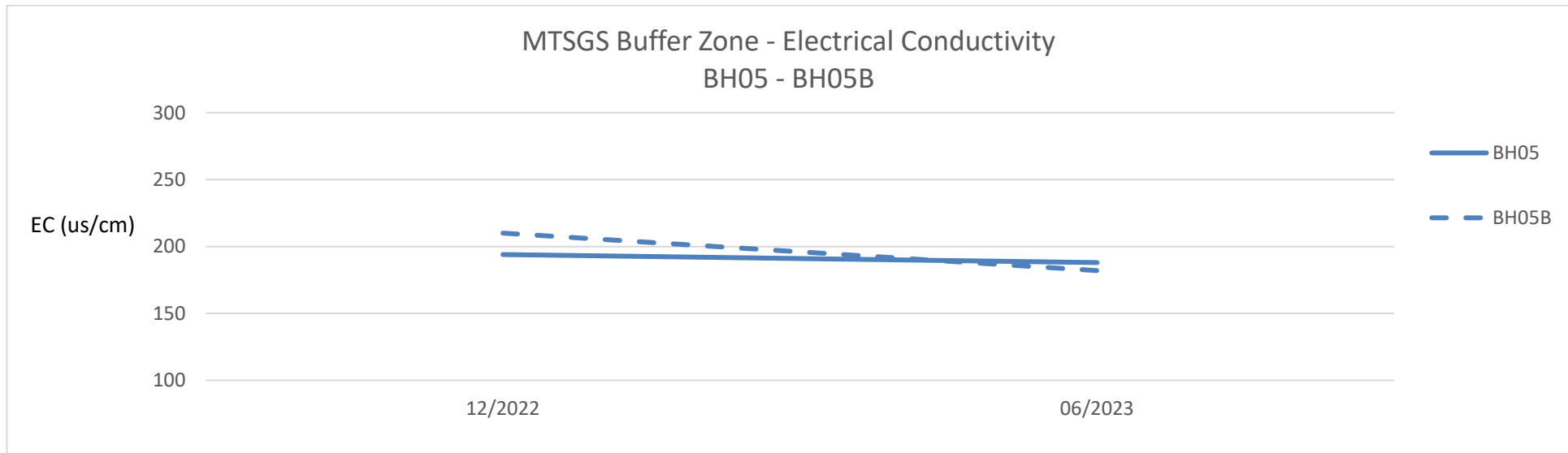


Chart 65: BH5 and BH05B Electrical Conductivity Results July 2022 – June 2023.

Table 24: SW1 and SW2 laboratory results

Sample Date	pH		Total Suspended Solids (mg/L)		Turbidity (NTU)	
	SW1	SW2	SW1	SW2	SW1	SW2
10/02/2020	6.70	5.88	12	14	82.1	25.3
10/08/2020	6.58	5.79	n/a	44	279	105
26/10/2020	6.33	5.84	5	16	107	54.4
05/01/2021	n/a	5.68	n/a	5	n/a	9
10/11/2021	n/a	5.06	n/a	84	n/a	160
26/11/2021	n/a	6.12	n/a	32	n/a	59.3
25/02/2022	5.49	5.06	90	13	475	27.1

Note: n/a denotes to parameter not being analysed due to invalid sample from insufficient water sample or lack of water for sampling.

6.4 Analyses

Groundwater Levels

During the 2022 - 2023 reporting period, groundwater levels for H-series boreholes indicated a strong relationship between water levels, existing ground moisture content and rainfall events. This is evident since the commencement of the groundwater monitoring program in 2005 shown on Chart 18. Fluctuations of water levels in the H-series boreholes directly correlate to the recharge from surface infiltration and percolation after rain events. This is clearly demonstrated in the months of July 2022 where a sharp rise in water levels were a result of aquifer recharge after significant rainfall events (refer to Charts 19 to 24 inclusive). In comparison, lower water levels were observed over the 2017 – 2018, 2018 – 2019 and 2019 - 2020 reporting periods due to extended drought conditions with less than average annual rainfall being evident.

Minor water level fluctuations have been recorded during this reporting period for Boreholes BH4 and BH5 which monitor the SBCGS however, there has been a relatively stable trend since the commission of these boreholes in 2011.

Twelve boreholes have been drilled and monitoring wells installed in the 100 metre MTSGS buffer zone. One additional monitoring well was installed next to the existing BH5. Groundwater monitoring of these thirteen bores have commenced since July 2018. The minor reduction in groundwater levels were due to monthly sampling of water using the low-flow pump out methodology for laboratory analysis (refer to Charts 25 to 33 inclusive, 36 to 39 inclusive). Condition 17 of Schedule 3 of DA 165-7-2005 requires that prior to commencing quarry operations within the MTSGS buffer zone, Dixon Sand is to complete a baseline groundwater monitoring program which includes monthly monitoring of groundwater levels and quality within the MTSGS buffer zone for a period of no less than 2 years. The 2-year baseline period was met at the end of July 2020. The assessment of the 2-year groundwater levels for the bores installed in the 100 metre MTSGS buffer zone is discussed further in Section 6.8.

Groundwater Quality

pH and electrical conductivity (EC) results for H-series, BH4 and BH5 have remained relatively stable from 2010 to the current reporting period, showing minimal fluctuations with occasional occurrences of anomalies due to human-induced environmental change such as application of fertiliser (from cropping) directly adjacent to the monitoring bore (refer to Charts 40 and 52). Elevated pH and EC results in H13 during 2015 were a result of influence from direct application of fertiliser in the immediate area surrounding the monitoring well. Water quality parameters obtained from H13 during this reporting period have returned to levels similar those previously recorded. Borehole H13 have since been decommissioned due to its location being the designated area for the processing plant and material stockpiles on Lot 216. Borehole H14 was unblocked in May 2018 and groundwater depth and quality sampling have resumed.

The assessment of the 2-year groundwater quality for the bores installed in the 100 metre MTSGS buffer zone will be further discussed in Section 6.8.

Surface Water

Due to these nominated monitoring points being ephemeral tributaries, water samples were only able to be collected when there has been sufficient rainfall to generate flows in the tributaries and when it is safe to undertake sampling. Despite some wet weather during this monitoring period, surface water sampling at SW1 and SW2 was not always possible due to heavy rainfall affecting safe site access or insufficient flow for sampling. Table 24 presents the pH, total suspended solids and turbidity of water samples obtained from SW1 and SW2 since the commencement of surface water monitoring. Additional data is still required to enable baseline surface water quality to be established.

Surface water monitoring for quarry related basins commenced during this reporting period. However, additional data is still required in order to allow for interpretation and trend identification. Reporting for basin surface water quality results and will be included in the next Annual Review.

6.5 Review of Maximum Extraction Depth Map

A review of the Maximum Extraction Depth Map (MEDM) was undertaken by WSP Golder within 3 months of the Independent Environmental Audit in accordance with Condition 22(b) of Schedule 2 of DA 165-7-2005 and was submitted on 15 April 2023. The revised MEDM (April 2023) is pending DPE's review and approval.

Condition 22(a) of Schedule 2 of DA 165-7-2005 requires Dixon Sand to review and update the MEDM annually, for the duration of the baseline groundwater monitoring program within the MTSGS buffer zone which commenced in July 2018. Additional review of the MEDM was undertaken on 29 June 2023 by Dixon Sand as part of the Annual Review. As the revised MEDM (April 2023) is still pending DPE's review and approval, no further changes are considered necessary.

The next review of the MEDM will be undertaken within 3 months of the IEA which is scheduled for late 2025.

6.6 Water Access License Usage

The Annual Returns for Water Access Licences (WALs) 25941 and 25956 for the 2022 - 2023 reporting period were submitted to WaterNSW in July 2023. The total water usage for each WAL is listed in Table 25 below.

Table 25: Water usage for Water Access Licences during the Financial Year 2022 - 2023.

Water Access License Number	Annual Water Usage (Megalitres)
WAL 25941	0
WAL 25956	6.9

6.7 Water Balance Monitoring

The following water balance related monitoring in Table 26 applied to the quarry during the monitoring period.

Table 26: Quarry Water Balance monitoring in accordance with Soil and Water Management Plan.

Monitoring Item	Response
Water inventories on site will be monitored by continuous level monitoring instrumentation	Groundwater levels are monitored using continuous data loggers.
The number of Water Cart fills per month	Water Cart records kept
Monthly water transfer volumes between water storages (based on rated pump capacity and run time)	No water transfers between water storages during this reporting period.
Monthly clean water import volumes;	No clean water imports for quarry operations during this reporting period. A total of 6.9 megalitres of water was utilised in accordance with the WALs by onsite farmers for crop irrigation purposes.
Monthly processing plant water consumption (if constructed) (either metered or based on rated pump capacity and run time).	Wet processing plant not yet commissioned at the quarry.
Surface water related complaints	No surface water related complaints received during this reporting period.
Assessment of the overall effectiveness of the Water Management System	Overall, the Water Management System at Haerses Road quarry has shown to be effective during this reporting period.

Future water balance monitoring data will be entered into a tracking spreadsheet to allow Dixon Sand to assess the adequacy of water inventories for ongoing production.

6.8 Groundwater Monitoring Program for Bores located in the 100m MTSGS Buffer

Condition 17 of Schedule 3 of DA 165-7-2005 requires Dixon Sand to complete a baseline groundwater monitoring program which includes monthly monitoring of groundwater levels and quality within the Maroota Tertiary Sands Groundwater Source (MTSGS) buffer zone for a period no less than 2 years prior to commencing quarrying operations within the MTSGS buffer zone. This is to be undertaken in consultation with DPE Water and to the satisfaction of the Secretary.

Dixon Sand has completed the abovementioned groundwater monitoring program in July 2020 and engaged Mr Peter Dundon from Dundon Consulting Pty Ltd to carry out a review and presentation of baseline groundwater levels and quality data. Consultation with DPE Water was undertaken through a series of meetings during the consultation process for DA 165-7-2005 Modification 1 which resulted in the required scope of works outlined in Conditions 16 and 17.

The review by Mr Dundon concluded that there is a clear distinction between the Maroota Sands groundwater and perched groundwater within the Hawkesbury Sandstone. It was therefore unlikely that any excavation of Hawkesbury Sandstone within the buffer zone around the Maroota Sands approved area will cause any disturbance to the groundwater remaining in the Maroota Sands after sand extraction had been completed down to the approved depth. There was no evidence to suggest that extraction could not safely proceed within the temporary 100m buffer zone along the eastern margin of the Hawkesbury Sandstone resource.

Dixon Sand submitted the abovementioned report containing the reviewed baseline data of monitoring bores within the MTSGS buffer zone to DPE Water on 4 September 2020. Multiple correspondences were exchanged between Dixon Sand and NRAR regarding the on-going actions and requirement for the baseline monitoring program. On 24 May 2021 Dixon Sand received the following recommendations from NRAR:

- Download and review datalogger from all bores included in the monitoring program at a minimum of monthly frequency, and
- Periodic (6 monthly) review of the data to identify potential changes and submission of the groundwater monitoring data (excel) to NRAR no later than one month following the end of each reporting period.

Dixon Sand received the DPE's endorsement on 11 June 2021 acknowledging that the Baseline Groundwater Monitoring Program meets the relevant conditions of consent and that the pre-extraction requirements relating to the MTSGS buffer zone and Buffer Groundwater Monitoring Program have been met and extraction can therefore occur (subject to other relevant consent conditions being met).

After the recent review of the 6-monthly groundwater data for the 100m buffer to the MTSGS, Dixon Sand received a recommendation from DPE-Water to replace the decommissioned monitoring boreholes BH06A, BH06B and BH06C with a new monitoring borehole. Dixon Sand engaged WSP Golder to undertake an assessment of the most

appropriate location and design specification for the new bore. It was proposed that the new monitoring bore be installed in the south-western corner of Extraction Cell 1A in the Modification 1 extraction area. This proposal was excepted by DPE-Water on 24 May 2023. Information and monitoring data for this new bore BH07 will be included in the next Annual Review.

6.9 Chages to Environmental Procedures

Current groundwater management measures are considered adequate.

Monitoring of the extraction limit will continue in order to ensure compliance. The Maximum Extraction Depth Map will require review following the next Independent Environmental Audit scheduled in 2025.

Review and submission of buffer zone groundwater monitoring data to be undertaken as per NRAR's recommendation.

Water sampling and laboratory analysis of surface water at SW1 and SW2 to continue when there is sufficient flow after rain events and safe access.

7. Ecological Monitoring and Rehabilitation

7.1 Vegetation Clearing

Vegetation clearing was undertaken in Extraction Stage 3, Cell 3B (Modification 1 extraction area) and along the 30m buffer to Wisemans Ferry Road during this reporting period.

All vegetation clearing were undertaken in accordance with the pre-clearing survey and multi-stage habitat tree clearing protocols. Appropriate briefing and induction were provided to the relevant staff prior to undertaking vegetation clearing.

7.2 Bush Regeneration and Weed Management

Rehabilitation and weed management at Haerses Road quarry were undertaken on a monthly basis by a bush regeneration contractor, Bush-It Pty Ltd.

Approximately 243 hours were spent on bush regeneration works at Haerses Road Quarry, equating to approximately 47% of the time spent between Old Northern Road Quarry and Haerses Road Quarry.

Bush regeneration and weed management were carried at the following locations:

- Western perimeter edge of Haerses Road Biobanking Site under the BCT agreement,
- Original Translocation and Planting area located east of Stage 2 west (Lot 177 DP 752039) and
- 30m vegetation buffer from Wisemans Ferry Road.

No bush regeneration work has been carried out at the Porters Road Biobank Site under the BCT agreement due to the current passive management status.

Bush regeneration works involved mechanical and chemical methodologies.

Figures 6 and 7 illustrate the areas where bush regeneration works have been completed during this reporting period.

The Annual Rehabilitation Report provided by the contractor for the 2022 - 2023 reporting period is attached as Appendix G.

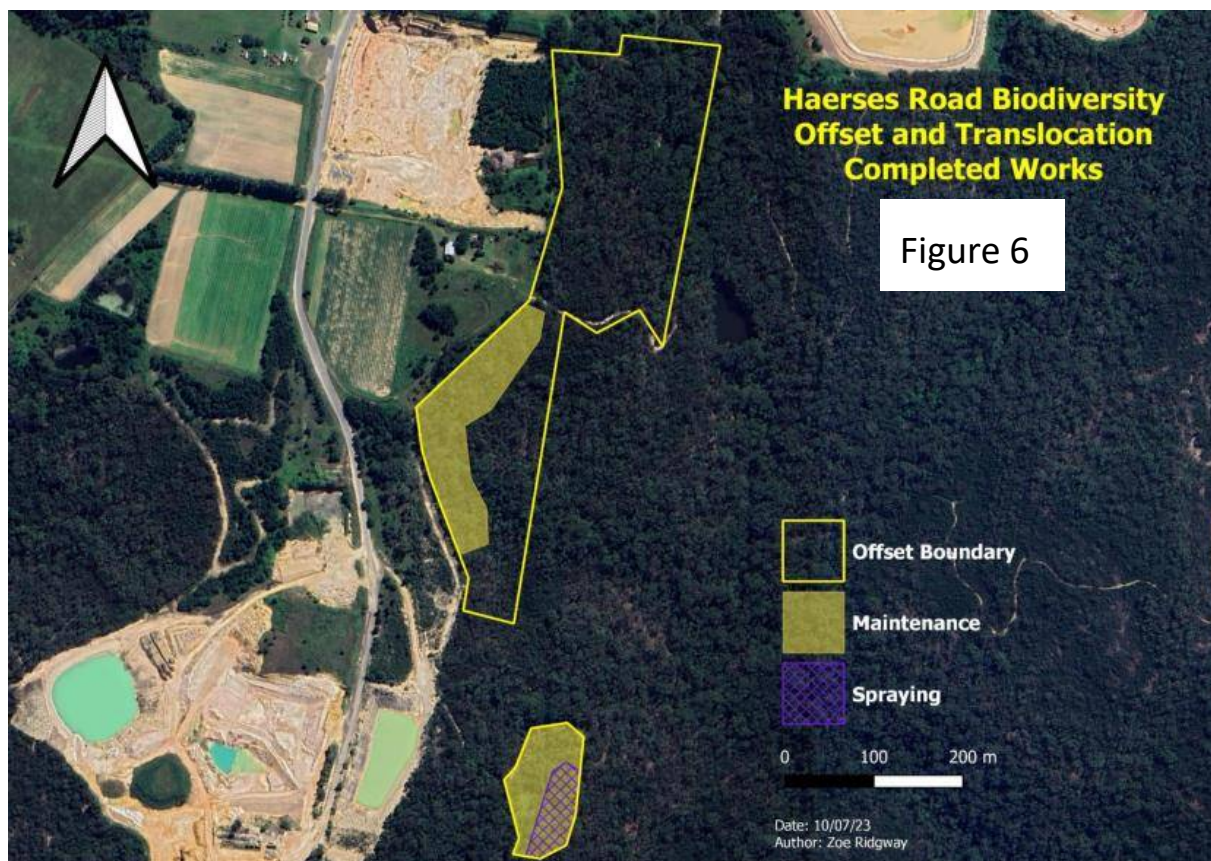


Figure 6: Bush regeneration and weed management works within the Biodiversity Offset and Translocation Site (source: BushIT 2023).

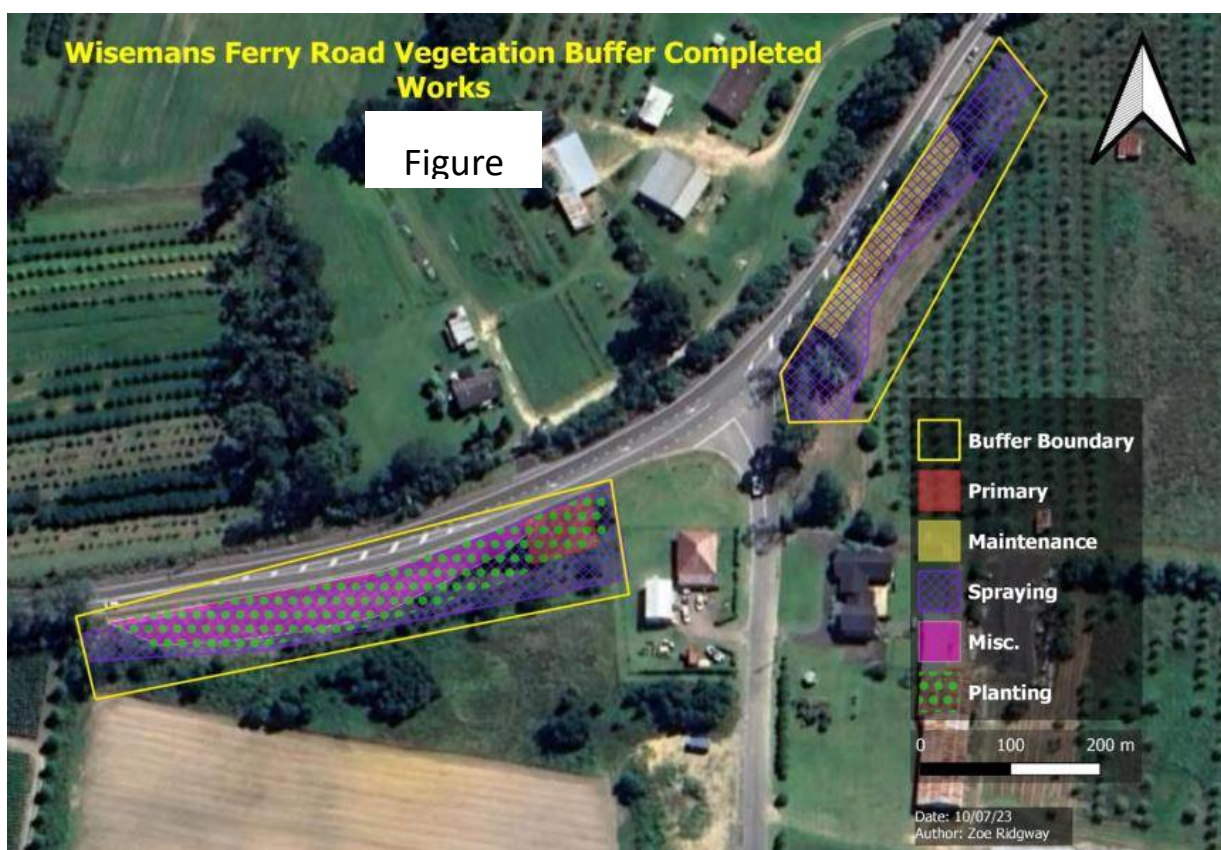


Figure 7: Bush regeneration and weed management works within the 30m buffer to Wisemans Ferry Road (source: BushIT 2023).

7.2.1 Translocation Site and Original Offset

Maintenance works at the areas shown in Figure 6 focused on controlling infestations of whiskey grass, African love grass and couch. The growth of *Kunzea ambigua* and other canopy trees were managed in order to assist regeneration at groundcover stratum.

7.2.2 Haerses Road and Porters Road Biobank Sites (BSA Agreement)

Haerses Road and Porters Road Biobank Sites are currently undergoing 'passive' management. However, as the western perimeter of Haerses Road biobank site borders exotic grassland containing several different invasive perennial grass and exotic annual species, weed management have occurred in the area highlighted in Figure 6.

No bush regeneration work was carried out at Porters Road biobank site.

More information on the BSA sites is provided in Section 7.4.

7.2.3 Wisemans Ferry Road 30 Metre Buffer

The Haerses Road and Wisemans Ferry Road intersection upgrade works have severely impacted access for maintenance of this area during the previous 2 reporting periods. Assisted revegetation and rework to this area was undertaken during this reporting period.

At the western buffer area, screening and treatment of Weeds of National Significance (WoNS) species was undertaken. The area was then stripped back with the aid of quarry machinery, weed species removed and the area capped with crushed sandstone. Planting of approximately 240 native trees, shrubs and ground cover species was undertaken in this area, followed by routine weed monitoring and treatment of exotic grasses such as Kikuyu and couch, and blackberry.

At the eastern buffer area, treatment of blackberry, asparagus fern, bridal creeper, moth vine, turkey rhubarb and wild tobacco was undertaken. Supplementary planting may be required pending ongoing monitoring.

7.3 Ecological Monitoring

Dixon Sand engaged South East Environmental to undertake the annual biodiversity and rehabilitation monitoring and reporting for Haerses Road Quarry. Progress assessment were made against the commitments in the Haerses Road Quarry Biodiversity and Rehabilitation Management Plan (BRMP).

The Biodiversity and Rehabilitation Management Report (South East Environmental, 2023) aimed to:

- Identify native flora and fauna species, populations and ecological communities known to or likely to occur within the Haerses Road site,
- describe the native vegetation and habitats within the Haerses Road site,
- describe the current condition of the threatened flora and its habitat found within the Haerses Road site,
- determine the legislative and conservation significance of species, populations and ecological communities known or likely to occur within the Haerses Road site 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 Haerses Road Quarry Biodiversity and Rehabilitation Management Plan v5 (2020), and
- provide an independent monitoring report for inclusion as part of the external reporting for the quarry Annual Review.

Figure 8 shows the buffer zones at Haerses Road Quarry.

Figure 9 shows the location of Haerses Road quarry, in relation to the biobank sites.

Figure 10 displays the areas delegated as the Haerses Road Biobank site (BSA 414).

Figure 11 displays the areas delegated as the Porters Road Biobank site (BSA 415).

Annual vegetation survey and baseline monitoring were undertaken for this reporting period.

Rehabilitation work at Haerses Road quarry is in the early stages and will increase with both intensity and measurable criteria within the next reporting period.

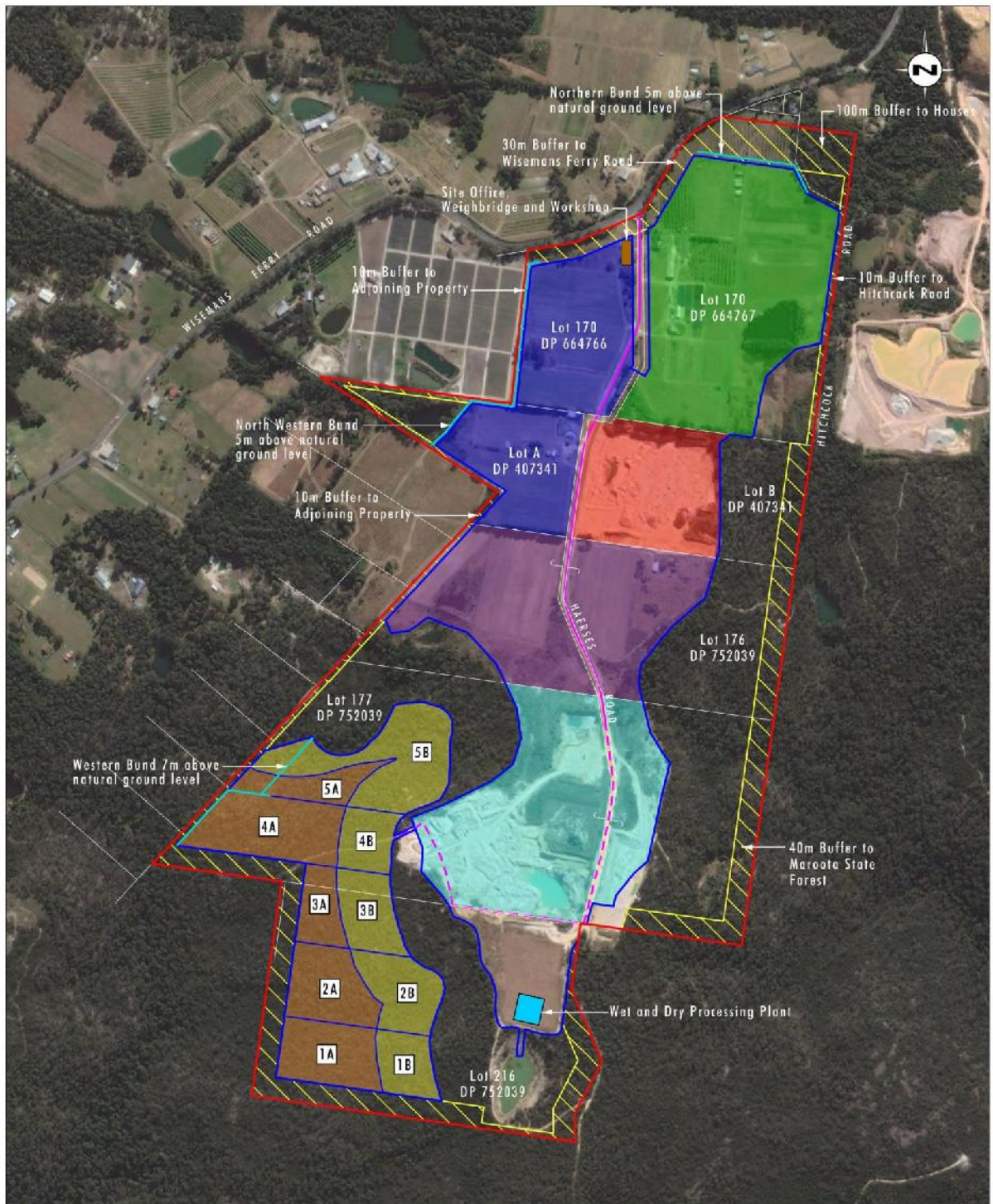


Image Source: Google Earth (Sep 2017)
Data Source: Mc Kinlay Morgan & Associates Pty Ltd (2014)

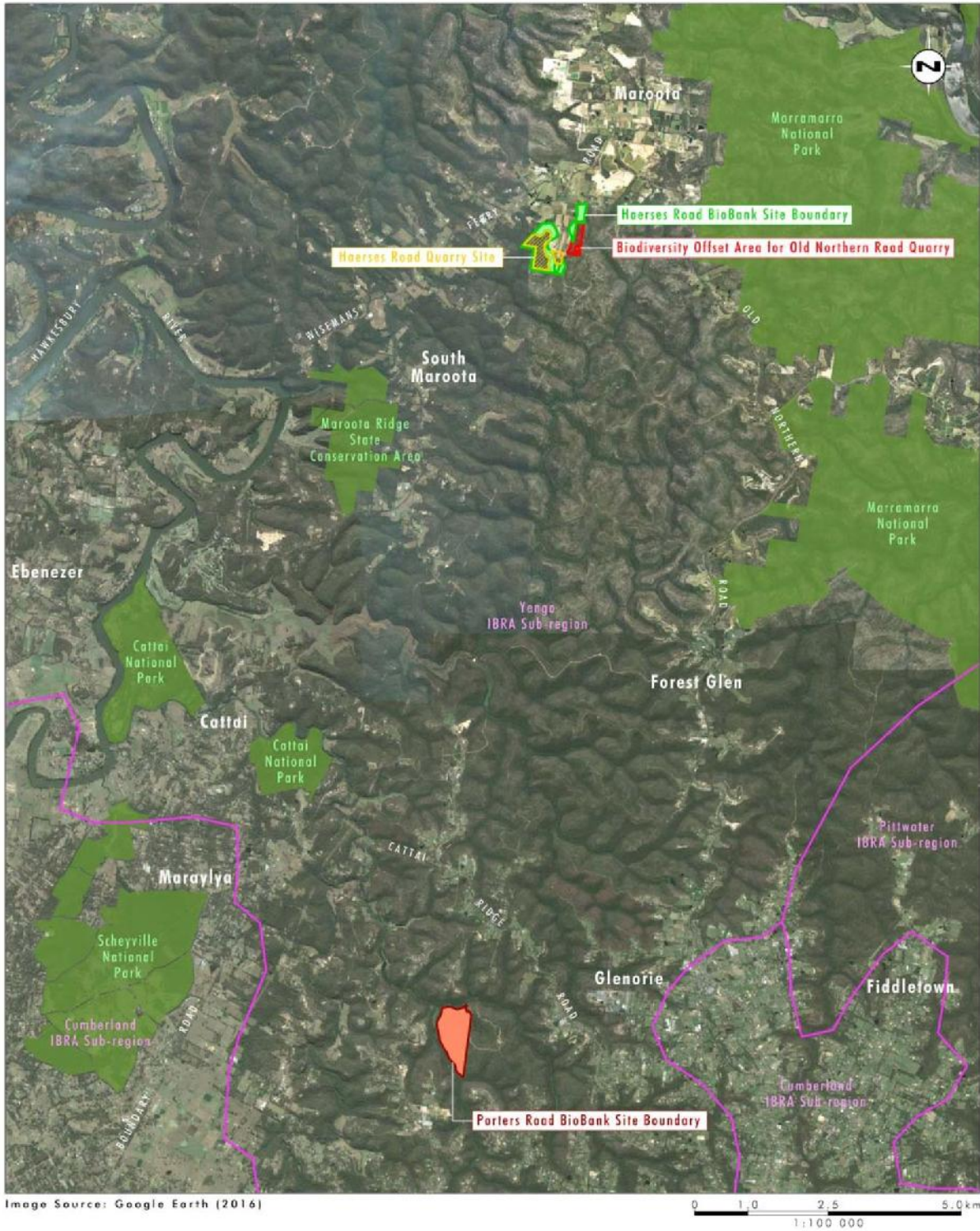
0 100 250 500m
1:10 000

Legend

- | | | |
|--|--|---|
| Haerses Road Quarry Site | Extraction Area Stage 5 | Indicative Unsealed Hc |
| Approved Extraction Area | Extraction Area A | Sealed Haul Road |
| Extraction Area Stage 1 | Extraction Area B | Acoustic Bund |
| Extraction Area Stage 2 | 1 Extraction Cell Number | Buffer Zone |
| Extraction Area Stage 3 | Site Office, Weighbridge and Workshop | |
| Extraction Area Stage 4 | Wet Processing Plant | |

File Name [A4]: R06/4272_042.dgn
20180608 10:10

Figure 8
Buffer Zones,
Haerses Road Quarry



Legend

- Haerses Road Quarry Site
- Biodiversity Offset Area for Old Northern Road Quarry
- Haerses Road BioBank Site Boundary
- Porters Road BioBank Site Boundary
- National Park and Conservation Area
- IBRA Sub-region

File Name (A4): R06/4272_005.dgn
20180525 10:58

Figure 9
Haerses Road and Porters Road
BioBank Sites and HR BOA

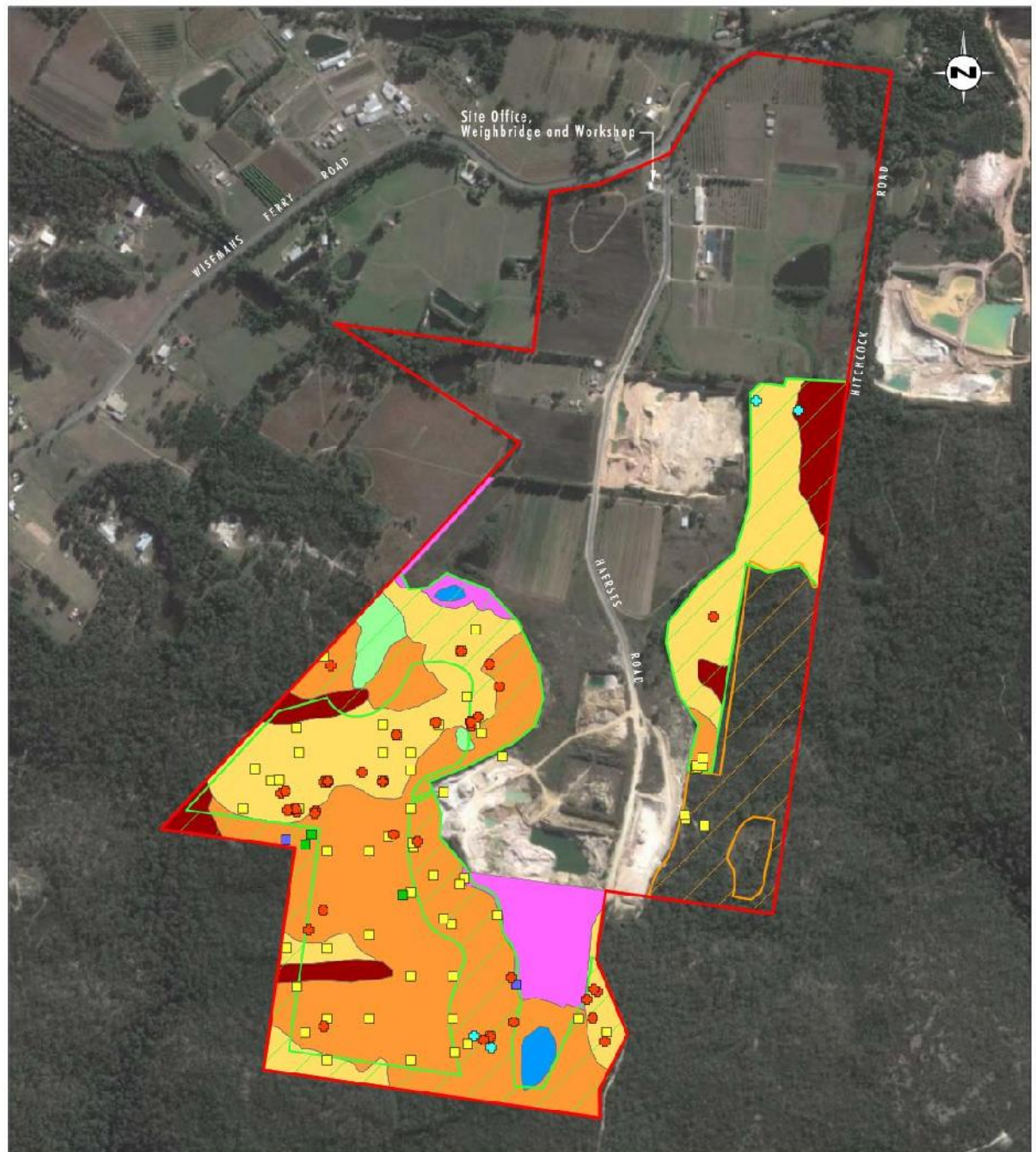


Image Source: Google Earth - DigitalGlobe (May 2016)
Data Source: Mc Kinlay Morgan & Associates Pty Ltd (2014)

0 100 250 500m
1:10 000

Legend

- Haerses Road Quarry Site
- Biodiversity Offset Area for Old Northern Road Quarry
- Haerses Road BioBank Site Boundary
- Cleared
- Dam
- Zone 1: PCT 978 - HN560 - Needlebrush - Banksia Wet Heath on Sandstone Plateaux of the Sydney Basin Bioregion - Moderate to Good Condition
- Zone 2: PCT 1083 - HN566 - Red Bloodwood - Scribbly Gum Heathy Woodland on Sandstone Plateaux of the Sydney Basin Bioregion - Moderate to Good Condition
- Zone 3: PCT 1134 - HN582 - Scribbly Gum - Hairpin Banksia - Dwarf Apple Heathy Woodland on Hinterland Sandstone Plateaux of the Central Coast, Sydney Basin Bioregion - Moderate to Good Condition
- Zone 4: PCT 1181 - HN586 - Smooth barked Apple - Red Bloodwood - Sydney Peppermint Heathy Open Forest on Slopes of Dry Sandstone Gullies of Western and Southern Sydney, Sydney Basin Bioregion - Moderate to Good Condition
- + Dural Land Snail
- Eastern pygmy possum
- *Darwinia biflora*
- *Cratichneumon subsp. supplicans*
- *Tetratheca glandulosa*

File Name (A4): R06/4272_010.dgn
20160525 11:00

Figure 10
Haerses Road BioBank Site
and HRBOA

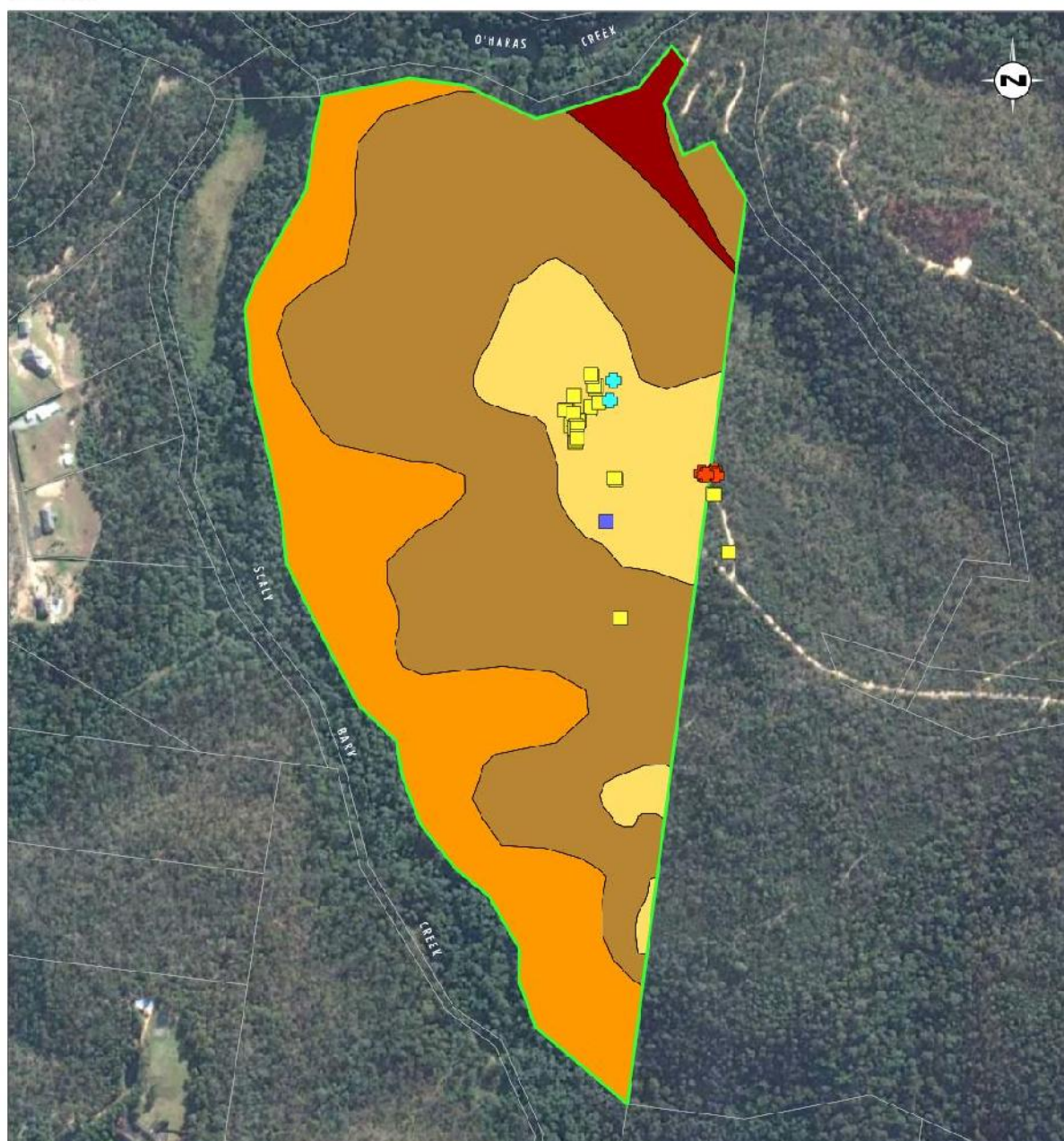


Image Source: Google Earth (2015)

Data Source: LPI (2011), Umwelt (2017), South East Environmental (2016, 2017)

Note: Site within Baulkham Hills Local Government Area and Yengo IBRA Subregion Boundary

0 100 200 400m
1:7,500

Legend

Porters Road BioBank Site Boundary

Zone 1: FCT 1083 - HN566 - Red Bloodwood - scribbly gum heathy woodland on sandstone plateaux of the Sydney Basin - Moderate to Good Condition

Zone 2: FCT 1134 - HN582 - Scribbly Gum - Hairpin Banksia - Dwarf Apple heathy woodland on hinter and sandstone plateaux of the Central Coast, Sydney Basin Bioregion - Moderate to Good Condition

Zone 3: FCT 1181 - HN586 - Smooth-barked Apple - Red Bloodwood - Sydney Peppermint heathy open forest on slopes of dry sandstone gullies of western and southern Sydney, Sydney Basin Bioregion - Moderate to Good Condition

Zone 4: FCT 1237 - HN596 - Sydney Blue Gum - Blackbutt - Smooth barked Apple - moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion - Moderate to Good Condition

Dural Land Snail

Eastern pygmy-possum

Darwinia biflora

Tetradlea glandulosa

File Name (A4): R06/4272_006.dgn
20180525 11:08

Figure 11
Porters Road BioBank Site

7.3.1 Stage 1 Extraction Cell

Approximately 5.68 hectares of Stage 1 has been disturbed for sand extraction. The remaining area to the east comprised of remnant native vegetation. Extraction has concluded for the eastern section (approximately 3 hectares) which is in the process of rehabilitation to agricultural land (refer to Plate 2). Extraction and stockpiling of materials were carried out within the western portion of Stage 1 (refer to Plate 1).

The wattle regrowth on the eastern stockpiles have been removed and the base material screened for use in site rehabilitation. The materials will require further screening due to unsuitably large sized rocks deemed unsuitable to support an agricultural soil profile. Further rehabilitation work is expected to continue during the next 2023 – 2024 reporting period.



Plate 1 - Active quarry operation in Stage 1 with rehabilitation material stockpiled on site (South East Environmental, 2023).



Plate 2 - Rehabilitation area in Stage 1 (South East Environmental, 2023).

7.3.2 Stage 2 Extraction Cell

Stage 2 extraction cell is still an active quarry extraction area. Rehabilitation has commenced in Stage 2 west where sandstone extraction took place and concluded. The farm dam constructed in this area which will form a permanent water infrastructure for the property, in accordance with the Soil and Water Management Plan (refer to Plate 3).

Soil containing native vegetation seed bank from the extraction cells A and B was spread over the area between the dam and native vegetation on the western boundary. The natural regeneration process has commenced with a good diversity ground cover species emerging. In addition, the threatened *Darwinia biflora* and *Tetratheca glandulosa* have emerged with *Darwinia biflora* being prolific across the area (refer to Plate 4). Emergence of *Acacia bynoeana* has also been observed in the area immediately surrounding the dam, as previously observed in the last reporting period.



Plate 3 – Farm dam located in Stage 2 west (South East Environmental, 2023).



Plate 4 – Stage 2 west rehabilitation area west of the farm dam (South East Environmental, 2023).

7.3.3 Extraction Cells A and B

Vegetation clearing and extraction have commenced in extraction Cell 1A in December 2019 following the completion of the pre-commencement conditions. During this reporting period, extraction was undertaken in Cells 1A, 1B, 2A, 2B and 3B.

No rehabilitation has been undertaken in Cells A and B of the Modification 1 area.

7.3.3.1 Baseline Monitoring for Extraction Cells A and B

Baseline vegetation data was obtained during the previous reporting period in areas within the future extraction cells, as outlined in the Biodiversity and Rehabilitation Management Plan (BRMP v5, 2020). The Haerses Road Biodiversity and Rehabilitation management Plan outlines the annual monitoring of the extraction cells prior to disturbance for the purpose of providing baseline data for rehabilitation of the site post extraction.

A baseline monitoring site was not able to be established in Extraction Cells 1A and 1B due to commencement of extraction and current areas being subjected to disturbance. The monitoring locations within cell 2B and 3B have been disturbed in preparation for material extraction and therefore monitoring at these sites has concluded. Baseline monitoring in Cell 2A was undertaken in July 2023. The remaining two monitoring locations within cells 4 and 5 were surveyed in July 2023 to collect further data which will contribute to the final rehabilitation of the quarry.

Information collected from these baseline monitoring sites was carried out in accordance with DPE Biodiversity Assessment Method, as approved via the *Biodiversity Conservation Act 2016* and the *Biodiversity Conservation Regulation 2017*. Photo monitoring points have been nominated within these baseline monitoring sites for ongoing monitoring and comparison purpose each year. The survey sites were selected for ongoing survey monitoring with the aim of representing the two dominant vegetation communities within the Haerses Road BRMP (v5, 2020).

Ground survey indicated that the PCT 978 previously identified within extraction Cell 5b could not be located. A larger secondary PCT 978 occurs within the Biodiversity Offset Area which is outside of the survey area required for this annual report. A small area of PCT 1181 was located within Extraction Cell 2A. However, this area of PCT 1181 is not large enough to be encompassed by the vegetation survey undertaken, therefore, part of this PCT is within quadrat 3 where transition between PCT 1181, PCT 1083 and PCT 1134 occurs.

Within the three vegetation survey quadrats the following information was collected:

- Composition – native plant species richness by growth form,
- Structure – foliage cover of native and exotic species by growth form, and
- Function – number of large trees, tree stem size class, canopy species regeneration, length of fallen logs, percentage of leaf litter, number of trees with hollows and high threat exotic cover

Full details of the survey results can be found in the *Annual Biodiversity & Rehabilitation Management Report (South East Environmental, 2023)* contained in Appendix H.

7.3.4 Wisemans Ferry Road 30 Metre Buffer

Supplementary buffer planting commenced in 2016 utilising native species such as *Banksia*, *Melaleuca*, *Hakea* and *Acacia* to provide visual screening for motorists on Wisemans Ferry Road. Intersection upgrade works at the Haerses Road and Wisemans Ferry Road during early 2020 have caused disturbance to the planted vegetation in the buffer

areas. The resulting disturbance from the road works was unavoidable. Works associated with the intersection upgrade was completed and finalised in May 2021.

Monitoring occurred throughout the reporting period for signs of natural regeneration. The western side of the Haerses Road intersection has begun natural regeneration with a diversity of *Eucalyptus*, *Acacia* and *Leptospermum* species emerging (refer to Plate 5). The eastern side of the intersection did not show signs of natural regeneration therefore further buffer screening will be required with the aim to commence rework in the next reporting period (refer to Plate 6).

Exotic species occur in the 30-metre buffer with Weeds of National Significance (WoNS) and High Threat Weeds (HTW) present. Weed management and control has commenced during this reporting period and will continue into the future, with priority given to management of WoNS and HTW.



Plate 5 – Western side of 30m buffer to Wisemans Ferry Road (South East Environmental, 2023).



Plate 6 – Eastern side of 30m buffer to Wisemans Ferry Road (South East Environmental, 2023).

7.3.5 Buffer to Deerubbin Local Aboriginal Land Council Property

The translocation and original offset sites from 2006 are located to the west of the Deerubbin LALC property (formerly Maroota State Forest). A 40-metre buffer runs along the eastern and southern boundaries between the quarry and the Deerubbin LALC property. Rehabilitation of this area started in 2015 with continued regular regeneration works in this area, there has been no further disturbance to any areas of the buffer.

7.4 Management of Biodiversity Stewardship Sites

Two Biodiversity Stewardship Agreements (BSA) were finalised for DA 165-7-2005. The two sites are located at Haerses Road and Porters Road. The BSA stipulates a requirement that management actions are to be implemented when the Agreement commences, and management actions that are to be undertaken when the Total Fund Deposit is met, and Dixon Sand received the first annual management payment. Dixon Sand is yet to reach 80% of the Total Fund Deposit and therefore are undertaking the Passive Management of the biobank sites.

The annual inspection for Year 4 of the Haerses Road and Porters Road biobank sites were undertaken on 13 March 2023 for the purpose of annual reporting of passive management actions. The reports were submitted to the BSA Coordination Team on 14 March 2023.

Inspections were carried out against a number of management actions with the following outcome at both stewardship sites:

- **weed control** – N/A until active management,
- **grazing management** – no stock kept or located on both properties, no unauthorised grazing of stock,
- **fire management** – no fire within the BSA sites during previous 12 month period,
- **native vegetation management** – no disturbance, burning or use of fertilisers, pesticides or herbicides within the BSA sites,
- **threatened species habitat management and enhancement** – no disturbance to any threatened species habitat within 12 months. The Haerses Road Biobank site is fenced sign posted as environmental protection area to deter unauthorised persons from entering and disturbing significant habitat areas. The Porters Road biobank site can only be accessed via 2 locked gates to which only the property owner and RFS have keys for.
- **management of human disturbance** – no removal of dead timber or rocks from the sites. No storage or disposal of rubbish within the sites. Maintenance of tracks at Haerses Road site has occurred particularly following extreme rainfall events which cause damage to the track pavement. Work was carried out with care and no disturbance to native vegetation alongside these tracks. Fence regularly checked to ensure their visibility. Tracks at Porters Road site are 4-wheel drive access only and maintenance is not expected to be required unless emergency services require access.
- **Monitoring** – N/A until active management. Photo points established.

Photographic point monitoring forms part of the assessment with three photo locations being assessed for each biobank site.

Previously during the Year 1 inspection, it was noted that both biobank sites experienced ongoing drought condition in 2019 which resulted in loss of some shrubs and ground cover vegetation. During the Year 2 inspection, a return to average rainfall conditions throughout 2020 has assisted in increase in grass diversity, emergence of ground cover forbs and ferns, and vegetation growth. During Year 3 inspection, increased shrub density has been noted in 2 out of 3 photographic point locations at Haerses Road site due to above average rainfall. A good increase in groundcover diversity was observed and shrub growth with increasing density and diversity were noted at Porters Road site. Low density of weed was detected growing on the margin of the Porters Road site. During the recent Year 4 inspection, no change was observed at any of the photo monitoring points at Porters Road site whilst a slight increase in grass cover diversity and shrub density were observed at 2 monitoring points at Haerses Road site.

The full annual management reports for Year 4 (2022 - 2023) of passive management for both biobanking sites are contained in Appendix I.

7.5 Change in Environmental Procedures

The following recommendations for bush regeneration, rehabilitation work and monitoring have been made:

Stage 1 Extraction Area

- Undertake screening of stockpiled rehabilitation material to remove unsuitable larger rocks and boulders
- Spread out screened material and stockpiled material to achieve final landform to enable rehabilitation to Class 4 Agriculture.

- First agricultural planting event if final landform levels have been achieved

Stage 2 Extraction Area

- Continue to monitor the native vegetation growth to the west of the water storage dam
- Dam wall repair / mitigation

Wisemans Ferry Road 30 metre Buffer Area

- Assisted rehabilitation of eastern side of Haerses Road intersection buffer area where disturbance has taken place

Buffer to Deerubbin LALC Property (formerly Maroota State Forest)

- Continued bush regeneration maintenance in the previously disturbed area
- Baseline monitoring locations established

Extraction Cells A and B

- Continued monitoring of vegetation quadrats for establishment of baseline data.

Weed Management

- Continue with weed management as per the recommendations contained in the Bush Regenerator and Ecologist's reports.

Haerses Road and Porters Road Biobank Sites

- Monitoring and management of the Haerses Road and Porters Road biobank BSA sites to be undertaken in accordance with the Biobanking Agreement and BSA reporting.

8. Community and Social Impacts

8.1 Compliance

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

Table 27: Community related consent conditions

Development Consent Condition	Requirement	Compliance
Condition 8 of Schedule 5	<p>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).</p> <p>Notes:</p> <ul style="list-style-type: none"> • 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 Applicant may, with the approval of the Secretary, combine the function of this CCC with the functions of other CCCs in the area. 	The current CCC members were re-appointed by the DP&E on 1 st March 2018 (note joint CCC for the Old Northern Road and Haerses Road quarries).
Condition 1(e) of Schedule 5	<p>describe the procedures to be implemented to:</p> <ul style="list-style-type: none"> • 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 and Management Plans

8.2 Complaints and Follow-up Actions

One traffic related complaint was received by Haerses Road quarry during the 2022 - 2023 reporting period. The complaint was received on 4 May 2023 and the details of the complaint are described in Table 28.

Table 28: Complaints received during the reporting period.

Complaint 1	
Date complaint received	4 May 2023
Issue	Truck and dog driving in a dangerous manner. No identification or details of the truck and dog was able to be provided so therefore it could not be determined that the truck and dog in question is related to Haerses Road quarry operations, or another quarries in Maroota.
Recommended Action(s)	Quarry to undertake a re-education campaign for truck drivers at both Haerses Road and Old Northern Road quarries.
Outcome	A re-education campaign was carried out at both Haerses Road and Old Northern Road quarries. All truck drivers were reminded of their: <ul style="list-style-type: none"> responsibility and requirement to comply with the driver induction, quarry traffic management plan, site speed limit, public road safety and road rules, and non-compliance procedures and the Local Maroota Traffic Management Policy i.e. disciplinary action leading to being banned by all signatory quarries. The Complainant was contacted and informed that the Quarry had undertaken a truck driver re-education campaign
Close out Date	4 May 2023

The complaints register and summary of complaint are contained in Appendix L.

8.2.1 Long Term Complaints Trend

Long term complaints monitoring data commencing 2006 – 2007 is depicted in Chart 66 below. It must be noted that complaints were recorded for the Haerses Road and Old Northern Road quarries combined from the 2006 – 2007 to 2017 – 2018 monitoring periods, with complaints recorded separately for individual quarries from thereon.

A total of sixteen complaints have been received by Dixon sand since the 2006 – 2007 monitoring period to date.

The number of complaints were nil and one during the 2006 - 2007 and 2007 – 2008 monitoring periods respectively, with the one complaint being associated with a haulage truck driving in a dangerous manner.

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 made in relation to the quarry generating excessive noise where the source of noise was identified to have been 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 can be observed. The number of complaints received reduced to two complaints during the 2018 – 2019 monitoring period which were associated with haulage trucks exceeding the speed limit. No complaints were received during this 2019 – 2020 monitoring period. One complaint was received during this 2020 – 2021 reporting period associated with a haulage truck driving in a dangerous manner. There were no complaints during the 2021 – 2022 reporting period.

Dixon Sand received one traffic related complaint during this reporting period.

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 occurred mainly on Old Northern Road and Wisemans Ferry Road in the local areas.

Dixon Sand executed the steps to identify the validity of the complaints received and implemented appropriate actions outlined in the complaints procedure and Maroota Local Traffic Management Policy (inter-pit policy). Throughout the years, a number of complaints were identified to have been associated with other operations in or out of the area. All complaints have been closed out.

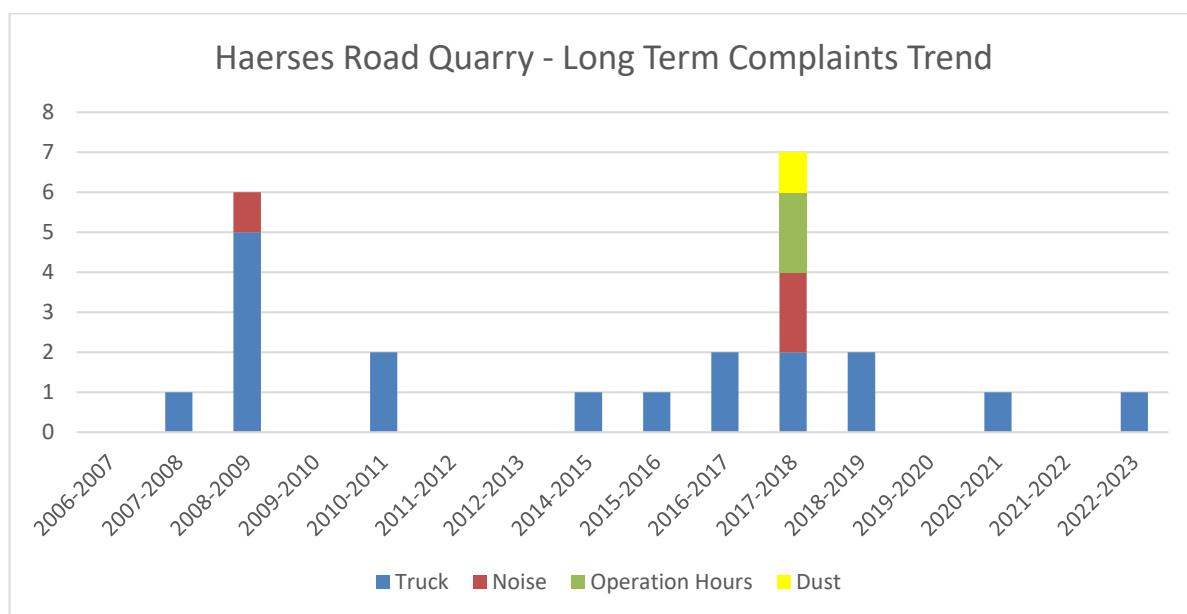


Chart 66: Long term complaints monitoring data.

8.3 Community Consultative Committee, Meetings and Guidelines

Two ordinary CCC meetings were held in the 2022 - 2023 reporting period, in accordance with the consent conditions and CCC Guidelines (2016). The CCC meetings were held on 9th November 2022 and on 3rd May 2023.

This CCC meeting provided opportunity to address any issues that were brought up by the community and/or stakeholders. The meeting minutes are contained in Appendix K.

8.4 Community and Stakeholder Liaison

In addition to contacting 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:

- Liaising with the neighbouring property owners to Haerses Road quarry regarding general maintenance,
- Notifying the Maroota Public School regarding noise monitoring undertaken in December 2022 and June 2023, and
- Bi-annual CCC meetings in November 2022 and May 2023

Local Initiatives

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

- monetary contribution and participating in the Maroota Public School (Maroota Muster Festival),
- monetary contribution to the Cattai Public School,
- monetary contribution to the Royal Flying Doctor Service,
- Wings4Kids,
- Black Dog Institute, and
- publication of environmental monitoring data, and provision of all current consents and site management plans for public viewing on the Dixon Sand website.

8.5 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 2000 as follows:

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

Haerses Road quarry continues 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.

8.6 Changes to Social Monitoring Procedures

No changes are proposed for the social management procedures.

9. Bushfire Management

9.1 Compliance

DA165-7-2005 requires Dixon Sand to ensure the quarry is suitably equipped to respond to any fires on site. Dixon Sand 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 Haerses Road quarry.

An annual meeting between Dixon Sand and the representative of the Rural Fire Service was conducted before the start of the bushfire season in October 2022 on the quarry premise to:

- review the Bushfire Management Plans,
- review risk assessment and procedures in the event of a bushfire,
- discuss key dates for the 2021-2022 bushfire season and any specific season predictions,
- discuss any planned hazard reduction burns in the area including locations, size and dates,
- discuss any changes to quarry operations which may affect bushfire risks, and
- discuss the locations of static water supplies including waters storage ponds and standpipe.

The outcome of the meeting was communicated to Dixon Staff in the form of a toolbox talk.

10. Competency, Training and Awareness

The quarry management team is to ensure 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,
- Multi staged pre-clearing procedures and fauna handling and rescue procedures training,
- Environmental hazard identification workshop,
- Regular toolbox talks, and
- Bushfire Management and Emergency evacuation training.

11. Incidents and Non-Compliances

11.1 Environmental Incidents and Non-Compliances

Details of the incidents and non-compliances are listed in Table 29 below.

Table 29: Environmental Non-compliances and Incidents

Event No.	Date of Incident	Applicable Condition(s)	Details, Cause and Mitigation of Incident
1	Submission of 2021-2022 Annual Review	Condition 12 of Schedule 5 of DA 165-7-2005	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 DPE for the submission deadline of the Annual Review to be adjusted to reflect the financial year reporting. Approval was granted by the DPE on 9 February 2018 to submit the Annual Review by the end of September each year.

No archaeological artefacts or sites have been uncovered during this reporting period.

11.2 Notices issued by MEG

Dixon Sand received one Prohibition Notice and one Improvement Notice under Section 195 of the *Work Health and Safety Act* 2011 from MEG (Resources Regulator) during this reporting period. The identified issue has been rectified and closed out.

Table 30: Notices issued by Resources Regulator

Date Issued	Notice Reference	Identified Issues	Action
19 Apr 2023	NTCE0012070 – Section 195 Prohibition Notice	Contractor conducting working at heights without controls to prevent a person falling from height.	Completed - Safety feature rectified, and work resumed. Reviewed contractors safety and engagement documentation
3 May 2023	NTCE0012147 – Section 191 Improvement Notice	A Traffic Management Plan (TMP) has not been developed. The TMP is to depict the current layout and controls identified in the risk assessment. Train all workers on site in the TMP.	Completed – TMP developed and implemented

12. Independent Environmental Audit

12.1 Independent Environmental Audit Requirements

Condition 14 of Schedule 5 of DA 165-7-2005 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 Haerses Road quarry was approved by the Department of Planning and Environment (DPE) 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: Haerses Road Report* (RW Corkery & Co, December 2022, Document No. 1021/02) was issued to Dixon Sand on 15th December 2022.

The *Response and Action Plan for the Independent Environmental Audit 2022, Haerses Road Quarry* document was prepared to provide Dixon Sand's response and proposed actions toward the IEA findings, recommendations for non-compliances and suggested improvements as identified in *the Independent Environmental Audit: Haerses Road Report (RW Corkery & Co, December 2022, Document No. 1022/02)*.

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

All proposed actions associated with the Non-compliances from the IEA 2022 have been implemented and closed out as detailed in Table 31.

The next IEA is scheduled to be undertaken late 2025.

Table 31: Status of Proposed Action, Implementation Timeframe and Proposed Recommendations arising from 2022 IEA Non-Compliances with DA 165-7-2005.

Consent Condition	Conditional Requirement	Compliance Status	IEA Comments and Recommendations	IEA Recommendation, Dixon Sand's Proposed Action and Implementation Timeframe
Schedule 2 – Administrative Conditions				
Terms of Consent				
2 (2)(b)	<p>The Applicant must carry out the development:</p> <p>in accordance with the conditions of this consent and the Development Layout Plan.</p> <p><i>Note: The Development Layout Plan is shown in Appendix 1.</i></p>	Non-compliant	<p>The Quarry layout was observed to reflect the Development Layout Plans included as Appendix 1 of DA 165-7-2005.</p> <p>However, several non-compliances have been recorded against the conditions of this consent during the audit period and hence contributed to the non-compliance status for this condition. See Conditions 2(18)(c), 3(11)(g), 3(11)(h), 3(16)(d) and 3(37)</p>	Refer to proposed actions for Conditions 2(18)(c), 3(11)(g), 3(11)(h), 3(16)(d) and 3(37)
Limits of Extraction				
Buffer Zones				
18(c)	<p>ensure that the boundaries of each operational extraction area are clearly marked on site in a permanent manner that allows operating staff and inspecting officers to clearly identify these limits, to the satisfaction of the Secretary.</p>	Non-compliant	<p>Surveyed star posts and connecting white cord delineating extraction area boundaries were observed during the site inspection of Cell 1A. However, some posts were observed to be missing and/or had been removed/buried along the southern and western boundaries of the MOD 1 extraction area during perimeter bund construction/maintenance.</p> <p>See Recommendations HR R1/22 to HR R5/22.</p>	<p>Recommendation R1/22</p> <p>All disturbed surveyed star posts around the boundaries of the approved extraction areas should be re-instated prior to painting (see Recommendation R2).</p> <p><i>A number of star posts were observed to be pushed over, bent or buried around Cells 1A and 1B. These star posts should not have been disturbed and need to be replaced.</i></p> <p>Proposed Action: The disturbed surveyed star posts will be reinstated.</p> <p>Implementation Timeframe: 31 March 2023</p> <p>Status Completed and closed out on 6 January 2023</p> <p>Recommendation R5/22</p>

Consent Condition	Conditional Requirement	Compliance Status	IEA Comments and Recommendations	IEA Recommendation, Dixon Sand's Proposed Action and Implementation Timeframe
				<p>The bund wall on the western side of Cell 1A (Photos 10 and 11) should be removed with the material brought back into the adjoining extraction area. The disturbed footprint should be rehabilitated and the boundary star posts (painted) re-instated.</p> <p><i>Recent earthworks on the western side of Cell 1A has resulted in a bund wall approximately 1.5m to 2m high being constructed on its western side just beyond the boundary of Cell 1A. A number of the boundary star posts appear to have been covered during the earthworks.</i></p> <p>Proposed Action: The disturbed area identified on the western side of Cell 1A will be rehabilitated appropriately and the boundary star posts will be re-instated and painted.</p> <p>Implementation Timeframe: 31 March 2023 (pending suitable weather and accessibility to the disturbed area).</p> <p>Status Completed and closed out on 6 January 2023.</p>
Schedule 3 Specific Environmental Conditions				
Noise				
Noise Management Plan				
8(g)	Describe the noise mitigation measures that will be implemented in the operation of plant and equipment to minimise noise emissions from sandstone cutting to ensure	Non-compliant	The approved NMP (May 2022) does not include measures targeting sandstone cutting operations and Condition 8(g) is not listed as a development consent condition in Section 2.1. It is recognised that whilst the Noise Management Plan had not been modified at the time of the audit site inspection to address the sandstone cutting operations, the document was	<p>Recommendation R15/22</p> <p>The Noise Management Plan should be updated to document the sandstone cutting operations within the Quarry.</p> <p><i>The requirements in Schedule 3 Condition 8(g) to describe the noise mitigation measures relating to the sandstone cutting operation in the Noise Management</i></p>

Consent Condition	Conditional Requirement	Compliance Status	IEA Comments and Recommendations	IEA Recommendation, Dixon Sand's Proposed Action and Implementation Timeframe
	<p>compliance with the noise criteria in this consent at all times.</p> <p>The Applicant must implement the Noise Management Plan as approved by the Secretary.</p>		<p>modified and submitted to DPE for approval on 28 November 2022.</p> <p>See Recommendation HR R15/22.</p>	<p><i>Plan have not been addressed.</i></p> <p>Proposed Action: The currently approved NMP (V1a, May 2022) addressed the requirements of DA Mod 3 and 4 conditions. Condition 8(g) of Schedule 3 was introduced in Development Consent Modification 5 which was approved in June 2022, issued after the above NMP was approved. The latest NMP (V2, Nov 2022) was submitted to DPE for review and approval on 28/11/22 – this document already includes Condition 8(g) During the IEA audit, the draft NMP (V2, Nov 2022) was sent out to the relevant agencies for consultation, it was not provided to RWC as this was not requested. Therefore, Dixon Sand believes that HR R15/22 does not constitute a non-compliance as the requirement of Condition 8(g) of Schedule 3 has been fulfilled. Therefore, no additional action is required as Condition 8(g) of Schedule 3 has been included in the current draft of NMP.</p> <p>Implementation Timeframe: Not Applicable</p> <p>Status Completed and closed out</p>
Air Quality				
Air Quality Management Plan				
11(g)	Describe the mitigation measures that will be implemented in the sandstone cutting shed during the processing of extracted sandstone and detail how these measures	Non-compliant	The approved AQMP (April 2020) and the latest (unapproved version of the AQMP (version dated November 2021) does not include measures targeting sandstone cutting operations. It is recognised that whilst the Air Quality Management Plan had not been modified at the time of the audit site inspection to address the sandstone cutting operations, the	<p>Recommendation R14/22</p> <p>The Air Quality Management Plan should be updated to document the sandstone cutting operations to be undertaken within the Quarry. <i>The requirements in Schedule 3 Conditions 11(g) and 11(h) to describe the air quality mitigation measures</i></p>

Consent Condition	Conditional Requirement	Compliance Status	IEA Comments and Recommendations	IEA Recommendation, Dixon Sand's Proposed Action and Implementation Timeframe
	will achieve compliance with the air quality criteria in this consent at all times; and		document was modified and submitted to DPE for approval on 28 November 2022. It is also acknowledged that sandstone cutting operations have not yet commenced within the quarry.	<p><i>relating to the sandstone cutting operation in the Air Quality Management Plan have not been addressed.</i></p> <p>Proposed Action: The AQMP (V1, Nov 2021) addressed the requirements of DA Mod 3 and 4 conditions. This AQMP (V1, Nov 2021) was submitted to DPE for review and approval in November 2021 but Dixon Sand never received any correspondence from the DPE. Conditions 11(g) and 11(h) of Schedule 3 were introduced in Development Consent Modification 5 which was approved in June 2022, issued after the AQMP (V1, Nov 2021) was submitted to DPE. The latest AQMP (V2, Nov 2022) was submitted to DPE for review and approval on 28/11/22 – this document already includes Conditions 11(g) and 11(h) of Schedule 3. During the IEA audit, the draft AQMP (V2, Nov 2022) was sent out to the relevant agencies for consultation, it was not provided to RWC as this was not requested. Therefore, Dixon Sand believes that HR R14/22 does not constitute a non-compliance as the requirements of Conditions 11(g) and 11(h) of Schedule 3 have been fulfilled.</p> <p>Implementation Timeframe: Not Applicable</p> <p>Status Completed and closed out</p>
11(h)	Describe the mitigation measures that will be implemented in the operation of plant and equipment to minimise dust emissions from sandstone cutting to ensure compliance with the air	Non-compliant	The approved AQMP (April 2020) and the latest (unapproved version of the AQMP (version dated November 2021) does not include measures targeting sandstone cutting operations. It is recognised that whilst the Air Quality Management Plan had not been modified at the time of the audit site inspection to address the sandstone cutting operations, the document was modified and submitted to DPE for	<p>Recommendation R14/22</p> <p>The Air Quality Management Plan should be updated to document the sandstone cutting operations to be undertaken within the Quarry. <i>The requirements in Schedule 3 Conditions 11(g) and 11(h) to describe the air quality mitigation measures relating to the sandstone cutting operation in the Air Quality Management Plan have not been addressed.</i></p>

Consent Condition	Conditional Requirement	Compliance Status	IEA Comments and Recommendations	IEA Recommendation, Dixon Sand's Proposed Action and Implementation Timeframe
	quality criteria in this consent at all times.		approval on 28 November 2022. It is also acknowledged that sandstone cutting operations have not yet commenced within the quarry.	<p>Proposed Action: The AQMP (V1, Nov 2021) addressed the requirements of DA Mod 3 and 4 conditions. This AQMP (V1, Nov 2021) was submitted to DPE for review and approval in November 2021 but Dixon Sand never received any correspondence from the DPE. Conditions 11(g) and 11(h) of Schedule 3 were introduced in Development Consent Modification 5 which was approved in June 2022, issued after the AQMP (V1, Nov 2021) was submitted to DPE. The latest AQMP (V2, Nov 2022) was submitted to DPE for review and approval on 28/11/22 – this document already includes Conditions 11(g) and 11(h) of Schedule 3. During the IEA audit, the draft AQMP (V2, Nov 2022) was sent out to the relevant agencies for consultation, it was not provided to RWC as this was not requested. Therefore, Dixon Sand believes that HR R14/22 does not constitute a non-compliance as the requirements of Conditions 11(g) and 11(h) of Schedule 3 have been fulfilled.</p> <p>Implementation Timeframe: Not Applicable</p> <p>Status Completed and closed out</p>
Soil and Water				
Groundwater Management				
16(d)	install water level loggers in all existing on-site quarry dams and in new quarry dams when constructed; and	Non-compliant	<p>Extraction has commenced in the MOD 1 area and water level data loggers have not been installed in on-site dams.</p> <p>See Recommendation HR R12/22.</p> <p>Surface water levels in on site dams were not presented in Annual Reviews during the audit period.</p>	<p>Recommendation R12/22</p> <p>Appropriate water level loggers, or an alternate method of recording, should be installed at each of the on-site quarry dams and any new quarry dams.</p> <p><i>The requirement for water level loggers is documented in Schedule 3 Condition 16(d). Reference to an alternate</i></p>

Consent Condition	Conditional Requirement	Compliance Status	IEA Comments and Recommendations	IEA Recommendation, Dixon Sand's Proposed Action and Implementation Timeframe
			<p>The locations of all on-site dams, and the distinction between dams and sediment basins, is not clear in the SWMP or Environmental Monitoring Locations documents.</p> <p>See Improvement HR I5/22.</p>	<p><i>method of recording is suggested should Dixon Sand identify a more practical and cost effective way to record the information required.</i></p> <p>Proposed Action: Surface water levels in on site dams were not presented in Annual Reviews during the audit period. The locations of all on-site dams, and the distinction between dams and sediment basins, is not clear in the SWMP or Environmental Monitoring Locations documents.</p> <p>Implementation Timeframe: 30 June 2023</p> <p>Status Pending confirmation from DPE (Compliance Team) whether the loggers are required to be installed if the Baseline monitoring for the MTSGS Buffer zone has been completed to the satisfactory of DPE-Water.</p> <p>Improvement I5/22 The locations and identification of all dams and sediments basins within the quarry site should be clarified to ensure all dams and basins are correctly identified.</p> <p><i>The identification and location of all dams and sediment basins will assist in the preparation of all documentation associated with the operation of the quarry and including the records required under Schedule 3 Condition 16(d).</i></p> <p>Proposed Action: Identification labels/signs will be installed at each quarry related dam and sediment basin on site.</p> <p>Implementation Timeframe: 30 June 2023</p>

Consent Condition	Conditional Requirement	Compliance Status	IEA Comments and Recommendations	IEA Recommendation, Dixon Sand's Proposed Action and Implementation Timeframe
				Status Completed and closed out on 5 April 2023.
Biodiversity and Rehabilitation				
Biodiversity and Rehabilitation Bond				
37	Within 6 months of the approval of the Biodiversity and Rehabilitation Management Plan, the Applicant must lodge a Biodiversity and rehabilitation Bond with the Department to ensure that the Biodiversity Offset Strategy and rehabilitation of the site are implemented in accordance with the performance and completion criteria set out in the Biodiversity and Rehabilitation Management Plan and the relevant conditions of this consent.	Non-compliant	<p>The original BRMP was approved on 18 September 2018 and the Biodiversity and Rehabilitation Bond was lodged on 25 March 2019 (ie.1 week past the required timeframe).</p> <p>This remains an administrative non-compliance with no further action required and was reported as a non-compliance in the 2019 IEA.</p>	Proposed Action: No further action required Implementation Timeframe: Not Applicable Status Completed – closed out on 25 March 2019

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

13.1 Noise Monitoring

- Continue with 6-monthly noise monitoring at nominated receivers as quarry operations are currently active in Modification 1 extraction cells.

13.2 Ground and Surface Water Management

- Continue with the review and submission of buffer zone groundwater monitoring data to be undertaken as per NRAR's recommendation,
- Water sampling and laboratory analysis of surface water at SW1 and SW2 to continue when there is sufficient flow after rain events,
- Commence data and trend interpretation for the new monitoring bore BH07, and
- Commence data and trend interpretation for surface water quality in quarry related basins.

13.3 Vegetation Clearing

- Continue to implement the pre-clearing survey and multistage habitat tree felling procedures prior to any vegetation felling.

13.4 Rehabilitation and Bush Regeneration

Stage 1 Extraction Area

- Undertake screening of stockpiled rehabilitation material to remove unsuitable larger rocks and boulders,
- Spread out screened material and stockpiled material to achieve final landform to enable rehabilitation to Class 4 Agriculture, and
- First agricultural planting event if final landform levels have been achieved.

Stage 2 Extraction Area

- Continue to monitor the native vegetation growth to the west of the water storage dam,
- Dam wall repair / mitigation

Wisemans Ferry Road 30 metre Buffer Area

- Assisted rehabilitation of eastern side of Haerses Road intersection buffer area where disturbance has taken place

Buffer to Deerubbin LALC Property (formerly Maroota State Forest)

- Continued bush regeneration maintenance in the previously disturbed area

- Baseline monitoring locations established

Extraction Cells A and B

- Continued monitoring of vegetation quadrats for establishment of baseline data.

Weed Management

- Continue with weed management as per the recommendations contained in the Bush Regenerator and Ecologist's reports.

Haerses Road and Porters Road Biobank Sites

- Monitoring and management of the Haerses Road and Porters Road biobank BSA sites to be undertaken in accordance with the Biobanking Agreement and BSA reporting.

14. Audits and Improvement Notice

There are no outstanding proposed actions for the Independent Environmental Audit and DRG's Improvement Notice.

15. Conclusion

A number of recommendations and changes in environmental procedures have been proposed throughout this Annual Review of 2022 - 2023 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: 13176

Date Issued: 5/08/2022

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 27/07/2022

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	29/06/2022 10:46	27/07/2022 12:05	13176/1	Dust	
D10 Hearses Rd	29/06/2022 11:16	27/07/2022 12:38	13176/2	Dust	
D06 School	29/06/2022 11:41	27/07/2022 10:42	13176/3	Dust	
D05 Bund	29/06/2022 11:54	27/07/2022 11:54	13176/4	Dust	Need access track cleared.
D04 Rehab	29/06/2022 12:20	27/07/2022 11:23	13176/5	Dust	Need steps cut in bank for access.
D07 Mullock	29/06/2022 12:31	27/07/2022 11:37	13176/6	Dust	
D01(A) Front Gate	29/06/2022 12:07	27/07/2022 10:53	13176/7	Dust	
D11 Goldstien	29/06/2022 11:05	27/07/2022 14:36	13176/8	Dust	Track repair required for access.
D12 Ram	29/06/2022 11:28	27/07/2022 12:27	13176/9	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 5/08/2022.

Test Report Number: 13176

Date Issued: 5/08/2022

Revision No: 00

Results

Deposited Matter	Method	Units	13176/1 D08&9 Hitchcock Rd Olive Grove 27/07/2022	13176/2 D10 Hearses Rd 27/07/2022	13176/3 D06 School 27/07/2022	13176/4 D05 Bund 27/07/2022	13176/5 D04 Rehab 27/07/2022
Date Tested	--	--	3/08/2022	3/08/2022	3/08/2022	3/08/2022	3/08/2022
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.5	0.6	10.3	0.8	0.4
Ash	AS 3580.10.1	g/m2/mth	0.2	0.2	3.5	0.5	0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.3	0.4	6.8	0.3	0.3
Calculated Rain	AS 3580.10.1	mm	285	287	288	288	286

Deposited Matter	Method	Units	13176/6 D07 Mullock 27/07/2022	13176/7 D01(A) Front Gate 27/07/2022	13176/8 D11 Goldstien 27/07/2022	13176/9 D12 Ram 27/07/2022
Date Tested	--	--	3/08/2022	3/08/2022	3/08/2022	3/08/2022
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.2	1.5	0.8	0.3
Ash	AS 3580.10.1	g/m2/mth	0.2	1.2	0.4	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	<0.1	0.3	0.4	0.1
Calculated Rain	AS 3580.10.1	mm	287	117	287	288



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: 13176

Date Issued: 5/08/2022

Revision No: 00

Sampling Conditions: Fine 14°-17°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
13176/1	D08&9 Hitchcock Rd Olive Grove		T & D.Walker	27/07/2022 12:05	AS3580.10.1	CuSO4
13176/2	D10 Hearses Rd		T & D.Walker	27/07/2022 12:38	AS3580.10.1	CuSO4
13176/3	D06 School		T & D.Walker	27/07/2022 10:42	AS3580.10.1	CuSO4
13176/4	D05 Bund		T & D.Walker	27/07/2022 11:54	AS3580.10.1	CuSO4
13176/5	D04 Rehab		T & D.Walker	27/07/2022 11:23	AS3580.10.1	CuSO4
13176/6	D07 Mullock		T & D.Walker	27/07/2022 11:37	AS3580.10.1	CuSO4
13176/7	D01(A) Front Gate		T & D.Walker	27/07/2022 10:53	AS3580.10.1	CuSO4
13176/8	D11 Goldstien		T & D.Walker	27/07/2022 14:36	AS3580.10.1	CuSO4
13176/9	D12 Ram		T & D.Walker	27/07/2022 12:27	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
13176/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	Full.
13176/2	D10 Hearses Rd	312538	6294576	Full.
13176/3	D06 School	313518	6296537	Full, vegetation.
13176/4	D05 Bund	313160	6296838	Full.
13176/5	D04 Rehab	312385	6296932	Full.
13176/6	D07 Mullock	312579	6296676	Full.
13176/7	D01(A) Front Gate	313290	6297176	Full, minor sand.
13176/8	D11 Goldstien	312034	6294213	Full.
13176/9	D12 Ram	311750	6294159	Full.

Sampling procedures have been approved and report finalised on 5/08/2022.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 13321

Date Issued: 1/09/2022

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 24/08/2022

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	27/07/2022 12:05	24/08/2022 10:25	13321/1	Dust	Olive tree adjacent needs trimming.
D10 Hearses Rd	27/07/2022 12:38	24/08/2022 10:50	13321/2	Dust	
D06 School	27/07/2022 10:42	24/08/2022 09:21	13321/3	Dust	
D05 Bund	27/07/2022 11:54	24/08/2022 10:12	13321/4	Dust	
D04 Rehab	27/07/2022 11:23	24/08/2022 09:46	13321/5	Dust	
D07 Mullock	27/07/2022 11:37	24/08/2022 09:58	13321/6	Dust	
D01(A) Front Gate	27/07/2022 10:53	24/08/2022 09:29	13321/7	Dust	
D11 Goldstien	27/07/2022 14:36	24/08/2022 12:02	13321/8	Dust	
D12 Ram	27/07/2022 12:27	24/08/2022 10:38	13321/9	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 1/09/2022.

Test Report Number: 13321

Date Issued: 1/09/2022

Revision No: 00

Results

Deposited Matter	Method	Units	13321/1 D08&9 Hitchcock Rd Olive Grove 24/08/2022	13321/2 D10 Hearses Rd 24/08/2022	13321/3 D06 School 24/08/2022	13321/4 D05 Bund 24/08/2022	13321/5 D04 Rehab 24/08/2022
Date Tested	--	--	29/08/2022	29/08/2022	29/08/2022	29/08/2022	29/08/2022
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.7	0.5	0.5	0.5	0.6
Ash	AS 3580.10.1	g/m2/mth	0.5	0.3	0.3	0.4	0.5
Combustible Matter	AS 3580.10.1	g/m2/mth	0.2	0.2	0.2	0.1	0.1
Calculated Rain	AS 3580.10.1	mm	28	28	29	29	27

Deposited Matter	Method	Units	13321/6 D07 Mullock 24/08/2022	13321/7 D01(A) Front Gate 24/08/2022	13321/8 D11 Goldstien 24/08/2022	13321/9 D12 Ram 24/08/2022
Date Tested	--	--	29/08/2022	29/08/2022	29/08/2022	29/08/2022
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.7	2.9	1.0	0.2
Ash	AS 3580.10.1	g/m2/mth	0.3	2.6	0.5	0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.4	0.3	0.5	0.1
Calculated Rain	AS 3580.10.1	mm	27	29	27	28

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: 13321

Date Issued: 1/09/2022

Revision No: 00

Sampling Conditions: Fine 12°-14°C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
13321/1	D08&9 Hitchcock Rd Olive Grove		T.Walker	24/08/2022 10:25	AS3580.10.1	CuSO4
13321/2	D10 Hearses Rd		T.Walker	24/08/2022 10:50	AS3580.10.1	CuSO4
13321/3	D06 School		T.Walker	24/08/2022 09:21	AS3580.10.1	CuSO4
13321/4	D05 Bund		T.Walker	24/08/2022 10:12	AS3580.10.1	CuSO4
13321/5	D04 Rehab		T.Walker	24/08/2022 09:46	AS3580.10.1	CuSO4
13321/6	D07 Mullock		T.Walker	24/08/2022 09:58	AS3580.10.1	CuSO4
13321/7	D01(A) Front Gate		T.Walker	24/08/2022 09:29	AS3580.10.1	CuSO4
13321/8	D11 Goldstien		T.Walker	24/08/2022 12:02	AS3580.10.1	CuSO4
13321/9	D12 Ram		T.Walker	24/08/2022 10:38	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
13321/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
13321/2	D10 Hearses Rd	312538	6294576	
13321/3	D06 School	313518	6296537	Minor vegetation.
13321/4	D05 Bund	313160	6296838	
13321/5	D04 Rehab	312385	6296932	
13321/6	D07 Mullock	312579	6296676	Spider.
13321/7	D01(A) Front Gate	313290	6297176	Dust - crop farming adjacent.
13321/8	D11 Goldstien	312034	6294213	Minor vegetation.
13321/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 1/09/2022.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 13465

Date Issued: 29/09/2022

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

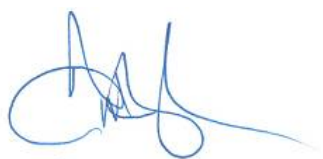
The following Dust Deposition sample(s) were received on 21/09/2022

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	24/08/2022 10:25	21/09/2022 12:08	13465/1	Dust	
D10 Hearses Rd	24/08/2022 10:50	21/09/2022 12:29	13465/2	Dust	
D06 School	24/08/2022 09:21	21/09/2022 11:08	13465/3	Dust	
D05 Bund	24/08/2022 10:12	21/09/2022 11:21	13465/4	Dust	
D04 Rehab	24/08/2022 09:46	21/09/2022 11:43	13465/5	Dust	
D07 Mullock	24/08/2022 09:58	21/09/2022 11:55	13465/6	Dust	
D01(A) Front Gate	24/08/2022 09:29	21/09/2022 11:31	13465/7	Dust	
D11 Goldstien	24/08/2022 12:02	21/09/2022 12:52	13465/8	Dust	
D12 Ram	24/08/2022 10:38	21/09/2022 12:17	13465/9	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 29/09/2022.

Test Report Number: 13465

Date Issued: 29/09/2022

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	13465/1 21/09/2022 D08&9 Hitchcock Rd Olive Grove	13465/2 21/09/2022 D10 Hearses Rd	13465/3 21/09/2022 D06 School	13465/4 21/09/2022 D05 Bund	13465/5 21/09/2022 D04 Rehab
	Method	Units					
Date Tested	--	--	28/09/2022	28/09/2022	[NT]	28/09/2022	28/09/2022
Number of Days	AS 3580.10.1	days	28	28	[NT]	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	2.9	1.0	[NT]	0.2	<0.1
Ash	AS 3580.10.1	g/m2/mth	2.6	0.5	[NT]	0.1	<0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.3	0.5	[NT]	0.1	<0.1
Calculated Rain	AS 3580.10.1	mm	57	56	[NT]	52	49

Deposited Matter		Lab ID Sample Date Sample ID	13465/6 21/09/2022 D07 Mullock	13465/7 21/09/2022 D01(A) Front Gate	13465/8 21/09/2022 D11 Goldstien	13465/9 21/09/2022 D12 Ram
	Method	Units				
Date Tested	--	--	28/09/2022	28/09/2022	28/09/2022	28/09/2022
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.6	0.8	0.8	0.8
Ash	AS 3580.10.1	g/m2/mth	0.2	0.5	0.5	0.5
Combustible Matter	AS 3580.10.1	g/m2/mth	0.4	0.3	0.3	0.3
Calculated Rain	AS 3580.10.1	mm	52	52	53	58

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: 13465

Date Issued: 29/09/2022

Revision No: 00

Sampling Conditions: 19-20 °C, cloudy

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
13465/1	D08&9 Hitchcock Rd Olive Grove		D.Walker	21/09/2022 12:08	AS3580.10.1	CuSO4
13465/2	D10 Hearses Rd		D.Walker	21/09/2022 12:29	AS3580.10.1	CuSO4
13465/3	D06 School		D.Walker	21/09/2022 11:08	AS3580.10.1	CuSO4
13465/4	D05 Bund		D.Walker	21/09/2022 11:21	AS3580.10.1	CuSO4
13465/5	D04 Rehab		D.Walker	21/09/2022 11:43	AS3580.10.1	CuSO4
13465/6	D07 Mullock		D.Walker	21/09/2022 11:55	AS3580.10.1	CuSO4
13465/7	D01(A) Front Gate		D.Walker	21/09/2022 11:31	AS3580.10.1	CuSO4
13465/8	D11 Goldstien		D.Walker	21/09/2022 12:52	AS3580.10.1	CuSO4
13465/9	D12 Ram		D.Walker	21/09/2022 12:17	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
13465/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
13465/2	D10 Hearses Rd	312538	6294576	Minor insects, minor vegetation
13465/3	D06 School	313518	6296537	Funnel missing, neck in bottle. Resident hit DG with mower. Funnel replaced.
13465/4	D05 Bund	313160	6296838	
13465/5	D04 Rehab	312385	6296932	
13465/6	D07 Mullock	312579	6296676	
13465/7	D01(A) Front Gate	313290	6297176	Minor sand, minor algae
13465/8	D11 Goldstien	312034	6294213	Minor bird droppings, algae
13465/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 29/09/2022.

Where method is "unknown" sampling procedures are not endorsed



Report Number: 13649

Date Issued: 25/10/2022

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 19/10/2022

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	21/09/2022 12:08	19/10/2022 10:41	13649/1	Dust	Clear sky view obstructed
D10 Hearses Rd	21/09/2022 12:29	19/10/2022 10:49	13649/2	Dust	
D06 School	21/09/2022 11:08	19/10/2022 09:33	13649/3	Dust	
D05 Bund	21/09/2022 11:21	19/10/2022 09:47	13649/4	Dust	
D04 Rehab	21/09/2022 11:43	19/10/2022 10:03	13649/5	Dust	
D07 Mullock	21/09/2022 11:55	19/10/2022 10:17	13649/6	Dust	
D01(A) Front Gate	21/09/2022 11:31	19/10/2022 09:40	13649/7	Dust	
D11 Goldstien	21/09/2022 12:52	19/10/2022 12:37	13649/8	Dust	
D12 Ram	21/09/2022 12:17	19/10/2022 11:08	13649/9	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 25/10/2022.

Test Report Number: 13649

Date Issued: 25/10/2022

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	13649/1 19/10/2022 D08&9 Hitchcock Rd Olive Grove	13649/2 19/10/2022 D10 Hearses Rd	13649/3 19/10/2022 D06 School	13649/4 19/10/2022 D05 Bund	13649/5 19/10/2022 D04 Rehab
	Method	Units					
Date Tested	--	--	21/10/2022	21/10/2022	21/10/2022	21/10/2022	21/10/2022
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.8	1.6	1.0	0.7	0.5
Ash	AS 3580.10.1	g/m2/mth	0.2	1.1	0.4	0.5	0.4
Combustible Matter	AS 3580.10.1	g/m2/mth	0.6	0.5	0.6	0.2	0.1
Calculated Rain	AS 3580.10.1	mm	135	135	141	148	141

Deposited Matter		Lab ID Sample Date Sample ID	13649/6 19/10/2022 D07 Mullock	13649/7 19/10/2022 D01(A) Front Gate	13649/8 19/10/2022 D11 Goldstien	13649/9 19/10/2022 D12 Ram
	Method	Units				
Date Tested	--	--	21/10/2022	21/10/2022	21/10/2022	21/10/2022
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.3	2.2	2.6	0.3
Ash	AS 3580.10.1	g/m2/mth	0.2	2.0	0.8	0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.1	0.2	1.8	0.2
Calculated Rain	AS 3580.10.1	mm	145	115	10	132

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: 13649

Date Issued: 25/10/2022

Revision No: 00

Sampling Conditions: Cloudy, 22°- 25°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
13649/1	D08&9 Hitchcock Rd Olive Grove		T.Walker	19/10/2022 10:41	AS3580.10.1	CuSO4
13649/2	D10 Hearses Rd		T.Walker	19/10/2022 10:49	AS3580.10.1	CuSO4
13649/3	D06 School		T.Walker	19/10/2022 09:33	AS3580.10.1	CuSO4
13649/4	D05 Bund		T.Walker	19/10/2022 09:47	AS3580.10.1	CuSO4
13649/5	D04 Rehab		T.Walker	19/10/2022 10:03	AS3580.10.1	CuSO4
13649/6	D07 Mullock		T.Walker	19/10/2022 10:17	AS3580.10.1	CuSO4
13649/7	D01(A) Front Gate		T.Walker	19/10/2022 09:40	AS3580.10.1	CuSO4
13649/8	D11 Goldstien		T.Walker	19/10/2022 12:37	AS3580.10.1	CuSO4
13649/9	D12 Ram		T.Walker	19/10/2022 11:08	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
13649/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
13649/2	D10 Hearses Rd	312538	6294576	Insects.
13649/3	D06 School	313518	6296537	
13649/4	D05 Bund	313160	6296838	Minor insects.
13649/5	D04 Rehab	312385	6296932	
13649/6	D07 Mullock	312579	6296676	
13649/7	D01(A) Front Gate	313290	6297176	Minor insects.
13649/8	D11 Goldstien	312034	6294213	Insects, algae. Bottle cracked and leaking.
13649/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 25/10/2022.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 13806

Date Issued: 23/11/2022

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 16/11/2022

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	19/10/2022 10:41	16/11/2022 11:58	13806/1	Dust	
D10 Hearses Rd	19/10/2022 10:49	16/11/2022 12:27	13806/2	Dust	
D06 School	19/10/2022 09:33	16/11/2022 10:26	13806/3	Dust	
D05 Bund	19/10/2022 09:47	16/11/2022 10:38	13806/4	Dust	
D04 Rehab	19/10/2022 10:03	16/11/2022 11:26	13806/5	Dust	
D07 Mullock	19/10/2022 10:17	16/11/2022 11:39	13806/6	Dust	
D01(A) Front Gate	19/10/2022 09:40	16/11/2022 10:47	13806/7	Dust	
D11 Goldstien	19/10/2022 12:37	16/11/2022 14:02	13806/8	Dust	
D12 Ram	19/10/2022 11:08	16/11/2022 12:16	13806/9	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 23/11/2022.

Test Report Number: 13806

Date Issued: 23/11/2022

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	13806/1 16/11/2022 D08&9 Hitchcock Rd Olive Grove	13806/2 16/11/2022 D10 Hearses Rd	13806/3 16/11/2022 D06 School	13806/4 16/11/2022 D05 Bund	13806/5 16/11/2022 D04 Rehab
	Method	Units					
Date Tested	--	--	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.4	1.0	0.7	1.0	0.7
Ash	AS 3580.10.1	g/m2/mth	0.7	0.5	0.5	0.7	0.4
Combustible Matter	AS 3580.10.1	g/m2/mth	0.7	0.5	0.2	0.3	0.3
Calculated Rain	AS 3580.10.1	mm	53	52	49	52	45

Deposited Matter		Lab ID Sample Date Sample ID	13806/6 16/11/2022 D07 Mullock	13806/7 16/11/2022 D01(A) Front Gate	13806/8 16/11/2022 D11 Goldstien	13806/9 16/11/2022 D12 Ram
	Method	Units				
Date Tested	--	--	18/11/2022	18/11/2022	18/11/2022	18/11/2022
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.3	2.0	1.2	1.7
Ash	AS 3580.10.1	g/m2/mth	0.3	1.8	0.5	0.7
Combustible Matter	AS 3580.10.1	g/m2/mth	<0.1	0.2	0.7	1.0
Calculated Rain	AS 3580.10.1	mm	49	53	49	49

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: 13806

Date Issued: 23/11/2022

Revision No: 00

Sampling Conditions: Cloudy, 18°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
13806/1	D08&9 Hitchcock Rd Olive Grove		T.Walker	16/11/2022 11:58	AS3580.10.1	CuSO4
13806/2	D10 Hearses Rd		T.Walker	16/11/2022 12:27	AS3580.10.1	CuSO4
13806/3	D06 School		T.Walker	16/11/2022 10:26	AS3580.10.1	CuSO4
13806/4	D05 Bund		T.Walker	16/11/2022 10:38	AS3580.10.1	CuSO4
13806/5	D04 Rehab		T.Walker	16/11/2022 11:26	AS3580.10.1	CuSO4
13806/6	D07 Mullock		T.Walker	16/11/2022 11:39	AS3580.10.1	CuSO4
13806/7	D01(A) Front Gate		T.Walker	16/11/2022 10:47	AS3580.10.1	CuSO4
13806/8	D11 Goldstien		T.Walker	16/11/2022 14:02	AS3580.10.1	CuSO4
13806/9	D12 Ram		T.Walker	16/11/2022 12:16	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
13806/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
13806/2	D10 Hearses Rd	312538	6294576	Minor vegetation, algae.
13806/3	D06 School	313518	6296537	Minor insects.
13806/4	D05 Bund	313160	6296838	Minor vegetation, algae.
13806/5	D04 Rehab	312385	6296932	Minor vegetation.
13806/6	D07 Mullock	312579	6296676	
13806/7	D01(A) Front Gate	313290	6297176	Minor sand.
13806/8	D11 Goldstien	312034	6294213	Minor vegetation.
13806/9	D12 Ram	311750	6294159	Insect, algae.

Sampling procedures have been approved and report finalised on 23/11/2022.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 13940

Date Issued: 21/12/2022

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 14/12/2022

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	16/11/2022 11:58	14/12/2022 10:39	13940/1	Dust	
D10 Hearses Rd	16/11/2022 12:27	14/12/2022 11:10	13940/2	Dust	
D06 School	16/11/2022 10:26	14/12/2022 11:34	13940/3	Dust	
D05 Bund	16/11/2022 10:38	14/12/2022 11:48	13940/4	Dust	
D04 Rehab	16/11/2022 11:26	14/12/2022 12:13	13940/5	Dust	
D07 Mullock	16/11/2022 11:39	14/12/2022 12:22	13940/6	Dust	
D01(A) Front Gate	16/11/2022 10:47	14/12/2022 11:56	13940/7	Dust	
D11 Goldstien	16/11/2022 14:02	14/12/2022 10:58	13940/8	Dust	
D12 Ram	16/11/2022 12:16	14/12/2022 11:22	13940/9	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 21/12/2022.

Test Report Number: 13940

Date Issued: 21/12/2022

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	13940/1 14/12/2022 D08&9 Hitchcock Rd Olive Grove	13940/2 14/12/2022 D10 Hearses Rd	13940/3 14/12/2022 D06 School	13940/4 14/12/2022 D05 Bund	13940/5 14/12/2022 D04 Rehab
	Method	Units					
Date Tested	--	--	20/12/2022	20/12/2022	20/12/2022	20/12/2022	20/12/2022
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.5	0.9	1.3	4.1	1.1
Ash	AS 3580.10.1	g/m2/mth	1.0	0.5	0.6	3.2	0.7
Combustible Matter	AS 3580.10.1	g/m2/mth	0.5	0.4	0.7	0.9	0.4
Calculated Rain	AS 3580.10.1	mm	41	45	39	34	36

Deposited Matter		Lab ID Sample Date Sample ID	13940/6 14/12/2022 D07 Mullock	13940/7 14/12/2022 D01(A) Front Gate	13940/8 14/12/2022 D11 Goldstien	13940/9 14/12/2022 D12 Ram
	Method	Units				
Date Tested	--	--	20/12/2022	20/12/2022	20/12/2022	20/12/2022
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.5	2.3	2.4	0.5
Ash	AS 3580.10.1	g/m2/mth	0.4	2.0	1.1	0.3
Combustible Matter	AS 3580.10.1	g/m2/mth	0.1	0.3	1.3	0.2
Calculated Rain	AS 3580.10.1	mm	35	32	44	39

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: 13940

Date Issued: 21/12/2022

Revision No: 00

Sampling Conditions: 18 - 22 °C, cloudy

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
13940/1	D08&9 Hitchcock Rd Olive Grove		D.Walker	14/12/2022 10:39	AS3580.10.1	CuSO4
13940/2	D10 Hearses Rd		D.Walker	14/12/2022 11:10	AS3580.10.1	CuSO4
13940/3	D06 School		D.Walker	14/12/2022 11:34	AS3580.10.1	CuSO4
13940/4	D05 Bund		D.Walker	14/12/2022 11:48	AS3580.10.1	CuSO4
13940/5	D04 Rehab		D.Walker	14/12/2022 12:13	AS3580.10.1	CuSO4
13940/6	D07 Mullock		D.Walker	14/12/2022 12:22	AS3580.10.1	CuSO4
13940/7	D01(A) Front Gate		D.Walker	14/12/2022 11:56	AS3580.10.1	CuSO4
13940/8	D11 Goldstien		D.Walker	14/12/2022 10:58	AS3580.10.1	CuSO4
13940/9	D12 Ram		D.Walker	14/12/2022 11:22	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
13940/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	Minor vegetation
13940/2	D10 Hearses Rd	312538	6294576	
13940/3	D06 School	313518	6296537	Insects, minor vegetation
13940/4	D05 Bund	313160	6296838	Vegetation, algae. Vegetation in capture zone.
13940/5	D04 Rehab	312385	6296932	Minor vegetation.
13940/6	D07 Mullock	312579	6296676	
13940/7	D01(A) Front Gate	313290	6297176	Minor sand
13940/8	D11 Goldstien	312034	6294213	Vegetation.
13940/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 21/12/2022.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 14052

Date Issued: 19/01/2023

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 11/01/2023

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	14/12/2022 10:39	11/01/2023 11:38	14052/1	Dust	
D10 Hearses Rd	14/12/2022 11:10	11/01/2023 12:04	14052/2	Dust	
D06 School	14/12/2022 11:34	11/01/2023 10:34	14052/3	Dust	
D05 Bund	14/12/2022 11:48	11/01/2023 10:46	14052/4	Dust	
D04 Rehab	14/12/2022 12:13	11/01/2023 11:12	14052/5	Dust	
D07 Mullock	14/12/2022 12:22	11/01/2023 11:24	14052/6	Dust	
D01(A) Front Gate	14/12/2022 11:56	11/01/2023 10:57	14052/7	Dust	
D11 Goldstien	14/12/2022 10:58	11/01/2023 13:16	14052/8	Dust	
D12 Ram	14/12/2022 11:22	11/01/2023 11:51	14052/9	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 19/01/2023.

Test Report Number: 14052

Date Issued: 19/01/2023

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	14052/1 11/01/2023 D08&9 Hitchcock Rd Olive Grove	14052/2 11/01/2023 D10 Hearses Rd	14052/3 11/01/2023 D06 School	14052/4 11/01/2023 D05 Bund	14052/5 11/01/2023 D04 Rehab
	Method	Units					
Date Tested	--	--	17/01/2023	17/01/2023	17/01/2023	17/01/2023	17/01/2023
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.5	0.2	0.4	1.8	0.7
Ash	AS 3580.10.1	g/m2/mth	0.4	0.2	0.2	0.9	0.3
Combustible Matter	AS 3580.10.1	g/m2/mth	0.1	<0.1	0.2	0.9	0.4
Calculated Rain	AS 3580.10.1	mm	67	68	53	47	50

Deposited Matter		Lab ID Sample Date Sample ID	14052/6 11/01/2023 D07 Mullock	14052/7 11/01/2023 D01(A) Front Gate	14052/8 11/01/2023 D11 Goldstien	14052/9 11/01/2023 D12 Ram
	Method	Units				
Date Tested	--	--	17/01/2023	17/01/2023	17/01/2023	17/01/2023
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.4	0.7	2.1	0.6
Ash	AS 3580.10.1	g/m2/mth	0.2	0.5	1.0	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	0.2	0.2	1.1	0.4
Calculated Rain	AS 3580.10.1	mm	51	49	76	84

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: 14052

Date Issued: 19/01/2023

Revision No: 00

Sampling Conditions: Cloudy, 24°- 27°C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
14052/1	D08&9 Hitchcock Rd Olive Grove		T.Walker	11/01/2023 11:38	AS3580.10.1	CuSO4
14052/2	D10 Hearses Rd		T.Walker	11/01/2023 12:04	AS3580.10.1	CuSO4
14052/3	D06 School		T.Walker	11/01/2023 10:34	AS3580.10.1	CuSO4
14052/4	D05 Bund		T.Walker	11/01/2023 10:46	AS3580.10.1	CuSO4
14052/5	D04 Rehab		T.Walker	11/01/2023 11:12	AS3580.10.1	CuSO4
14052/6	D07 Mullock		T.Walker	11/01/2023 11:24	AS3580.10.1	CuSO4
14052/7	D01(A) Front Gate		T.Walker	11/01/2023 10:57	AS3580.10.1	CuSO4
14052/8	D11 Goldstien		T.Walker	11/01/2023 13:16	AS3580.10.1	CuSO4
14052/9	D12 Ram		T.Walker	11/01/2023 11:51	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
14052/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	Minor insects - Adjacent olive tree encroaching funnel capture zone
14052/2	D10 Hearses Rd	312538	6294576	
14052/3	D06 School	313518	6296537	Minor insects
14052/4	D05 Bund	313160	6296838	Minor vegetation & algae - Adjacent wattles encroaching funnel capture zone.
14052/5	D04 Rehab	312385	6296932	
14052/6	D07 Mullock	312579	6296676	
14052/7	D01(A) Front Gate	313290	6297176	Minor insects
14052/8	D11 Goldstien	312034	6294213	Minor insects, vegetation & algae
14052/9	D12 Ram	311750	6294159	Minor insects

Sampling procedures have been approved and report finalised on 19/01/2023.

Where method is "unknown" sampling procedures are not endorsed



Report Number: 14153

Date Issued: 16/02/2023

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 8/02/2023

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	11/01/2023 11:38	08/02/2023 12:01	14153/1	Dust	Clear sky obstruction.
D10 Hearses Rd	11/01/2023 12:04	08/02/2023 12:37	14153/2	Dust	
D06 School	11/01/2023 10:34	08/02/2023 10:54	14153/3	Dust	
D05 Bund	11/01/2023 10:46	08/02/2023 11:08	14153/4	Dust	Clear sky obstruction.
D04 Rehab	11/01/2023 11:12	08/02/2023 11:31	14153/5	Dust	
D07 Mullock	11/01/2023 11:24	08/02/2023 11:45	14153/6	Dust	
D01(A) Front Gate	11/01/2023 10:57	08/02/2023 11:18	14153/7	Dust	
D11 Goldstien	11/01/2023 13:16	08/02/2023 13:21	14153/8	Dust	
D12 Ram	11/01/2023 11:51	08/02/2023 12:23	14153/9	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 16/02/2023.

Test Report Number: 14153

Date Issued: 16/02/2023

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	14153/1 8/02/2023 D08&9 Hitchcock Rd Olive Grove	14153/2 8/02/2023 D10 Hearses Rd	14153/3 8/02/2023 D06 School	14153/4 8/02/2023 D05 Bund	14153/5 8/02/2023 D04 Rehab
	Method	Units					
Date Tested	--	--	14/02/2023	14/02/2023	14/02/2023	14/02/2023	14/02/2023
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.9	0.4	0.5	1.6	0.6
Ash	AS 3580.10.1	g/m2/mth	0.5	0.2	0.2	1.0	0.4
Combustible Matter	AS 3580.10.1	g/m2/mth	0.4	0.2	0.3	0.6	0.2
Calculated Rain	AS 3580.10.1	mm	164	176	162	127	151

Deposited Matter		Lab ID Sample Date Sample ID	14153/6 8/02/2023 D07 Mullock	14153/7 8/02/2023 D01(A) Front Gate	14153/8 8/02/2023 D11 Goldstien	14153/9 8/02/2023 D12 Ram
	Method	Units				
Date Tested	--	--	14/02/2023	14/02/2023	14/02/2023	14/02/2023
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.4	0.8	0.8	0.5
Ash	AS 3580.10.1	g/m2/mth	0.3	0.7	0.3	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	0.1	0.1	0.5	0.3
Calculated Rain	AS 3580.10.1	mm	152	113	192	186

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: 14153

Date Issued: 16/02/2023

Revision No: 00

Sampling Conditions: Cloudy, 24°- 28°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
14153/1	D08&9 Hitchcock Rd Olive Grove		T & D.Walker	08/02/2023 12:01	AS3580.10.1	CuSO4
14153/2	D10 Hearses Rd		T & D.Walker	08/02/2023 12:37	AS3580.10.1	CuSO4
14153/3	D06 School		T & D.Walker	08/02/2023 10:54	AS3580.10.1	CuSO4
14153/4	D05 Bund		T & D.Walker	08/02/2023 11:08	AS3580.10.1	CuSO4
14153/5	D04 Rehab		T & D.Walker	08/02/2023 11:31	AS3580.10.1	CuSO4
14153/6	D07 Mullock		T & D.Walker	08/02/2023 11:45	AS3580.10.1	CuSO4
14153/7	D01(A) Front Gate		T & D.Walker	08/02/2023 11:18	AS3580.10.1	CuSO4
14153/8	D11 Goldstien		T & D.Walker	08/02/2023 13:21	AS3580.10.1	CuSO4
14153/9	D12 Ram		T & D.Walker	08/02/2023 12:23	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
14153/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	Minor vegetation
14153/2	D10 Hearses Rd	312538	6294576	
14153/3	D06 School	313518	6296537	Minor insects
14153/4	D05 Bund	313160	6296838	Minor insects, minor vegetation
14153/5	D04 Rehab	312385	6296932	Minor vegetation.
14153/6	D07 Mullock	312579	6296676	
14153/7	D01(A) Front Gate	313290	6297176	
14153/8	D11 Goldstien	312034	6294213	
14153/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 16/02/2023.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 14277

Date Issued: 16/03/2023

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 8/03/2023

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	08/02/2023 12:01	08/03/2023 11:51	14277/1	Dust	
D10 Hearses Rd	08/02/2023 12:37	08/03/2023 12:21	14277/2	Dust	
D06 School	08/02/2023 10:54	08/03/2023 10:42	14277/3	Dust	
D05 Bund	08/02/2023 11:08	08/03/2023 10:52	14277/4	Dust	
D04 Rehab	08/02/2023 11:31	08/03/2023 11:19	14277/5	Dust	
D07 Mullock	08/02/2023 11:45	08/03/2023 11:33	14277/6	Dust	
D01(A) Front Gate	08/02/2023 11:18	08/03/2023 11:01	14277/7	Dust	
D11 Goldstien	08/02/2023 13:21	08/03/2023 13:32	14277/8	Dust	
D12 Ram	08/02/2023 12:23	08/03/2023 12:06	14277/9	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 16/03/2023.

Test Report Number: 14277

Date Issued: 16/03/2023

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	14277/1 8/03/2023 D08&9 Hitchcock Rd Olive Grove	14277/2 8/03/2023 D10 Hearses Rd	14277/3 8/03/2023 D06 School	14277/4 8/03/2023 D05 Bund	14277/5 8/03/2023 D04 Rehab
	Method	Units					
Date Tested	--	--	14/03/2023	14/03/2023	14/03/2023	14/03/2023	14/03/2023
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.9	0.4	1.1	1.6	0.9
Ash	AS 3580.10.1	g/m2/mth	0.5	0.3	0.5	1.1	0.4
Combustible Matter	AS 3580.10.1	g/m2/mth	0.4	0.1	0.6	0.5	0.5
Calculated Rain	AS 3580.10.1	mm	165	172	144	145	144

Deposited Matter		Lab ID Sample Date Sample ID	14277/6 8/03/2023 D07 Mullock	14277/7 8/03/2023 D01(A) Front Gate	14277/8 8/03/2023 D11 Goldstien	14277/9 8/03/2023 D12 Ram
	Method	Units				
Date Tested	--	--	14/03/2023	14/03/2023	14/03/2023	14/03/2023
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.4	1.5	1.0	0.9
Ash	AS 3580.10.1	g/m2/mth	0.1	1.2	0.3	0.4
Combustible Matter	AS 3580.10.1	g/m2/mth	0.3	0.3	0.7	0.5
Calculated Rain	AS 3580.10.1	mm	151	115	182	183

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: 14277

Date Issued: 16/03/2023

Revision No: 00

Sampling Conditions: Fine, 25°- 30°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
14277/1	D08&9 Hitchcock Rd Olive Grove		T.Walker	08/03/2023 11:51	AS3580.10.1	CuSO4
14277/2	D10 Hearses Rd		T.Walker	08/03/2023 12:21	AS3580.10.1	CuSO4
14277/3	D06 School		T.Walker	08/03/2023 10:42	AS3580.10.1	CuSO4
14277/4	D05 Bund		T.Walker	08/03/2023 10:52	AS3580.10.1	CuSO4
14277/5	D04 Rehab		T.Walker	08/03/2023 11:19	AS3580.10.1	CuSO4
14277/6	D07 Mullock		T.Walker	08/03/2023 11:33	AS3580.10.1	CuSO4
14277/7	D01(A) Front Gate		T.Walker	08/03/2023 11:01	AS3580.10.1	CuSO4
14277/8	D11 Goldstien		T.Walker	08/03/2023 13:32	AS3580.10.1	CuSO4
14277/9	D12 Ram		T.Walker	08/03/2023 12:06	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
14277/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	Minor insects.
14277/2	D10 Hearses Rd	312538	6294576	
14277/3	D06 School	313518	6296537	Vegetation.
14277/4	D05 Bund	313160	6296838	Minor insects, minor vegetation.
14277/5	D04 Rehab	312385	6296932	Minor insects.
14277/6	D07 Mullock	312579	6296676	
14277/7	D01(A) Front Gate	313290	6297176	Minor sand, minor insects.
14277/8	D11 Goldstien	312034	6294213	Minor vegetation.
14277/9	D12 Ram	311750	6294159	Minor insects.

Sampling procedures have been approved and report finalised on 16/03/2023.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 14394

Date Issued: 14/04/2023

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 5/04/2023

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	08/03/2023 11:51	05/04/2023 11:40	14394/1	Dust	
D10 Hearses Rd	08/03/2023 12:21	05/04/2023 12:05	14394/2	Dust	
D06 School	08/03/2023 10:42	05/04/2023 10:39	14394/3	Dust	
D05 Bund	08/03/2023 10:52	05/04/2023 10:51	14394/4	Dust	Clear Sky 120° Fail/10m Clearance Fail -Trees
D04 Rehab	08/03/2023 11:19	05/04/2023 11:16	14394/5	Dust	
D07 Mullock	08/03/2023 11:33	05/04/2023 11:28	14394/6	Dust	
D01(A) Front Gate	08/03/2023 11:01	05/04/2023 11:02	14394/7	Dust	
D11 Goldstien	08/03/2023 13:32	05/04/2023 13:03	14394/8	Dust	
D12 Ram	08/03/2023 12:06	05/04/2023 11:53	14394/9	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 14/04/2023.

Test Report Number: 14394

Date Issued: 14/04/2023

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	14394/1 5/04/2023 D08&9 Hitchcock Rd Olive Grove	14394/2 5/04/2023 D10 Hearses Rd	14394/3 5/04/2023 D06 School	14394/4 5/04/2023 D05 Bund	14394/5 5/04/2023 D04 Rehab
	Method	Units					
Date Tested	--	--	12/04/2023	12/04/2023	12/04/2023	12/04/2023	12/04/2023
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.7	1.3	1.1	1.2	0.4
Ash	AS 3580.10.1	g/m2/mth	0.4	1.0	0.4	0.4	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	0.3	0.3	0.7	0.8	0.2
Calculated Rain	AS 3580.10.1	mm	83	74	82	89	78

Deposited Matter		Lab ID Sample Date Sample ID	14394/6 5/04/2023 D07 Mullock	14394/7 5/04/2023 D01(A) Front Gate	14394/8 5/04/2023 D11 Goldstien	14394/9 5/04/2023 D12 Ram
	Method	Units				
Date Tested	--	--	12/04/2023	12/04/2023	12/04/2023	12/04/2023
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	0.7	1.5
Ash	AS 3580.10.1	g/m2/mth	0.2	1.8	0.2	0.7
Combustible Matter	AS 3580.10.1	g/m2/mth	<0.1	0.3	0.5	0.8
Calculated Rain	AS 3580.10.1	mm	83	88	71	70

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: 14394

Date Issued: 14/04/2023

Revision No: 00

Sampling Conditions: Cloudy, 20°- 24°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
14394/1	D08&9 Hitchcock Rd Olive Grove		T.Walker	05/04/2023 11:40	AS3580.10.1	CuSO4
14394/2	D10 Hearses Rd		T.Walker	05/04/2023 12:05	AS3580.10.1	CuSO4
14394/3	D06 School		T.Walker	05/04/2023 10:39	AS3580.10.1	CuSO4
14394/4	D05 Bund		T.Walker	05/04/2023 10:51	AS3580.10.1	CuSO4
14394/5	D04 Rehab		T.Walker	05/04/2023 11:16	AS3580.10.1	CuSO4
14394/6	D07 Mullock		T.Walker	05/04/2023 11:28	AS3580.10.1	CuSO4
14394/7	D01(A) Front Gate		T.Walker	05/04/2023 11:02	AS3580.10.1	CuSO4
14394/8	D11 Goldstien		T.Walker	05/04/2023 13:03	AS3580.10.1	CuSO4
14394/9	D12 Ram		T.Walker	05/04/2023 11:53	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
14394/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
14394/2	D10 Hearses Rd	312538	6294576	
14394/3	D06 School	313518	6296537	Insects.
14394/4	D05 Bund	313160	6296838	Vegetation
14394/5	D04 Rehab	312385	6296932	
14394/6	D07 Mullock	312579	6296676	
14394/7	D01(A) Front Gate	313290	6297176	Minor sand, minor insects
14394/8	D11 Goldstien	312034	6294213	Minor insects
14394/9	D12 Ram	311750	6294159	Insects

Sampling procedures have been approved and report finalised on 14/04/2023.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 14556

Date Issued: 12/05/2023

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 4/05/2023

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	05/04/2023 11:40	03/05/2023 12:43	14556/1	Dust	Adjacent olive will need trimming prior to next month to ensure compliance
D10 Hearses Rd	05/04/2023 12:05	03/05/2023 13:17	14556/2	Dust	
D06 School	05/04/2023 10:39	03/05/2023 12:36	14556/3	Dust	
D05 Bund	05/04/2023 10:51	03/05/2023 12:17	14556/4	Dust	Non compliant due to trees
D04 Rehab	05/04/2023 11:16	03/05/2023 11:36	14556/5	Dust	Adjacent eucalypt sapling on pond side will need trimming prior to next month to ensure compliance
D07 Mullock	05/04/2023 11:28	03/05/2023 11:52	14556/6	Dust	
D01(A) Front Gate	05/04/2023 11:02	03/05/2023 11:14	14556/7	Dust	
D11 Goldstien	05/04/2023 13:03	03/05/2023 14:16	14556/8	Dust	
D12 Ram	05/04/2023 11:53	03/05/2023 12:59	14556/9	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 12/05/2023.

Test Report Number: 14556

Date Issued: 12/05/2023

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	14556/1 3/05/2023 D08&9 Hitchcock Rd Olive Grove	14556/2 3/05/2023 D10 Hearses Rd	14556/3 3/05/2023 D06 School	14556/4 3/05/2023 D05 Bund	14556/5 3/05/2023 D04 Rehab
	Method	Units					
Date Tested	--	--	10/05/2023	10/05/2023	10/05/2023	10/05/2023	10/05/2023
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.6	2.0	0.4	0.7	0.4
Ash	AS 3580.10.1	g/m2/mth	0.4	1.1	0.2	0.4	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	0.2	0.9	0.2	0.3	0.2
Calculated Rain	AS 3580.10.1	mm	60	60	57	58	57

Deposited Matter		Lab ID Sample Date Sample ID	14556/6 3/05/2023 D07 Mullock	14556/7 3/05/2023 D01(A) Front Gate	14556/8 3/05/2023 D11 Goldstien	14556/9 3/05/2023 D12 Ram
	Method	Units				
Date Tested	--	--	10/05/2023	10/05/2023	10/05/2023	10/05/2023
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.7	33.6	1.2	0.5
Ash	AS 3580.10.1	g/m2/mth	0.5	32.8	0.7	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	0.2	0.8	0.5	0.3
Calculated Rain	AS 3580.10.1	mm	58	61	64	67

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: 14556

Date Issued: 12/05/2023

Revision No: 00

Sampling Conditions: Fine, 21°- 23°C. Winds wnw @ 40km/hr

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
14556/1	D08&9 Hitchcock Rd Olive Grove		T.Walker	03/05/2023 12:43	AS3580.10.1	CuSO4
14556/2	D10 Hearses Rd		T.Walker	03/05/2023 13:17	AS3580.10.1	CuSO4
14556/3	D06 School		T.Walker	03/05/2023 12:36	AS3580.10.1	CuSO4
14556/4	D05 Bund		T.Walker	03/05/2023 12:17	AS3580.10.1	CuSO4
14556/5	D04 Rehab		T.Walker	03/05/2023 11:36	AS3580.10.1	CuSO4
14556/6	D07 Mullock		T.Walker	03/05/2023 11:52	AS3580.10.1	CuSO4
14556/7	D01(A) Front Gate		T.Walker	03/05/2023 11:14	AS3580.10.1	CuSO4
14556/8	D11 Goldstien		T.Walker	03/05/2023 14:16	AS3580.10.1	CuSO4
14556/9	D12 Ram		T.Walker	03/05/2023 12:59	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
14556/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	Adjacent olive will need trimming prior to next month to ensure compliance
14556/2	D10 Hearses Rd	312538	6294576	Minor vegetation, algae, bird droppings in funnel
14556/3	D06 School	313518	6296537	Minor insects
14556/4	D05 Bund	313160	6296838	Minor insects, minor vegetation.
14556/5	D04 Rehab	312385	6296932	Adjacent eucalypt sapling on pond side will need trimming prior to next month to ensure compliance
14556/6	D07 Mullock	312579	6296676	Very minor sand
14556/7	D01(A) Front Gate	313290	6297176	Major sand - Strong westerly winds, water cart active on site
14556/8	D11 Goldstien	312034	6294213	Minor insects, minor vegetation
14556/9	D12 Ram	311750	6294159	Minor insects

Sampling procedures have been approved and report finalised on 12/05/2023.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 14654

Date Issued: 9/06/2023

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 31/05/2023

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	03/05/2023 12:43	31/05/2023 12:21	14654/1	Dust	
D10 Hearses Rd	03/05/2023 13:17	31/05/2023 12:46	14654/2	Dust	
D06 School	03/05/2023 12:36	31/05/2023 11:09	14654/3	Dust	
D05 Bund	03/05/2023 12:17	31/05/2023 11:23	14654/4	Dust	
D04 Rehab	03/05/2023 11:36	31/05/2023 11:51	14654/5	Dust	2x small saplings on dam side need removing to allow clear sky compliance
D07 Mullock	03/05/2023 11:52	31/05/2023 12:04	14654/6	Dust	
D01(A) Front Gate	03/05/2023 11:14	31/05/2023 11:34	14654/7	Dust	
D11 Goldstien	03/05/2023 14:16	31/05/2023 13:49	14654/8	Dust	
D12 Ram	03/05/2023 12:59	31/05/2023 12:36	14654/9	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 9/06/2023.

Test Report Number: 14654

Date Issued: 9/06/2023

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	14654/1 31/05/2023 D08&9 Hitchcock Rd Olive Grove	14654/2 31/05/2023 D10 Hearses Rd	14654/3 31/05/2023 D06 School	14654/4 31/05/2023 D05 Bund	14654/5 31/05/2023 D04 Rehab
	Method	Units					
Date Tested	--	--	7/06/2023	7/06/2023	7/06/2023	7/06/2023	7/06/2023
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.3	3.6	0.4	0.7	0.3
Ash	AS 3580.10.1	g/m2/mth	0.2	2.1	0.2	0.4	<0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.1	1.5	0.2	0.3	0.3
Calculated Rain	AS 3580.10.1	mm	16	16	21	22	22

Deposited Matter		Lab ID Sample Date Sample ID	14654/6 31/05/2023 D07 Mullock	14654/7 31/05/2023 D01(A) Front Gate	14654/8 31/05/2023 D11 Goldstien	14654/9 31/05/2023 D12 Ram
	Method	Units				
Date Tested	--	--	7/06/2023	7/06/2023	7/06/2023	7/06/2023
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	18.0	2.6	0.3	0.2
Ash	AS 3580.10.1	g/m2/mth	17.3	2.4	0.1	<0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.7	0.2	0.2	0.2
Calculated Rain	AS 3580.10.1	mm	23	21	13	15

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: 14654

Date Issued: 9/06/2023

Revision No: 00

Sampling Conditions: Cloudy, 19°- 21°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
14654/1	D08&9 Hitchcock Rd Olive Grove		T.Walker	31/05/2023 12:21	AS3580.10.1	CuSO4
14654/2	D10 Hearses Rd		T.Walker	31/05/2023 12:46	AS3580.10.1	CuSO4
14654/3	D06 School		T.Walker	31/05/2023 11:09	AS3580.10.1	CuSO4
14654/4	D05 Bund		T.Walker	31/05/2023 11:23	AS3580.10.1	CuSO4
14654/5	D04 Rehab		T.Walker	31/05/2023 11:51	AS3580.10.1	CuSO4
14654/6	D07 Mullock		T.Walker	31/05/2023 12:04	AS3580.10.1	CuSO4
14654/7	D01(A) Front Gate		T.Walker	31/05/2023 11:34	AS3580.10.1	CuSO4
14654/8	D11 Goldstien		T.Walker	31/05/2023 13:49	AS3580.10.1	CuSO4
14654/9	D12 Ram		T.Walker	31/05/2023 12:36	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
14654/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
14654/2	D10 Hearses Rd	312538	6294576	Bird droppings, algae, minor insects & vegetation. - Paddock slashed.
14654/3	D06 School	313518	6296537	
14654/4	D05 Bund	313160	6296838	Minor vegetation
14654/5	D04 Rehab	312385	6296932	
14654/6	D07 Mullock	312579	6296676	Sand (large particle size)
14654/7	D01(A) Front Gate	313290	6297176	Minor sand - visible airborne dust on entrance road
14654/8	D11 Goldstien	312034	6294213	Minor vegetation
14654/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 9/06/2023.

Where method is "unknown" sampling procedures are not endorsed



Report Number: 14746

Date Issued: 5/07/2023

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 28/06/2023

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	31/05/2023 12:21	28/06/2023 10:44	14746/1	Dust	
D10 Hearses Rd	31/05/2023 12:46	28/06/2023 11:11	14746/2	Dust	
D06 School	31/05/2023 11:09	28/06/2023 11:33	14746/3	Dust	
D05 Bund	31/05/2023 11:23	28/06/2023 11:44	14746/4	Dust	
D04 Rehab	31/05/2023 11:51	28/06/2023 12:10	14746/5	Dust	
D07 Mullock	31/05/2023 12:04	28/06/2023 12:21	14746/6	Dust	
D01(A) Front Gate	31/05/2023 11:34	28/06/2023 11:53	14746/7	Dust	
D11 Goldstien	31/05/2023 13:49	28/06/2023 10:56	14746/8	Dust	
D12 Ram	31/05/2023 12:36	28/06/2023 11:26	14746/9	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 5/07/2023.

Test Report Number: 14746

Date Issued: 5/07/2023

Revision No: 00

Results

Deposited Matter		Lab ID Sample Date Sample ID	14746/1 28/06/2023 D08&9 Hitchcock Rd Olive Grove	14746/2 28/06/2023 D10 Hearses Rd	14746/3 28/06/2023 D06 School	14746/4 28/06/2023 D05 Bund	14746/5 28/06/2023 D04 Rehab
	Method	Units					
Date Tested	--	--	30/06/2023	30/06/2023	30/06/2023	30/06/2023	30/06/2023
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.7	6.3	0.6	0.6	0.2
Ash	AS 3580.10.1	g/m2/mth	0.5	3.0	0.3	0.3	0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.2	3.3	0.3	0.3	0.1
Calculated Rain	AS 3580.10.1	mm	16	13	15	15	12

Deposited Matter		Lab ID Sample Date Sample ID	14746/6 28/06/2023 D07 Mullock	14746/7 28/06/2023 D01(A) Front Gate	14746/8 28/06/2023 D11 Goldstien	14746/9 28/06/2023 D12 Ram
	Method	Units				
Date Tested	--	--	30/06/2023	30/06/2023	30/06/2023	30/06/2023
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.3	2.1	0.5	0.3
Ash	AS 3580.10.1	g/m2/mth	0.2	1.7	0.2	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	0.1	0.4	0.3	0.1
Calculated Rain	AS 3580.10.1	mm	14	14	12	13

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: 14746

Date Issued: 5/07/2023

Revision No: 00

Sampling Conditions: 9 °C, cloudy

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
14746/1	D08&9 Hitchcock Rd Olive Grove		D.Walker	28/06/2023 10:44	AS3580.10.1	CuSO4
14746/2	D10 Hearses Rd		D.Walker	28/06/2023 11:11	AS3580.10.1	CuSO4
14746/3	D06 School		D.Walker	28/06/2023 11:33	AS3580.10.1	CuSO4
14746/4	D05 Bund		D.Walker	28/06/2023 11:44	AS3580.10.1	CuSO4
14746/5	D04 Rehab		D.Walker	28/06/2023 12:10	AS3580.10.1	CuSO4
14746/6	D07 Mullock		D.Walker	28/06/2023 12:21	AS3580.10.1	CuSO4
14746/7	D01(A) Front Gate		D.Walker	28/06/2023 11:53	AS3580.10.1	CuSO4
14746/8	D11 Goldstien		D.Walker	28/06/2023 10:56	AS3580.10.1	CuSO4
14746/9	D12 Ram		D.Walker	28/06/2023 11:26	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
14746/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
14746/2	D10 Hearses Rd	312538	6294576	Major vegetation, bird droppings, algae. Paddock recently slashed
14746/3	D06 School	313518	6296537	Minor vegetation
14746/4	D05 Bund	313160	6296838	Minor vegetation
14746/5	D04 Rehab	312385	6296932	Minor vegetation, tree approaching capture zone
14746/6	D07 Mullock	312579	6296676	
14746/7	D01(A) Front Gate	313290	6297176	Minor sand
14746/8	D11 Goldstien	312034	6294213	Minor vegetation
14746/9	D12 Ram	311750	6294159	Minor insects

Sampling procedures have been approved and report finalised on 5/07/2023.

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 2022

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 24 August 2022

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 2022 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 results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The 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 2022 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 75% of valid meteorological data was recorded for July 2022. Loss of valid data was due to a faulty humidity sensor (replaced 2/8/2022) and a power outage (5-6 July 2022).

Approximately 94% of TEOM data was recovered for July 2022. Loss of Loss of valid data was due to a power outage (5-6 July 2022).

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or OEH (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.

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 2022 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted 2 August 2022 (rescheduled from June 2022) with the next calibration due to be completed in September 2022. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for June 2022 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2022.

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)
1/07/2022	13.9	13.9	34.8	34.8
2/07/2022	5.4	9.7	13.5	24.1
3/07/2022	5.9	8.4	14.8	21.0
4/07/2022	6.0	7.8	15.0	19.5
5/07/2022	No Valid Data	7.8	No Valid Data	19.5
6/07/2022	No Valid Data	7.8	No Valid Data	19.5
7/07/2022	2.1	6.7	5.3	16.7
8/07/2022	5.9	6.5	14.8	16.3
9/07/2022	5.8	6.4	14.5	16.1
10/07/2022	7.1	6.5	17.8	16.3
11/07/2022	6.3	6.5	15.8	16.2
12/07/2022	9.4	6.8	23.5	17.0
13/07/2022	5.6	6.7	14.0	16.7
14/07/2022	7.6	6.8	19.0	16.9
15/07/2022	12.0	7.2	30.0	17.9
16/07/2022	6.0	7.1	15.0	17.7
17/07/2022	7.1	7.1	17.8	17.7
18/07/2022	9.2	7.2	23.0	18.0
19/07/2022	9.0	7.3	22.5	18.3
20/07/2022	7.7	7.3	19.3	18.3
21/07/2022	6.1	7.3	15.3	18.2
22/07/2022	6.4	7.2	16.0	18.1
23/07/2022	5.9	7.2	14.8	17.9
24/07/2022	6.2	7.1	15.5	17.8
25/07/2022	12.0	7.3	30.0	18.3
26/07/2022	8.0	7.4	20.0	18.4
27/07/2022	10.0	7.5	25.0	18.7
28/07/2022	11.3	7.6	28.3	19.0
29/07/2022	8.6	7.6	21.5	19.1
30/07/2022	10.2	7.7	25.5	19.3
31/07/2022	9.4	7.8	23.5	19.5

*Calculated from PM10

**Calculated from PM10 Annual Average

“No Valid Data” – when displayed, indicates when no valid 1-hour data is available to calculate a 24hr average (5-6 July 2022 power outage)

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

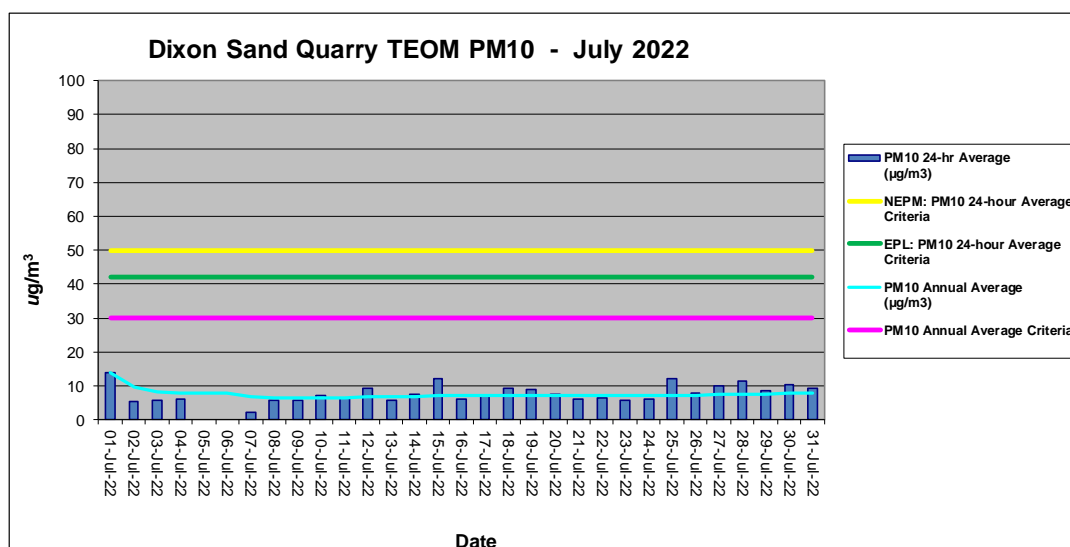


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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.

An annual physical screening and system check of the meteorological station was conducted March 2022 and is next due in March 2023. The screening and system check certificates are provided in **Appendix 1** (when required).

Table 3: Meteorological Data Summary for July 2022

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
1/07/2022	8.6	9.6	10.9	5.0	0.5	4.0	9.6				1002.6	1004.0	1005.7
2/07/2022	9.4	11.5	13.6	14.8	0.2	4.2	14.7				997.8	999.9	1002.7
3/07/2022	12.6	13.3	14.1	104.2	0.3	6.6	27.2				994.1	996.3	998.4
4/07/2022	11.5	13.1	14.7	100.4	0.2	5.2	17.1				993.2	994.8	997.1
5/07/2022				0.0									
6/07/2022				5.6									
7/07/2022	7.6	12.8	17.4	1.2	0.2	4.9	18.2				989.0	990.9	992.5
8/07/2022	6.5	9.5	14.4	0.0	0.0	3.7	15.2				990.4	991.9	994.0
9/07/2022	6.9	10.4	14.8	0.0	0.3	3.1	11.1				993.6	996.8	999.9
10/07/2022	6.6	9.4	13.6	22.6	0.8	5.4	17.6				999.5	1002.6	1005.2
11/07/2022	8.4	10.5	14.6	0.6	0.2	3.5	14.1				999.5	1002.8	1005.2
12/07/2022	6.3	10.4	15.8	1.4	0.0	2.3	17.4				993.3	995.8	999.5
13/07/2022	5.6	9.3	13.2	0.0	0.0	4.2	15.7				991.5	993.2	996.0
14/07/2022	7.0	9.8	13.6	0.0	0.1	6.3	26.6				996.0	1001.1	1005.6
15/07/2022	3.9	9.2	15.2	0.0	0.1	2.5	8.5				1004.2	1005.8	1007.9
16/07/2022	5.5	10.6	15.9	0.0	0.0	4.8	13.4				999.2	1002.4	1005.1
17/07/2022	10.1	14.6	18.8	0.0	0.6	8.7	42.4				991.7	994.9	999.2
18/07/2022	6.3	11.2	14.8	0.0	0.2	4.7	23.7				991.6	996.7	1003.1
19/07/2022	5.5	8.3	12.4	2.4	0.0	4.7	18.2				1003.1	1006.4	1009.4
20/07/2022	7.1	9.4	13.7	1.2	0.2	2.9	7.6				1008.3	1010.2	1011.8
21/07/2022	8.4	10.4	13.0	26.4	0.2	2.3	9.0				1009.3	1010.5	1012.0
22/07/2022	9.6	11.5	15.2	6.2	0.1	3.1	17.1				1005.9	1008.0	1010.0
23/07/2022	9.7	11.5	15.6	2.8	0.1	2.6	10.0				1002.4	1004.1	1006.1
24/07/2022	9.1	12.1	16.4	0.2	0.0	2.2	7.8				1000.0	1001.7	1003.4
25/07/2022	8.1	12.2	17.4	0.2	0.1	3.1	12.6				994.2	998.1	1001.2
26/07/2022	7.8	12.0	18.0	2.6	0.5	5.3	17.5				988.3	991.4	994.1
27/07/2022	6.2	10.6	16.2	0.0	0.0	3.5	15.1				992.9	996.7	1001.6
28/07/2022	8.4	12.3	17.5	0.0	0.1	2.7	10.9				1000.5	1001.7	1003.4
29/07/2022	7.3	10.7	15.3	0.0	0.1	3.8	17.9				1000.9	1003.1	1006.3
30/07/2022	3.8	9.2	15.0	0.0	0.1	2.9	10.5				1004.9	1006.4	1008.6
31/07/2022	5.6	11.0	16.0	0.0	0.5	4.3	15.5				997.4	1002.0	1005.6
Monthly	3.8	10.9	18.8	297.8	0.0	4.1	42.4	0.0	#DIV/0!	0.0	988.3	1000.4	1012.0

Faulty humidity sensor & power outage (5-6 July 2022)

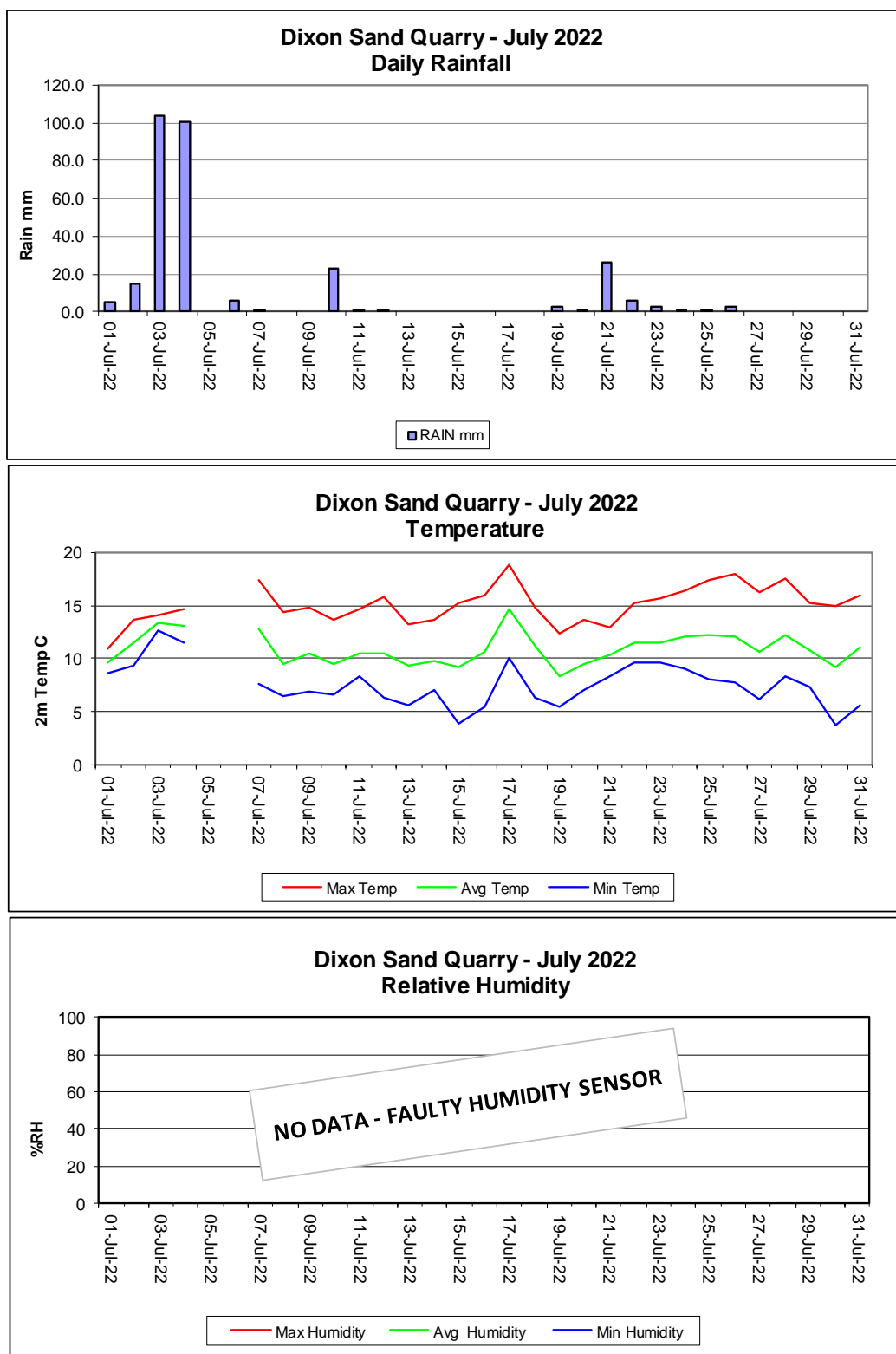


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

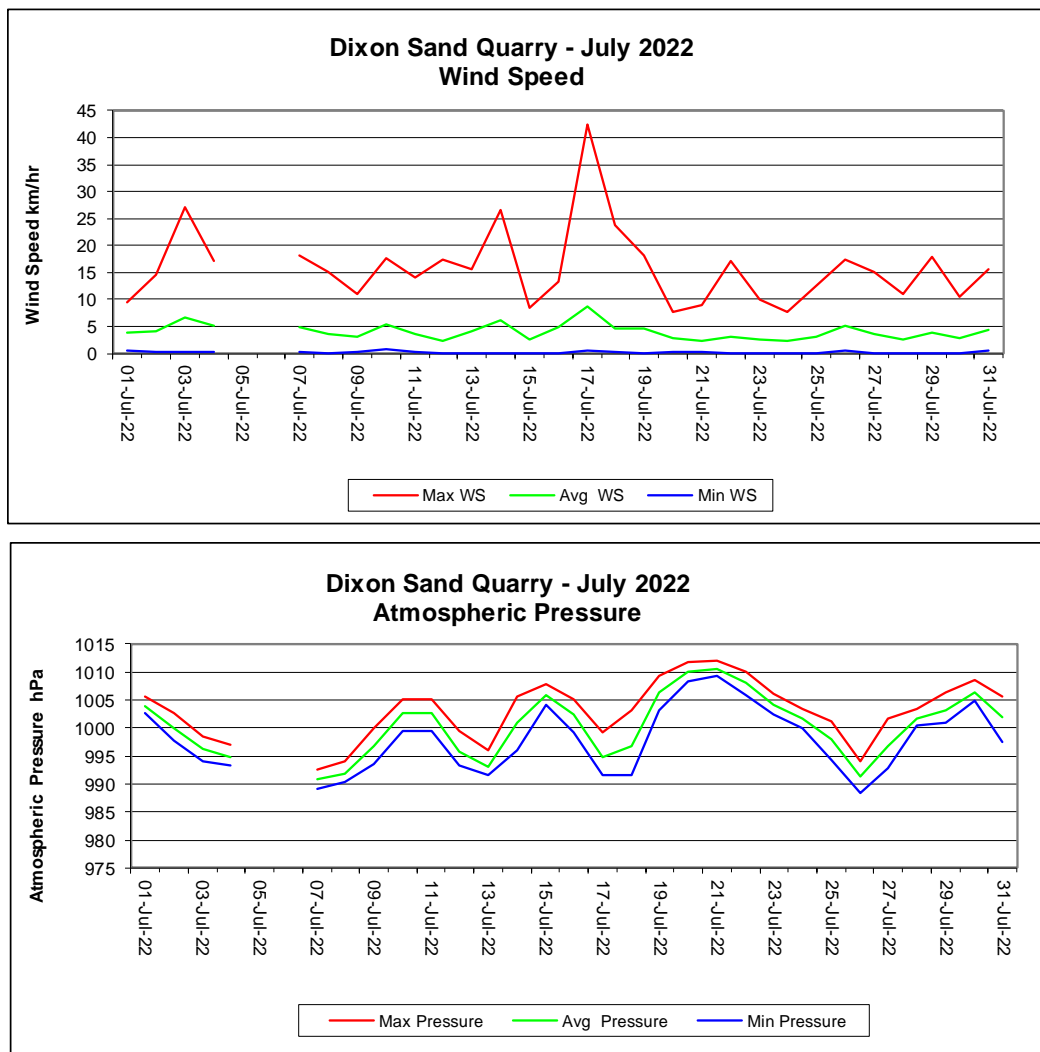
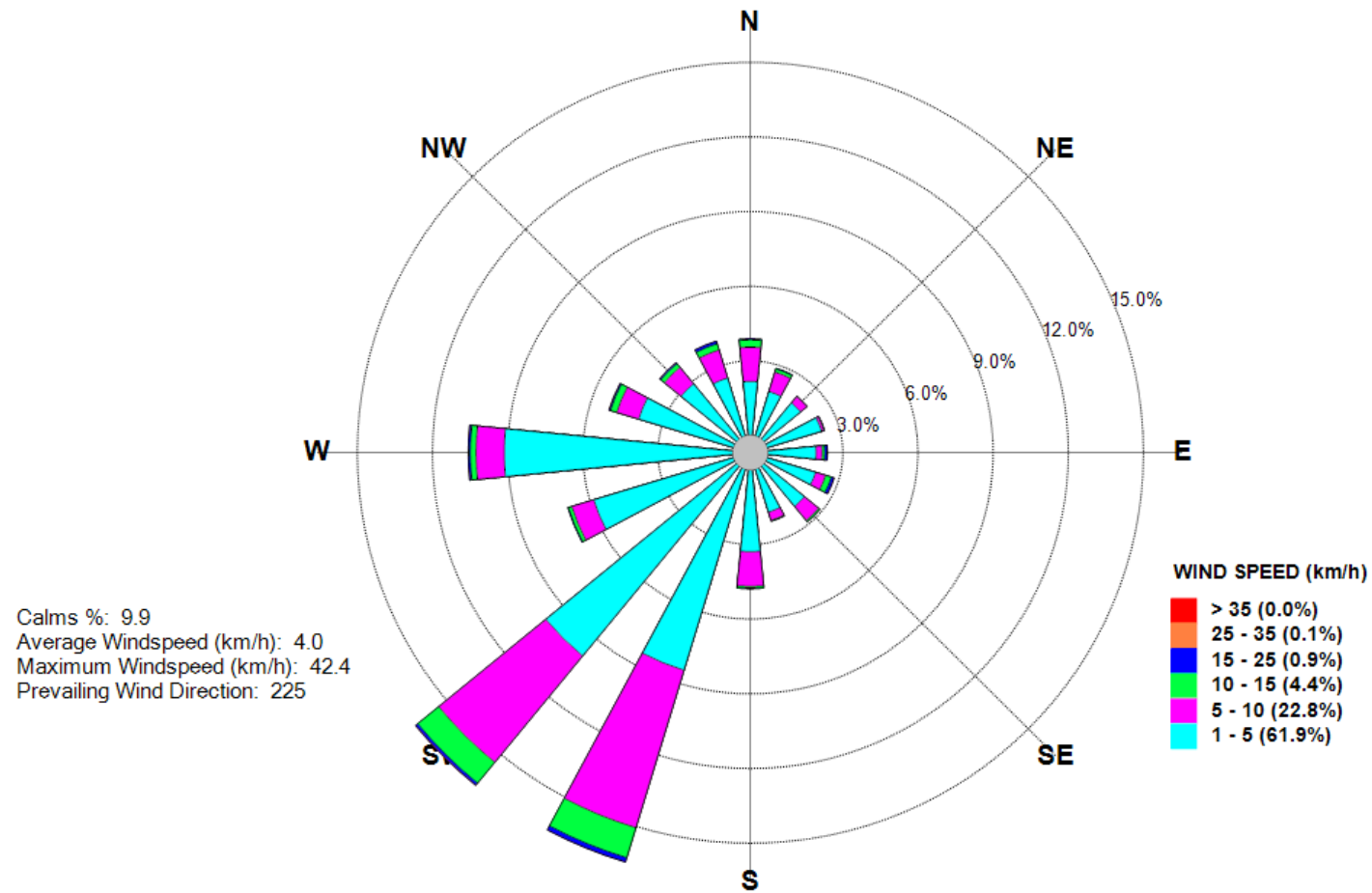


Figure 3: *Wind Speed and Atmospheric Pressure Charts*

Dixon Sand Quarry - Windrose JULY 2022



Appendix 1

Calibration Documents (when required)



Continuous Air Quality

Monthly/Quarterly/Six

Monthly/Annual

TEOM Maintenance and

Calibration – 1400AB

TEOM Client/Site: Dixon Sapi TeamDate: 2.8.22**1. TEOM Data Screen**SERIAL No: 25570Firmware: N/A AB Model

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	<u>4 OK</u>	Green - Normal	✓	
Date/time	TEOM: <u>2.8.22</u> 13:36 Actual: <u>2.8.22</u> 12:40	Current Date/time correct within 5 minutes	✓ PST	
PM-10 24hr av	<u>10.0</u>	Positive values	✓	
Filter loading PM10	<u>52</u>	<80 %	✓	
Frequency PM-10	<u>252.29823</u>	200-300 Hz	✓	
Noise PM-10	<u>0.057</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		<0.50 atm		
Warnings	<u>N.L</u>	No Warnings	✓	
If any warnings list:				

Comments:

Cleaned rain gauge - very dirty
 Replaced H/T ion sensors which OK ✓ Some rust.
 Cleaned bio/wd sensor wire OK

Data Downloaded: YES/NO (circle)

Technician Name: Colin Davis Signed [Signature]

3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	21.4	-10 to 50 C	✓	
Ambient Dew Point	NA	-10 to 50 C	—	—
Ambient Pressure	0.974	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	13.69	12.95 – 14.39 lpm	✓	
Total Flow rate	16.69	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	255.71694	255.71694	255.71698	255.71693

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.

noise = 0.041 ✓ good

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 mld cool

Ref
 $P = 744.5$
 mmHg
 $T = 20.5^{\circ}\text{C}$

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 3.02 Error % 0.7 (allowed error <6%) ☒ PASS/FAIL

Bypass Flow verified Flow l/min 13.85 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 0.10 < Limit 0.15

Bypass actual 0.35 < Limit 0.60

Leak check ☒ PASS/FAIL – If fail then find leak and retest.

Comments:



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: Tetral measures Atmospheric Pressure in mm Hg or mb or hPa
 For mb or hPa divide tetral result by 1013.25 to change units to atm.
 For mmHg divide tetral 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:-



New install
2/8/22
Dixon Sands Ref

CERTIFICATE

Dixon
Sands 2/8/22

rotronic

LEADING IN HUMIDITY MEASUREMENT

Device type	HC2A-S3
Serialnumber	0020596685
RPC-number	99-0463051533
ROTRONIC AG certifies that this instrument meets the published specifications. It has been calibrated using standards and instruments as stated below and corresponds to the process requirements of ISO 9001. The references are traceable to national standards. The calibrated values are only valid at the time of measurement and are referenced to the indicated references and working standards.	

FACTORY CALIBRATION

Adjustment

Temperature	23.41°C
Humidity 1	10.56%rH (@23.43°C)
Humidity 2	34.03%rH (@23.51°C)
Humidity 3	78.86%rH (@23.55°C)

Calibration

	Device	Reference
Temperature	23.47°C	23.50°C
Humidity	49.75%rH	49.71%rH

Date of calibration: 08.04.2022

Reference System

HC2A-S (traceable to national standards)
--

FUNCTION TEST

Firmware	V1.2
Analog Output	Out1: Humi 0..100%rH (0..1V) Set: 40.00%rH, measured 39.95%rH (0.400V) Out2: Temp -40..60°C (0..1V) Set: 20.00°C, measured 19.95°C (0.600V)
Printnumber	66.1085.0301

Final test passed - 07.04.2022 - quality engineer: M. Bicanin
Control number: 303

ROTRONIC AG, Grindelstrasse 6, CH - 8303 Bassersdorf
www.rotronic.com



**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 2022

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 21 August 2022

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 2022 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results;
- Meteorological results; and
- Quarterly TEOM calibration and maintenance.

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

- 24-hour average results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The 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 2022 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 98% of valid meteorological data was recorded for August 2022. Loss of valid data was due to a faulty humidity sensor (replaced 2/8/2022).

Approximately 100% of TEOM data was recovered for August 2022.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or OEH (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.

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 2022 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted 2 August 2022 (rescheduled from June 2022) with the next calibration due to be completed in September 2022. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for August 2022 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2022.

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)
1/08/2022	10.3	7.9	25.8	19.7
2/08/2022	7.1	7.9	17.6	19.6
3/08/2022	7.8	7.9	19.5	19.6
4/08/2022	11.1	8.0	27.8	19.9
5/08/2022	8.1	8.0	20.3	19.9
6/08/2022	5.6	7.9	14.0	19.7
7/08/2022	6.0	7.8	15.0	19.6
8/08/2022	10.0	7.9	25.0	19.7
9/08/2022	9.0	7.9	22.5	19.8
10/08/2022	7.6	7.9	19.0	19.8
11/08/2022	11.0	8.0	27.5	20.0
12/08/2022	8.7	8.0	21.8	20.0
13/08/2022	4.4	7.9	11.0	19.8
14/08/2022	3.1	7.8	7.8	19.5
15/08/2022	12.4	7.9	31.0	19.8
16/08/2022	8.6	7.9	21.5	19.8
17/08/2022	14.3	8.1	35.8	20.2
18/08/2022	11.2	8.1	28.0	20.3
19/08/2022	15.2	8.3	38.0	20.7
20/08/2022	9.8	8.3	24.5	20.8
21/08/2022	12.2	8.4	30.5	21.0
22/08/2022	23.8	8.7	59.5	21.7
23/08/2022	14.8	8.8	37.0	22.0
24/08/2022	6.9	8.8	17.3	21.9
25/08/2022	10.7	8.8	26.8	22.0
26/08/2022	8.7	8.8	21.8	22.0
27/08/2022	6.3	8.8	15.8	21.9
28/08/2022	9.8	8.8	24.5	22.0
29/08/2022	12.2	8.8	30.5	22.1
30/08/2022	10.9	8.9	27.3	22.2
31/08/2022	14.0	9.0	35.0	22.4

*Calculated from PM10

**Calculated from PM10 Annual Average

“No Valid Data” – when displayed, indicates when no valid 1-hour data is available to calculate a 24hr average

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

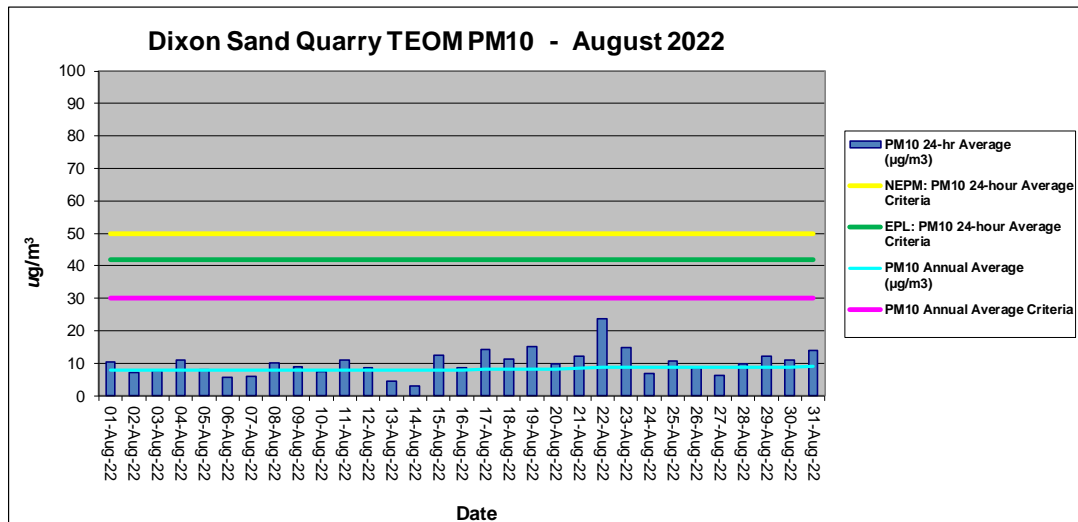


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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.

An annual physical screening and system check of the meteorological station was conducted March 2022 and is next due in March 2023. The screening and system check certificates are provided in **Appendix 1** (when required).

Table 3: Meteorological Data Summary for August 2022

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
1/08/2022	9.8	13.5	18.7	0.0	0.2	5.6	23.9				994.6	996.2	998.3
2/08/2022	6.2	12.1	19.0	0.2	0.0	4.0	12.4				996.0	998.2	1001.2
3/08/2022	9.9	15.6	21.9	0.0	1.0	7.5	19.0	46.0	58.0	69.6	990.9	993.8	997.2
4/08/2022	14.9	17.5	20.1	7.6	0.9	8.2	23.6	58.5	73.9	97.1	983.3	987.7	992.3
5/08/2022	13.7	16.5	19.6	0.2	0.6	5.7	20.2	38.9	62.8	87.4	983.1	985.0	986.9
6/08/2022	10.0	13.6	18.1	0.0	0.2	4.9	34.6	33.0	54.2	74.8	986.3	989.1	992.9
7/08/2022	8.6	11.4	16.8	0.0	0.3	3.7	15.0	43.1	64.6	79.7	992.2	995.4	999.8
8/08/2022	6.4	10.5	16.1	0.0	0.0	4.5	17.4	45.1	73.6	93.5	999.5	1001.2	1003.0
9/08/2022	6.4	9.5	13.7	0.2	0.2	5.2	19.6	64.9	82.4	98.7	1001.5	1003.8	1006.4
10/08/2022	8.1	10.7	16.1	0.6	0.2	3.6	12.2	51.1	83.6	99.5	1005.3	1006.7	1008.9
11/08/2022	7.9	11.6	14.2	0.0	0.1	3.6	13.7	69.0	82.0	98.5	999.4	1002.5	1006.0
12/08/2022	11.6	12.6	14.3	1.8	0.2	5.9	15.8	67.7	81.1	97.5	994.9	997.1	999.4
13/08/2022	9.4	12.3	17.5	6.8	0.2	3.9	14.1	39.4	76.0	100.0	989.8	991.8	994.8
14/08/2022	8.6	11.0	15.0	0.0	0.1	6.4	22.3	46.0	63.1	75.5	987.0	989.1	990.3
15/08/2022	8.8	11.7	16.1	0.0	0.4	5.2	19.3	35.9	58.9	73.6	986.9	988.7	990.2
16/08/2022	7.9	11.7	17.4	0.0	0.3	4.4	15.2	33.9	58.9	77.6	988.0	990.7	996.2
17/08/2022	6.9	11.8	17.7	0.0	0.0	2.7	11.1	39.3	66.5	84.1	995.8	997.9	1000.2
18/08/2022	8.7	13.9	19.7	0.0	0.3	4.7	12.7	42.4	61.0	82.5	992.0	994.3	997.5
19/08/2022	8.9	14.2	19.0	0.0	0.0	4.8	18.6	42.0	54.8	62.1	990.5	993.4	998.9
20/08/2022	7.0	11.7	17.8	0.0	0.0	3.6	14.8	41.6	57.8	70.6	998.0	999.7	1003.8
21/08/2022	8.8	12.0	16.8	0.0	0.1	3.4	13.3	41.0	65.5	82.9	1003.2	1004.7	1007.2
22/08/2022	7.6	13.6	19.1	0.0	0.2	6.1	31.3	35.2	57.1	90.8	994.4	998.2	1003.3
23/08/2022	5.2	11.9	20.1	9.0	0.0	8.5	24.8	35.5	68.5	98.6	986.0	991.7	996.9
24/08/2022	5.2	9.7	15.2	0.0	0.1	5.6	21.9	35.6	56.6	76.8	996.7	999.4	1001.5
25/08/2022	6.2	11.3	17.0	0.0	0.2	3.1	14.1	44.5	62.5	87.0	999.2	1001.8	1005.1
26/08/2022	8.9	11.8	15.9	0.0	0.5	4.3	16.0	61.3	81.8	100.0	1004.7	1006.4	1008.2
27/08/2022	8.4	11.7	15.4	1.2	0.0	2.8	11.0	74.1	92.6	100.0	1006.4	1008.1	1009.8
28/08/2022	9.1	13.2	19.7	0.2	0.1	3.5	14.0	55.0	88.4	100.0	1005.6	1007.2	1009.6
29/08/2022	9.7	13.6	18.6	0.2	0.1	2.6	14.7	69.6	91.6	100.0	999.3	1003.3	1006.5
30/08/2022	12.7	16.5	20.1	0.2	1.1	7.2	23.5	41.3	67.0	80.6	994.9	997.2	1000.0
31/08/2022	10.3	13.6	19.3	0.2	0.0	3.8	17.5	45.5	73.7	100.0	1000.0	1002.9	1004.7
Monthly	5.2	12.7	21.9	28.4	0.0	4.8	34.6	33.0	69.6	100.0	983.1	997.5	1009.8

Faulty humidity sensor, replaced 2/8/2022

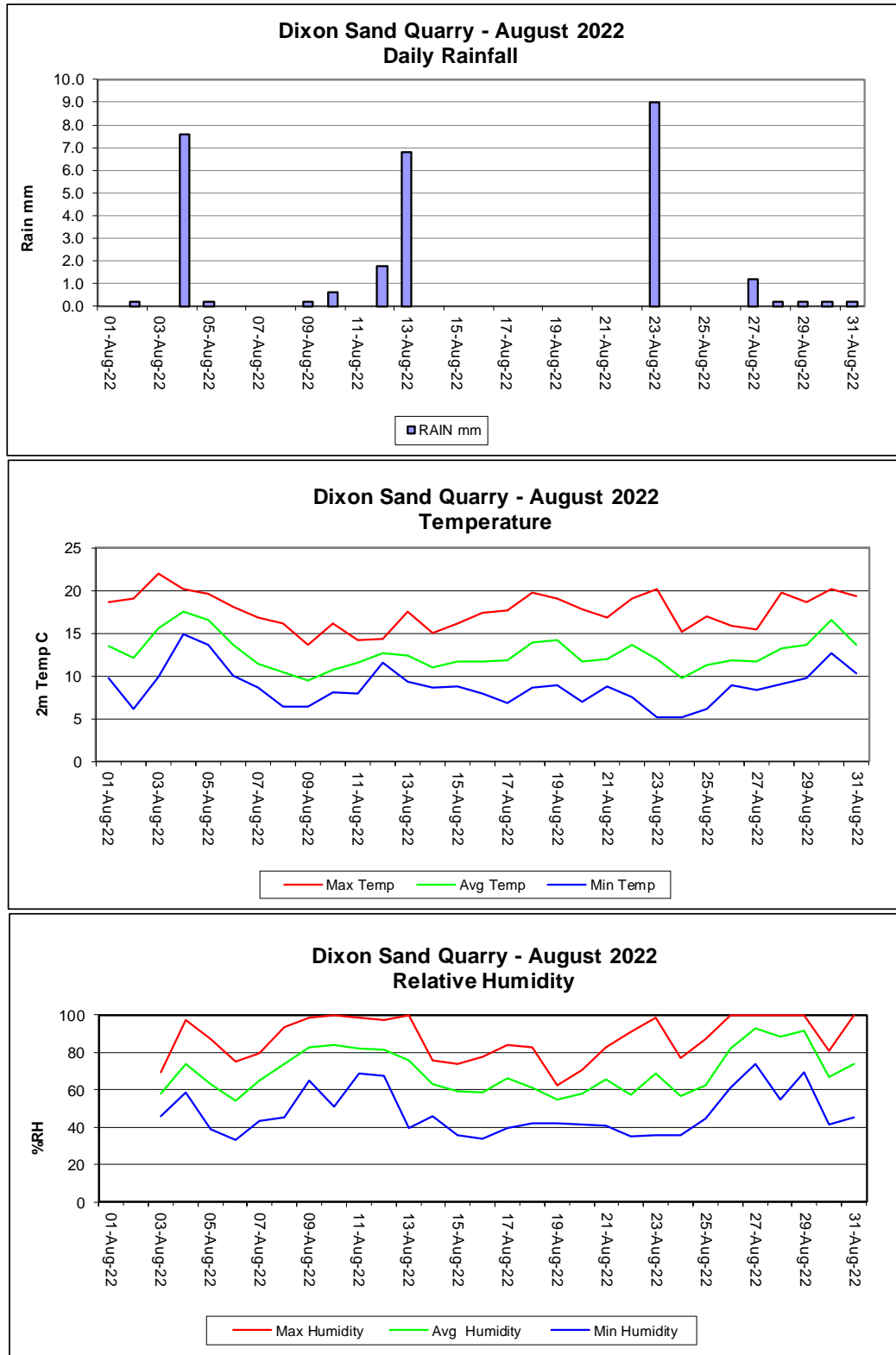


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

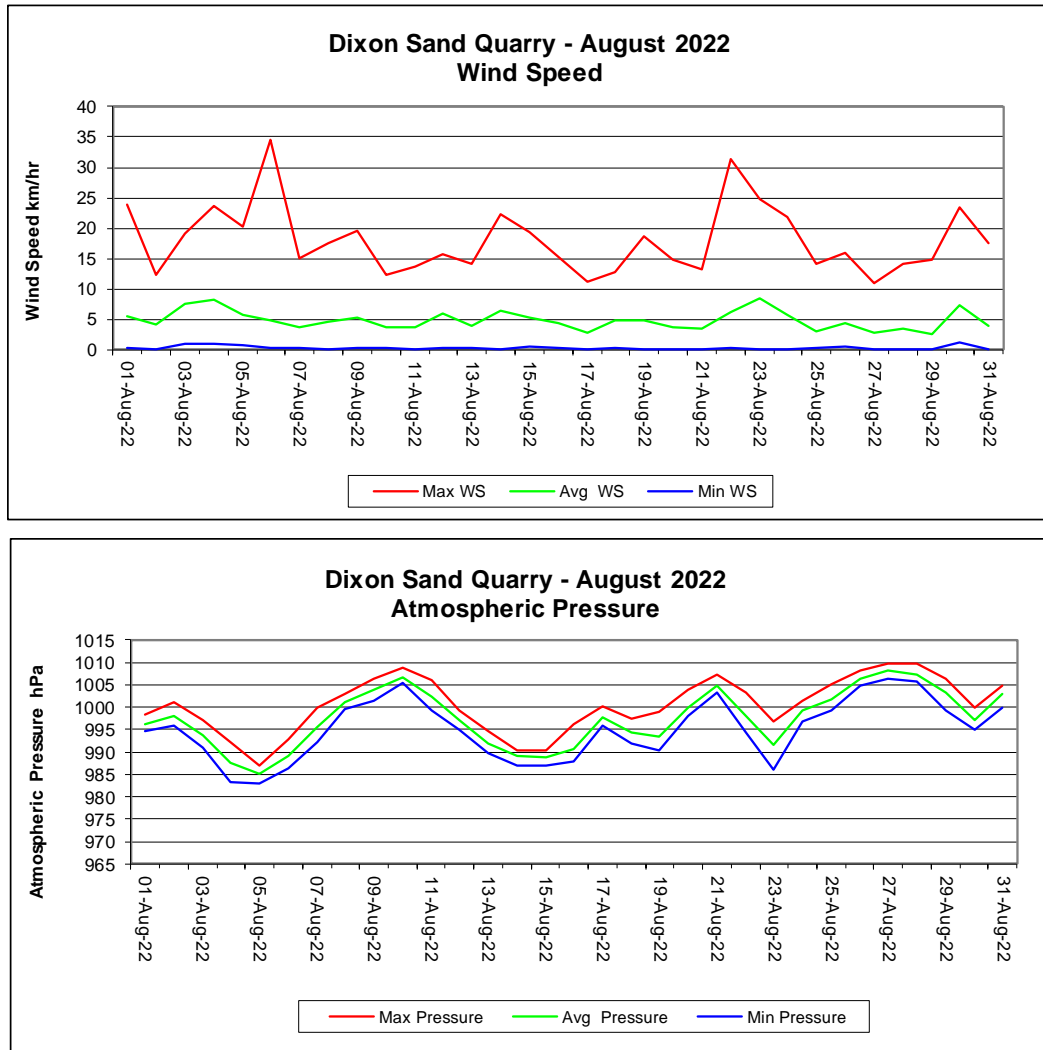
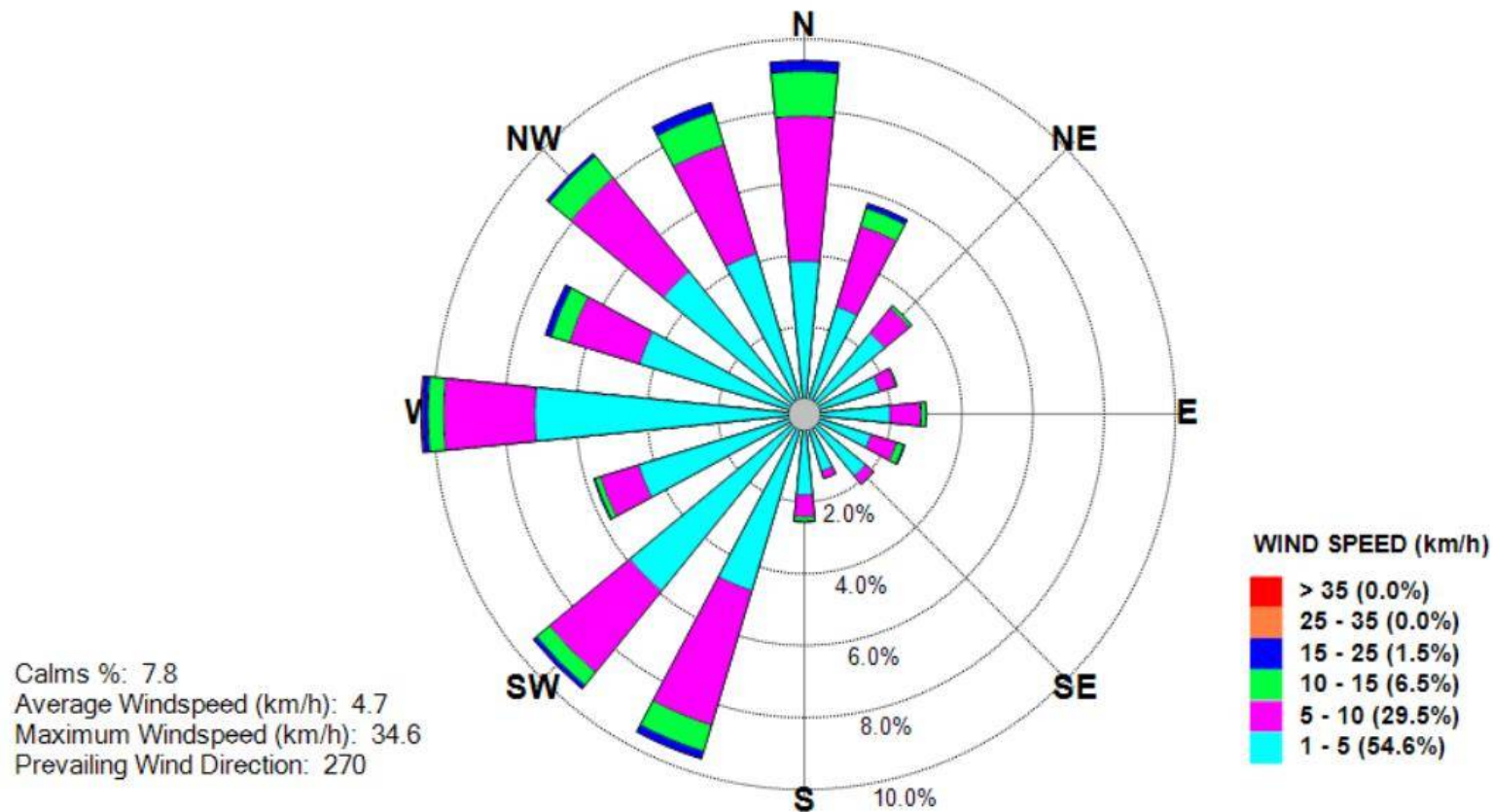


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose AUGUST 2022



Appendix 1

Calibration Documents (when required)



Continuous Air Quality

Monthly/Quarterly/Six Monthly/Annual

TEOM Maintenance and Calibration – 1400AB

TEOM Client/Site: Dixon Sapi TeamDate: 2.8.22**1. TEOM Data Screen**SERIAL No: 25570Firmware: N/A AB Model

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	<u>4 OK</u>	Green - Normal	✓	
Date/time	TEOM: <u>2.8.22</u> 13:36 Actual: <u>2.8.22</u> 12:40	Current Date/time correct within 5 minutes	✓ PST	
PM-10 24hr av	<u>10.0</u>	Positive values	✓	
Filter loading PM10	<u>52</u>	<80 %	✓	
Frequency PM-10	<u>252.29823</u>	200-300 Hz	✓	
Noise PM-10	<u>0.057</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		<0.50 atm		
Warnings	<u>N.L</u>	No Warnings	✓	
If any warnings list:				

Comments:

Cleaned rain gauge - very dirty
 Replaced H/T ion sensors which OK ✓ Some rust.
 Cleaned bio(wd) sensor wire OK

Data Downloaded: YES/NO (circle)

Technician Name: Colin Davis Signed [Signature]

3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	21.4	-10 to 50 C	✓	
Ambient Dew Point	NA	-10 to 50 C	—	—
Ambient Pressure	0.974	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	13.69	12.95 – 14.39 lpm	✓	
Total Flow rate	16.69	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	255.71694	255.71694	255.71698	255.71693

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.

noise = 0.041 ✓ good

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 mld cool

Ref
 $P = 744.5$
 mmHg
 $T = 20.5^{\circ}\text{C}$

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 3.02 Error % 0.7 (allowed error <6%) ☒ PASS/FAIL

Bypass Flow verified Flow l/min 13.85 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 0.10 < Limit 0.15

Bypass actual 0.35 < Limit 0.60

Leak check ☒ PASS/FAIL – If fail then find leak and retest.

Comments:



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: Tetracal measures Atmospheric Pressure in mm Hg or mb or hPa
 For mb or hPa divide tetracal result by 1013.25 to change units to atm.
 For mmHg divide tetracal 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 KO = _____ TEOM stated KO _____ 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:-



New install
2/8/22
Dixon Sands Ref

CERTIFICATE

Dixon
Sands 2/8/22

rotronic

LEADING IN HUMIDITY MEASUREMENT

Device type	HC2A-S3
Serialnumber	0020596685
RPC-number	99-0463051533
ROTRONIC AG certifies that this instrument meets the published specifications. It has been calibrated using standards and instruments as stated below and corresponds to the process requirements of ISO 9001. The references are traceable to national standards. The calibrated values are only valid at the time of measurement and are referenced to the indicated references and working standards.	

FACTORY CALIBRATION

Adjustment

Temperature	23.41°C
Humidity 1	10.56%rH (@23.43°C)
Humidity 2	34.03%rH (@23.51°C)
Humidity 3	78.86%rH (@23.55°C)

Calibration

	Device	Reference
Temperature	23.47°C	23.50°C
Humidity	49.75%rH	49.71%rH

Date of calibration: 08.04.2022

Reference System

HC2A-S (traceable to national standards)
--

FUNCTION TEST

Firmware	V1.2
Analog Output	Out1: Humi 0...100%rH (0...1V) Set: 40.00%rH, measured 39.95%rH (0.400V) Out2: Temp -40...60°C (0...1V) Set: 20.00°C, measured 19.95°C (0.600V)
Printnumber	66.1085.0301

Final test passed - 07.04.2022 - quality engineer: M. Bicanin
Control number: 303

ROTRONIC AG, Grindelstrasse 6, CH - 8303 Bassersdorf
www.rotronic.com



**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 2022

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 21 October 2022

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 2022 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results;
- Meteorological results; and
- Quarterly TEOM calibration and maintenance.

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

- 24-hour average results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The 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 2022 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of valid meteorological data was recorded for September 2022.

Approximately 81% of TEOM valid data was available for September 2022.

Loss of valid data was due to a lightning strike causing damage to the TEOM from 25 September 2022. Unit was repaired on 7 October 2022.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or OEH (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 81% of TEOM valid data was available during September 2022 reporting period. Loss of valid data was due to a lightning strike which damage to the TEOM from 25 September 2022. Unit was repaired on 7 October 2022.

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 2022 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted 23 September 2022 with the next calibration due to be completed in December 2022. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for September 2022 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2022.

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)
1/09/2022	11.3	9.0	28.3	22.5
2/09/2022	18.1	9.1	45.3	22.9
3/09/2022	8.8	9.1	22.0	22.9
4/09/2022	7.6	9.1	19.0	22.8
5/09/2022	9.7	9.1	24.3	22.8
6/09/2022	10.2	9.1	25.5	22.9
7/09/2022	11.7	9.2	29.3	23.0
8/09/2022	12.4	9.2	31.0	23.1
9/09/2022	8.0	9.2	20.0	23.0
10/09/2022	5.4	9.2	13.5	22.9
11/09/2022	6.5	9.1	16.3	22.8
12/09/2022	12.5	9.2	31.3	22.9
13/09/2022	12.5	9.2	31.3	23.0
14/09/2022	11.9	9.2	29.8	23.1
15/09/2022	9.3	9.2	23.3	23.1
16/09/2022	11.1	9.3	27.8	23.2
17/09/2022	9.5	9.3	23.8	23.2
18/09/2022	6.6	9.2	16.5	23.1
19/09/2022	18.4	9.4	46.0	23.4
20/09/2022	14.0	9.4	35.0	23.5
21/09/2022	18.3	9.5	45.8	23.8
22/09/2022	9.7	9.5	24.3	23.8
23/09/2022	11.5	9.5	28.6	23.9
24/09/2022	8.6	9.5	21.5	23.8
25/09/2022	ND	9.5	ND	23.8
26/09/2022	ND	9.5	ND	23.8
27/09/2022	ND	9.5	ND	23.8
28/09/2022	ND	9.5	ND	23.8
29/09/2022	ND	9.5	ND	23.8
30/09/2022	ND	9.5	ND	23.8

*Calculated from PM10

**Calculated from PM10 Annual Average

ND (No Valid Data) – when displayed, indicates when no valid 1-hour data is available to calculate a 24hr average.

NOTE: Lightning strike/damage to TEOM (from 25/09/2022), repaired 7/10/22

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

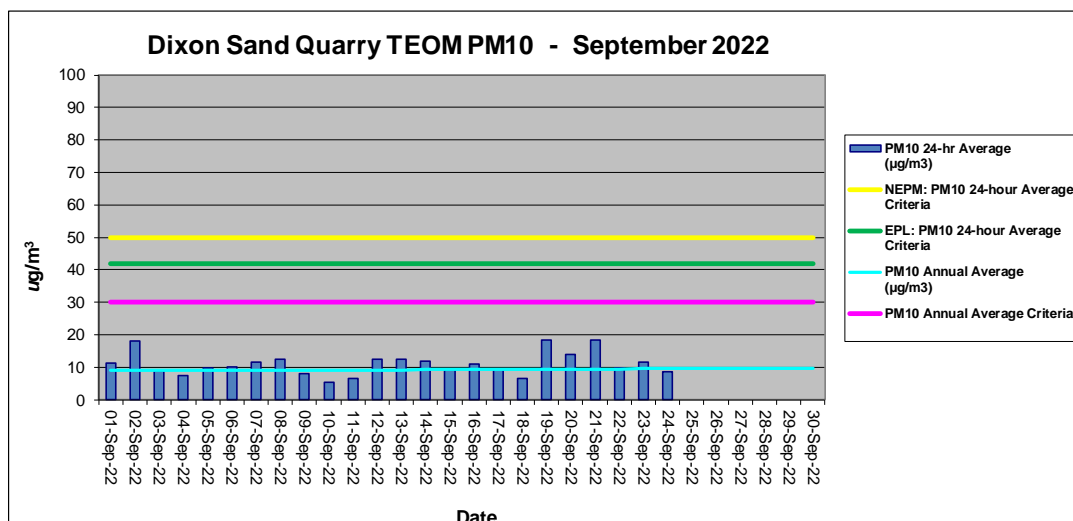


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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.

An annual physical screening and system check of the meteorological station was conducted March 2022 and is next due in March 2023. The screening and system check certificates are provided in **Appendix 1** (when required).

Table 3: Meteorological Data Summary for September 2022

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
1/09/2022	11.5	14.5	20.4	0.8	0.0	3.4	15.3	54.1	88.5	100.0	999.8	1001.9	1004.2
2/09/2022	10.6	12.8	16.8	0.8	0.0	3.1	12.0	67.1	88.0	100.0	999.5	1001.6	1003.4
3/09/2022	7.6	9.4	12.3	11.2	0.0	5.2	17.1	83.6	95.9	100.0	1002.5	1003.5	1004.7
4/09/2022	8.6	10.8	16.0	3.8	0.5	5.6	16.9	54.4	92.0	100.0	1002.7	1004.1	1005.2
5/09/2022	7.4	11.5	17.3	0.2	0.1	3.7	12.8	39.6	75.3	100.0	1001.1	1003.1	1004.8
6/09/2022	7.9	11.1	15.4	0.0	0.0	3.1	13.4	60.0	81.5	100.0	1002.9	1004.2	1005.6
7/09/2022	8.0	12.1	16.9	0.0	0.1	3.1	19.6	58.4	84.9	100.0	1001.0	1003.3	1005.9
8/09/2022	9.3	14.6	19.8	0.0	0.2	4.1	15.1	51.5	79.0	100.0	994.4	998.2	1001.9
9/09/2022	12.6	14.9	20.2	2.0	0.1	4.6	19.2	48.5	78.9	100.0	989.6	992.0	994.5
10/09/2022	12.0	15.5	20.8	0.0	0.3	4.6	17.2	42.5	66.9	87.0	987.3	989.5	991.9
11/09/2022	10.0	14.2	20.4	0.0	0.3	3.5	16.3	32.3	51.8	79.2	992.0	993.9	996.3
12/09/2022	7.2	12.6	17.9	0.0	0.0	3.0	10.5	36.0	54.5	75.1	995.7	997.8	1001.3
13/09/2022	7.8	11.3	15.7	0.0	0.0	4.1	19.2	59.6	73.8	91.1	1001.2	1004.9	1007.9
14/09/2022	7.1	11.8	16.8	0.0	0.1	4.1	19.9	45.4	71.0	86.5	1001.5	1005.3	1008.5
15/09/2022	9.0	11.4	12.8	23.8	0.1	3.2	19.5	83.2	97.7	100.0	986.3	994.4	1001.6
16/09/2022	11.6	16.6	22.3	0.0	0.5	5.7	23.3	29.0	61.3	100.0	984.0	985.8	987.9
17/09/2022	13.0	16.2	20.1	0.0	1.2	7.1	25.2	37.9	48.1	68.1	984.0	986.5	989.7
18/09/2022	11.7	15.7	20.7	0.0	0.2	5.2	20.8	29.7	46.2	62.6	988.0	990.3	993.3
19/09/2022	11.8	15.4	20.8	0.0	0.2	4.5	16.0	24.7	51.6	77.9	991.5	994.7	999.8
20/09/2022	6.9	13.7	20.2	0.0	0.1	4.1	17.1	44.7	69.1	93.7	998.5	1000.9	1003.4
21/09/2022	10.8	14.6	18.3	1.0	0.2	2.6	12.0	72.2	91.7	100.0	995.7	998.2	1000.4
22/09/2022	13.6	14.8	17.3	10.8	0.3	6.2	27.1	71.5	92.1	100.0	995.2	997.3	998.6
23/09/2022	13.2	15.7	18.7	2.2	0.1	3.6	13.0	76.9	95.1	100.0	992.2	995.2	997.9
24/09/2022	11.6	14.8	21.0	16.2	0.2	3.6	13.4	56.7	95.4	100.0	989.3	991.2	994.9
25/09/2022	9.2	14.4	21.4	0.2	0.2	3.7	14.1	34.1	75.6	99.9	993.2	995.2	997.7
26/09/2022	10.5	14.0	19.0	0.0	0.1	3.3	13.6	61.8	90.8	100.0	994.4	996.2	998.2
27/09/2022	11.8	15.4	20.5	1.6	0.2	3.6	13.6	53.5	85.7	99.9	990.6	992.8	995.1
28/09/2022	11.0	15.0	21.7	4.2	0.3	4.3	13.6	31.0	82.8	100.0	989.6	991.4	994.2
29/09/2022	10.3	13.6	18.4	4.0	1.0	7.3	24.9	65.8	92.0	99.9	993.8	997.5	1002.1
30/09/2022	11.0	13.1	16.9	7.8	0.2	6.6	19.5	71.2	95.1	100.0	1000.9	1003.2	1004.5
Monthly	6.9	13.7	22.3	90.6	0.0	4.3	27.1	24.7	78.4	100.0	984.0	997.1	1008.5

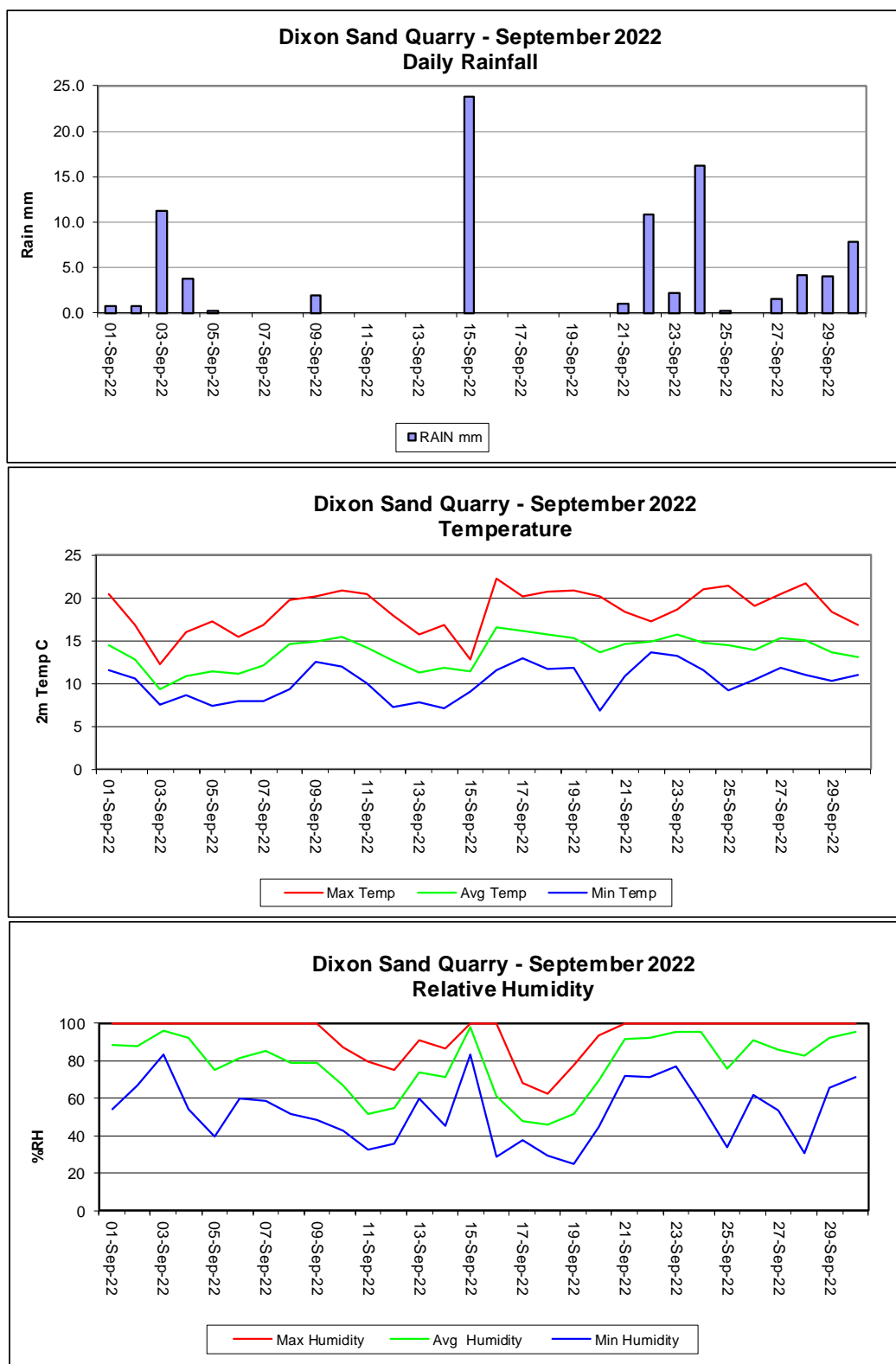


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

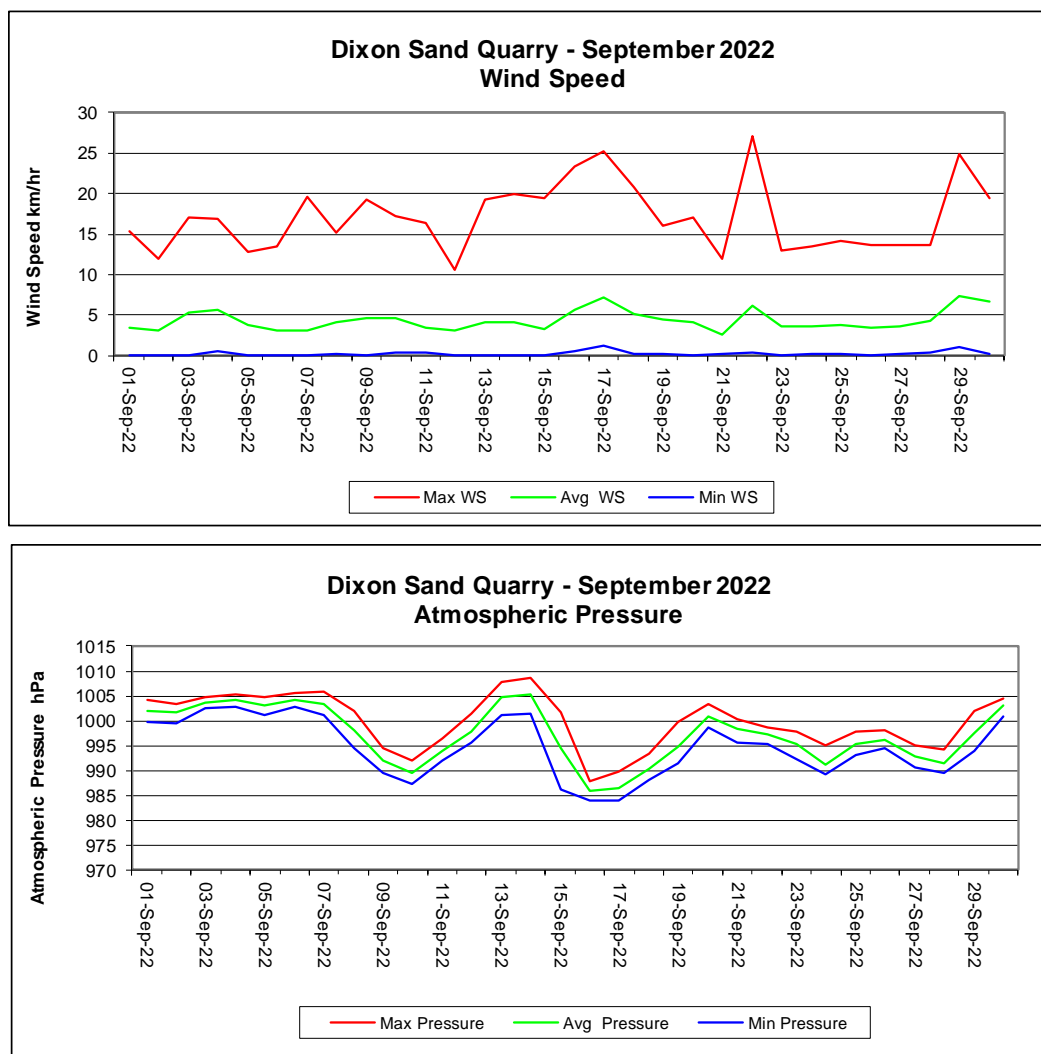
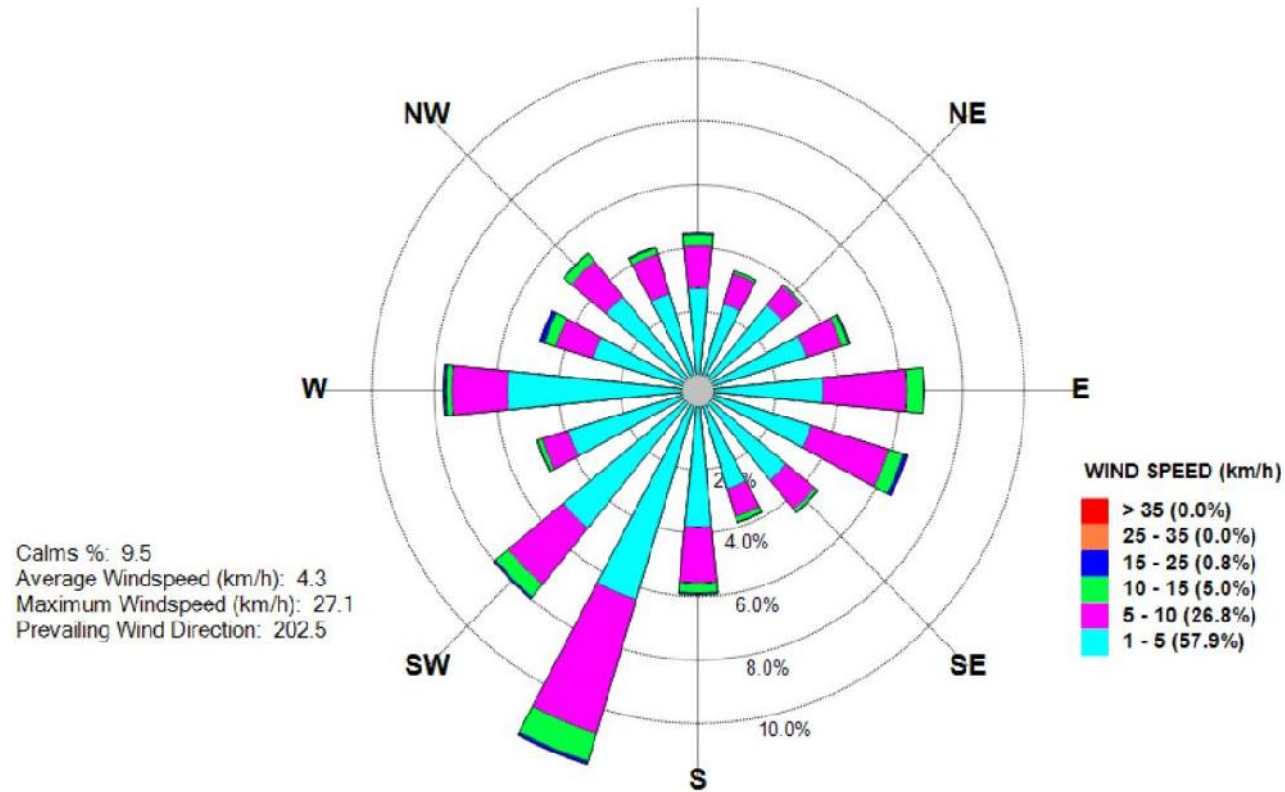


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose SEPTEMBER 2022



Appendix 1

Calibration Documents (when required)



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



TEOM Client/Site: Dura Sands / TEOM Date: 23.4.22

Exoted 05-0721

1. TEOM Data Screen SERIAL No: 25570 Firmware: NA
1400AB255700503

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	4 - OK	Green - Normal	✓	
Date/time	TEOM: 23/4/22 12.12 Actual: 23/4/22 12.16	Current Date/time correct within 5 minutes	✓	
PM-10 24hr av	10.5	Positive values	✓	
Filter loading PM10	37	<80 %	✓	
Frequency PM-10	254.8147	200-300 Hz	✓	
Noise PM-10	0.026	<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	OK	<0.50 atm	✓	
Warnings	Nil	No Warnings	✓	
If any warnings list:				

Comments:

Data Downloaded: YES/NO (circle)

Technician Name: COLIN DAVIES Signed CD



3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	19.5	-10 to 50 C	/	
Ambient Dew Point	NA	-10 to 50 C	/	
Ambient Pressure	0.971	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	13.69	12.95 – 14.39 lpm	/	
Total Flow rate	16.69	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	255.57073	255.57012	255.57071	255.57016

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.

✓ good

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: 1009 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 3.02 Error % 0.7 (allowed error <6%) PASS/FAIL

Bypass Flow verified Flow l/min 13.54 Error % 1.0 (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 0.09 < Limit 0.15

Bypass actual 0.36 < Limit 0.60

Leak check PASS/FAIL – If fail then find leak and retest.
 Comments:



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: Tetracal measures Atmospheric Pressure in mm Hg or mb or hPa**For mb or hPa divide tetracal result by 1013.25 to change units to atm.****For mmHg divide tetracal 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 KO = _____ TEOM stated KO _____ 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/m³Noise was less than 5ug/m³ YES/NO**5. Maintenance**

Air Inlet system cleaned YES/NO

Pump Reconditioned YES/NO

Check Waterproofing YES/NO

Comments:





**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 2022

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 30 November 2022

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 2022 was prepared by CBased Environmental and includes the following:

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

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

- 24-hour average results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The 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 2022 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 84% of valid meteorological data was recorded for October 2022 due to power outages.

Approximately 68% of TEOM valid data was available for October 2022. Loss of valid data was due to a lightning strike in late September causing damage to the TEOM and power outages in late October 2022.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or OEH (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 68% of TEOM valid data was available for October 2022. Loss of valid data was due to a lightning strike in late September causing damage to the TEOM and power outages in late October 2022.

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 2022 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted in September 2022 with the next calibration due to be completed in December 2022. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for October 2022 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2022.

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)
1/10/2022	ND	9.5	ND	23.8
2/10/2022	ND	9.5	ND	23.8
3/10/2022	ND	9.5	ND	23.8
4/10/2022	ND	9.5	ND	23.8
5/10/2022	ND	9.5	ND	23.8
6/10/2022	ND	9.5	ND	23.8
7/10/2022	ND	9.5	ND	23.8
8/10/2022	4.7	9.5	11.7	23.7
9/10/2022	3.8	9.4	9.5	23.5
10/10/2022	9.6	9.4	24.0	23.5
11/10/2022	10.0	9.4	25.0	23.6
12/10/2022	16.1	9.5	40.3	23.7
13/10/2022	14.4	9.6	36.0	23.9
14/10/2022	9.5	9.6	23.8	23.9
15/10/2022	8.8	9.5	22.0	23.9
16/10/2022	12.0	9.6	30.0	23.9
17/10/2022	11.2	9.6	28.0	24.0
18/10/2022	11.1	9.6	27.8	24.0
19/10/2022	17.5	9.7	43.8	24.2
20/10/2022	13.2	9.7	33.0	24.3
21/10/2022	9.8	9.7	24.5	24.3
22/10/2022	8.2	9.7	20.5	24.3
23/10/2022	10.3	9.7	25.8	24.3
24/10/2022	7.3	9.7	18.3	24.2
25/10/2022	11.1	9.7	27.8	24.3
26/10/2022	10.7	9.7	26.8	24.3
27/10/2022	13.8	9.8	34.5	24.4
28/10/2022	19.3	9.8	48.2	24.6
29/10/2022	ND	9.8	ND	24.6
30/10/2022	ND	9.8	ND	24.6
31/10/2022	ND	9.8	ND	24.6

*Calculated from PM10

**Calculated from PM10 Annual Average

ND (No Valid Data) – when displayed, indicates when no valid 1-hour data is available to calculate a 24hr average.

NOTE: Lightning strike/damage to TEOM (25/09/2022 - 7/10/22) & power outage 29/10/22 - 2/11/22)

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

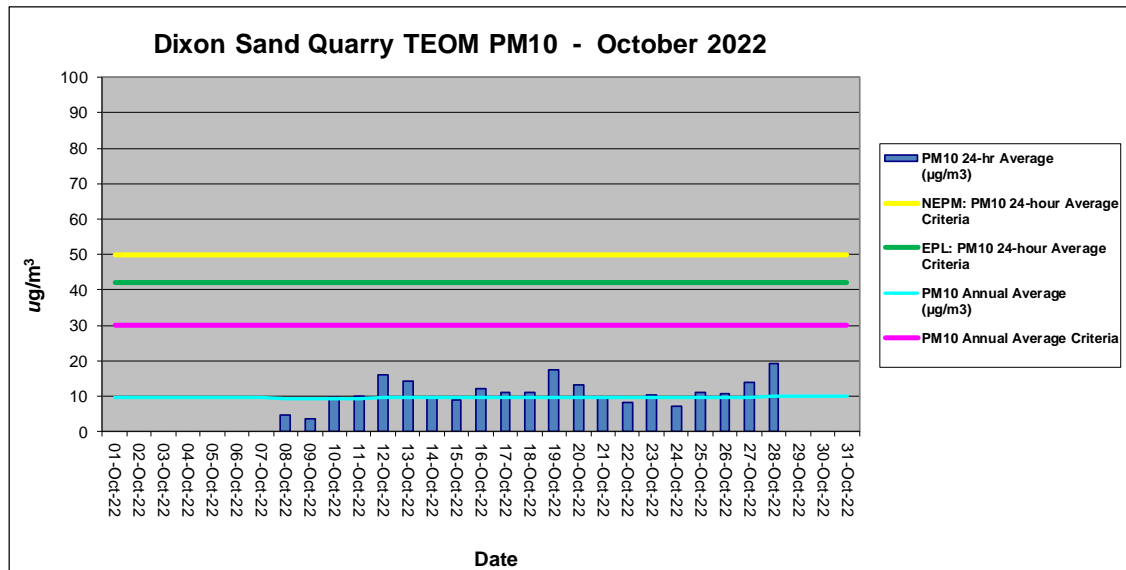


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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.

An annual physical screening and system check of the meteorological station was conducted March 2022 and is next due in March 2023. The screening and system check certificates are provided in **Appendix 1** (when required).

Table 3: Meteorological Data Summary for October 2022

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
1/10/2022	9.5	11.7	15.6	0.0	0.6	4.2	12.3	69.5	93.2	100.0	1000.2	1002.3	1004.3
2/10/2022	8.5	12.2	17.8	0.0	0.2	4.1	19.7	41.6	81.1	99.9	996.3	999.0	1000.8
3/10/2022	7.4	12.7	19.0	0.0	0.0	3.0	11.6	42.0	75.9	99.9	998.8	1000.9	1003.3
4/10/2022	10.3	14.3	22.3	0.0	0.2	3.3	12.4	39.8	71.1	96.0	999.9	1001.1	1002.5
5/10/2022													
6/10/2022													
7/10/2022	15.1	16.1	21.7	0.6	0.4	4.8	17.7	43.0	98.5	100.0	993.3	994.6	999.9
8/10/2022	13.3	16.6	20.4	2.8	0.0	3.3	14.0	83.1	98.8	100.0	992.1	994.2	996.4
9/10/2022	9.6	12.2	15.5	0.2	0.0	6.3	22.8	55.3	86.5	100.0	993.1	999.2	1004.1
10/10/2022	8.9	12.4	15.9	0.0	0.0	4.1	18.4	62.3	87.3	100.0	1003.8	1005.3	1007.1
11/10/2022	11.1	13.7	17.6	0.0	0.0	4.0	23.9	65.0	89.7	100.0	1002.1	1004.0	1006.2
12/10/2022	10.6	14.2	18.3	0.0	0.0	4.3	18.1	72.6	93.3	100.0	1001.3	1003.0	1004.6
13/10/2022	11.6	16.1	19.7	0.0	0.1	4.2	19.8	65.7	88.6	100.0	992.2	998.3	1003.7
14/10/2022	13.7	17.8	23.1	0.0	0.4	5.6	21.4	25.4	67.7	100.0	988.2	991.4	996.4
15/10/2022	11.7	16.1	22.6	0.0	0.1	4.2	21.6	32.5	58.4	86.9	995.7	997.7	999.9
16/10/2022	11.8	16.0	21.2	0.0	0.0	5.0	26.4	59.1	88.8	100.0	996.1	998.4	999.9
17/10/2022	12.7	14.6	17.9	0.0	0.2	5.0	16.4	76.4	96.8	100.0	999.1	1000.8	1002.7
18/10/2022	12.2	15.2	19.4	0.0	0.0	3.7	15.7	84.1	99.6	100.0	997.7	1000.1	1002.1
19/10/2022	14.9	18.0	24.2	0.0	0.3	3.8	22.5	49.9	90.8	100.0	995.5	997.3	998.5
20/10/2022	16.1	17.3	20.5	0.2	0.3	3.3	12.1	99.8	99.9	99.9	994.3	996.3	997.9
21/10/2022	16.7	18.7	22.8	0.2	0.2	3.6	11.8	69.1	96.1	100.0	991.4	993.8	995.8
22/10/2022	15.9	19.5	24.9	0.0	0.1	4.8	17.3	58.3	90.5	100.0	990.4	992.3	994.0
23/10/2022	16.6	18.1	21.5	0.4	0.3	5.2	17.1	85.8	99.7	100.0	991.4	993.1	994.5
24/10/2022	15.1	17.5	20.9	0.2	0.0	3.8	12.1	92.1	99.8	100.0	987.2	990.5	994.4
25/10/2022	16.1	19.9	25.9	0.2	0.2	3.9	20.2	50.6	81.3	100.0	982.6	984.8	987.7
26/10/2022	17.6	21.9	27.0	0.0	0.2	4.1	19.6	33.5	58.1	83.7	980.2	982.4	985.0
27/10/2022	16.8	20.0	25.9	0.6	0.2	4.3	13.9	37.2	61.9	99.9	980.2	982.4	984.3
28/10/2022	14.8	18.8	22.7	4.2	1.0	6.6	22.0	24.5	43.7	69.4	981.5	983.3	984.6
29/10/2022													
30/10/2022													
31/10/2022													
Monthly	7.4	16.2	27.0	9.6	0.0	4.3	26.4	24.5	84.5	100.0	980.2	995.6	1007.1
No data due to power outages													

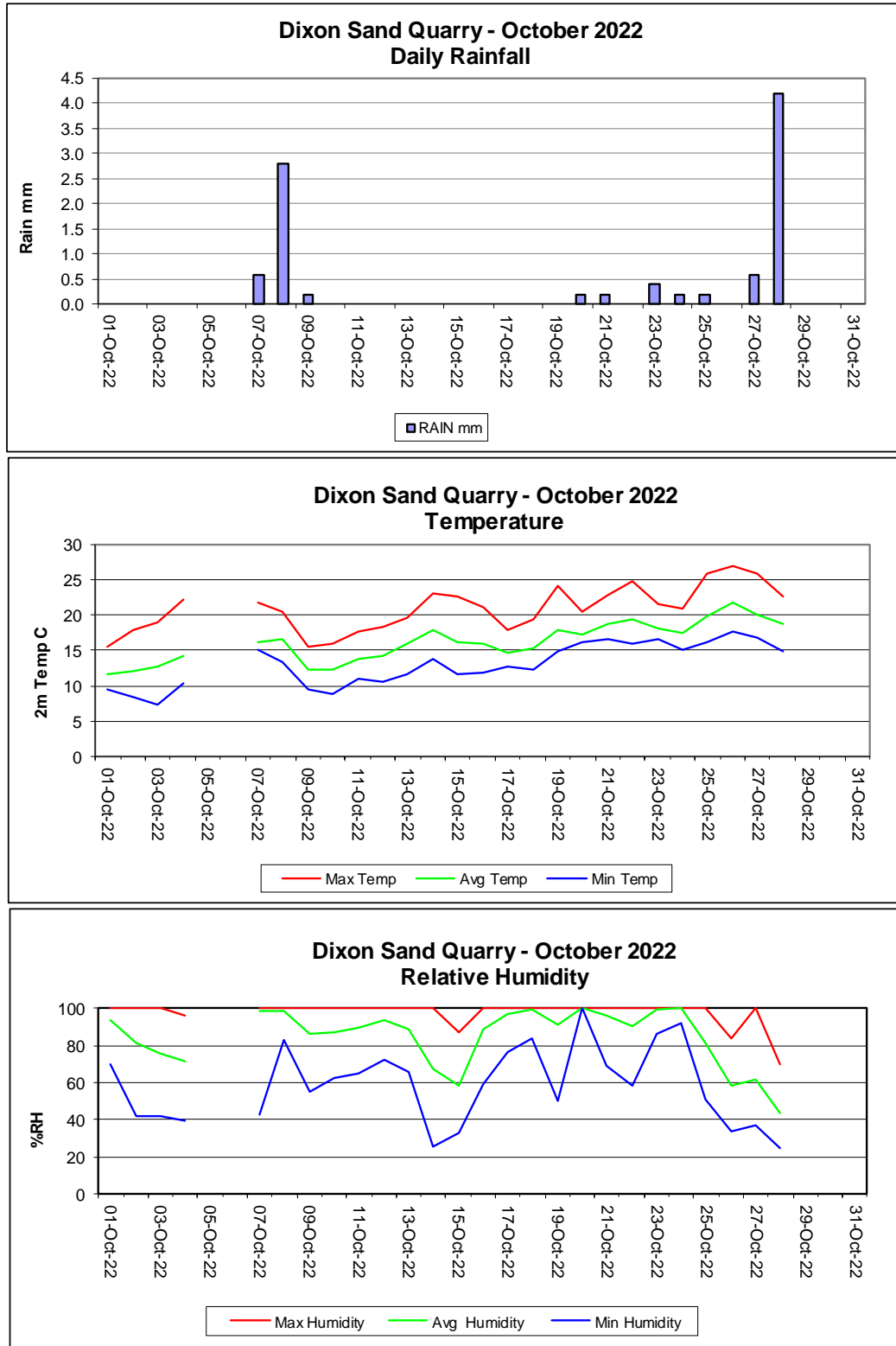


Figure 2: *Daily Rainfall, Temperature and Relative Humidity Charts*

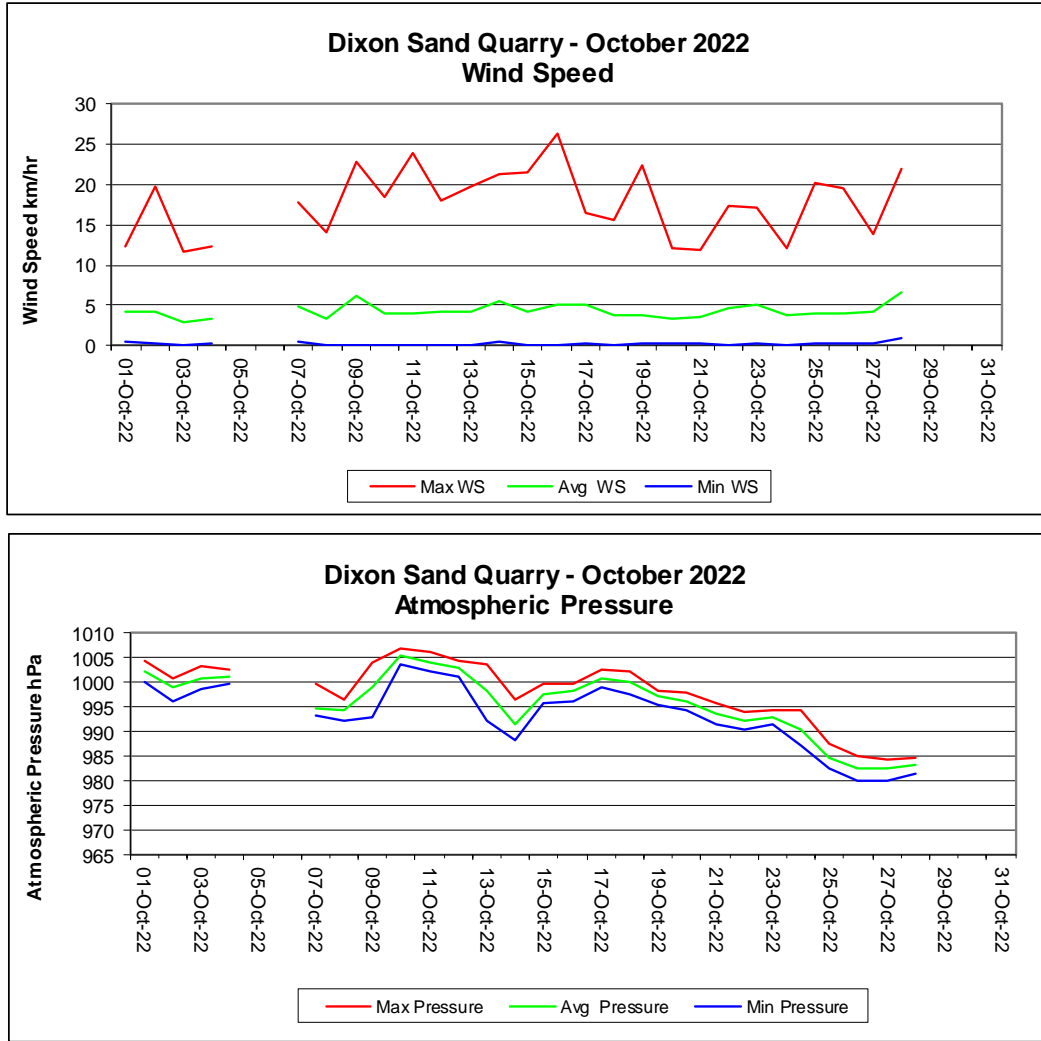
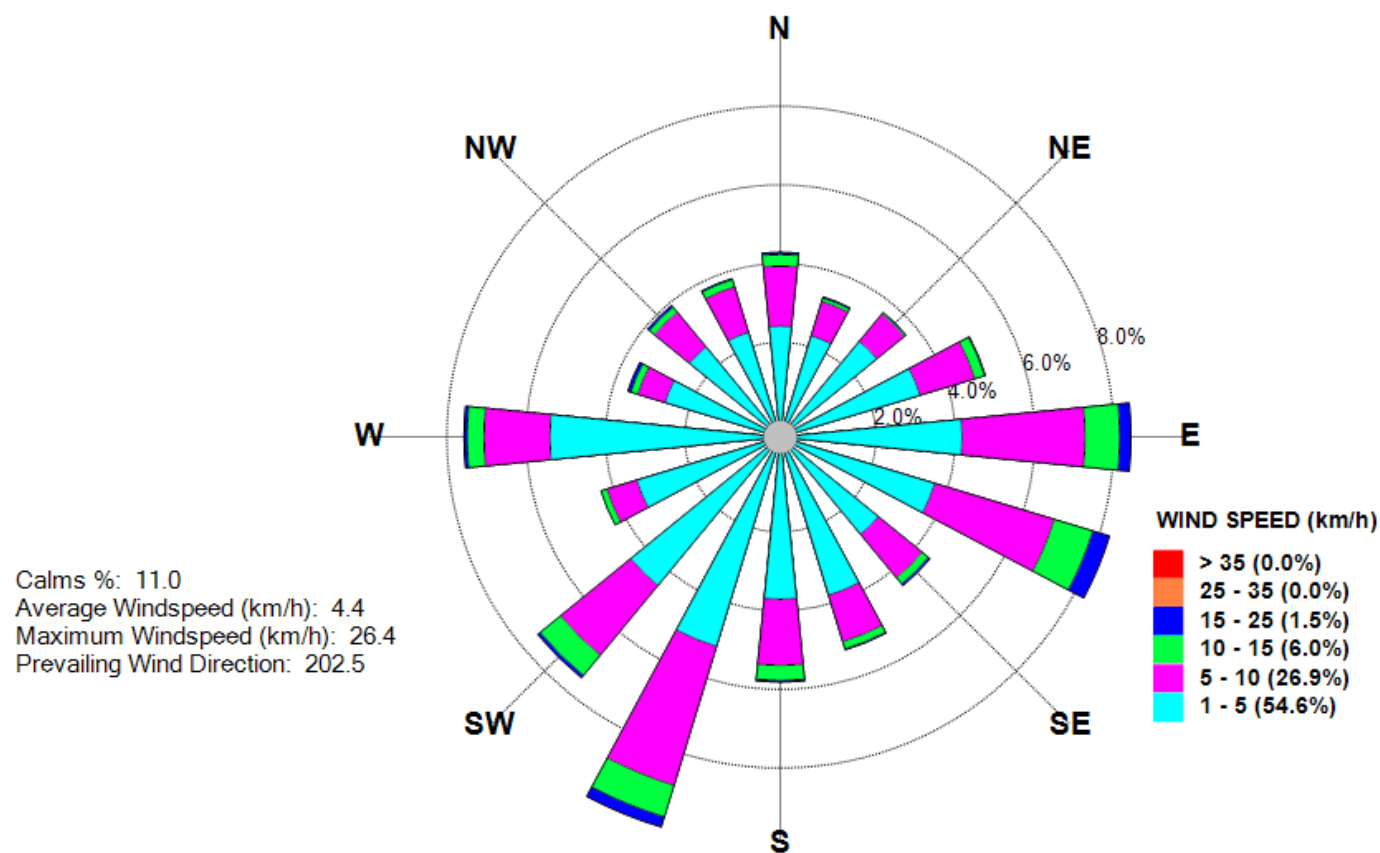


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose OCTOBER 2022



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 2022

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 22 December 2022

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 2022 was prepared by CBased Environmental and includes the following:

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

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

- 24-hour average results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The 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 2022 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 97% of valid meteorological data was recorded for November 2022 due power outages.

Approximately 94% of TEOM valid data was available for November 2022. Loss of valid data was due to a power outage in late October-early November 2022.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or OEH (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 94% of TEOM valid data was available for November 2022. Loss of valid data was due to a power outage in late October-early November 2022.

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 2022 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted in September 2022 with the next calibration due to be completed in December 2022. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for November 2022 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2022.

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)
1/11/2022	ND	9.8	ND	24.6
2/11/2022	ND	9.8	ND	24.6
3/11/2022	10.7	9.9	26.8	24.6
4/11/2022	13.5	9.9	33.8	24.7
5/11/2022	13.0	9.9	32.5	24.8
6/11/2022	9.8	9.9	24.5	24.8
7/11/2022	11.3	9.9	28.3	24.8
8/11/2022	10.0	9.9	25.0	24.8
9/11/2022	11.7	9.9	29.3	24.9
10/11/2022	9.8	9.9	24.5	24.9
11/11/2022	15.1	10.0	37.8	25.0
12/11/2022	11.2	10.0	28.0	25.0
13/11/2022	13.6	10.0	34.0	25.1
14/11/2022	17.2	10.1	43.0	25.2
15/11/2022	8.6	10.1	21.5	25.2
16/11/2022	9.9	10.1	24.8	25.2
17/11/2022	9.8	10.1	24.5	25.2
18/11/2022	11.4	10.1	28.5	25.2
19/11/2022	13.7	10.1	34.3	25.3
20/11/2022	11.6	10.1	29.0	25.3
21/11/2022	23.5	10.2	58.8	25.6
22/11/2022	11.6	10.2	29.0	25.6
23/11/2022	16.2	10.3	40.5	25.7
24/11/2022	13.6	10.3	34.0	25.8
25/11/2022	24.8	10.4	62.0	26.1
26/11/2022	13.3	10.5	33.3	26.1
27/11/2022	14.5	10.5	36.3	26.2
28/11/2022	16.4	10.5	41.0	26.3
29/11/2022	14.8	10.6	37.0	26.4
30/11/2022	22.7	10.7	56.8	26.6

*Calculated from PM10

**Calculated from PM10 Annual Average

ND (No Valid Data) – when displayed, indicates when no valid 1-hour data is available to calculate a 24hr average. Power outage 29/10/22 - 2/11/22

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

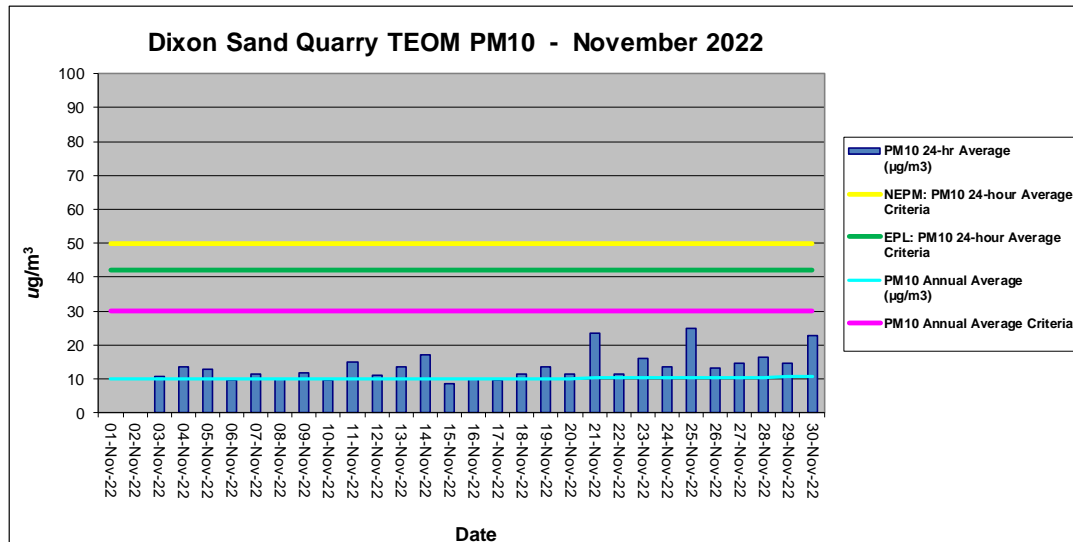


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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.

An annual physical screening and system check of the meteorological station was conducted March 2022 and is next due in March 2023. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 97% of valid meteorological data was recorded for November 2022 due power outages.

Table 3: *Meteorological Data Summary for November 2022*

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
1/11/2022													
2/11/2022	10.5	13.6	17.6	0.0	0.5	5.6	19.5	29.0	41.8	57.5	986.3	990.4	993.3
3/11/2022	8.6	14.0	21.1	4.2	0.2	5.3	20.1	30.5	60.5	99.9	992.5	996.4	1003.7
4/11/2022	11.2	14.4	17.7	0.0	0.1	3.6	13.8	64.2	88.1	100.0	1003.5	1006.0	1008.7
5/11/2022	11.6	16.1	21.1	0.0	0.1	3.8	19.1	55.5	81.3	100.0	1005.1	1007.4	1009.3
6/11/2022	11.4	17.1	23.6	0.0	0.0	4.4	23.4	41.1	80.6	100.0	1001.1	1004.2	1006.9
7/11/2022	11.7	17.3	23.1	0.0	0.1	4.4	21.8	50.2	81.9	100.0	999.1	1001.7	1003.5
8/11/2022	12.3	17.2	22.2	0.0	0.1	4.8	34.4	50.5	79.8	100.0	998.5	1000.6	1002.3
9/11/2022	12.4	17.0	22.3	0.0	0.0	5.0	24.2	43.6	74.8	100.0	1000.4	1001.6	1002.9
10/11/2022	11.0	17.0	22.9	0.0	0.0	4.0	23.4	47.3	75.6	99.9	996.7	1000.0	1002.8
11/11/2022	12.3	17.8	24.4	0.0	0.1	4.3	24.0	43.9	78.2	100.0	991.3	993.8	997.6
12/11/2022	15.0	19.8	27.6	0.8	0.2	5.1	20.6	45.5	83.2	100.0	990.2	991.9	994.0
13/11/2022	16.5	18.7	21.6	5.6	0.2	5.4	22.0	99.9	99.9	99.9	982.5	988.6	993.6
14/11/2022	17.6	21.3	25.9	3.8	0.5	6.0	32.8	27.9	60.8	100.0	978.7	982.7	987.9
15/11/2022	14.3	19.0	23.9	0.0	0.0	3.5	17.6	34.4	51.9	88.4	985.2	987.4	989.9
16/11/2022	9.5	12.8	17.6	4.2	0.2	4.0	39.2	27.0	59.8	99.9	988.6	990.3	994.0
17/11/2022	7.8	13.3	19.2	0.0	0.0	3.4	16.5	34.9	68.2	99.9	992.3	993.9	996.2
18/11/2022	10.2	15.0	20.8	0.0	0.2	3.9	17.8	35.8	72.8	100.0	992.6	994.6	996.5
19/11/2022	11.4	18.4	25.9	0.0	0.1	4.8	16.8	34.6	73.9	100.0	980.8	988.1	994.1
20/11/2022	16.3	21.2	24.9	0.6	0.5	6.2	28.5	22.2	46.9	100.0	974.8	979.6	985.2
21/11/2022	12.8	17.9	22.2	0.0	0.7	7.2	44.1	25.0	36.6	46.6	982.6	984.8	990.0
22/11/2022	10.5	15.5	21.8	0.0	0.2	5.1	26.1	23.9	39.8	56.4	988.7	991.8	994.5
23/11/2022	11.9	18.7	26.2	0.0	0.1	3.2	16.3	28.6	46.8	65.7	992.2	993.9	996.9
24/11/2022	13.4	18.7	26.8	0.0	0.2	4.5	21.9	29.4	67.8	100.0	994.7	997.1	999.4
25/11/2022	14.5	19.2	27.7	0.0	0.1	4.8	25.7	29.3	77.7	99.9	993.2	996.3	999.3
26/11/2022	14.2	17.5	22.9	0.0	0.2	5.1	29.4	47.5	79.0	99.9	989.7	992.8	995.9
27/11/2022	14.2	20.9	29.7	0.4	0.0	4.9	19.4	32.3	71.4	100.0	979.9	984.3	989.9
28/11/2022	15.8	18.3	23.6	1.2	0.2	5.1	22.0	65.4	93.1	100.0	983.4	986.1	989.5
29/11/2022	13.9	17.5	24.5	0.0	0.1	5.3	24.3	26.0	72.4	99.9	988.5	992.5	998.3
30/11/2022	13.5	16.8	20.1	0.0	0.2	4.2	21.8	52.9	68.8	88.6	995.0	997.4	999.2
Monthly	7.8	17.3	29.7	20.8	0.0	4.7	44.1	22.2	69.4	100.0	974.8	993.7	1009.3

No data due to power outages

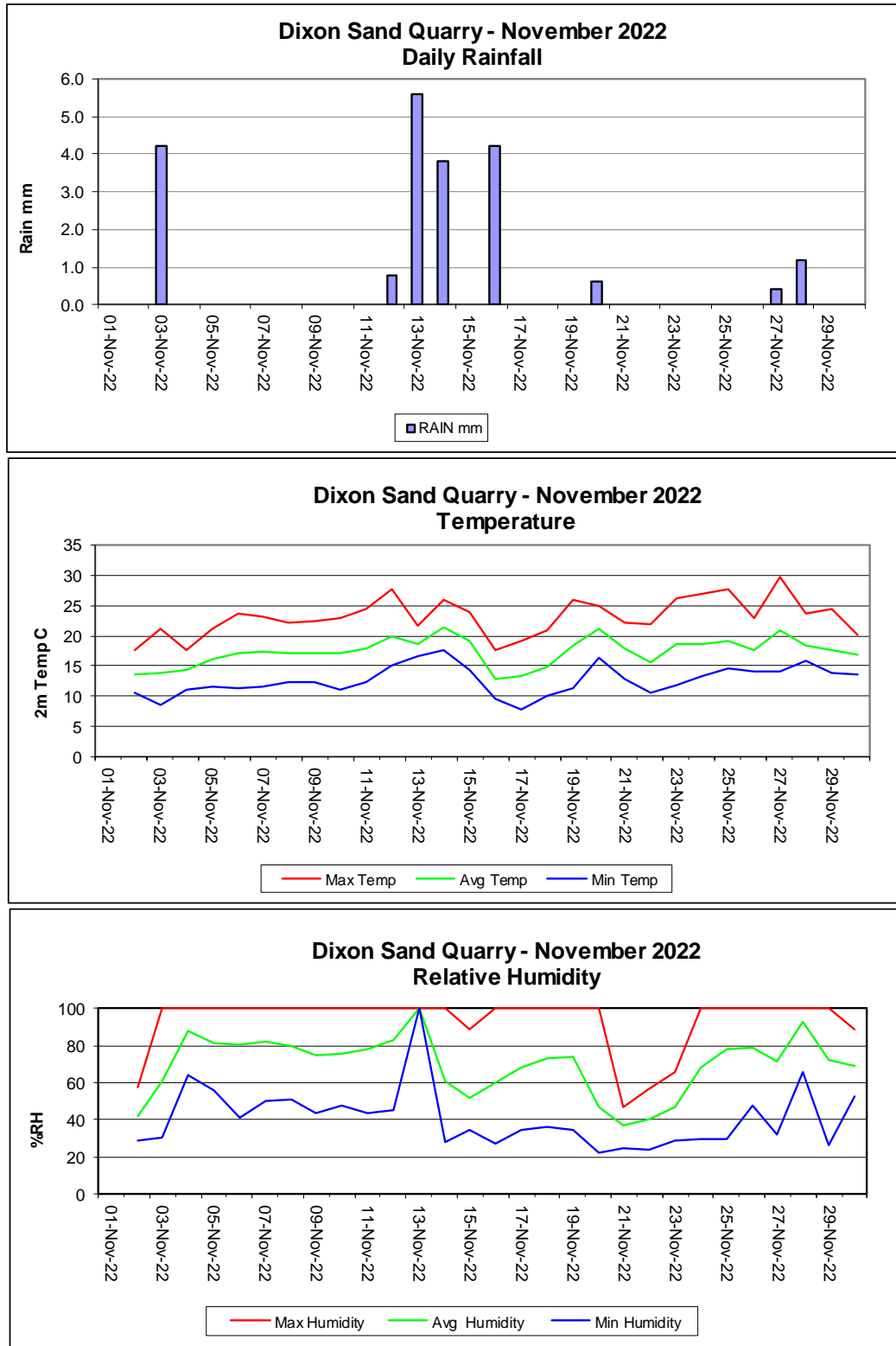


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

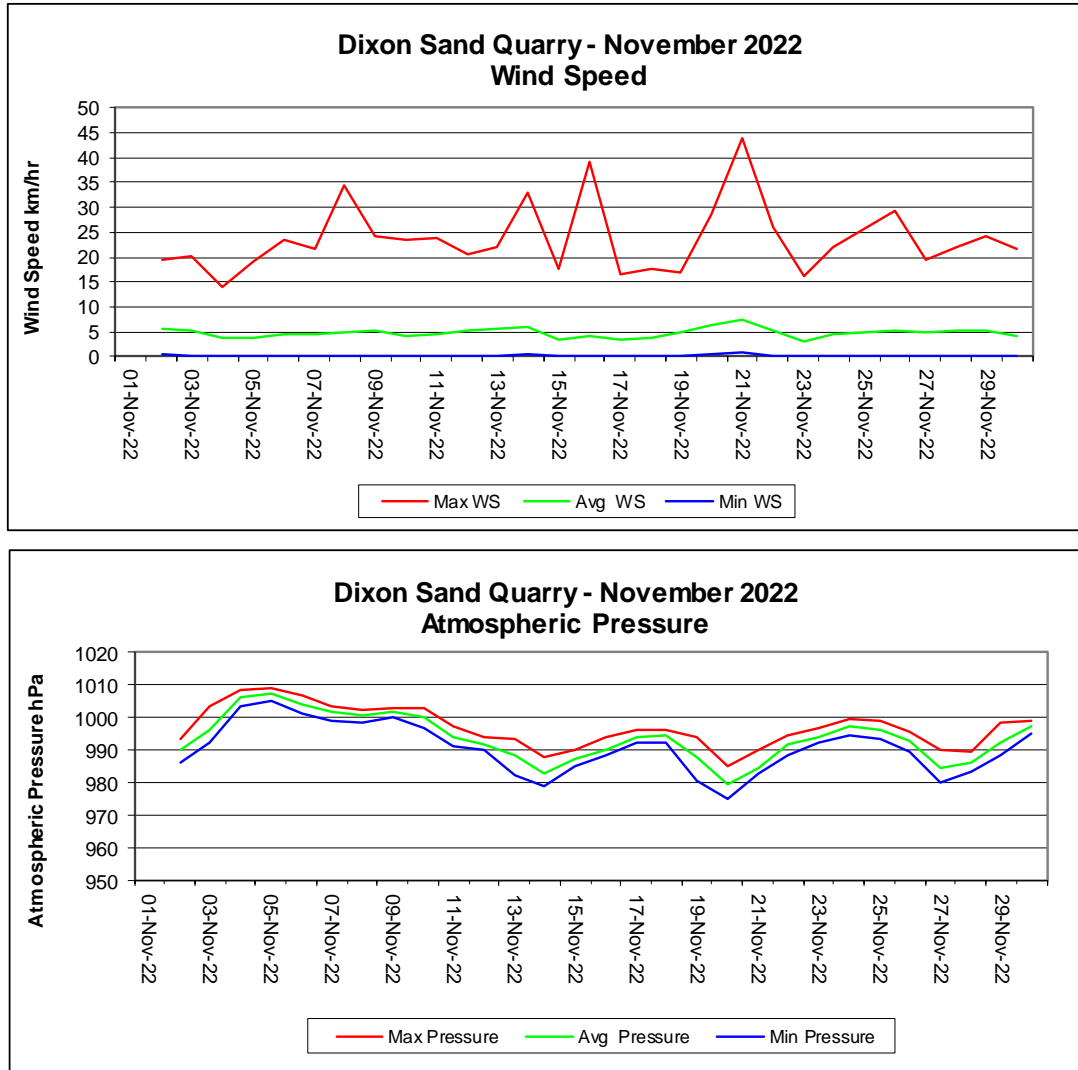


Figure 3: Wind Speed and Atmospheric Pressure Charts

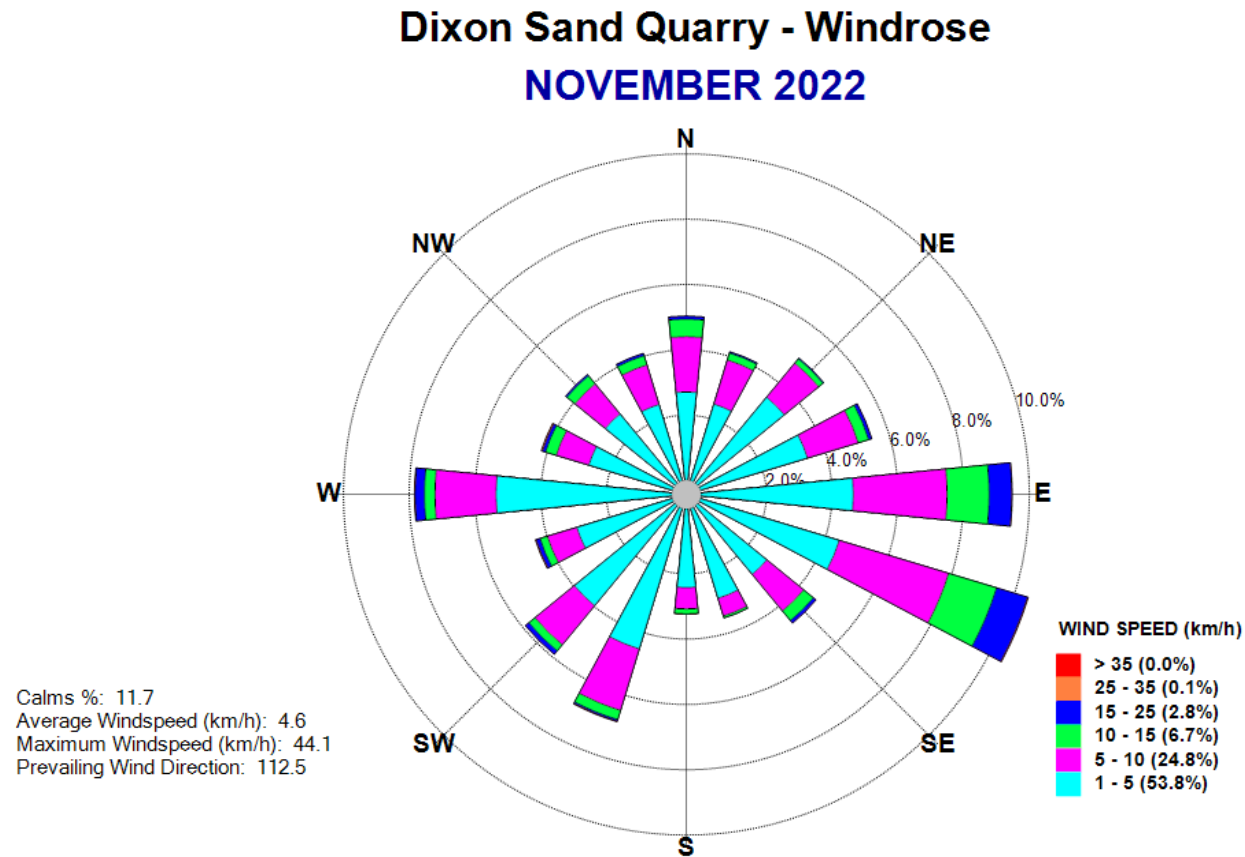


Figure 4: *Monthly Windrose*

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

DECEMBER 2022

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 24 January 2023

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 2022 was prepared by CBased Environmental and includes the following:

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

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

- 24-hour average results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The 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 2022 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has now been collected.

Approximately 100% of valid meteorological data was recorded for December 2022 due power outages.

Approximately 100% of TEOM valid data was available for December 2022.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or OEH (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 TEOM valid data was available for December 2022.

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 2022 and therefore an annual amount of data has now been collected.

The quarterly TEOM calibration was conducted on 2 December 2022 with the next calibration due to be completed in March 2023. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for December 2022 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2022.

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)
1/12/2022	15.7	10.7	39.3	26.7
2/12/2022	14.2	10.7	35.5	26.8
3/12/2022	10.8	10.7	27.0	26.8
4/12/2022	9.2	10.7	23.0	26.8
5/12/2022	18.8	10.8	47.0	26.9
6/12/2022	17.6	10.8	44.0	27.0
7/12/2022	20.3	10.9	50.8	27.2
8/12/2022	15.6	10.9	39.0	27.3
9/12/2022	17.9	11.0	44.8	27.4
10/12/2022	17.8	11.0	44.5	27.5
11/12/2022	14.6	11.0	36.5	27.6
12/12/2022	18.3	11.1	45.8	27.7
13/12/2022	19.1	11.1	47.8	27.9
14/12/2022	18.4	11.2	46.0	28.0
15/12/2022	16.4	11.2	41.0	28.1
16/12/2022	13.6	11.2	34.0	28.1
17/12/2022	12.9	11.3	32.3	28.1
18/12/2022	7.4	11.2	18.5	28.1
19/12/2022	20.1	11.3	50.3	28.2
20/12/2022	18.1	11.3	45.3	28.3
21/12/2022	10.2	11.3	25.5	28.3
22/12/2022	12.2	11.3	30.5	28.3
23/12/2022	12.0	11.3	30.0	28.3
24/12/2022	10.3	11.3	25.8	28.3
25/12/2022	22.1	11.4	55.3	28.5
26/12/2022	9.9	11.4	24.8	28.5
27/12/2022	10.2	11.4	25.5	28.4
28/12/2022	13.9	11.4	34.8	28.5
29/12/2022	19.9	11.4	49.8	28.6
30/12/2022	11.2	11.4	28.0	28.6
31/12/2022	12.1	11.4	30.3	28.6

*Calculated from PM10

**Calculated from PM10 Annual Average

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

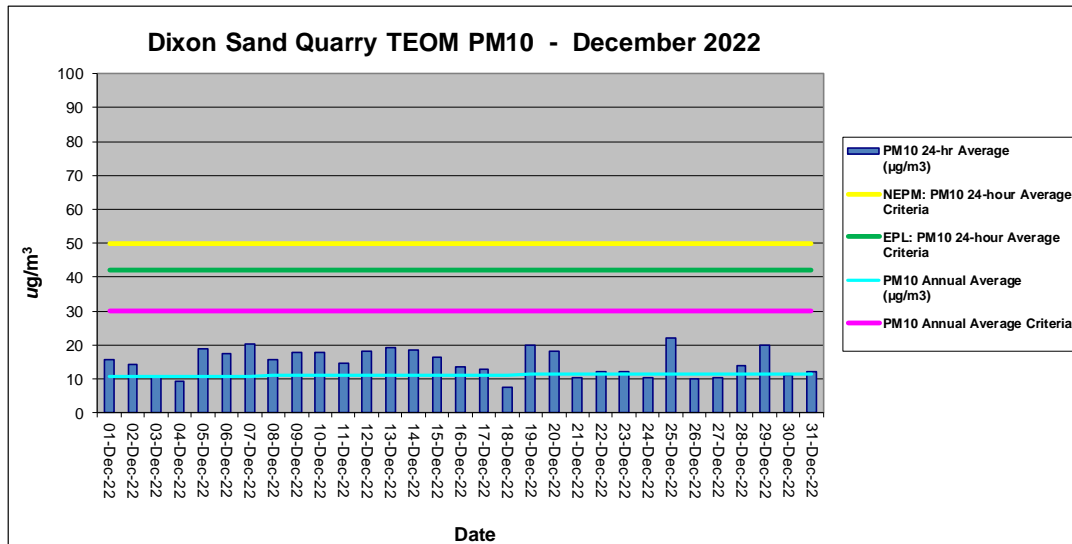


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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.

An annual physical screening and system check of the meteorological station was conducted March 2022 and is next due in March 2023. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 100% of valid meteorological data was recorded for December 2022.

Table 3: *Meteorological Data Summary for December 2022*

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
1/12/2022	14.0	16.4	20.1	0.0	0.0	3.8	19.4	50.6	80.2	100.0	994.1	995.6	997.0
2/12/2022	12.5	16.1	21.6	0.2	0.1	4.7	21.3	47.9	83.7	100.0	994.8	996.6	998.8
3/12/2022	11.9	17.2	23.1	0.0	0.0	4.2	21.0	44.9	77.4	100.0	995.5	997.5	999.4
4/12/2022	14.5	18.7	24.6	0.0	0.2	4.1	23.4	40.6	76.3	100.0	992.4	995.4	997.8
5/12/2022	14.1	22.1	32.0	0.0	0.2	4.6	15.0	27.5	72.3	100.0	982.7	987.4	993.5
6/12/2022	15.0	18.8	24.0	0.2	0.0	5.4	33.8	44.3	82.4	100.0	985.3	987.1	989.9
7/12/2022	14.3	19.8	25.1	0.0	0.1	4.3	25.1	30.6	65.8	99.9	981.6	985.4	988.9
8/12/2022	12.8	18.4	25.0	0.0	0.1	5.8	31.9	19.7	50.6	80.3	982.5	986.4	992.8
9/12/2022	12.0	15.5	19.8	0.0	0.1	4.3	23.4	47.2	65.4	95.9	991.6	993.6	997.4
10/12/2022	13.2	16.4	20.5	0.0	0.2	3.9	17.1	54.7	73.2	95.9	994.3	996.7	999.0
11/12/2022	13.2	21.2	30.9	0.0	0.0	4.8	19.1	30.7	69.4	100.0	986.0	990.7	995.7
12/12/2022	16.1	22.7	26.7	27.8	0.5	7.8	30.6	26.9	49.7	99.9	979.8	983.0	989.0
13/12/2022	12.9	19.2	26.7	0.0	0.1	4.1	18.6	22.2	40.1	65.0	985.7	988.5	990.8
14/12/2022	13.1	17.4	22.3	0.0	0.0	3.4	24.6	19.2	43.5	90.2	986.0	987.9	989.7
15/12/2022	10.4	16.3	23.9	0.0	0.0	4.2	20.1	25.4	50.3	80.2	987.0	988.8	991.6
16/12/2022	10.7	14.9	20.0	1.6	0.1	4.2	13.5	38.9	69.7	100.0	991.2	994.3	998.4
17/12/2022	10.0	15.3	20.5	0.0	0.1	5.5	17.8	48.4	74.4	100.0	997.3	999.7	1001.8
18/12/2022	11.7	14.7	19.3	1.0	1.0	5.5	15.5	52.9	86.8	99.9	1000.1	1001.5	1002.7
19/12/2022	11.9	15.1	20.6	1.0	0.2	5.3	19.5	40.8	73.5	100.0	1001.2	1002.8	1004.2
20/12/2022	11.0	14.9	19.8	0.0	0.1	4.2	21.5	49.8	74.5	99.9	998.7	1001.0	1003.2
21/12/2022	10.3	16.3	22.4	0.0	0.0	4.8	23.2	43.2	75.2	100.0	994.8	997.4	1000.1
22/12/2022	12.5	17.0	23.7	0.8	0.2	3.4	16.7	41.7	84.8	100.0	992.8	994.7	996.5
23/12/2022	15.5	21.0	29.7	5.8	0.1	4.0	38.4	37.9	80.5	100.0	987.8	990.7	993.1
24/12/2022	18.5	24.8	31.9	0.0	0.0	4.8	20.5	26.0	62.0	100.0	988.1	990.2	992.9
25/12/2022	18.7	22.9	29.6	0.0	0.1	4.9	18.2	52.0	82.5	100.0	992.6	995.5	998.5
26/12/2022	16.7	23.8	32.0	0.0	0.0	4.4	22.9	18.6	67.8	99.9	998.3	1000.0	1001.9
27/12/2022	16.4	22.4	29.2	0.0	0.0	5.9	22.9	40.0	77.8	100.0	999.3	1001.1	1003.6
28/12/2022	17.3	23.3	31.4	0.0	0.0	5.0	20.7	21.7	74.0	100.0	990.6	994.7	999.5
29/12/2022	17.6	19.9	22.1	0.4	0.3	4.2	11.7	82.1	97.5	100.0	990.8	995.6	999.0
30/12/2022	16.8	19.6	25.0	3.0	0.2	5.6	23.4	52.9	87.6	100.0	995.5	997.3	999.2
31/12/2022	16.0	20.1	24.3	0.0	0.1	4.1	26.5	67.5	88.3	100.0	993.9	995.5	997.1
Monthly	10.0	18.8	32.0	41.8	0.0	4.7	38.4	18.6	72.2	100.0	979.8	993.9	1004.2

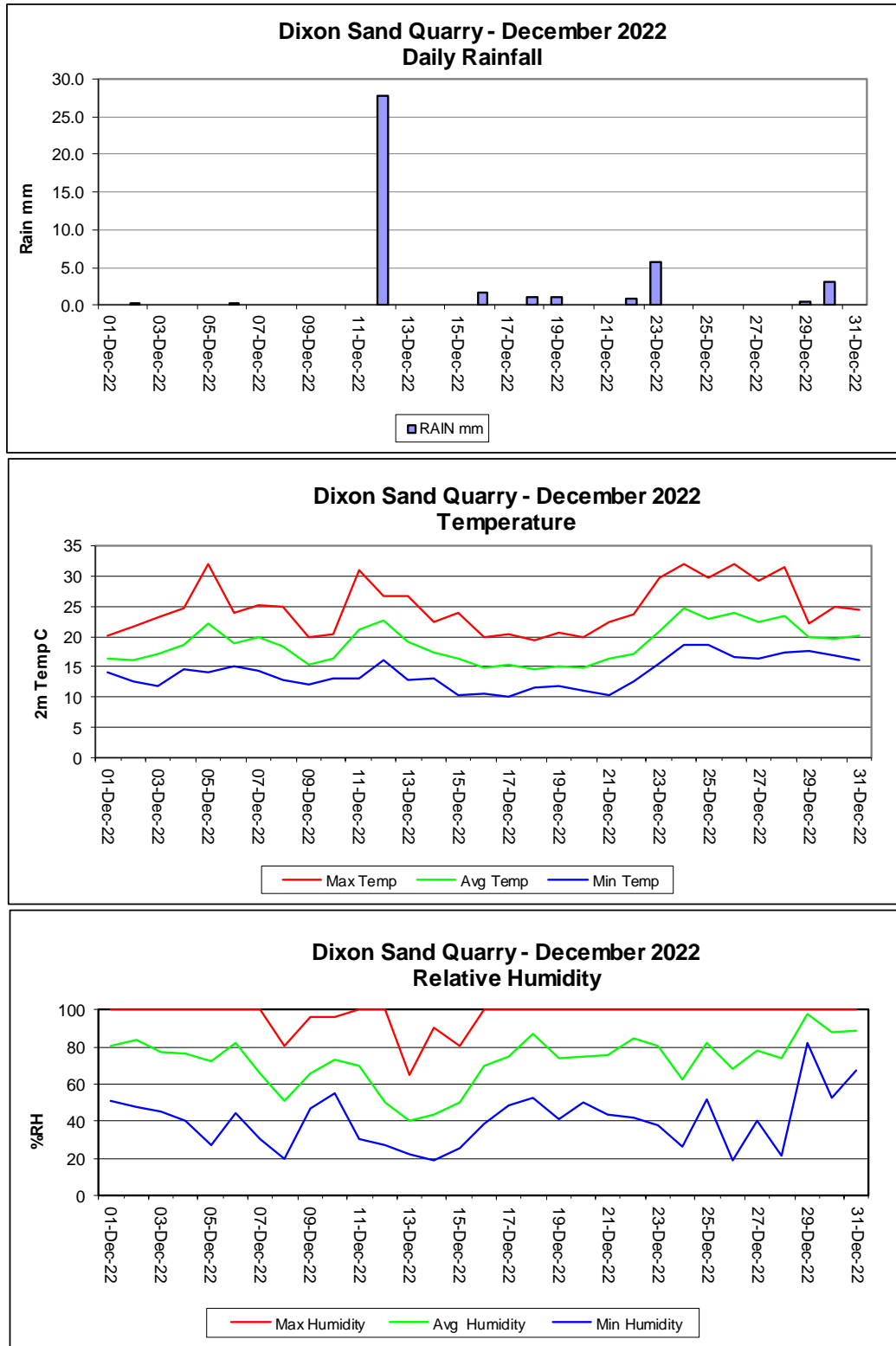


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

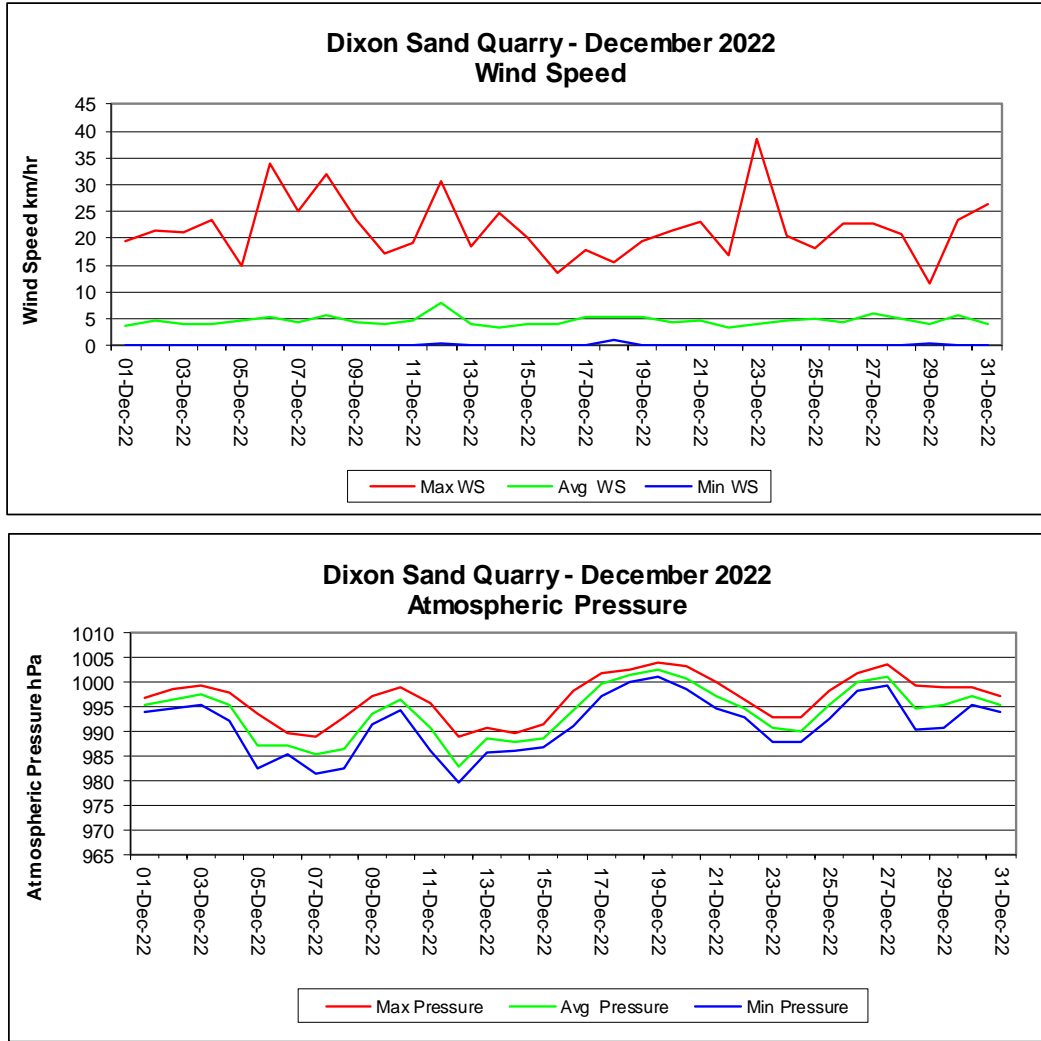


Figure 3: *Wind Speed and Atmospheric Pressure Charts*

Dixon Sand Quarry - Windrose DECEMBER 2022

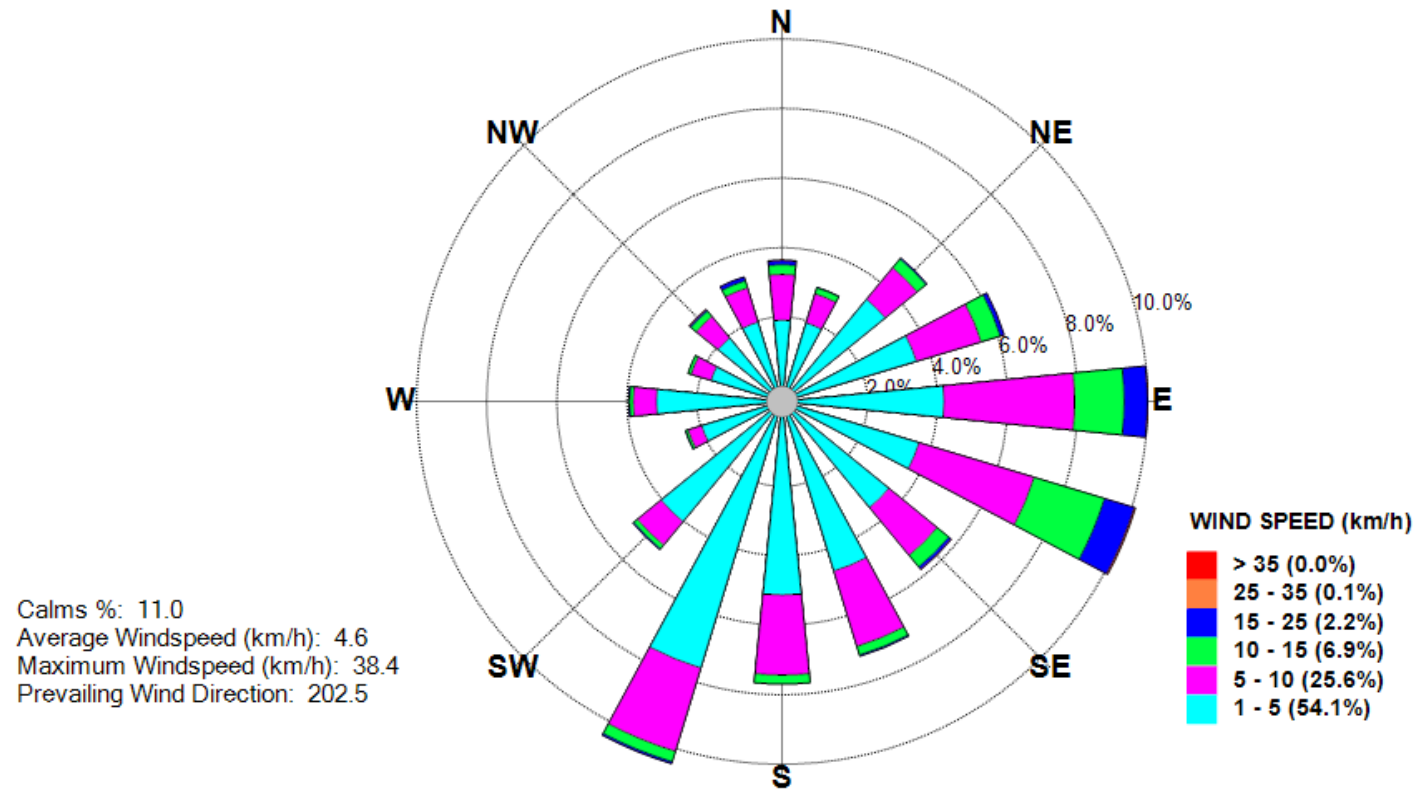


Figure 4: Monthly Windrose

Appendix 1

Calibration Documents (when required)



Continuous Air Quality

Monthly/Quarterly/Six Monthly/Annual

TEOM Maintenance and Calibration – 1400AB

TEOM Client/Site: Dixon Sandil TEOM1Date: 2/12/22**1. TEOM Data Screen**SERIAL No: 25570Firmware: NA AB ✓

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	Full op 4	Green - Normal	✓	
Date/time	TEOM: 2/12/22 n-50 Actual: 2/12/22 n-51	Current Date/time correct within 5 minutes	✓	
PM-10 24hr av	14.8	Positive values	✓	
Filter loading PM10	32	<80 %	✓	
Frequency PM-10	254.07020	200-300 Hz	✓	
Noise PM-10	0.033	<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	NA OK	<0.50 atm	✓	
Warnings	NIL	No Warnings	✓	
If any warnings list:				

Comments:

Data Downloaded: YES/NO (circle)

Technician Name : Colin Davis Signed Colin Davis

3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	27.3	-10 to 50 C	/	
Ambient Dew Point	NA	-10 to 50 C	/	
Ambient Pressure	0.973	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	13.68	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	255-69714	255-69714	255-69713	255-69713

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: 1009 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 3.02 Error % 0.7 (allowed error <6%) PASS/FAIL

Bypass Flow verified Flow l/min 13.58 Error % 0.7 (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: Full recal → see over

2. Leak Check – Conducted YES/NO

PM10 actual 0.13 < Limit 0.15

Bypass actual 0.45 < Limit 0.60

Leak check PASS/FAIL – If fail then find leak and retest.

Comments:

Slight leak OK ✓



Annual Calibration/Maintenance**1. Temperature and Pressure Calibration – Conducted YES/NO**

Reference Temperature: 27.2 C TEOM Temperature 27.5 C
 if difference +/- 1 C recalibrate sensor. Sensor recalibrated YES/NO

Reference Pressure: 0.975 atm TEOM Pressure 0.973 atm
 if difference +/- 0.010 atm recalibrate sensor. Sensor recalibrated YES/NO

Note: Tetral measures Atmospheric Pressure in mm Hg or mb or hPa
 For mb or hPa divide tetral result by 1013.25 to change units to atm.
 For mmHg divide tetral result by 760 to change units to atm.

Ref = 1009
T = 27.2 °C
P = 987.9 mb
 0.975 atm
 ✓ OK

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

Hardware Cal

F_{adj} main

Pre

Post

1.060

1.055 3.00
4m

1.000

1.005
13.72 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/NOActual measured KO = _____ TEOM stated KO 13748 Error %: _____Allowed Error +/- 2.5% PASS/FAIL

If Error +/- 2.5% repeat. If confirmed consult manufacturer.

Second Error % = _____ PASS/FAIL. Comments: NA

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: 9/10/22 00:00 Finish date/time: 9/10/22 18:00Standard deviation of all recorded data (min 30 min averages) = 1.2 ug/m³Noise was less than 5ug/m³ YES/NOAverage = 2.1 ug/m³ ✓ OK**5. Maintenance**

Air Inlet system cleaned YES/NO

Pump Reconditioned YES/NO

Check Waterproofing YES/NO

Comments: OK



**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 2023

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 28 February 2023

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 2023 was prepared by CBased Environmental and includes the following:

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

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

- 24-hour average results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The 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 2022 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of valid meteorological data was recorded for January 2023.

Approximately 92% of TEOM valid data was available for January 2023.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or OEH (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 92% of TEOM valid data was available for January 2023 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 2022 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted in December 2022 with the next calibration due to be completed in March 2023. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for January 2023 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2022.

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)
1/01/2023	13.9	11.5	34.8	28.7
2/01/2023	14.8	11.5	37.0	28.7
3/01/2023	18.4	11.5	46.0	28.8
4/01/2023	12.5	11.5	31.3	28.8
5/01/2023	11.6	11.5	29.0	28.8
6/01/2023	8.9	11.5	22.3	28.8
7/01/2023	10.8	11.5	27.0	28.8
8/01/2023	13.2	11.5	33.0	28.8
9/01/2023	12.7	11.5	31.8	28.8
10/01/2023	10.5	11.5	26.3	28.8
11/01/2023	15.7	11.5	39.3	28.9
12/01/2023	17.3	11.6	43.3	28.9
13/01/2023	14.6	11.6	36.5	29.0
14/01/2023	11.8	11.6	29.5	29.0
15/01/2023	13.3	11.6	33.3	29.0
16/01/2023	12.0	11.6	30.0	29.0
17/01/2023	11.1	11.6	27.8	29.0
18/01/2023	15.6	11.6	39.0	29.1
19/01/2023	11.5	11.6	28.8	29.1
20/01/2023	13.7	11.6	34.3	29.1
21/01/2023	12.1	11.6	30.3	29.1
22/01/2023	8.6	11.6	21.5	29.1
23/01/2023	10.6	11.6	26.5	29.0
24/01/2023	13.9	11.6	34.8	29.1
25/01/2023	7.8	11.6	19.6	29.0
26/01/2023	15.0	11.6	37.5	29.1
27/01/2023	24.7	11.7	61.8	29.2
28/01/2023	15.2	11.7	38.0	29.3
29/01/2023	ND	11.7	ND	29.3
30/01/2023	ND	11.7	ND	29.3
31/01/2023	ND	11.7	ND	29.3

*Calculated from PM10

**Calculated from PM10 Annual Average

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

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

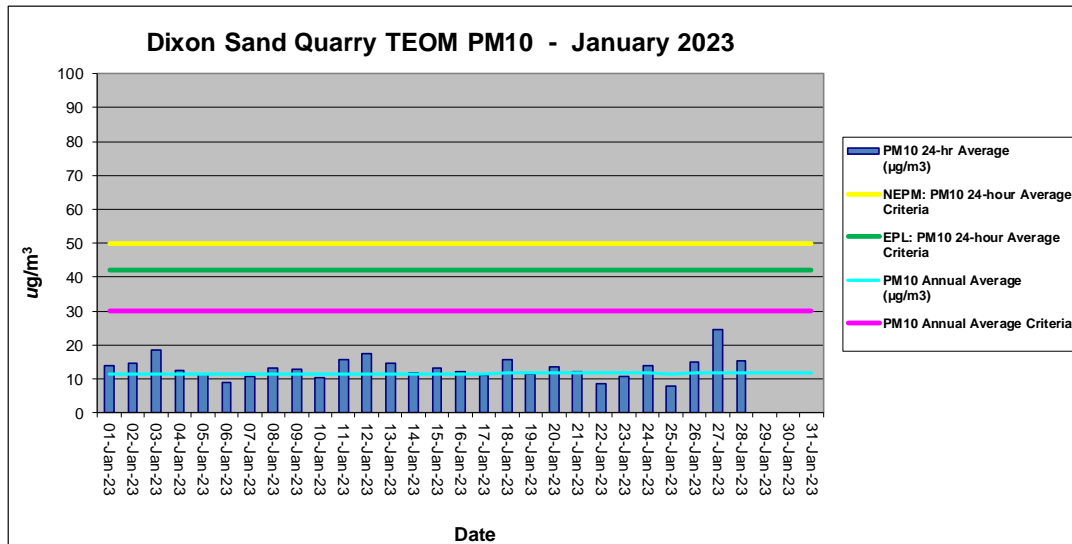


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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.

An annual physical screening and system check of the meteorological station was conducted March 2022 and is next due in March 2023. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 100% of valid meteorological data was recorded for January 2023.

Table 3: *Meteorological Data Summary for January 2023*

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
1/01/2023	17.6	21.3	26.5	0.0	0.1	4.7	22.0	56.3	84.4	100.0	993.5	995.1	996.7
2/01/2023	17.4	22.0	28.4	0.0	0.2	5.3	25.4	42.6	77.3	99.9	987.9	991.8	995.3
3/01/2023	17.9	22.8	30.1	2.2	0.1	5.3	23.9	45.5	78.6	99.9	983.1	985.8	988.8
4/01/2023	17.0	20.3	26.1	1.8	0.2	4.3	19.1	64.9	94.8	99.9	981.9	984.5	986.5
5/01/2023	14.3	16.5	20.3	2.4	0.9	6.6	18.2	60.2	85.2	99.9	986.5	989.7	992.8
6/01/2023	13.4	14.8	16.8	21.8	0.7	6.5	22.6	77.8	94.2	99.9	991.2	992.7	995.5
7/01/2023	14.1	16.4	20.8	3.2	0.5	4.4	13.9	66.1	94.4	99.9	993.1	994.5	995.6
8/01/2023	14.9	18.6	24.9	0.6	0.3	3.9	26.0	36.7	76.0	99.9	991.9	993.7	995.3
9/01/2023	14.5	20.6	28.8	0.0	0.1	4.3	22.2	39.5	74.6	100.0	990.8	992.7	994.7
10/01/2023	15.4	20.4	26.6	0.0	0.0	3.9	21.6	41.2	79.0	100.0	992.8	994.1	995.7
11/01/2023	17.7	20.3	24.7	0.0	0.2	4.3	18.4	61.8	83.5	100.0	992.9	994.9	996.3
12/01/2023	18.4	21.3	27.0	0.0	0.2	5.3	25.8	59.7	83.3	100.0	993.5	995.8	998.1
13/01/2023	17.1	21.2	25.9	0.0	0.1	4.5	23.8	61.0	85.0	100.0	996.4	998.1	999.8
14/01/2023	17.7	21.6	26.5	0.0	0.3	5.3	18.6	56.8	81.3	100.0	995.6	997.7	999.8
15/01/2023	17.2	23.5	31.6	0.0	0.1	4.7	25.4	36.5	74.9	100.0	993.8	996.4	999.1
16/01/2023	18.3	22.4	27.0	0.0	0.1	6.4	23.6	54.6	80.9	100.0	998.9	1000.8	1002.3
17/01/2023	17.6	21.6	27.2	0.0	0.2	3.7	17.5	56.9	84.6	100.0	995.9	998.9	1001.8
18/01/2023	17.6	23.8	33.3	18.4	0.1	5.2	33.4	29.9	75.6	99.9	985.3	990.7	996.4
19/01/2023	15.2	17.4	19.7	6.6	0.2	3.6	11.6	99.2	99.9	99.9	986.8	990.9	994.9
20/01/2023	15.1	17.1	19.9	0.0	0.1	3.4	12.6	69.0	91.1	100.0	993.4	996.1	998.3
21/01/2023	14.1	18.6	24.3	0.0	0.1	4.1	26.7	47.8	82.5	100.0	994.0	996.2	998.3
22/01/2023	15.2	17.0	19.5	26.2	0.2	2.6	8.7	88.6	99.4	100.0	994.0	995.4	996.8
23/01/2023	15.2	18.8	24.0	0.0	0.0	3.7	17.2	57.6	87.4	100.0	991.2	993.1	995.3
24/01/2023	17.2	21.3	27.9	0.4	0.0	4.3	22.6	53.1	85.4	99.9	988.7	991.8	993.6
25/01/2023	15.8	21.9	28.3	0.0	0.0	4.5	21.3	53.6	82.1	99.9	991.1	992.5	994.3
26/01/2023	18.0	24.0	34.7	4.6	0.1	3.9	18.6	23.9	77.9	99.9	989.9	992.6	995.2
27/01/2023	19.3	22.4	28.4	7.8	0.0	3.5	19.6	66.4	91.9	100.0	992.7	994.9	996.3
28/01/2023	20.3	25.1	32.2	0.2	0.0	4.0	17.7	49.5	83.2	100.0	989.6	992.9	995.3
29/01/2023	19.8	23.3	33.7	43.8	0.4	3.6	17.8	44.9	93.7	99.9	991.2	993.0	995.5
30/01/2023	18.7	20.6	22.7	28.6	0.0	4.8	16.4	99.8	99.8	99.9	986.5	989.8	994.5
31/01/2023	18.1	21.6	27.4	0.2	0.2	4.3	12.1	56.6	82.5	100.0	982.3	985.1	987.4
Monthly	13.4	20.6	34.7	168.8	0.0	4.5	33.4	23.9	85.3	100.0	981.9	993.3	1002.3

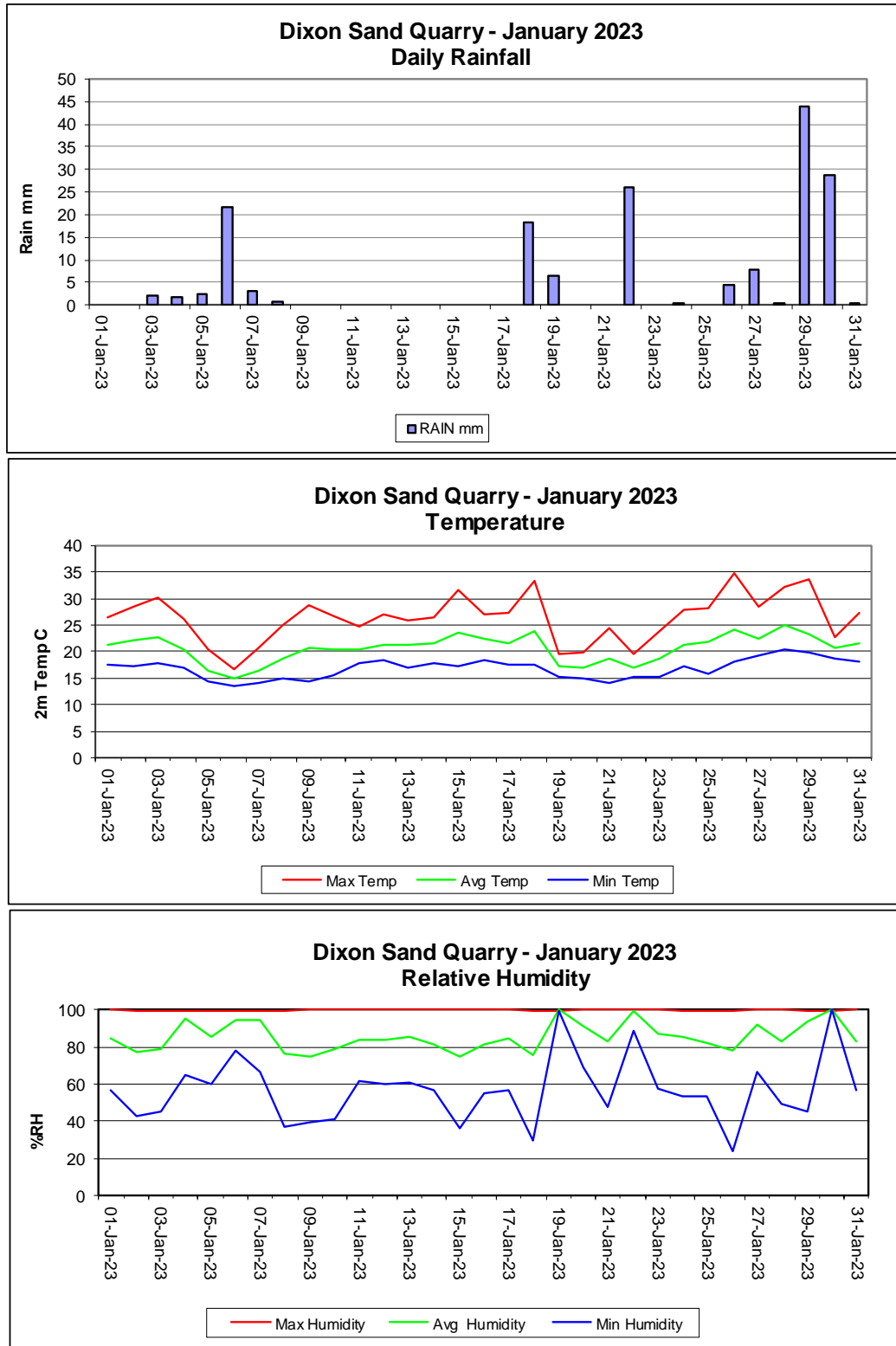


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

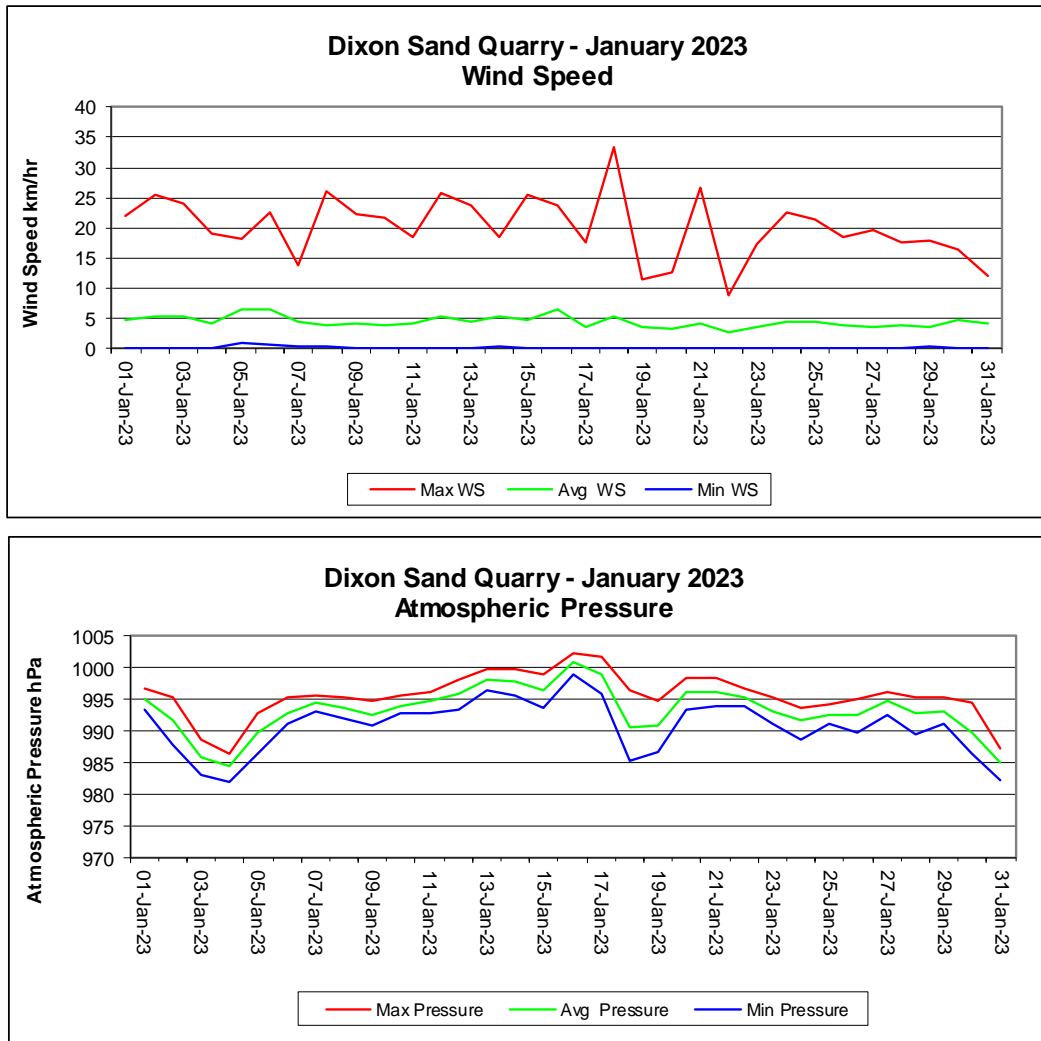


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose JANUARY 2023

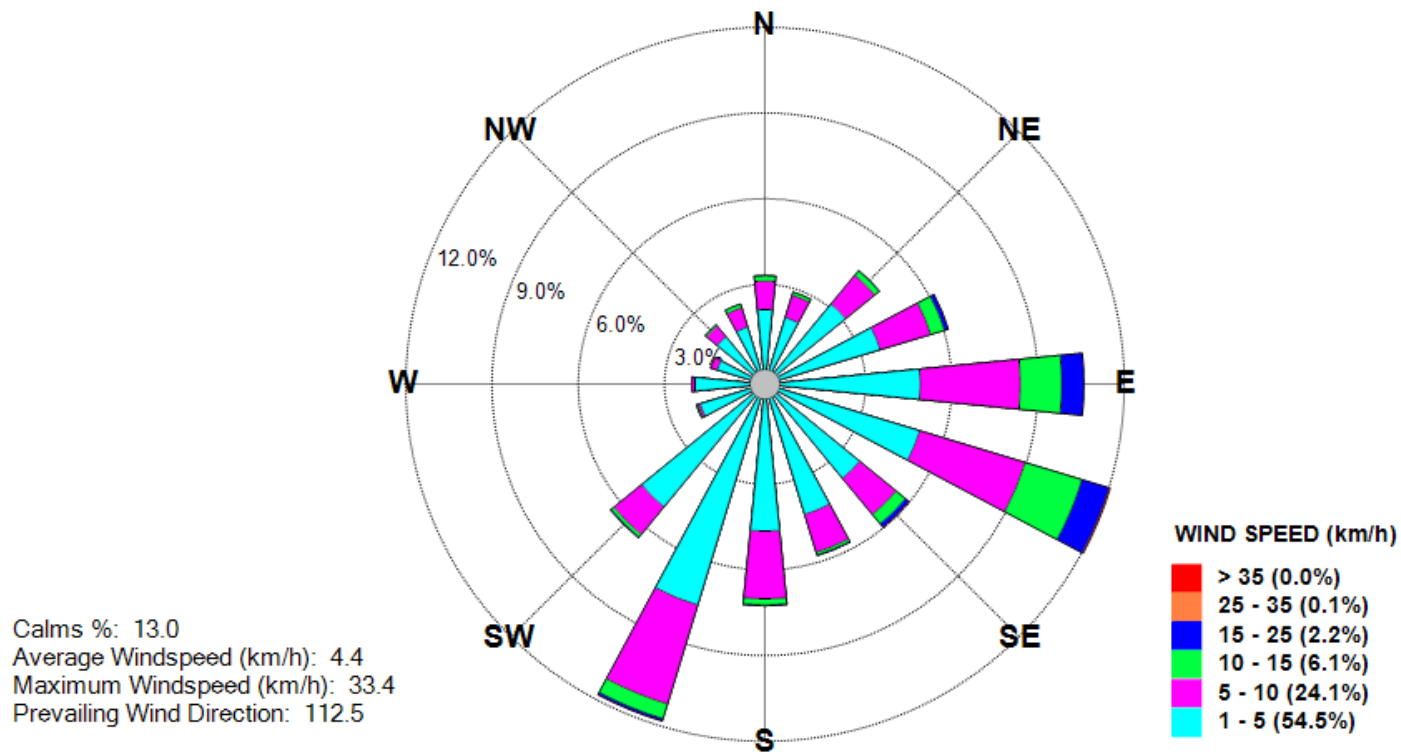


Figure 4: Monthly Windrose

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

FEBRUARY 2023

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 30 March 2023

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 2023 was prepared by CBased Environmental and includes the following:

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

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

- 24-hour average results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The 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 2022 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 96% of valid meteorological data was recorded for February 2023 due to a power outage on 19 February 2023.

Approximately 65% of TEOM valid data was available for February 2023 due to a flow fault and power issues. Main and bypass filter replaced on 19 February 2023.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or OEH (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 65% of TEOM valid data was available for February 2023 due to a flow fault and power issues. Main and bypass filter replaced on 9 February 2023. Calibration certificate after repair is provided in **Appendix 1**.

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 2022 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted in December 2022 with the next calibration due to be completed in March 2023. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for February 2023 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2022.

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)
1/02/2023	ND	11.7	ND	29.3
2/02/2023	ND	11.7	ND	29.3
3/02/2023	ND	11.7	ND	29.3
4/02/2023	ND	11.7	ND	29.3
5/02/2023	ND	11.7	ND	29.3
6/02/2023	ND	11.7	ND	29.3
7/02/2023	ND	11.7	ND	29.3
8/02/2023	ND	11.7	ND	29.3
9/02/2023	ND	11.7	ND	29.3
10/02/2023	ND	11.7	ND	29.3
11/02/2023	14.2	11.7	35.5	29.3
12/02/2023	18.7	11.8	46.8	29.4
13/02/2023	22.1	11.8	55.3	29.5
14/02/2023	25.3	11.9	63.3	29.7
15/02/2023	13.4	11.9	33.5	29.7
16/02/2023	11.6	11.9	29.0	29.7
17/02/2023	16.0	11.9	40.0	29.8
18/02/2023	18.3	11.9	45.8	29.9
19/02/2023	17.9	12.0	44.8	29.9
20/02/2023	ND	12.0	ND	29.9
21/02/2023	17.2	12.0	43.0	30.0
22/02/2023	15.8	12.0	39.5	30.0
23/02/2023	12.3	12.0	30.8	30.1
24/02/2023	16.2	12.0	40.5	30.1
25/02/2023	12.9	12.0	32.3	30.1
26/02/2023	9.8	12.0	24.5	30.1
27/02/2023	12.0	12.0	30.0	30.1
28/02/2023	22.6	12.1	56.5	30.2

*Calculated from PM₁₀

**Calculated from PM₁₀ Annual Average

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

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

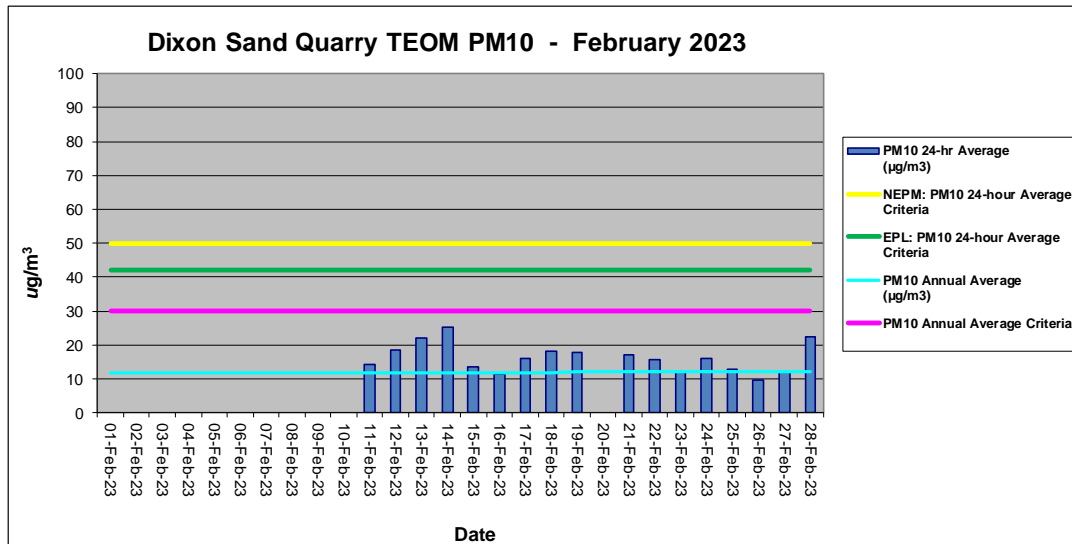


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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.

An annual physical screening and system check of the meteorological station was conducted March 2022 and is next due in March 2023. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 96% of valid meteorological data was recorded for February 2023 due to a power outage on 19 February 2023.

Table 3: Meteorological Data Summary for February 2023

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
1/02/2023	17.4	21.9	28.5	0.0	0.0	4.7	25.9	55.1	80.4	100.0	981.3	983.3	984.9
2/02/2023	19.0	25.3	32.1	0.0	0.2	4.8	18.9	22.4	64.7	100.0	973.1	978.3	983.9
3/02/2023	17.8	23.1	28.7	0.0	0.0	4.4	23.6	25.1	49.6	100.0	972.7	976.1	981.7
4/02/2023	13.9	20.2	26.2	0.0	0.0	2.9	20.6	18.4	40.2	99.9	981.1	985.7	991.5
5/02/2023	15.5	21.2	28.8	0.0	0.1	4.3	26.9	22.8	48.8	92.0	991.4	994.5	997.8
6/02/2023	16.6	22.0	28.3	0.0	0.0	4.1	23.5	52.3	85.5	100.0	994.0	996.7	998.8
7/02/2023	19.7	22.8	28.1	0.0	0.1	5.0	25.3	58.2	82.9	99.9	993.0	995.4	996.8
8/02/2023	19.0	22.2	26.9	0.0	0.0	4.9	21.1	53.9	81.0	100.0	992.6	994.7	996.2
9/02/2023	17.2	20.1	24.9	5.4	0.0	2.8	9.8	64.7	94.6	100.0	989.2	992.0	994.7
10/02/2023	16.4	21.8	30.7	0.4	0.2	3.4	14.2	37.6	81.0	99.9	985.2	988.1	990.4
11/02/2023	18.5	26.6	35.9	0.0	0.3	4.7	16.7	21.0	62.3	100.0	981.3	984.8	988.1
12/02/2023	19.6	23.7	29.0	0.0	0.0	3.8	18.2	33.2	67.2	94.3	980.9	984.8	989.9
13/02/2023	18.5	20.1	22.6	0.0	0.1	3.4	19.3	71.8	92.3	100.0	988.8	990.3	991.8
14/02/2023	17.3	18.7	21.5	0.6	0.1	3.2	12.8	72.4	98.3	100.0	990.4	992.7	996.0
15/02/2023	16.3	20.1	25.5	1.0	0.1	3.3	18.5	57.1	82.4	99.9	995.0	996.2	998.0
16/02/2023	16.2	22.4	30.5	0.0	0.2	3.9	12.5	36.1	69.9	99.9	994.3	996.8	998.7
17/02/2023	17.0	23.3	31.7	0.0	0.1	5.0	22.7	35.3	75.4	99.9	993.2	995.7	997.5
18/02/2023	18.4	25.4	36.7	2.0	0.4	5.0	18.1	25.8	74.3	100.0	989.4	993.3	995.3
19/02/2023													
20/02/2023	20.4	24.3	31.1	0.0	0.0	4.3	17.9	51.7	82.7	100.0	997.5	999.3	1001.0
21/02/2023	18.3	22.3	29.3	59.0	0.0	3.6	18.1	54.9	88.7	100.0	999.1	1001.6	1005.1
22/02/2023	16.4	18.0	19.7	39.8	0.0	3.7	13.1	71.5	91.6	99.9	1003.0	1005.0	1006.2
23/02/2023	15.1	17.8	22.0	4.2	0.0	4.7	27.5	70.1	91.0	100.0	1001.9	1003.4	1004.9
24/02/2023	14.6	19.0	24.0	0.0	0.0	3.7	19.7	53.9	80.7	100.0	998.4	1000.9	1002.7
25/02/2023	15.6	20.2	25.9	0.0	0.0	3.0	13.8	45.4	77.0	100.0	994.4	997.2	1000.1
26/02/2023	16.1	23.7	32.9	0.0	0.1	4.9	14.0	28.6	68.1	99.9	989.1	991.9	995.0
27/02/2023	19.0	22.1	27.1	2.0	0.0	4.6	25.9	52.8	88.0	100.0	989.3	992.0	994.8
28/02/2023	18.4	21.4	25.6	0.4	0.2	3.7	26.9	68.0	89.8	100.0	987.4	991.3	994.3
Monthly	13.9	21.8	36.7	114.8	0.0	4.1	27.5	18.4	77.4	100.0	972.7	992.7	1006.2

No data due to power outage on 19/02/2023

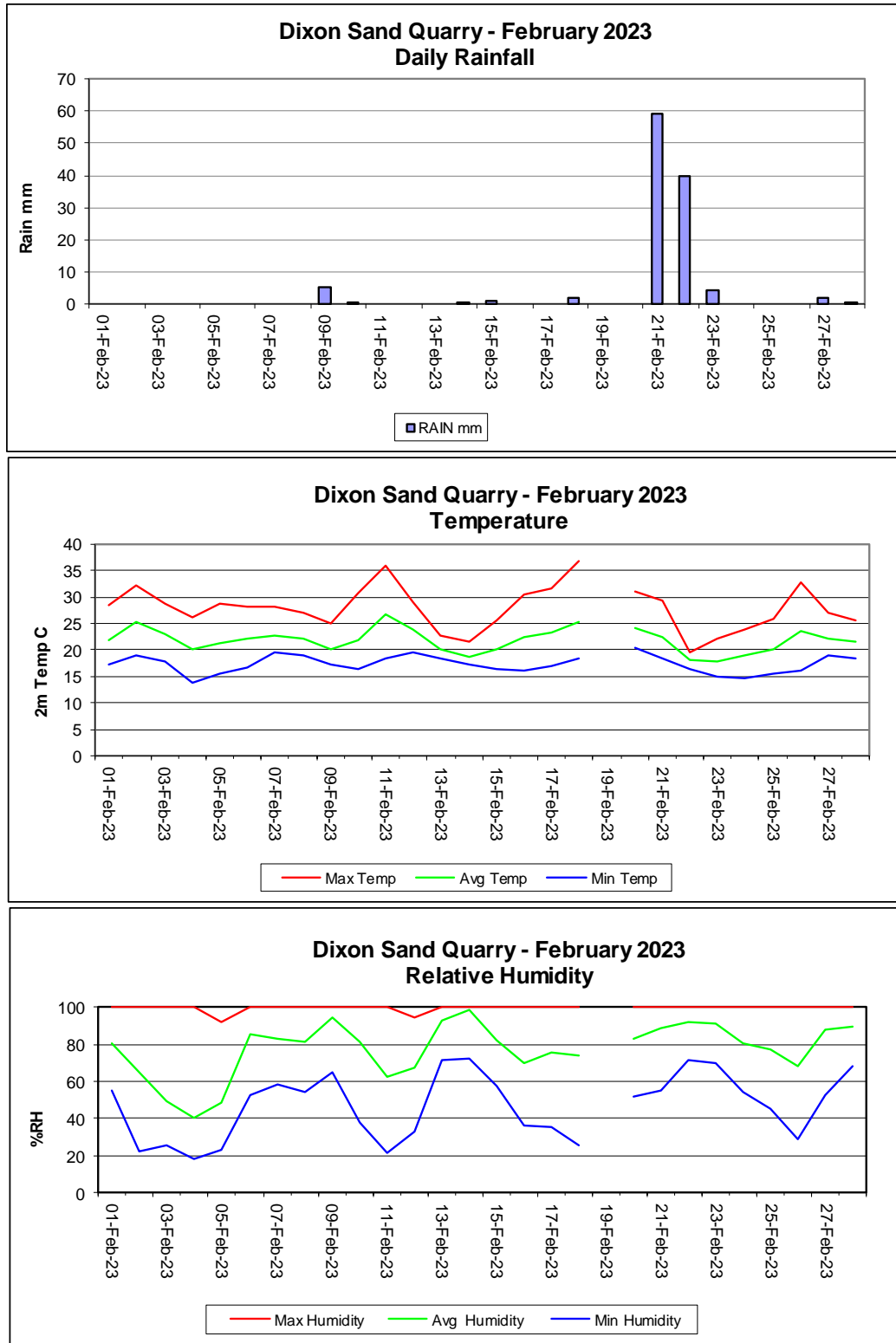


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

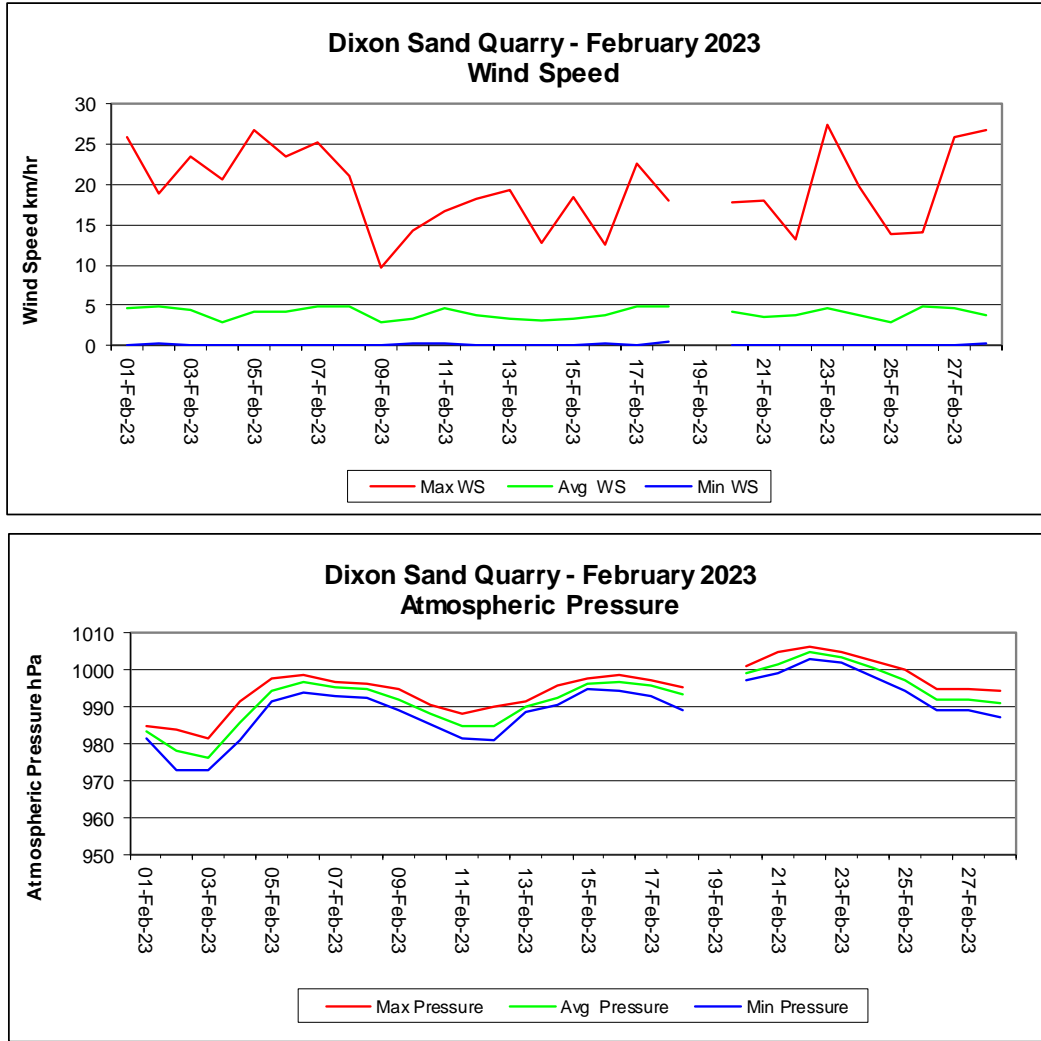


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose FEBRUARY 2023

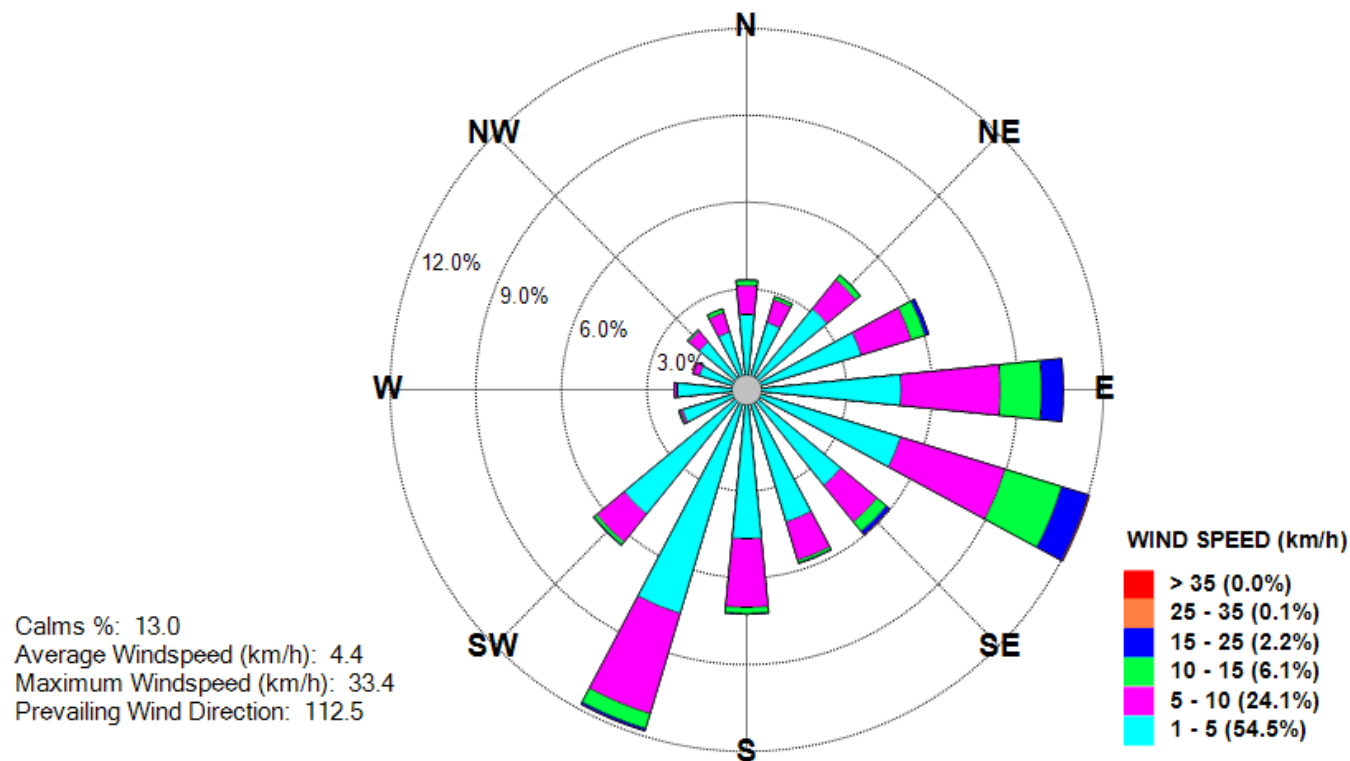


Figure 4: *Monthly Windrose*

Appendix 1

Calibration Documents (when required)

Special Visit for
TEOM repair.

Continuous Air Quality

Monthly/Quarterly/Six Monthly/Annual

TEOM Maintenance and Calibration – 1400AB

TEOM Client/Site: Dixon Sully TeamDate: 9.2.21

Etek 05-0721

1. TEOM Data Screen

SERIAL No:

Firmware: A/B140AB 255700503

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	<u>F-1</u>	Green - Normal		<input checked="" type="checkbox"/>
Date/time	TEOM: <u>11.27</u> Actual: <u>11.31</u>	Current Date/time correct within 5 minutes	<input checked="" type="checkbox"/>	
PM-10 24hr av	<u>0</u>	Positive values		<input checked="" type="checkbox"/>
Filter loading PM10	<u>77</u>	<80 %	<input checked="" type="checkbox"/>	
Frequency PM-10	<u>254.0009</u>	200-300 Hz	<input checked="" type="checkbox"/>	
Noise PM-10	<u>0.000</u>	<0.100ug	<input checked="" type="checkbox"/>	<u>2.9</u>

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

Comments: Fault → System not working Flow fail → TEOM not operational

* After main + bypass filter replacement TEOM working OK ✓ No errors

2. System Status

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Vacuum pump pressure	<u>OK</u>	<0.50 atm	<input checked="" type="checkbox"/>	
Warnings	<u>Yes</u>	No Warnings	<input checked="" type="checkbox"/>	
If any warnings list:				

Comments:

on arrival Flow bypass 13.52 l/min Before filter replaced.
Main 2.23 l/min Main Flow fail

Data Downloaded: YES/NO(circle)Technician Name : COLIN DAVIES Signed CD

3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	22.4	-10 to 50 C	✓	
Ambient Dew Point	0.97 m	-10 to 50 C	✓	
Ambient Pressure	0.97	0.9-1.1 atm	✓	
Ambient Relative Humidity	N/A m	10-100 %RH	✓	
Cap temperature	50.02	50.00 +/- 0.10 C	✓	
Case temperature	49.99	50.00 +/- 0.10 C	✓	
Main (PM-10) Air Tube temp	50.01	50.00 +/- 0.10 C	✓	

Comments:

Ref 22.6°C ✓ OK

Pres 983.9 mb = 0.971 atm ✓ OK

4. Instrument Conditions – Flows

After filter replaced ✓

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	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.comDate faults notified to CBased: 6/2/23**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%	255.83094	255.83094	255.83163	

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: Low Cool to

Tetralcal Flow/Temp/Pressure Calibrator Serial No: 1009 Refer to calibration corrections for Temperature/Pressure and Flows and apply to all readings.

Quarterly or Six Monthly Calibration

After fixed

1. Flow Verification – Conducted YES/NO

PM10 Flow verified Flow l/min 3.04 Error % 1.3 (allowed error <6%) PASS/FAIL

Bypass Flow verified Flow l/min 13.60 Error % 0.5 (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 0.14 < Limit 0.15

Bypass actual 0.46 < Limit 0.60

Leak check PASS/FAIL – If fail then find leak and retest.

Comments:

Slight leak, same as previous.

Flow Board

F_{adj} Mean = 1.06

F_{adj} Avg = 1.00
✓ good



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: Tetracal measures Atmospheric Pressure in mm Hg or mb or hPa**For mb or hPa divide tetracal result by 1013.25 to change units to atm.****For mmHg divide tetracal 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/m³Noise was less than 5ug/m³ YES/NO**5. Maintenance**

Air Inlet system cleaned YES/NO

Pump Reconditioned YES/NO

Check Waterproofing YES/NO

Comments:





**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 2023

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 27 April 2023

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 2023 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results;
- Meteorological results;
- Quarterly TEOM calibration and maintenance; and
- 6-monthly meteorological station physical screening and system check.

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

- 24-hour average results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The 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 2022 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 87% of valid meteorological data was recorded for March 2023 due to a power outages from 16-19 March 2023.

Approximately 71% of valid TEOM data was available for March 2023 due to power issues and blocked filter from 15-24 March 2023. Mass transducer filter replaced on 24 March 2023 when quarterly maintenance and calibration was conducted.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or OEH (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 71% of valid TEOM data was available for March 2023 due to power issues and blocked filter from 15-24 March 2023. Mass transducer filter replaced on 24 March 2023 when quarterly maintenance and calibration was conducted.

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 2022 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted in 24 March 2023 with the next calibration due to be completed in June 2023. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for March 2023 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2022.

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)
1/03/2023	15.0	12.1	37.5	30.2
2/03/2023	17.4	12.1	43.5	30.3
3/03/2023	14.3	12.1	35.8	30.3
4/03/2023	13.0	12.1	32.5	30.3
5/03/2023	9.7	12.1	24.3	30.3
6/03/2023	11.1	12.1	27.8	30.3
7/03/2023	31.8	12.2	79.5	30.5
8/03/2023	30.5	12.3	76.3	30.7
9/03/2023	22.4	12.3	56.0	30.9
10/03/2023	17.2	12.4	43.0	30.9
11/03/2023	21.5	12.4	53.8	31.0
12/03/2023	17.1	12.4	42.8	31.1
13/03/2023	22.3	12.5	55.8	31.2
14/03/2023	14.4	12.5	36.0	31.2
15/03/2023	12.8	12.5	32.0	31.2
16/03/2023	ND	12.5	ND	31.2
17/03/2023	ND	12.5	ND	31.2
18/03/2023	ND	12.5	ND	31.2
19/03/2023	ND	12.5	ND	31.2
20/03/2023	ND	12.5	ND	31.2
21/03/2023	ND	12.5	ND	31.2
22/03/2023	ND	12.5	ND	31.2
23/03/2023	ND	12.5	ND	31.2
24/03/2023	ND	12.5	ND	31.2
25/03/2023	ND	12.5	ND	31.2
26/03/2023	10.3	12.5	25.8	31.2
27/03/2023	10.3	12.5	25.8	31.2
28/03/2023	9.8	12.5	24.5	31.1
29/03/2023	13.3	12.5	33.3	31.1
30/03/2023	11.0	12.4	27.5	31.1
31/03/2023	7.8	12.4	19.5	31.1

*Calculated from PM₁₀

**Calculated from PM₁₀ Annual Average

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

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

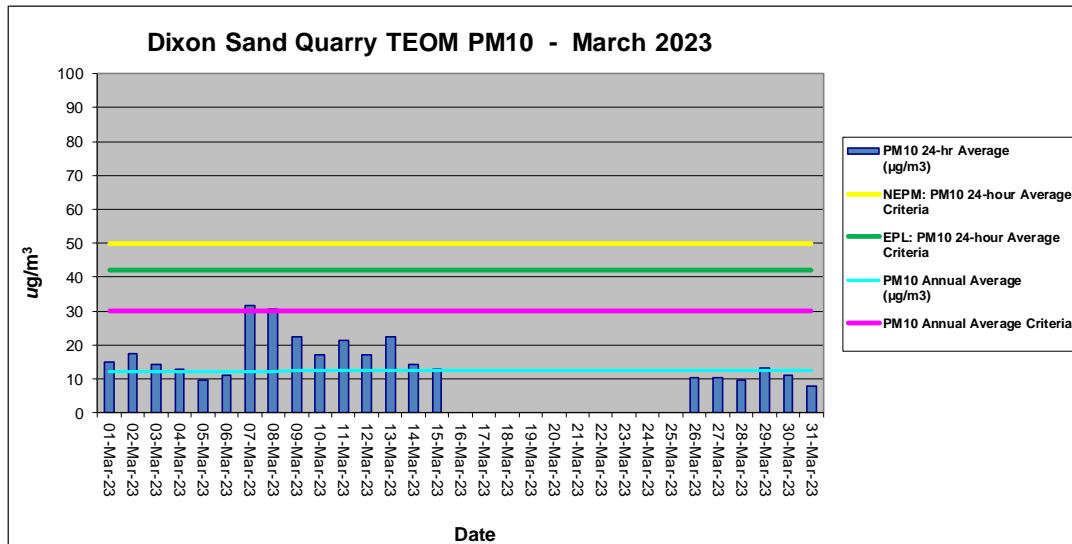


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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 on 24 March 2023 and is next due in September 2024. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 87% of valid meteorological data was recorded for March 2023 due to a power outages from 16-19 March 2023.

Table 3: Meteorological Data Summary for March 2023

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
1/03/2023	18.8	22.5	29.1	0.0	0.0	2.8	12.4	32.9	77.7	99.9	986.0	988.4	992.9
2/03/2023	17.2	20.8	25.8	0.0	0.0	3.9	17.4	58.5	85.8	100.0	990.9	992.8	994.7
3/03/2023	17.9	20.8	26.4	2.0	0.1	3.0	20.3	60.1	89.0	100.0	993.1	995.7	997.9
4/03/2023	17.9	20.3	25.7	0.2	0.1	3.2	15.8	57.7	86.9	100.0	994.8	996.4	998.4
5/03/2023	16.7	22.3	29.5	0.0	0.1	3.7	17.5	44.1	76.8	100.0	987.6	991.4	995.6
6/03/2023	19.3	28.8	37.3	0.0	0.1	5.3	26.2	14.9	44.4	100.0	982.3	984.9	987.6
7/03/2023	20.0	26.6	33.6	0.0	0.0	3.8	19.0	22.0	47.5	100.0	983.8	985.5	988.1
8/03/2023	18.5	24.0	31.1	0.0	0.4	3.5	15.9	11.9	31.2	51.3	982.8	985.7	988.9
9/03/2023	16.0	20.3	28.1	0.0	0.1	3.2	24.0	22.1	50.9	78.0	988.2	990.3	994.7
10/03/2023	14.4	19.7	25.6	0.0	0.0	4.1	21.4	61.0	77.5	98.7	993.6	995.3	997.5
11/03/2023	16.8	23.3	31.7	0.0	0.0	3.3	16.7	32.5	74.2	100.0	989.4	992.4	994.9
12/03/2023	19.4	21.8	27.0	0.6	0.0	3.3	19.6	65.4	89.9	100.0	990.0	991.2	994.0
13/03/2023	17.3	18.8	20.8	2.4	0.1	2.9	14.8	80.1	96.3	100.0	993.6	996.2	998.2
14/03/2023	16.3	19.0	22.0	3.4	0.0	2.2	11.2	87.9	99.0	100.0	995.6	997.0	998.6
15/03/2023	18.1	19.9	26.3	0.2	0.2	1.8	7.2	60.1	93.4	99.9	992.2	994.2	995.5
16/03/2023													
17/03/2023													
18/03/2023													
19/03/2023													
20/03/2023	16.6	19.2	26.3	0.4	0.5	3.1	14.5	60.2	93.0	100.0	992.2	1006.4	1008.7
21/03/2023	16.0	18.0	21.1	0.6	0.1	3.0	12.5	63.9	87.2	100.0	1005.9	1007.7	1009.7
22/03/2023	15.5	19.2	25.0	1.2	0.0	1.7	5.8	68.7	90.5	100.0	999.4	1002.1	1006.0
23/03/2023	17.9	20.7	28.3	6.2	0.1	3.1	11.0	60.5	92.2	100.0	994.7	997.4	1000.1
24/03/2023	16.4	19.6	24.9	3.4	0.1	3.3	17.0	66.0	91.8	100.0	995.0	997.1	999.4
25/03/2023	17.3	18.5	21.0	7.4	0.0	2.2	15.8	88.7	99.2	99.9	997.1	998.3	999.7
26/03/2023	16.4	18.9	22.1	0.2	0.1	2.4	10.6	73.6	92.8	100.0	995.3	997.2	999.0
27/03/2023	17.1	19.5	22.2	8.4	0.4	3.3	13.0	86.0	97.1	100.0	991.4	993.4	995.6
28/03/2023	18.0	19.8	22.4	13.6	0.1	2.7	11.9	76.7	91.7	99.9	992.0	993.9	995.3
29/03/2023	18.0	20.7	26.2	2.4	0.3	5.3	19.8	40.1	79.2	100.0	982.4	986.8	991.8
30/03/2023	14.4	18.0	23.0	0.0	0.2	2.5	9.9	32.3	57.1	84.3	985.5	987.3	990.5
31/03/2023	12.4	17.3	24.2	0.0	0.1	2.5	14.4	38.2	56.8	71.1	989.8	991.4	993.9
Monthly	12.4	20.7	37.3	52.6	0.0	3.1	26.2	11.9	79.6	100.0	982.3	993.9	1009.7

No data due to power outage 16-19 March 2023.

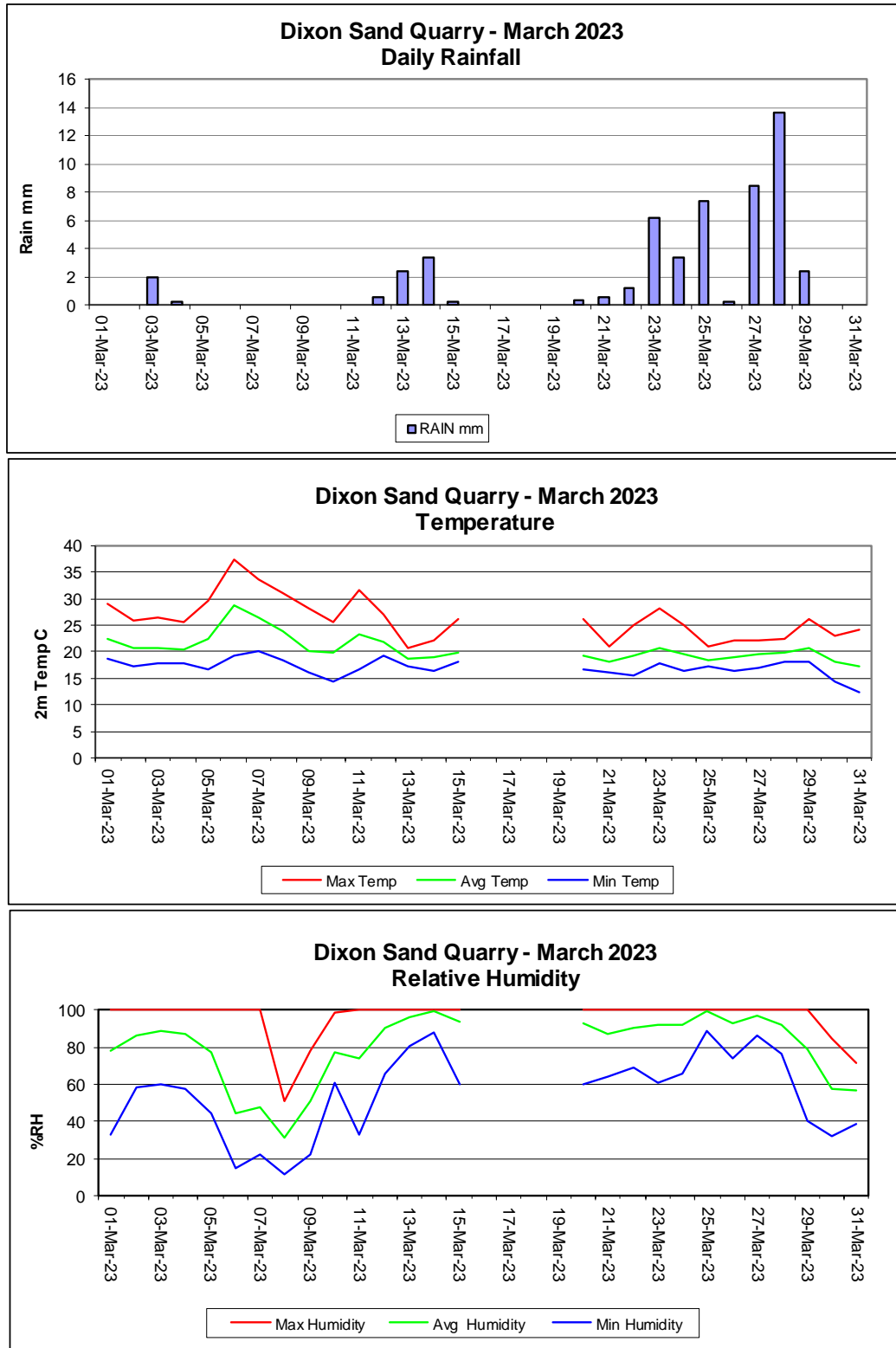


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

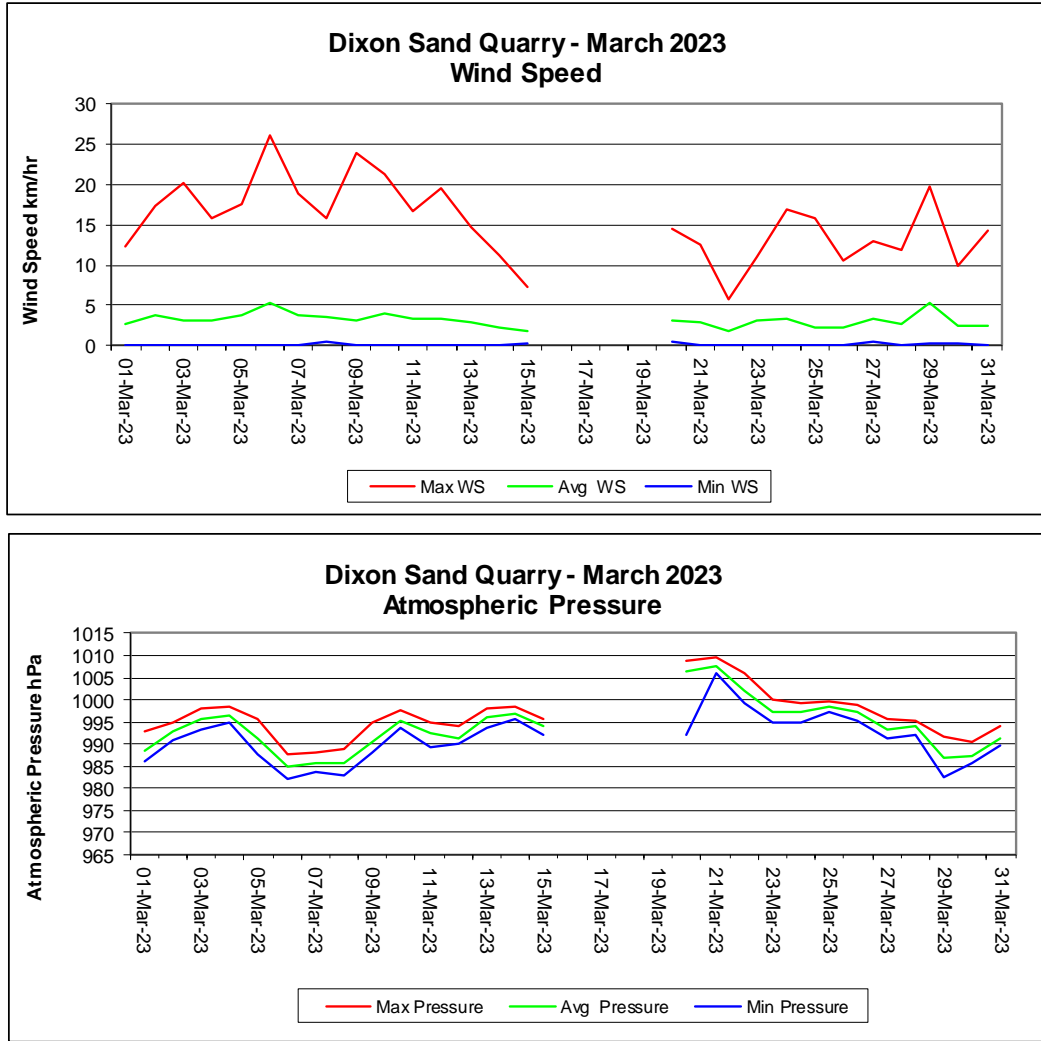
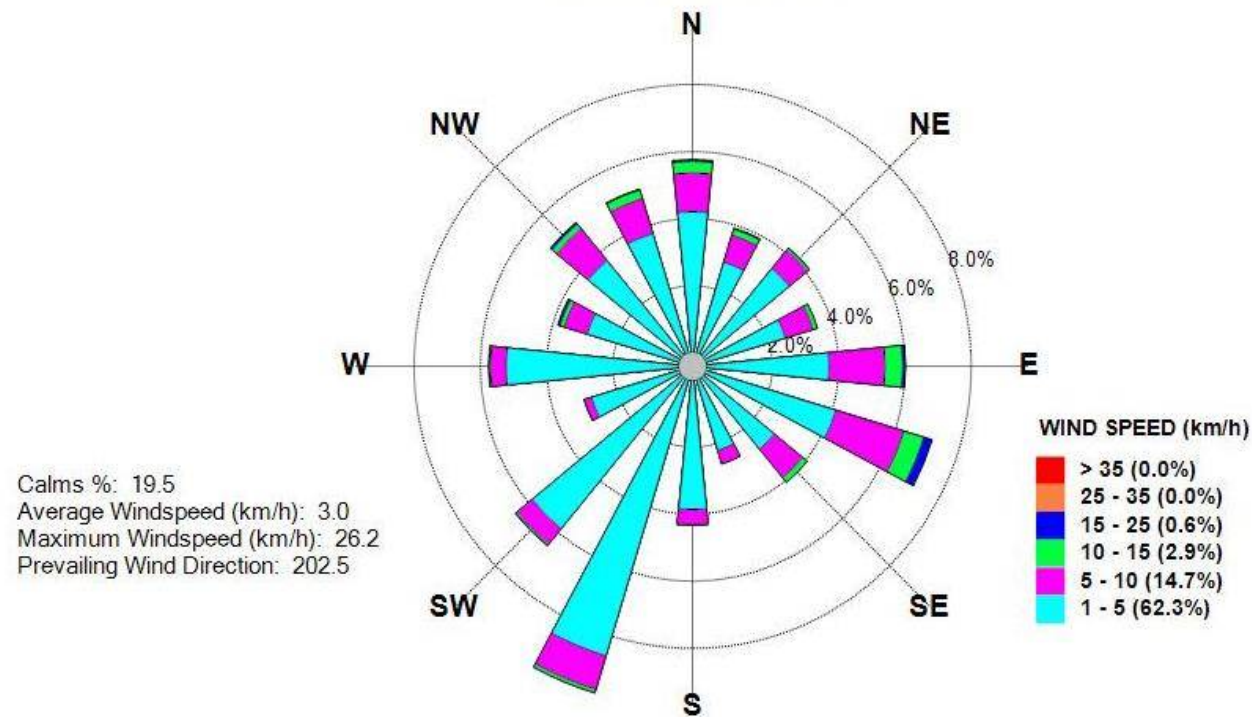


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose MARCH 2023



**Chart excludes 16-19 March 2023 due to site power outage*

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: 24/03/2023 15:30-16:30**Measured Against Reference Sensors**

Parameter	Units	Site	Reference	Difference	Pass/Fail	Reference Description
Temperature 10m	°C	21.3	21.6	-0.3	Pass	Ref Thermometer
Humidity	%RH	82	79	3.0	Pass	Ref RH sensor
Rainfall	mm	3.0	3.2	-0.2	Pass	Glass Pipette
Wind Speed	km/hr	8.0	8.0	0.0	Pass	Ref Anemometer
Wind Direction	Degrees	109	111	-2.0	Pass	Sighting compass

Reference Instruments Specifications:

* Calibration expires:

10/06/2023

Sensor	Serial Number	Specifications	Accuracy
*Temperature	220610N01	-40 to 65°C	+/- 0.3°C
*Barometer	BF211103059	20 to 30" Hg	+/- 1.1hPa
*Humidity	220610N01	10 to 90%RH	+/- 2%RH
*Anemometer	220610N03	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 24/3/2023.

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-24

Checked by: Colin Davies

27/03/2023

CBased Environmental Pty Limited
Unit 3, 2 Enterprise Crescent
SINGLETON NSW 2330
P: 65 713 334



CBased Environmental Pty Limited

ABN 62 811 924 264

Weather Station Physical Screening Field Check

Client **DIXON SANDS**

Site Name: **DIXON SAND TEAM**

Date: **15-30-26-30 24/3/23**

Time: **15:30-16:30**

	Yes (Pass)	No (Fail)	Comments
Grass / Vegetation Impacts			
Compound Grass height <10cm	✓		
No objects within impact area (10 x height of object)		✓	Trees nearby, 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		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		fixed mast
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	✓		OK → loose wires due to wind system
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 = NA 240V system
Battery volts (charging >13V, not charging >12V)	NA		" "
Solar panel undamaged and clean	NA		" "
Sensor shields clean	NA		" "
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	✓		30 mm cal deck cleaned.
Rain gauge level OK	✓		
Anemometer/wind vane moving freely (analogue sensors)	NA		all Ultrasonic
Other sensors visually checked and OK	✓		
Last months data checked and OK / Logging data OK	✓		

Checked By: Name **COLIN DANIEL**

Signed **CD**

CBased Environmental Pty Limited
Unit 3, 2 Enterprise Crescent
SINGLETON NSW 2330
P: (02) 6571 3334

F471 V4



Continuous Air Quality

Monthly/Quarterly/Six Monthly/Annual

TEOM Maintenance and Calibration – 1400AB

TEOM Client/Site: DIXON SANDI TEAMDate: 24/3/23**1. TEOM Data Screen**SERIAL No: 05-0721Firmware: (AB)

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	OK-4	Green - Normal	✓	
Date/time	TEOM: 24/3/23 15:33 Actual: 24/3/23 15:29	Current Date/time correct within 5 minutes	✓	
PM-10 24hr av	0	Positive values		
Filter loading PM10	80	<80 %		✓
Frequency PM-10	254.4260	200-300 Hz	✓	
Noise PM-10	0	<0.100ug	✓	

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

Comments:

Note: TEAM was not operating due to a blocked filter (flow error)
Replacing mass transducer / TEOM reset fixed the issue.

2. System Status

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Vacuum pump pressure	OK	<0.50 atm	✓	
Warnings	Flow	No Warnings		✓
If any warnings list:				
Flow fail				

Comments: (see above)Data Downloaded: YES (NO) (circle)Technician Name : COLIN DAVIES Signed [Signature]

3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	23.2	-10 to 50 C	✓	
Ambient Dew Point	NA	-10 to 50 C	—	—
Ambient Pressure	0.973	0.9-1.1 atm	✓	
Ambient Relative Humidity	NA	10-100 %RH	—	—
Cap temperature	50.00	50.00 +/- 0.10 C	✓	
Case temperature	49.99	50.00 +/- 0.10 C	✓	
Main (PM-10) Air Tube temp	50.00	50.00 +/- 0.10 C	✓	

Comments:**4. Instrument Conditions – Flows** *after filter fix.*

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	16.68	15.67 – 17.67 lpm	✓	

Comments:**Results: (Tick box)****There were NO equipment faults found. No action required – (file report)***After filter change that we knew would be required.***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	255.51641	255.51644	255.51643	255.51641

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: low cool to

Tetracal Flow/Temp/Pressure Calibrator Serial No: 1009 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 3.07 Error % 2.3 (allowed error <6%) PASS/FAIL Final 3.02
 Bypass Flow verified Flow l/min 13.60 Error % 0.5 (allowed error <6%) PASS/FAIL Final 13.67
 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 0.46 < Limit 0.60

Leak check PASS/FAIL – If fail then find leak and retest.

Comments: slight leak but OK ✓



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: Tetracal measures Atmospheric Pressure in mm Hg or mb or hPa
For mb or hPa divide tetracal result by 1013.25 to change units to atm.
For mmHg divide tetracal 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:





**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

APRIL 2023

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 29 May 2023

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 April 2023 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 results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The 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 2022 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of valid meteorological data was recorded for April 2023.

Approximately 100% of valid TEOM data was available for April 2023.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or OEH (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 April 2023.

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 2022 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted in March 2023 with the next calibration due to be completed in June 2023. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for April 2023 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2022.

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)
1/04/2023	10.3	12.4	25.8	31.0
2/04/2023	8.3	12.4	20.8	31.0
3/04/2023	10.8	12.4	27.0	31.0
4/04/2023	10.6	12.4	26.5	30.9
5/04/2023	12.5	12.4	31.3	30.9
6/04/2023	11.0	12.4	27.5	30.9
7/04/2023	7.7	12.3	19.3	30.9
8/04/2023	7.7	12.3	19.3	30.8
9/04/2023	7.5	12.3	18.8	30.8
10/04/2023	6.8	12.3	17.0	30.7
11/04/2023	12.7	12.3	31.8	30.7
12/04/2023	11.5	12.3	28.8	30.7
13/04/2023	10.5	12.3	26.3	30.7
14/04/2023	9.0	12.3	22.5	30.7
15/04/2023	7.8	12.2	19.5	30.6
16/04/2023	9.4	12.2	23.5	30.6
17/04/2023	11.9	12.2	29.8	30.6
18/04/2023	13.6	12.2	34.0	30.6
19/04/2023	16.5	12.3	41.3	30.6
20/04/2023	14.4	12.3	36.0	30.7
21/04/2023	14.6	12.3	36.5	30.7
22/04/2023	13.6	12.3	34.0	30.7
23/04/2023	11.0	12.3	27.5	30.7
24/04/2023	11.0	12.3	27.5	30.7
25/04/2023	12.5	12.3	31.3	30.7
26/04/2023	15.8	12.3	39.5	30.7
27/04/2023	12.5	12.3	31.3	30.7
28/04/2023	9.9	12.3	24.8	30.7
29/04/2023	12.7	12.3	31.8	30.7
30/04/2023	6.8	12.3	17.0	30.6

*Calculated from PM₁₀

**Calculated from PM₁₀ Annual Average

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

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

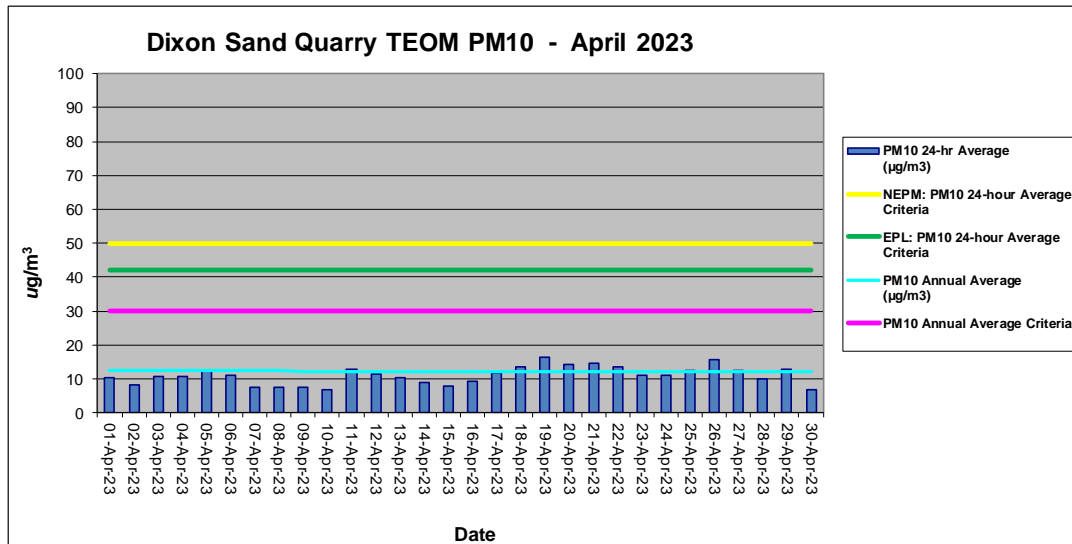


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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 2023 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 April 2023.

Table 3: Meteorological Data Summary for April 2023

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
1/04/2023	13.3	15.5	20.1	0.6	0.1	2.4	13.2	57.1	79.2	100.0	992.7	994.8	997.6
2/04/2023	13.1	14.9	18.1	10.8	0.2	3.3	13.6	89.1	97.7	100.0	996.6	998.7	1000.9
3/04/2023	14.1	16.5	21.9	10.2	0.0	2.9	10.0	71.4	94.0	100.0	999.5	1000.6	1002.0
4/04/2023	13.6	17.4	23.6	0.2	0.0	2.5	14.7	55.5	89.6	100.0	996.9	999.2	1001.6
5/04/2023	13.6	17.3	22.9	0.0	0.1	3.3	10.7	59.0	88.2	100.0	994.7	996.2	997.4
6/04/2023	13.8	17.1	21.3	0.0	0.0	2.4	9.7	71.5	89.6	100.0	991.1	994.2	996.5
7/04/2023	14.2	17.4	23.1	1.8	0.0	3.7	21.7	65.4	88.6	100.0	979.1	984.6	991.1
8/04/2023	15.0	18.1	22.2	0.0	0.1	3.7	13.3	41.1	58.5	89.2	978.8	981.4	984.7
9/04/2023	10.4	15.5	20.0	0.0	0.2	3.6	25.2	33.1	50.5	72.6	983.2	985.9	988.8
10/04/2023	9.8	13.5	19.3	0.0	0.1	2.6	11.9	30.4	51.7	70.4	987.5	989.1	991.3
11/04/2023	9.2	14.7	20.4	0.0	0.0	2.4	12.3	46.5	62.1	75.4	990.0	991.4	993.0
12/04/2023	12.5	15.8	19.4	1.2	0.0	3.0	14.3	56.9	75.4	99.9	985.3	988.3	991.8
13/04/2023	12.2	15.6	21.6	2.6	0.1	3.6	13.5	62.2	91.2	100.0	985.2	989.7	993.4
14/04/2023	13.5	15.6	19.6	5.2	0.1	3.4	13.7	72.6	95.5	100.0	991.8	993.1	995.0
15/04/2023	11.4	17.6	23.6	0.2	0.2	3.8	14.7	44.9	74.1	99.9	986.2	989.1	991.8
16/04/2023	12.7	18.9	24.3	0.0	0.1	4.5	28.1	35.7	57.3	72.9	983.8	987.4	996.3
17/04/2023	10.3	15.2	20.4	0.0	0.0	3.0	17.7	55.1	72.4	89.9	996.1	1001.6	1005.5
18/04/2023	11.5	15.8	21.0	0.0	0.0	2.6	12.3	57.8	83.0	100.0	1001.7	1003.7	1006.0
19/04/2023	12.5	17.3	23.2	0.0	0.1	2.6	12.6	45.5	80.2	99.9	996.7	999.0	1001.8
20/04/2023	14.1	15.0	16.6	10.8	0.4	3.8	12.3	89.7	98.7	100.0	999.7	1003.1	1006.5
21/04/2023	12.1	15.7	21.2	0.0	0.4	3.4	10.8	51.2	80.2	96.7	1005.8	1007.8	1010.0
22/04/2023	11.7	14.7	18.2	0.2	0.0	2.4	8.5	83.0	94.6	100.0	1009.0	1009.9	1011.1
23/04/2023	13.5	16.7	22.1	5.4	0.1	3.1	15.2	62.4	91.3	100.0	1009.8	1011.5	1013.3
24/04/2023	14.7	17.0	21.4	1.2	0.2	3.2	13.5	61.6	90.9	100.0	1010.8	1012.2	1013.9
25/04/2023	13.9	17.2	22.3	0.2	0.0	2.7	11.1	50.4	84.3	99.9	1006.2	1008.8	1011.0
26/04/2023	12.3	16.4	20.9	0.0	0.0	2.4	11.8	69.3	87.2	100.0	1005.3	1007.1	1009.3
27/04/2023	14.3	17.9	23.0	0.0	0.1	2.8	11.7	45.4	77.5	97.3	1001.1	1003.6	1006.3
28/04/2023	13.2	19.1	25.3	0.0	0.3	4.2	13.4	43.5	74.2	100.0	991.5	996.1	1001.0
29/04/2023	12.9	16.1	19.3	16.2	0.2	3.0	10.5	71.2	90.2	99.9	989.4	990.5	992.0
30/04/2023	12.4	14.4	19.4	1.8	0.0	2.6	11.5	66.4	89.0	99.9	988.8	991.1	994.1
Monthly	9.2	16.3	25.3	68.6	0.0	3.1	28.1	30.4	81.2	100.0	978.8	997.0	1013.9

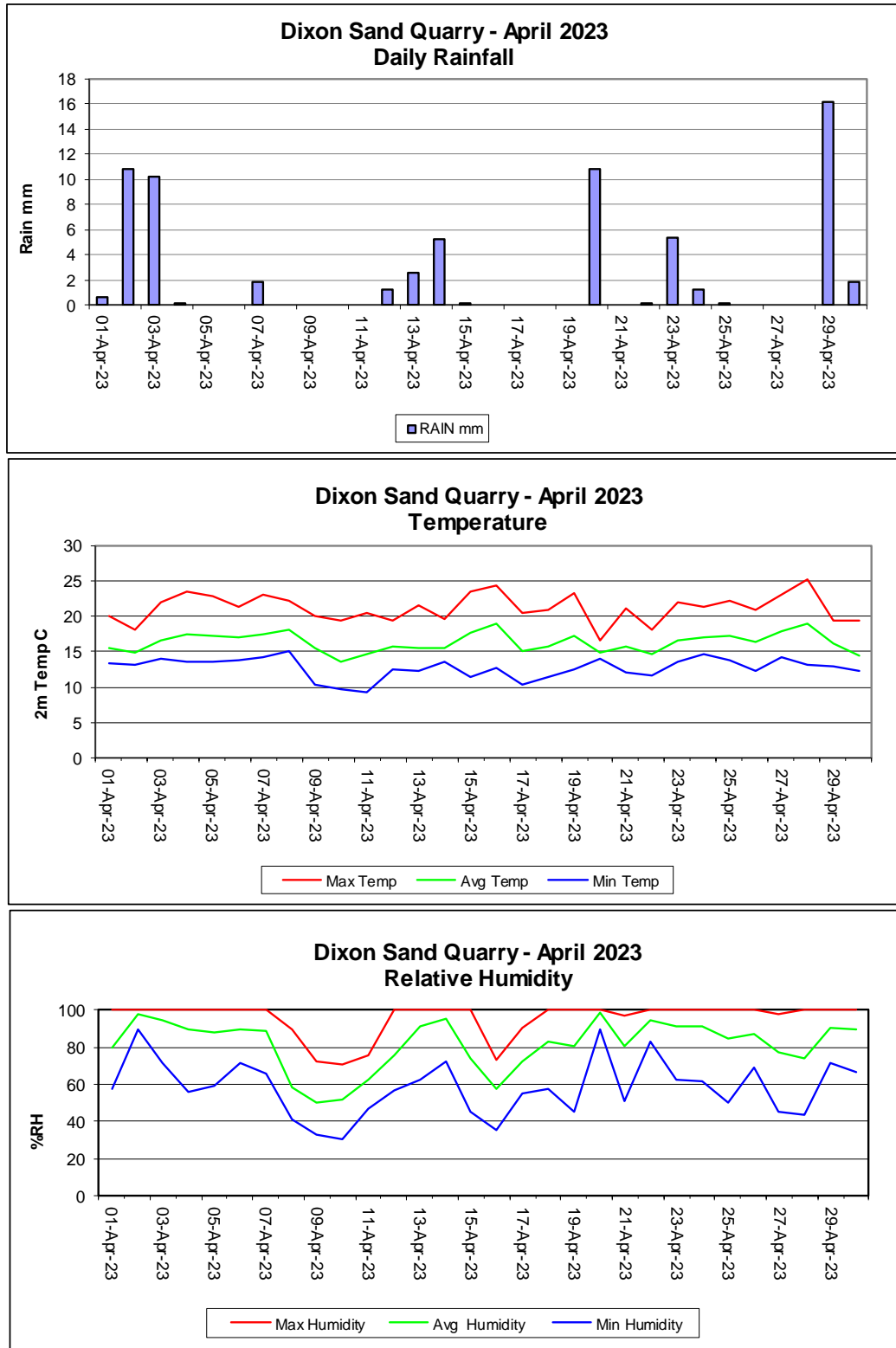


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

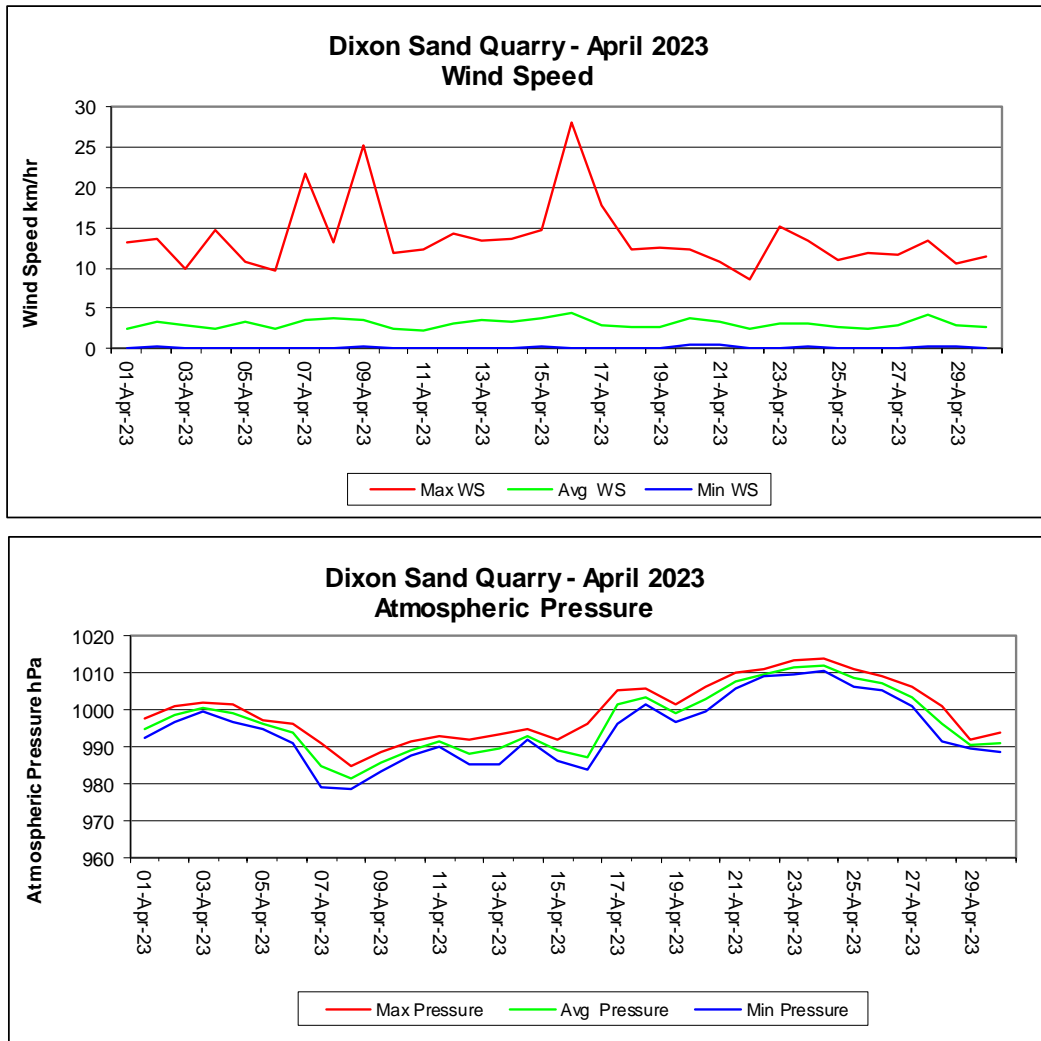


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose

APRIL 2023

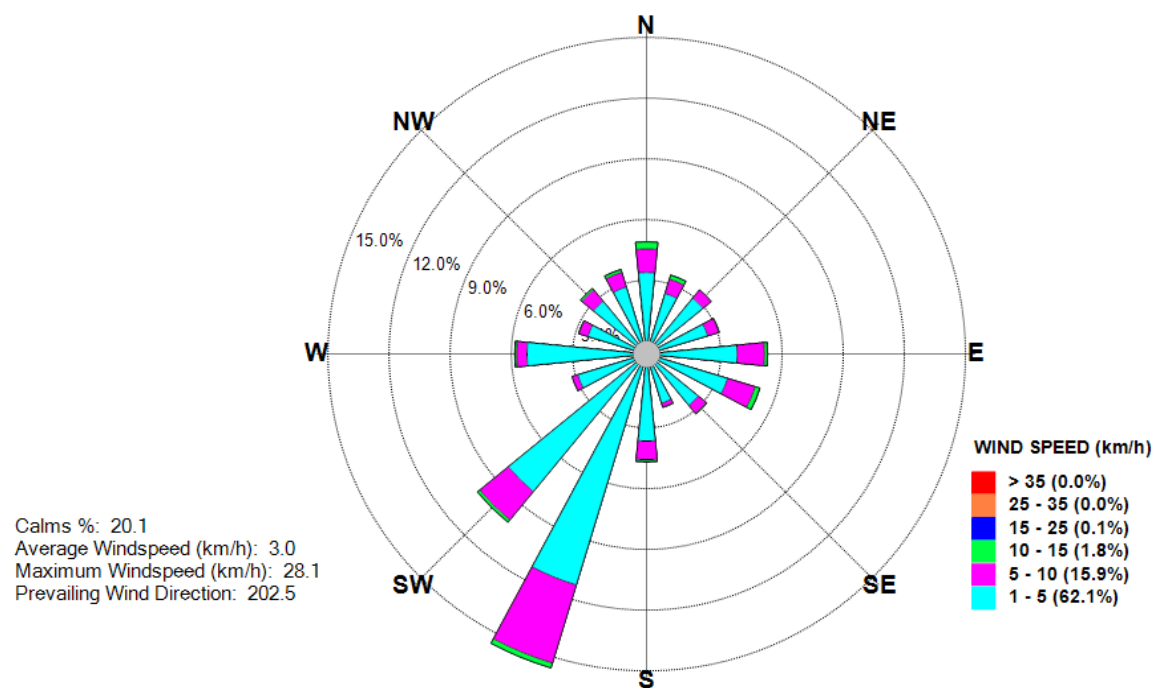


Figure 4: *Monthly Windrose*

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

MAY 2023

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 28 June 2023

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 2023 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 results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The 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 2022 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of valid meteorological data was recorded for May 2023.

Approximately 100% of valid TEOM data was available for May 2023.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or OEH (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 May 2023.

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 2022 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted in March 2023 with the next calibration due to be completed in June 2023. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for May 2023 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2022.

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)
1/05/2023	8.0	12.2	20.0	30.6
2/05/2023	13.2	12.2	33.0	30.6
3/05/2023	11.0	12.2	27.5	30.6
4/05/2023	13.9	12.2	34.8	30.6
5/05/2023	12.6	12.2	31.5	30.6
6/05/2023	12.4	12.2	31.0	30.6
7/05/2023	8.9	12.2	22.3	30.6
8/05/2023	7.7	12.2	19.3	30.5
9/05/2023	13.4	12.2	33.5	30.6
10/05/2023	10.4	12.2	26.0	30.5
11/05/2023	21.7	12.3	54.3	30.6
12/05/2023	15.2	12.3	38.0	30.7
13/05/2023	15.4	12.3	38.5	30.7
14/05/2023	9.1	12.3	22.8	30.7
15/05/2023	9.0	12.2	22.5	30.6
16/05/2023	11.5	12.2	28.8	30.6
17/05/2023	11.2	12.2	28.0	30.6
18/05/2023	9.6	12.2	24.0	30.6
19/05/2023	6.8	12.2	17.0	30.5
20/05/2023	7.4	12.2	18.5	30.5
21/05/2023	6.6	12.2	16.5	30.4
22/05/2023	9.3	12.2	23.3	30.4
23/05/2023	17.5	12.2	43.8	30.5
24/05/2023	18.5	12.2	46.3	30.5
25/05/2023	12.5	12.2	31.3	30.5
26/05/2023	18.3	12.2	45.8	30.6
27/05/2023	6.9	12.2	17.3	30.5
28/05/2023	4.9	12.2	12.3	30.5
29/05/2023	6.6	12.2	16.5	30.4
30/05/2023	11.1	12.2	27.8	30.4
31/05/2023	14.5	12.2	36.3	30.4

*Calculated from PM₁₀

**Calculated from PM₁₀ Annual Average

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

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

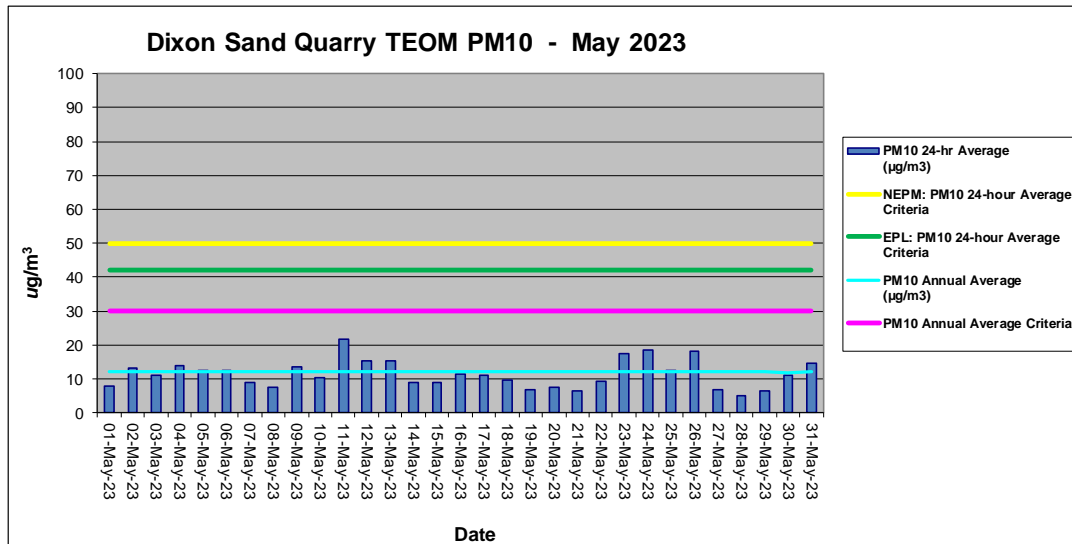


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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 2023 and is next due in September 2023. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 100% of valid meteorological data was recorded for May 2023.

Table 3: Meteorological Data Summary for May 2023

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
1/05/2023	9.1	12.8	18.4	1.2	0.0	2.3	8.2	45.9	79.6	100.0	992.2	994.0	995.5
2/05/2023	10.4	15.1	20.9	0.0	0.2	2.8	14.6	46.1	66.7	80.8	993.7	995.8	997.9
3/05/2023	12.5	16.9	21.4	0.0	0.4	5.2	39.2	29.4	55.6	84.2	992.1	995.3	998.0
4/05/2023	9.2	13.8	18.5	0.0	0.0	2.3	10.7	41.3	57.1	89.4	997.1	999.0	1000.5
5/05/2023	8.7	14.2	19.8	0.0	0.1	3.1	16.8	42.7	69.3	94.6	995.4	997.9	1000.0
6/05/2023	9.0	14.3	20.1	0.0	0.1	2.4	9.2	37.6	60.7	80.4	995.7	997.2	999.4
7/05/2023	5.9	9.9	14.2	3.6	0.0	2.7	14.2	35.5	76.6	100.0	993.3	995.2	997.0
8/05/2023	6.0	10.4	15.5	0.4	0.0	4.1	20.1	35.5	57.4	99.9	992.4	995.9	999.5
9/05/2023	7.8	12.0	17.2	0.0	0.1	2.8	16.4	43.4	60.3	77.9	999.0	1001.4	1004.3
10/05/2023	7.0	12.5	18.4	0.0	0.2	2.6	11.1	39.8	69.1	92.6	1004.3	1006.2	1008.0
11/05/2023	8.5	13.5	19.4	0.0	0.1	2.3	12.8	51.7	82.9	100.0	1007.2	1008.6	1010.3
12/05/2023	10.0	15.4	22.4	0.0	0.0	2.5	10.1	35.3	81.0	100.0	1007.1	1008.8	1010.1
13/05/2023	10.0	13.4	18.6	2.8	0.0	2.1	10.0	73.1	93.6	99.9	1009.2	1010.4	1012.0
14/05/2023	10.1	13.2	18.8	7.4	0.1	1.6	8.2	72.0	96.1	100.0	1006.7	1008.6	1010.8
15/05/2023	11.3	14.4	19.7	0.2	0.0	1.8	6.7	55.6	89.7	100.0	1001.3	1004.3	1007.0
16/05/2023	10.2	13.7	19.3	0.0	0.0	2.4	10.3	45.1	80.8	100.0	997.3	999.5	1001.5
17/05/2023	8.9	11.8	16.1	1.0	0.7	4.9	13.3	56.9	78.8	99.9	1000.8	1002.4	1003.8
18/05/2023	7.5	10.8	16.3	1.0	0.0	2.9	12.2	56.0	81.6	100.0	997.4	999.9	1002.2
19/05/2023	6.0	10.8	16.8	0.2	0.0	2.0	9.2	44.5	74.9	100.0	995.1	997.4	999.2
20/05/2023	6.5	11.1	16.9	0.0	0.0	2.4	8.7	40.2	62.1	78.4	994.1	995.9	997.4
21/05/2023	9.8	12.9	17.5	0.0	0.0	3.7	19.5	42.5	55.7	74.8	993.3	996.4	1003.5
22/05/2023	7.6	12.3	18.1	0.0	0.2	2.5	9.5	32.6	57.2	78.7	1003.5	1005.1	1007.0
23/05/2023	7.7	12.3	18.9	0.0	0.0	2.3	9.0	33.0	57.4	80.1	1005.4	1006.8	1008.6
24/05/2023	7.0	13.1	20.3	0.0	0.0	2.7	8.8	33.9	61.0	87.8	1002.8	1005.1	1007.3
25/05/2023	10.3	15.8	19.9	0.0	0.5	5.3	19.9	24.9	36.8	50.5	993.3	998.4	1002.8
26/05/2023	6.8	12.6	16.4	0.4	0.1	4.7	17.2	29.8	56.0	91.2	988.6	993.5	998.3
27/05/2023	5.5	9.7	17.0	0.0	0.1	1.9	6.4	35.7	65.7	90.5	994.9	997.2	998.7
28/05/2023	5.6	9.8	15.5	0.0	0.1	2.8	10.6	46.8	61.8	73.2	993.2	995.7	997.5
29/05/2023	9.2	13.2	19.1	0.0	0.2	3.8	11.3	40.3	59.7	78.4	995.5	997.5	1001.2
30/05/2023	9.4	13.8	20.1	0.0	0.0	2.4	7.6	44.0	60.8	75.2	1000.5	1001.8	1004.0
31/05/2023	9.6	14.8	19.4	0.0	0.1	3.9	13.0	58.1	67.4	83.5	996.9	999.1	1001.6
Monthly	5.5	12.9	22.4	18.2	0.0	2.9	39.2	24.9	68.2	100.0	988.6	1000.3	1012.0

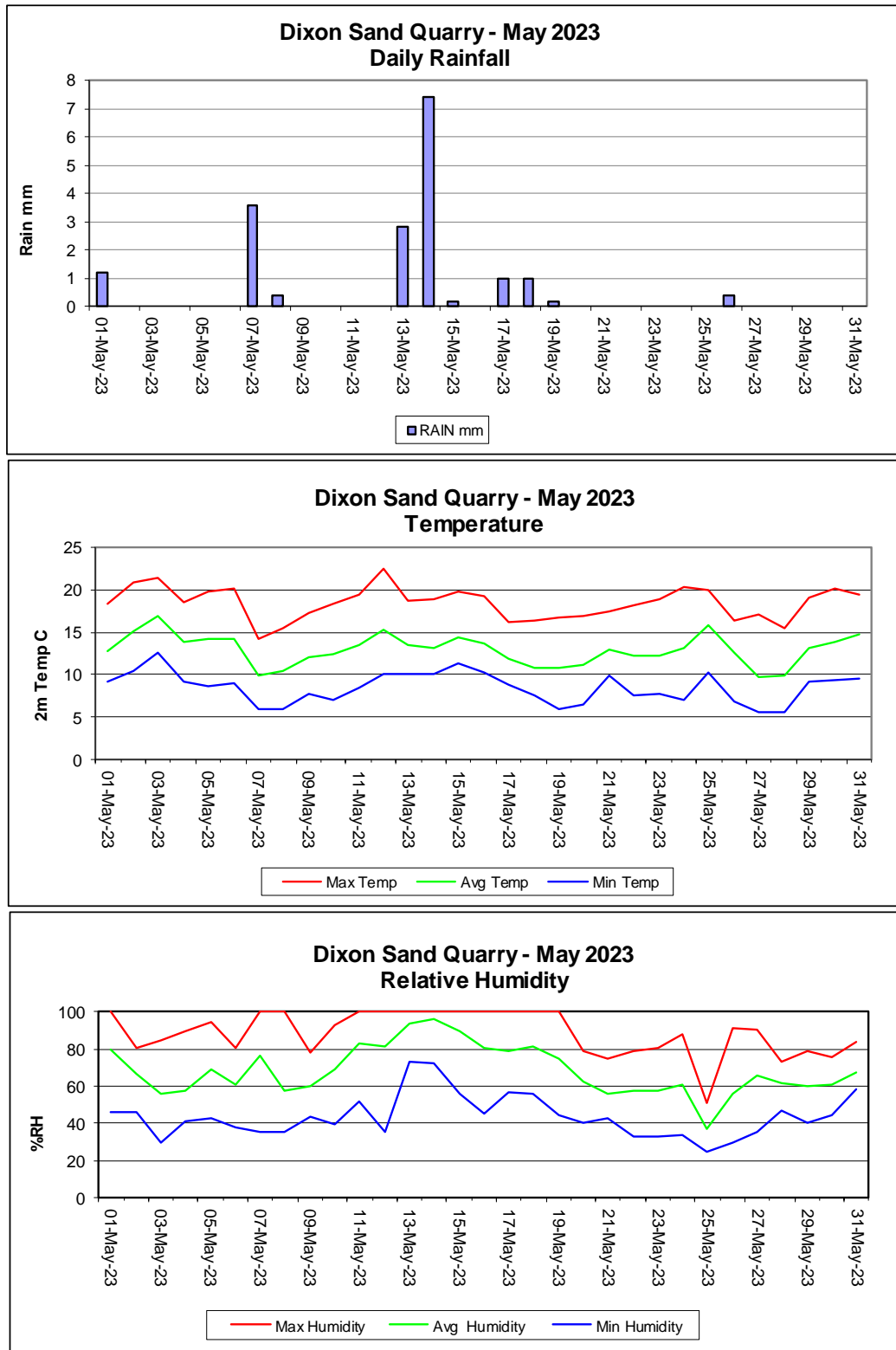


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

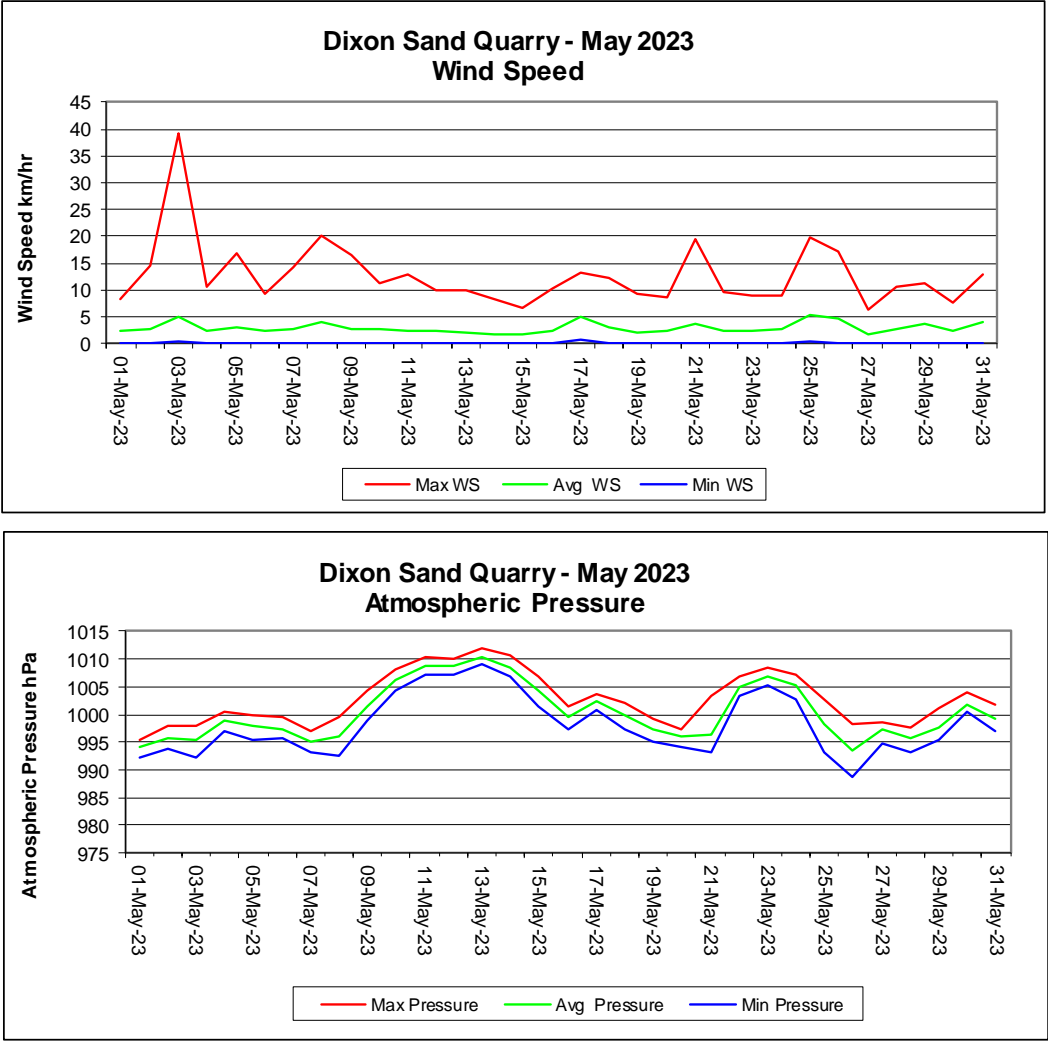


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose MAY 2023

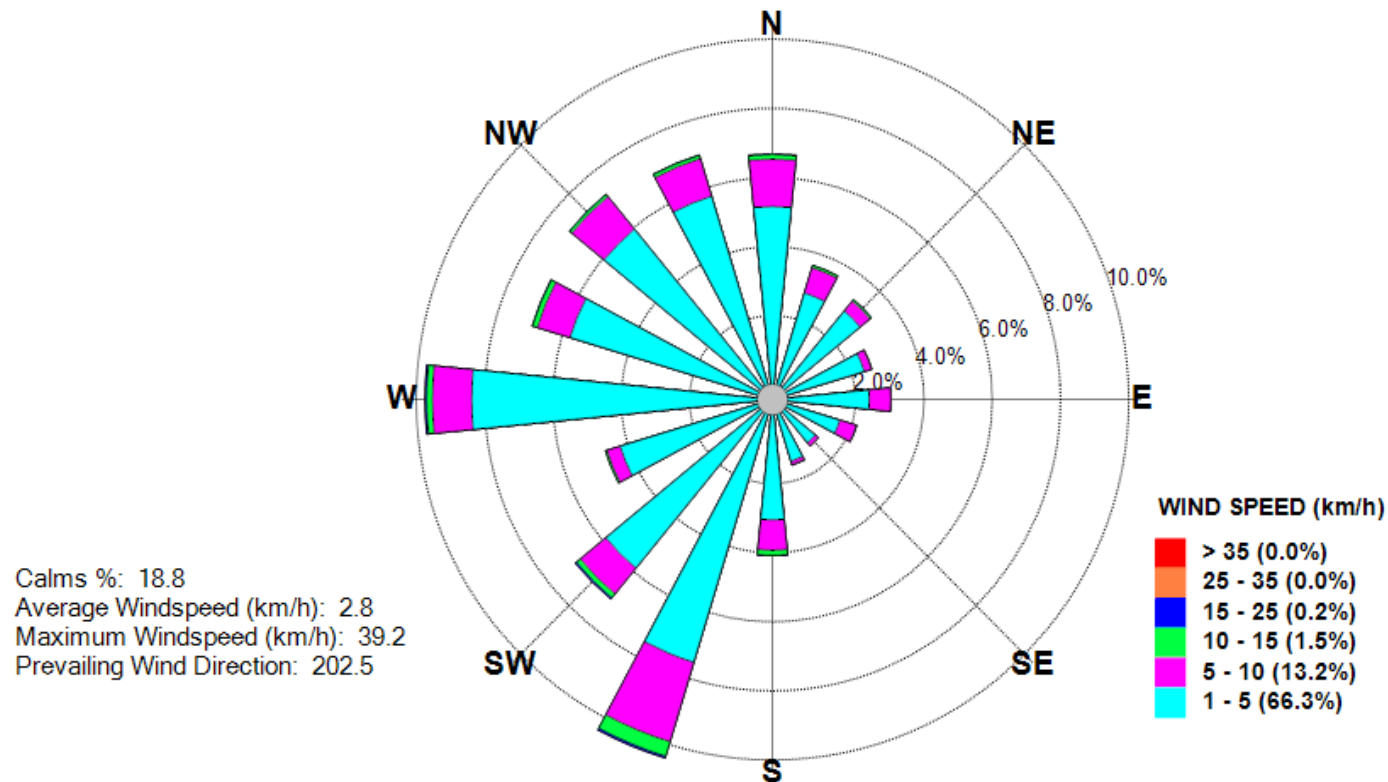


Figure 4: Monthly Windrose

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

JUNE 2023

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 18 July 2023

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 2023 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 results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The 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 2022 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has now been collected.

Approximately 100% of valid meteorological data was recorded for June 2023.

Approximately 100% of valid TEOM data was available for June 2023.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or OEH (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 June 2023.

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 2022 and therefore an annual amount of data has now been collected.

The quarterly TEOM calibration was conducted on 7 June 2023 with the next calibration due to be completed in September 2023. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for June 2023 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2022.

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)
1/06/2023	10.2	12.2	25.5	30.4
2/06/2023	25.7	12.2	64.3	30.5
3/06/2023	11.8	12.2	29.5	30.5
4/06/2023	12.3	12.2	30.8	30.5
5/06/2023	10.6	12.2	26.5	30.5
6/06/2023	9.9	12.2	24.8	30.5
7/06/2023	7.0	12.2	17.5	30.4
8/06/2023	6.3	12.2	15.8	30.4
9/06/2023	6.6	12.1	16.5	30.4
10/06/2023	8.0	12.1	20.0	30.3
11/06/2023	12.9	12.1	32.3	30.3
12/06/2023	11.0	12.1	27.5	30.3
13/06/2023	9.6	12.1	24.0	30.3
14/06/2023	10.1	12.1	25.3	30.3
15/06/2023	9.3	12.1	23.3	30.3
16/06/2023	11.1	12.1	27.8	30.2
17/06/2023	9.3	12.1	23.3	30.2
18/06/2023	5.7	12.1	14.3	30.2
19/06/2023	10.5	12.1	26.3	30.2
20/06/2023	9.9	12.1	24.8	30.1
21/06/2023	11.0	12.1	27.5	30.1
22/06/2023	16.9	12.1	42.3	30.2
23/06/2023	6.9	12.1	17.3	30.1
24/06/2023	5.5	12.0	13.8	30.1
25/06/2023	5.5	12.0	13.8	30.0
26/06/2023	9.2	12.0	23.0	30.0
27/06/2023	11.9	12.0	29.8	30.0
28/06/2023	11.8	12.0	29.5	30.0
29/06/2023	7.8	12.0	19.5	30.0
30/06/2023	4.6	12.0	11.5	29.9

*Calculated from PM₁₀

**Calculated from PM₁₀ Annual Average

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

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

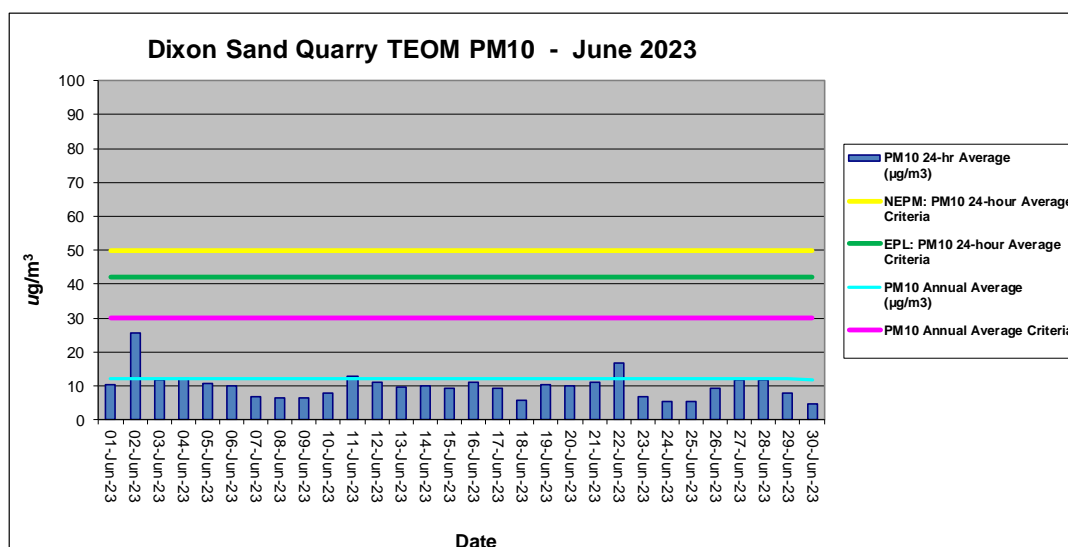


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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 2023 and is next due in September 2023. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 100% of valid meteorological data was recorded for June 2023.

Table 3: Meteorological Data Summary for June 2023

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
1/06/2023	12.7	16.3	20.5	0.4	0.0	3.1	11.7	54.6	69.7	99.9	995.9	998.5	1002.8
2/06/2023	11.4	15.1	19.6	0.0	0.1	3.0	16.2	71.0	94.0	100.0	1002.7	1004.0	1005.9
3/06/2023	12.4	16.3	23.7	0.0	0.0	2.4	17.4	48.5	86.4	99.9	1003.2	1005.2	1009.6
4/06/2023	12.9	14.3	15.7	1.0	0.2	2.8	10.9	76.0	89.2	100.0	1009.3	1011.7	1013.7
5/06/2023	10.8	13.0	16.0	0.4	0.0	2.5	10.5	75.3	91.6	100.0	1008.0	1010.0	1012.5
6/06/2023	10.7	13.2	17.1	0.0	0.2	1.8	8.8	77.2	95.4	100.0	1006.3	1008.0	1009.7
7/06/2023	10.6	14.3	19.3	0.4	0.2	2.5	11.3	68.2	90.3	100.0	1001.3	1004.8	1007.9
8/06/2023	11.0	13.2	15.6	0.4	0.4	5.6	20.3	62.6	88.0	100.0	992.4	996.1	1001.2
9/06/2023	8.7	12.8	17.2	0.0	0.1	3.3	15.5	47.7	62.3	80.1	994.9	996.8	1000.0
10/06/2023	8.2	12.0	16.4	0.0	0.1	2.3	8.3	38.6	61.7	86.4	999.8	1002.3	1004.4
11/06/2023	5.6	10.7	17.0	0.0	0.0	2.5	10.2	48.3	78.0	99.9	1002.2	1003.9	1006.1
12/06/2023	6.9	12.6	18.7	0.0	0.0	2.9	17.6	53.7	79.1	99.9	996.8	1000.0	1003.0
13/06/2023	10.2	13.8	18.2	1.6	0.4	4.7	16.9	59.3	78.0	100.0	991.0	993.9	996.7
14/06/2023	8.4	11.8	16.6	0.2	0.2	4.4	19.6	33.3	59.0	97.2	992.4	994.1	997.1
15/06/2023	7.4	11.0	16.3	0.0	0.1	2.6	9.4	44.1	58.6	71.2	995.6	997.3	999.2
16/06/2023	7.1	12.0	18.4	0.0	0.3	2.6	7.0	41.9	62.9	81.1	999.0	1000.8	1002.5
17/06/2023	6.9	12.2	17.8	0.0	0.4	3.8	15.4	45.2	64.3	87.3	996.8	999.6	1002.5
18/06/2023	7.0	11.9	17.3	0.0	0.0	5.0	18.1	31.9	53.5	67.5	992.8	995.5	996.9
19/06/2023	5.4	9.8	15.1	0.0	0.4	4.7	19.5	29.9	52.9	71.6	991.9	994.9	996.8
20/06/2023	4.6	9.0	14.3	0.0	0.2	3.1	15.8	29.0	50.1	70.6	995.2	999.9	1003.3
21/06/2023	2.5	8.2	14.4	0.0	0.0	1.8	6.9	36.0	60.7	86.3	1001.7	1002.9	1004.9
22/06/2023	6.0	9.4	12.4	4.6	0.1	2.0	7.3	58.4	81.0	100.0	991.5	997.6	1001.8
23/06/2023	9.1	12.2	16.1	1.6	0.6	5.4	21.6	38.8	71.2	99.9	987.0	989.8	992.6
24/06/2023	8.4	12.6	17.4	0.0	0.2	5.0	19.4	30.6	50.8	72.3	991.3	993.0	995.6
25/06/2023	10.2	13.6	18.5	0.0	0.4	6.0	18.6	28.5	40.1	52.7	990.3	992.5	993.9
26/06/2023	9.4	12.7	17.0	0.0	0.0	5.2	25.1	33.8	41.1	58.8	992.8	994.8	998.7
27/06/2023	8.0	12.1	16.6	0.0	0.1	2.4	7.6	45.9	57.0	70.1	997.9	999.6	1002.3
28/06/2023	8.3	9.6	11.9	2.0	0.1	1.9	5.0	56.2	86.0	99.9	992.5	995.6	998.9
29/06/2023	5.7	9.0	14.2	0.4	0.4	2.8	10.5	44.8	71.5	99.9	993.4	996.1	997.9
30/06/2023	5.4	10.1	17.3	0.0	0.1	3.4	10.9	41.4	60.4	71.3	996.0	997.8	999.4
Monthly	2.5	12.2	23.7	13.0	0.0	3.4	25.1	28.5	69.5	100.0	987.0	999.2	1013.7

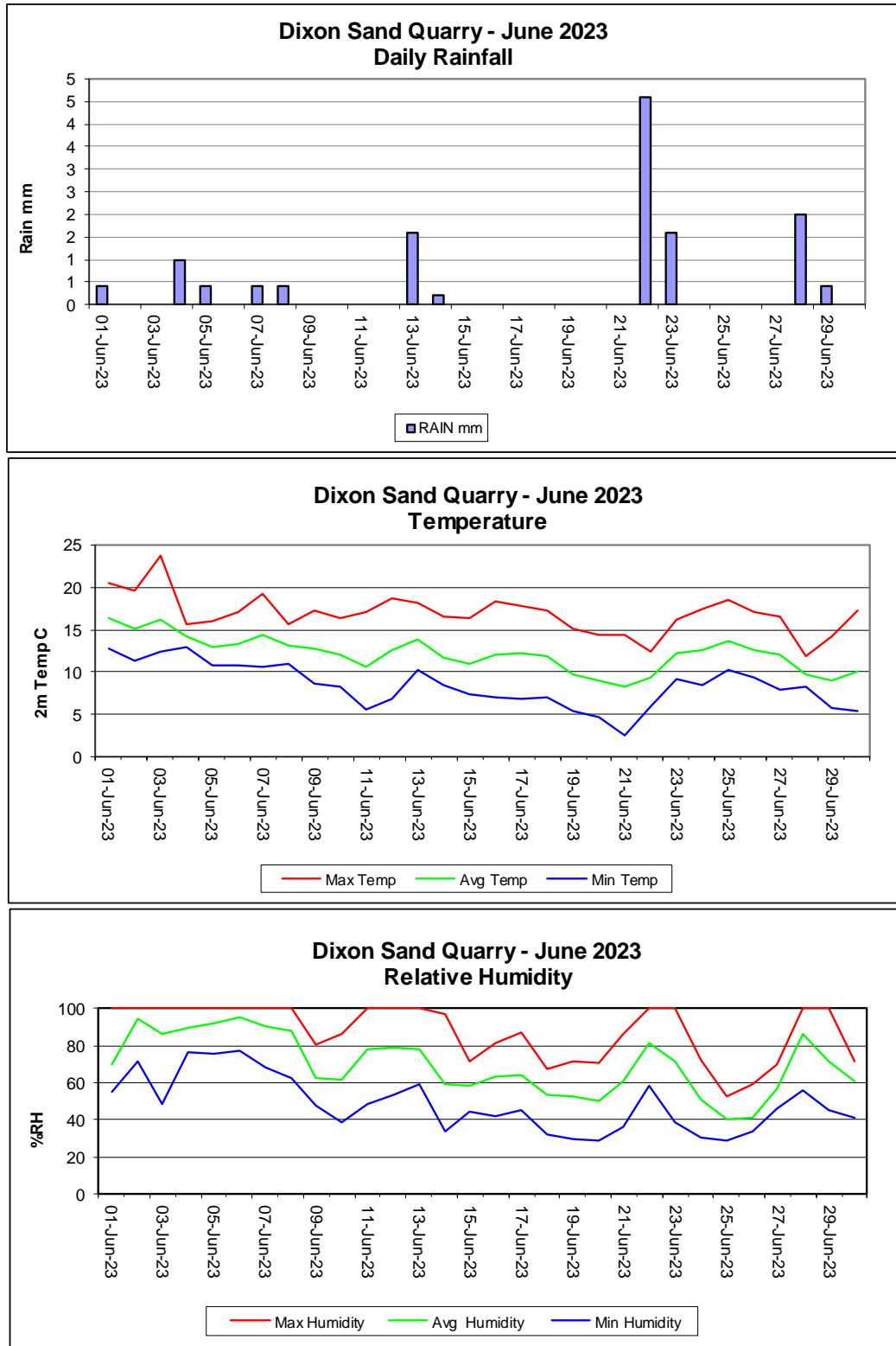


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

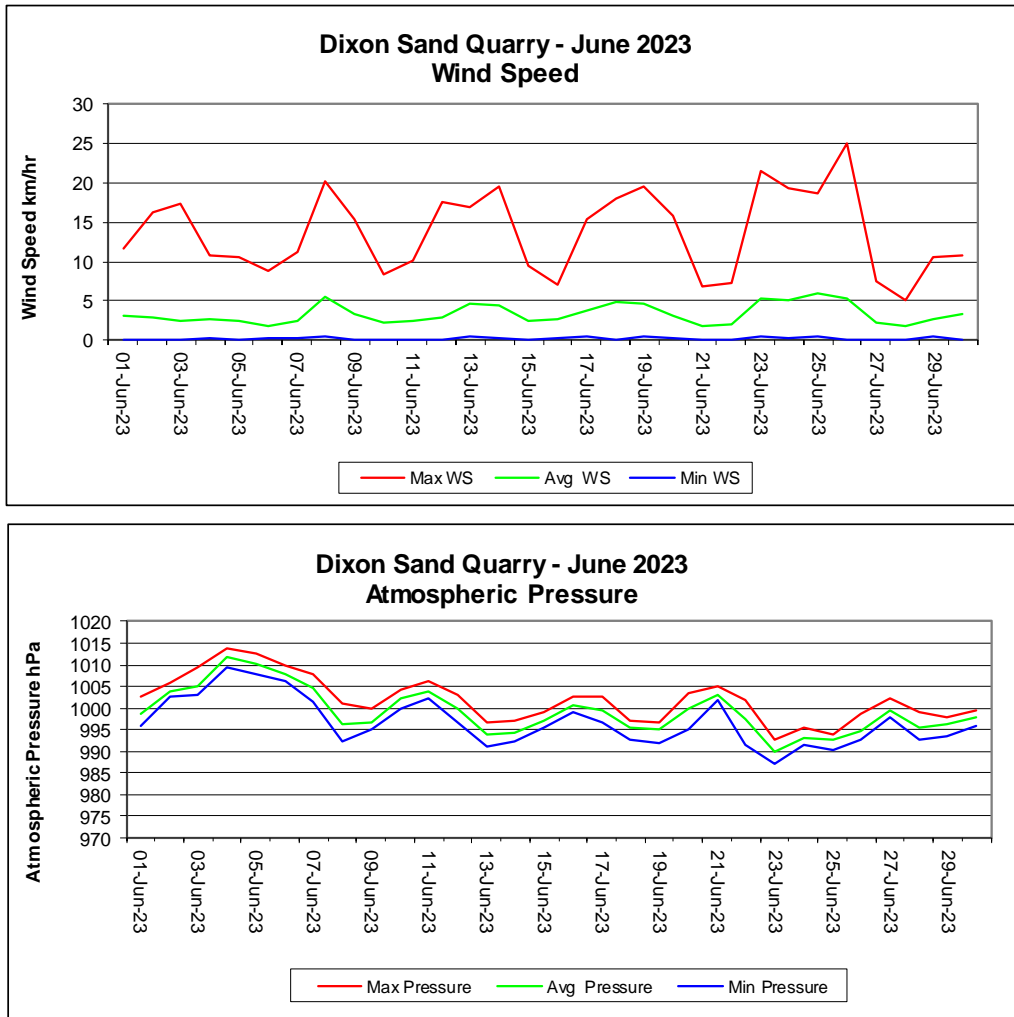


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose JUNE 2023

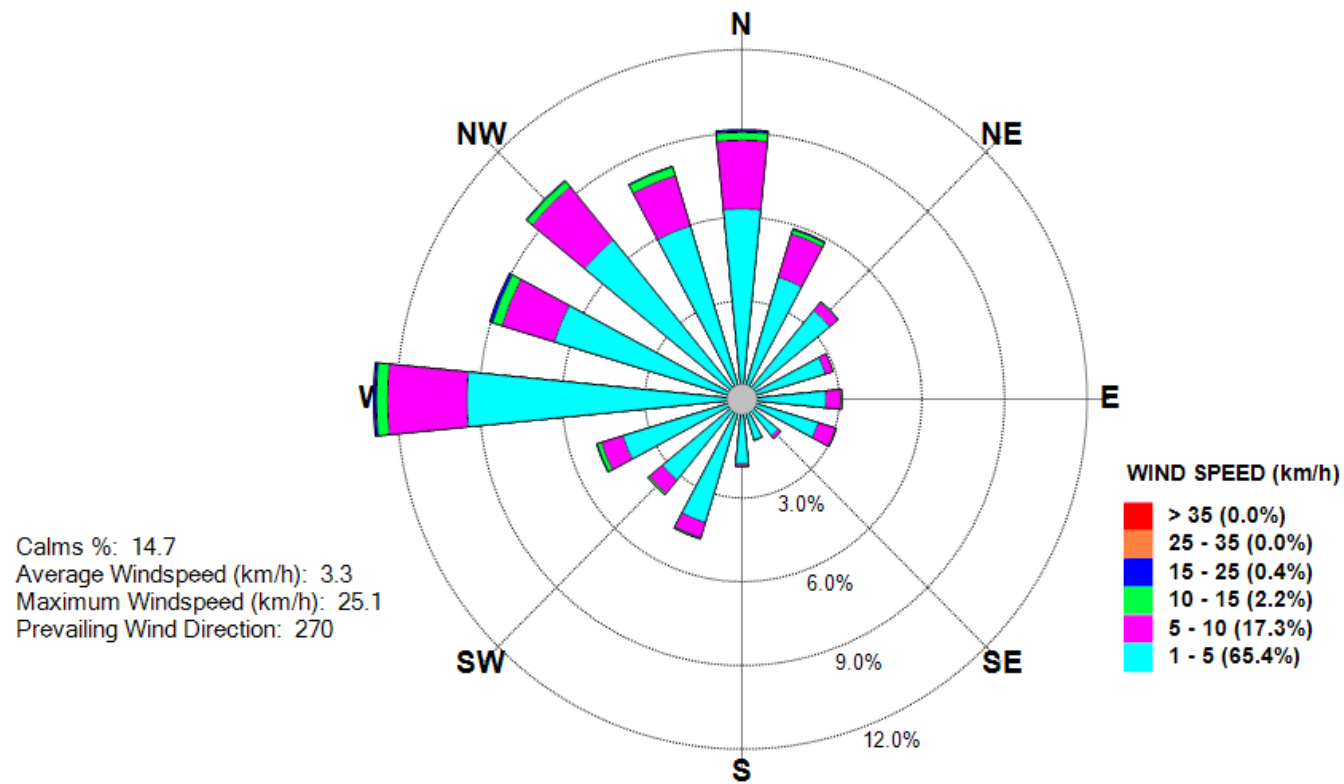


Figure 4: *Monthly Windrose*

Appendix 1

Calibration Documents (when required)



Continuous Air Quality

Monthly/Quarterly/Six Monthly/Annual

TEOM Maintenance and Calibration – 1400AB

TEOM Client/Site: Dixon Sade / TeoniDate: 7.6.23**1. TEOM Data Screen**SERIAL No: 25570Firmware: MA AB

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	<u>OK, Green ✓</u>	Green - Normal	✓	
Date/time	TEOM: <u>7.6.23</u> <u>11.09</u> Actual: <u>7.6.23</u> <u>11.12</u>	Current Date/time correct within 5 minutes	✓	
PM-10 24hr av	<u>9.3</u>	Positive values	✓	
Filter loading PM10	<u>51%</u>	<80 %	✓	
Frequency PM-10	<u>254.08694</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:**2. System Status**

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Vacuum pump pressure	<u>OK</u>	<0.50 atm	✓	
Warnings	<u>NIL</u>	No Warnings	✓	
If any warnings list:				

Comments:Data Downloaded: YES/NO (circle)Technician Name : LOUIS DAVIA Signed LD

3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	24.1	-10 to 50 C	✓	
Ambient Dew Point	NA	-10 to 50 C	✓	
Ambient Pressure	0.982	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	13.68	12.95 – 14.39 lpm	✓	
Total Flow rate	16.68	15.67 – 17.67 lpm	✓	

Comments:

$F_{adj \text{ main}} = 1.060$
 $F_{adj \text{ aux}} = 1.000$

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	255.4231	255.4229	255.4234	255.4235

✓ 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.

noise 0.018 ✓

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 low cool ✓Tetral Flow/Temp/Pressure Calibrator Serial No: 1009 Refer to calibration corrections for Temperature/Pressure and Flows and apply to all readings.Quarterly or Six Monthly Calibration1. Flow Verification – Conducted YES/NOPM10 Flow verified Flow l/min 2.99 Error % 0.3 (allowed error <6%) PASS/FAILBypass Flow verified Flow l/min 13.32 Error % 2.6 (allowed error <6%) PASS/FAILIf fail then complete a full multipoint recalibration and review previous data from last good flow check. Comments if Flows recalibrated: Fadj 1.020 Am 13.682. Leak Check – Conducted YES/NOPM10 actual 0.13 < Limit 0.15Bypass actual 0.47 < Limit 0.60Leak check PASS/FAIL – If fail then find leak and retest.

Comments:

Slight leak but OK.* Also cleaned
rain gauge – leaves
debris

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: Tetral measures Atmospheric Pressure in mm Hg or mb or hPa**For mb or hPa divide tetral result by 1013.25 to change units to atm.****For mmHg divide tetral 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/m³Noise was less than 5ug/m³ YES/NO**5. Maintenance**

Air Inlet system cleaned YES/NO

Pump Reconditioned YES/NO

Check Waterproofing YES/NO

Comments:

NA



Appendix C – Groundwater and Surface Water Monitoring Data

Groundwater Monitoring Data

Report Number: 13911

Date Issued: 16/12/2022

Revision Number: 00

Site/Job: Haerses Road H 6 Mnth Ground Water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following groundwater sample(s) were received on 8/12/2022

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
H6	8/12/2022	13911/1	Water	
H7	8/12/2022	13911/2	Water	
H9	8/12/2022	13911/3	Water	
H12	8/12/2022	13911/4	Water	
BH4	8/12/2022	13911/5	Water	
H14	8/12/2022	13911/6	Water	
H2	8/12/2022	13911/7	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 16/12/2022.

Test Report Number: 13911

Date Issued: 16/12/2022

Revision No: 00

Results

Field Analysis		Lab ID Sample Date Sample ID Units	13911/1 8/12/2022 H6	13911/2 8/12/2022 H7	13911/3 8/12/2022 H9	13911/4 8/12/2022 H12	13911/5 8/12/2022 BH4
Date Tested	--	--	08/12/2022	08/12/2022	08/12/2022	08/12/2022	08/12/2022
Depth to Water (TOM)	AS5667.11	m(bTOM)	9.48	10.39	7.64	9.86	37.32
Temperature	Temp	°C	19.3	19.2	19.0	19.5	19.8
pH	APHA 4500-H B	pH Units	4.7	4.6	4.6	4.7	5.5
Electrical Conductivity	APHA 2510 B	µS/cm	215	156	117	211	134

Field Analysis		Lab ID Sample Date Sample ID Units	13911/6 8/12/2022 H14	13911/7 8/12/2022 H2
Date Tested	--	--	08/12/2022	08/12/2022
Depth to Water (TOM)	AS5667.11	m(bTOM)	6.89	2.23
Temperature	Temp	°C	18.8	18.2
pH	APHA 4500-H B	pH Units	4.6	4.3
Electrical Conductivity	APHA 2510 B	µS/cm	140	132

Total Dissolved Solids		Lab ID Sample Date Sample ID Units	13911/1 8/12/2022 H6	13911/2 8/12/2022 H7	13911/3 8/12/2022 H9	13911/4 8/12/2022 H12	13911/5 8/12/2022 BH4
Date Tested	--	--	9/12/2022	9/12/2022	9/12/2022	9/12/2022	9/12/2022
Total Dissolved Solids	AS3550.4	mg/L	150	110	96	170	86

Total Dissolved Solids		Lab ID Sample Date Sample ID Units	13911/6 8/12/2022 H14	13911/7 8/12/2022 H2
Date Tested	--	--	9/12/2022	9/12/2022
Total Dissolved Solids	AS3550.4	mg/L	86	82



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 : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 13911

Date Issued: 16/12/2022

Revision No: 00

Sampling Conditions: Fine, 21°- 26°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
13911/1	H6		T & D.Walker	8/12/2022 9:12 AM	AS5667.11, Pump	AS5667.1
13911/2	H7		T & D.Walker	8/12/2022 9:27 AM	AS5667.11, Pump	AS5667.1
13911/3	H9		T & D.Walker	8/12/2022 9:58 AM	AS5667.11, Pump	AS5667.1
13911/4	H12		T & D.Walker	8/12/2022 10:14 AM	AS5667.11, Pump	AS5667.1
13911/5	BH4		T & D.Walker	8/12/2022 10:37 AM	AS5667.11, Pump	AS5667.1
13911/6	H14		T & D.Walker	8/12/2022 11:04 AM	AS5667.11, Pump	AS5667.1
13911/7	H2		T & D.Walker	8/12/2022 3:10 PM	AS5667.11, Pump	AS5667.1

Lab ID	Client Sample Reference	Sampling Observations
13911/1	H6	
13911/2	H7	
13911/3	H9	
13911/4	H12	
13911/5	BH4	1.0m knot in logger string - rectified
13911/6	H14	
13911/7	H2	

Sampling procedures have been approved and report finalised on 16/12/2022.

Where method is "unknown" sampling procedures are not endorsed

Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd

Site/Job: Haerses Road H 6 Mnth Ground Water

Well ID	GPS-Easting	GPS-Northing	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
H6	312989	6295066			
H7	312855	6294643			
H9	312796	6294232			
H12	312709	6294090			
BH4	312843	6293870			
H14	312659	6293363			
H2	312515	6294585			

Well ID	Date Well Measured	Monument Height (TOM) (m)	Depth to Bottom (bTOM) (m)	Recharge Rate	Approximate Volume (L)
H6	28/10/2019	0.78	15.75	Slow	3
H7	28/10/2019	0.81	16.67	Fast	5
H9	28/10/2019	0.78	16.23	Slow	14
H12	28/10/2019	0.86	17.04	Fast	9.62
BH4	28/10/2019	0.64	>60	Moderate	>45
H14	28/10/2019	0.84	13.97	Fast	7
H2	28/10/2019	0.69	5.79	Slow	5

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: 14676

Date Issued: 20/06/2023

Revision Number: 00

Site/Job: Haerses Road H 6 Mnth Ground Water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following groundwater sample(s) were received on 13/06/2023

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
H6	13/06/2023	14676/1	Water	
H7	13/06/2023	14676/2	Water	
H9	13/06/2023	14676/3	Water	
H12	13/06/2023	14676/4	Water	
BH4	13/06/2023	14676/5	Water	
H14	13/06/2023	14676/6	Water	
H2	13/06/2023	14676/7	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 20/06/2023.

Test Report Number: 14676

Date Issued: 20/06/2023

Revision No: 00

Results

Field Analysis	Method	Lab ID Sample Date Sample ID Units	14676/1 13/06/2023 H6	14676/2 13/06/2023 H7	14676/3 13/06/2023 H9	14676/4 13/06/2023 H12	14676/5 13/06/2023 BH4
Date Tested	--	--	13/06/2023	13/06/2023	13/06/2023	13/06/2023	13/06/2023
Depth to Water (TOM)	AS5667.11	m(bTOM)	11.04	11.80	8.26	11.12	37.32
Temperature	Temp	°C	17.8	18.3	16.9	18.0	18.2
pH	APHA 4500-H B	pH Units	4.2	4.2	5.2	4.9	5.4
Electrical Conductivity	APHA 2510 B	µS/cm	187	173	113	197	125

Field Analysis	Method	Lab ID Sample Date Sample ID Units	14676/6 13/06/2023 H14	14676/7 13/06/2023 H2
Date Tested	--	--	13/06/2023	13/06/2023
Depth to Water (TOM)	AS5667.11	m(bTOM)	7.23	3.12
Temperature	Temp	°C	18.7	17.2
pH	APHA 4500-H B	pH Units	4.3	4.4
Electrical Conductivity	APHA 2510 B	µS/cm	128	88.0

Total Dissolved Solids	Method	Lab ID Sample Date Sample ID Units	14676/1 13/06/2023 H6	14676/2 13/06/2023 H7	14676/3 13/06/2023 H9	14676/4 13/06/2023 H12	14676/5 13/06/2023 BH4
Date Tested	--	--	14/06/2023	14/06/2023	14/06/2023	14/06/2023	14/06/2023
Total Dissolved Solids	AS3550.4	mg/L	96	100	70	120	68

Total Dissolved Solids	Method	Lab ID Sample Date Sample ID Units	14676/6 13/06/2023 H14	14676/7 13/06/2023 H2
Date Tested	--	--	15/06/2023	15/06/2023
Total Dissolved Solids	AS3550.4	mg/L	63	55



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 : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 14676

Date Issued: 20/06/2023

Revision No: 00

Sampling Conditions: Cloudy, 14°- 20°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
14676/1	H6		T & D.Walker	13/06/2023 9:58 AM	AS5667.11, Bail	AS5667.1
14676/2	H7		T & D.Walker	13/06/2023 10:18 AM	AS5667.11, Bail	AS5667.1
14676/3	H9		T & D.Walker	13/06/2023 10:36 AM	AS5667.11, Pump	AS5667.1
14676/4	H12		T & D.Walker	13/06/2023 10:53 AM	AS5667.11, Pump	AS5667.1
14676/5	BH4		T & D.Walker	13/06/2023 11:09 AM	AS5667.11, Pump	AS5667.1
14676/6	H14		T & D.Walker	13/06/2023 11:39 AM	AS5667.11, Bail	AS5667.1
14676/7	H2		T & D.Walker	13/06/2023 4:10 PM	AS5667.11, Pump	AS5667.1

Lab ID	Client Sample Reference	Sampling Observations
14676/1	H6	
14676/2	H7	
14676/3	H9	
14676/4	H12	
14676/5	BH4	
14676/6	H14	
14676/7	H2	

Sampling procedures have been approved and report finalised on 20/06/2023.

Where method is "unknown" sampling procedures are not endorsed

Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd

Site/Job: Haerses Road H 6 Mnth Ground Water

Well ID	GPS-Easting	GPS-Northing	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
H6	312989	6295066			
H7	312855	6294643			
H9	312796	6294232			
H12	312709	6294090			
BH4	312843	6293870			
H14	312659	6293363			
H2	312515	6294585			

Well ID	Date Well Measured	Monument Height (TOM) (m)	Depth to Bottom (bTOM) (m)	Recharge Rate	Approximate Volume (L)
H6	28/10/2019	0.78	15.75	Slow	3
H7	28/10/2019	0.81	16.67	Fast	5
H9	28/10/2019	0.78	16.23	Slow	14
H12	28/10/2019	0.86	17.04	Fast	9.62
BH4	28/10/2019	0.64	>60	Moderate	>45
H14	28/10/2019	0.84	13.97	Fast	7
H2	28/10/2019	0.69	5.79	Slow	5

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: 13912

Date Issued: 16/12/2022

Revision Number: 00

Site/Job: Haerses Road 6 Monthly Ground Water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following groundwater sample(s) were received on 8/12/2022

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A	8/12/2022	13912/1	Water	
BH01B	8/12/2022	13912/2	Water	
BH01C	8/12/2022	13912/3	Water	
BH02A	8/12/2022	13912/4	Water	
BH02B	8/12/2022	13912/5	Water	
BH02C	8/12/2022	13912/6	Water	
BH03A	8/12/2022	13912/7	Water	
BH03B	8/12/2022	13912/8	Water	
BH03C	8/12/2022	13912/9	Water	
BH05B	8/12/2022	13912/10	Water	
BH5	8/12/2022	13912/11	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 16/12/2022.

Test Report Number: 13912

Date Issued: 16/12/2022

Revision No: 00

Results

Field Analysis		Lab ID Sample Date Sample ID Units	13912/1 8/12/2022 BH01A	13912/2 8/12/2022 BH01B	13912/3 8/12/2022 BH01C	13912/4 8/12/2022 BH02A	13912/5 8/12/2022 BH02B
Date Tested	--	--	08/12/2022	08/12/2022	08/12/2022	08/12/2022	08/12/2022
Depth to Water (TOM)	AS5667.11	m(bTOM)	8.59	15.06	5.41	22.11	17.80
Temperature	Temp	°C	18.7	18.7	17.8	19.7	19.4
pH	APHA 4500-H B	pH Units	5.4	4.6	4.8	4.5	4.3
Electrical Conductivity	APHA 2510 B	µS/cm	213	166	203	181	188

Field Analysis		Lab ID Sample Date Sample ID Units	13912/6 8/12/2022 BH02C	13912/7 8/12/2022 BH03A	13912/8 8/12/2022 BH03B	13912/9 8/12/2022 BH03C	13912/10 8/12/2022 BH05B
Date Tested	--	--	08/12/2022	08/12/2022	08/12/2022	08/12/2022	08/12/2022
Depth to Water (TOM)	AS5667.11	m(bTOM)	14.41	56.32	22.05	13.44	18.81
Temperature	Temp	°C	18.9	19.8	19.2	18.8	20.3
pH	APHA 4500-H B	pH Units	5.5	4.9	4.3	4.2	4.7
Electrical Conductivity	APHA 2510 B	µS/cm	212	158	159	182	210

Field Analysis		Lab ID Sample Date Sample ID Units	13912/11 8/12/2022 BH5
Date Tested	--	--	08/12/2022
Depth to Water (TOM)	AS5667.11	m(bTOM)	29.27
Temperature	Temp	°C	20.9
pH	APHA 4500-H B	pH Units	5.0
Electrical Conductivity	APHA 2510 B	µS/cm	194

Total Dissolved Solids		Lab ID Sample Date Sample ID Units	13912/1 8/12/2022 BH01A	13912/2 8/12/2022 BH01B	13912/3 8/12/2022 BH01C	13912/4 8/12/2022 BH02A	13912/5 8/12/2022 BH02B
Date Tested	--	--	13/12/2022	13/12/2022	13/12/2022	13/12/2022	13/12/2022
Total Dissolved Solids	AS3550.4	mg/L	150	110	140	98	99

Total Dissolved Solids		Lab ID Sample Date Sample ID Units	13912/6 8/12/2022 BH02C	13912/7 8/12/2022 BH03A	13912/8 8/12/2022 BH03B	13912/9 8/12/2022 BH03C	13912/10 8/12/2022 BH05B
Date Tested	--	--	13/12/2022	13/12/2022	13/12/2022	13/12/2022	14/12/2022
Total Dissolved Solids	AS3550.4	mg/L	140	90	77	87	130



Total Dissolved Solids		Lab ID Sample Date Sample ID Units	13912/11 8/12/2022 BH5
	Method		
Date Tested	--	--	14/12/2022
Total Dissolved Solids	AS3550.4	mg/L	130

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 : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 13912

Date Issued: 16/12/2022

Revision No: 00

Sampling Conditions: Fine, 21°- 26°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
13912/1	BH01A		T & D.Walker	8/12/2022 2:18 PM	AS5667.11, Pump	AS5667.1
13912/2	BH01B		T & D.Walker	8/12/2022 2:45 PM	AS5667.11, Pump	AS5667.1
13912/3	BH01C		T & D.Walker	8/12/2022 2:28 PM	AS5667.11, Bail	AS5667.1
13912/4	BH02A		T & D.Walker	8/12/2022 1:05 PM	AS5667.11, Pump	AS5667.1
13912/5	BH02B		T & D.Walker	8/12/2022 1:29 PM	AS5667.11, Pump	AS5667.1
13912/6	BH02C		T & D.Walker	8/12/2022 1:15 PM	AS5667.11, Bail	AS5667.1
13912/7	BH03A		T & D.Walker	8/12/2022 12:04 PM	AS5667.11, Bail	AS5667.1
13912/8	BH03B		T & D.Walker	8/12/2022 12:13 PM	AS5667.11, Bail	AS5667.1
13912/9	BH03C		T & D.Walker	8/12/2022 12:23 PM	AS5667.11, Bail	AS5667.1
13912/10	BH05B		T & D.Walker	8/12/2022 1:58 PM	AS5667.11, Bail	AS5667.1
13912/11	BH5		T & D.Walker	8/12/2022 1:46 PM	AS5667.11, Bail	AS5667.1

Lab ID	Client Sample Reference	Sampling Observations
13912/1	BH01A	
13912/2	BH01B	
13912/3	BH01C	
13912/4	BH02A	
13912/5	BH02B	
13912/6	BH02C	
13912/7	BH03A	
13912/8	BH03B	
13912/9	BH03C	
13912/10	BH05B	
13912/11	BH5	

Sampling procedures have been approved and report finalised on 16/12/2022.

Where method is "unknown" sampling procedures are not endorsed

Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd

Site/Job: Haerses Road 6 Monthly Ground Water

Well ID	GPS-Easting	GPS-Northing	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
BH01A	312186	6293968			
BH01B	312190	6293971			
BH01C	312184	6293972			
BH02A	312305	6293793			
BH02B	312315	6293800			
BH02C	312303	6293801			
BH03A	312341	6293579			
BH03B	312342	6293588			
BH03C	312341	6293583			
BH05B	312160	6293752			
BH5	312159	6293753			

Well ID	Date Well Measured	Monument Height (TOM) (m)	Depth to Bottom (bTOM) (m)	Recharge Rate	Approximate Volume (L)
BH01A	28/10/2019	1.05	>60	Slow	>100
BH01B	28/10/2019	0.92	40.92	Slow	50
BH01C	28/10/2019	1.01	11.02	Medium	6
BH02A	28/10/2019	0.81	>60	Slow	>65
BH02B	28/10/2019	0.77	42.57	Slow	30
BH02C	28/10/2019	0.98	16.12	Slow	<1
BH03A	28/10/2019	0.87	>60	Slow	>5
BH03B	28/10/2019	1.05	23.75	Slow	3
BH03C	28/10/2019	1.08	15.98	Slow	4
BH05B	28/10/2019	0.97	33.87	Medium	27
BH5	28/10/2019	0.57	>60	Fast	>60

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: 14678

Date Issued: 20/06/2023

Revision Number: 00

Site/Job: Haerses Road 6 Monthly Ground Water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following groundwater sample(s) were received on 13/06/2023

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A	13/06/2023	14678/1	Water	
BH01B	13/06/2023	14678/2	Water	
BH01C	13/06/2023	14678/3	Water	
BH02A	13/06/2023	14678/4	Water	
BH02B	13/06/2023	14678/5	Water	
BH02C	13/06/2023	14678/6	Water	
BH03A	13/06/2023	14678/7	Water	
BH03B	13/06/2023	14678/8	Water	
BH03C	13/06/2023	14678/9	Water	
BH05B	13/06/2023	14678/10	Water	
BH5	13/06/2023	14678/11	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 20/06/2023.

Test Report Number: 14678

Date Issued: 20/06/2023

Revision No: 00

Results

Field Analysis		Lab ID Sample Date Sample ID Units	14678/1 13/06/2023 BH01A	14678/2 13/06/2023 BH01B	14678/3 13/06/2023 BH01C	14678/4 13/06/2023 BH02A	14678/5 13/06/2023 BH02B
Date Tested	--	--	13/06/2023	13/06/2023	13/06/2023	13/06/2023	13/06/2023
Depth to Water (TOM)	AS5667.11	m(bTOM)	9.02	15.55	5.52	21.74	17.86
Temperature	Temp	°C	18.0	17.4	17.8	18.5	18.3
pH	APHA 4500-H B	pH Units	5.8	4.8	4.7	4.5	4.5
Electrical Conductivity	APHA 2510 B	µS/cm	217	159	193	177	180

Field Analysis		Lab ID Sample Date Sample ID Units	14678/6 13/06/2023 BH02C	14678/7 13/06/2023 BH03A	14678/8 13/06/2023 BH03B	14678/9 13/06/2023 BH03C	14678/10 13/06/2023 BH05B
Date Tested	--	--	13/06/2023	13/06/2023	13/06/2023	13/06/2023	13/06/2023
Depth to Water (TOM)	AS5667.11	m(bTOM)	14.46	56.21	22.03	13.92	18.90
Temperature	Temp	°C	18.7	18.9	18.4	18.8	19.0
pH	APHA 4500-H B	pH Units	4.9	4.7	4.3	4.2	4.8
Electrical Conductivity	APHA 2510 B	µS/cm	182	148	151	169	182

Field Analysis		Lab ID Sample Date Sample ID Units	14678/11 13/06/2023 BH5
Date Tested	--	--	13/06/2023
Depth to Water (TOM)	AS5667.11	m(bTOM)	29.26
Temperature	Temp	°C	18.9
pH	APHA 4500-H B	pH Units	5.0
Electrical Conductivity	APHA 2510 B	µS/cm	188

Total Dissolved Solids		Lab ID Sample Date Sample ID Units	14678/1 13/06/2023 BH01A	14678/2 13/06/2023 BH01B	14678/3 13/06/2023 BH01C	14678/4 13/06/2023 BH02A	14678/5 13/06/2023 BH02B
Date Tested	--	--	15/06/2023	15/06/2023	15/06/2023	15/06/2023	15/06/2023
Total Dissolved Solids	AS3550.4	mg/L	160	97	100	100	130

Total Dissolved Solids		Lab ID Sample Date Sample ID Units	14678/6 13/06/2023 BH02C	14678/7 13/06/2023 BH03A	14678/8 13/06/2023 BH03B	14678/9 13/06/2023 BH03C	14678/10 13/06/2023 BH05B
Date Tested	--	--	15/06/2023	15/06/2023	15/06/2023	15/06/2023	16/06/2023
Total Dissolved Solids	AS3550.4	mg/L	130	110	94	95	150



Total Dissolved Solids		Lab ID Sample Date Sample ID Units	14678/11 13/06/2023 BH5
	Method		
Date Tested	--	--	16/06/2023
Total Dissolved Solids	AS3550.4	mg/L	140

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 : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 14678

Date Issued: 20/06/2023

Revision No: 00

Sampling Conditions: Cloudy, 14°- 20°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
14678/1	BH01A		T & D.Walker	13/06/2023 3:21 PM	AS5667.11, Pump	AS5667.1
14678/2	BH01B		T & D.Walker	13/06/2023 3:44 PM	AS5667.11, Pump	AS5667.1
14678/3	BH01C		T & D.Walker	13/06/2023 3:31 PM	AS5667.11, Bail	AS5667.1
14678/4	BH02A		T & D.Walker	13/06/2023 1:14 PM	AS5667.11, Pump	AS5667.1
14678/5	BH02B		T & D.Walker	13/06/2023 1:41 PM	AS5667.11, Pump	AS5667.1
14678/6	BH02C		T & D.Walker	13/06/2023 1:27 PM	AS5667.11, Bail	AS5667.1
14678/7	BH03A		T & D.Walker	13/06/2023 1:55 PM	AS5667.11, Bail	AS5667.1
14678/8	BH03B		T & D.Walker	13/06/2023 2:09 PM	AS5667.11, Bail	AS5667.1
14678/9	BH03C		T & D.Walker	13/06/2023 2:19 PM	AS5667.11, Bail	AS5667.1
14678/10	BH05B		T & D.Walker	13/06/2023 2:43 PM	AS5667.11, Bail	AS5667.1
14678/11	BH5		T & D.Walker	13/06/2023 2:31 PM	AS5667.11, Bail	AS5667.1

Lab ID	Client Sample Reference	Sampling Observations
14678/1	BH01A	
14678/2	BH01B	
14678/3	BH01C	
14678/4	BH02A	
14678/5	BH02B	
14678/6	BH02C	
14678/7	BH03A	
14678/8	BH03B	
14678/9	BH03C	
14678/10	BH05B	No vehicle access
14678/11	BH5	0.75m knot in logger string - No vehicle access

Sampling procedures have been approved and report finalised on 20/06/2023.

Where method is "unknown" sampling procedures are not endorsed

Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd

Site/Job: Haerses Road 6 Monthly Ground Water

Well ID	GPS-Easting	GPS-Northing	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
BH01A	312186	6293968			
BH01B	312190	6293971			
BH01C	312184	6293972			
BH02A	312305	6293793			
BH02B	312315	6293800			
BH02C	312303	6293801			
BH03A	312341	6293579			
BH03B	312342	6293588			
BH03C	312341	6293583			
BH05B	312160	6293752			
BH5	312159	6293753			

Well ID	Date Well Measured	Monument Height (TOM) (m)	Depth to Bottom (bTOM) (m)	Recharge Rate	Approximate Volume (L)
BH01A	28/10/2019	1.05	>60	Slow	>100
BH01B	28/10/2019	0.92	40.92	Slow	50
BH01C	28/10/2019	1.01	11.02	Medium	6
BH02A	28/10/2019	0.81	>60	Slow	>65
BH02B	28/10/2019	0.77	42.57	Slow	30
BH02C	28/10/2019	0.98	16.12	Slow	<1
BH03A	28/10/2019	0.87	>60	Slow	>5
BH03B	28/10/2019	1.05	23.75	Slow	3
BH03C	28/10/2019	1.08	15.98	Slow	4
BH05B	28/10/2019	0.97	33.87	Medium	27
BH5	28/10/2019	0.57	>60	Fast	>60

Note: NATA accreditation does not cover information provided in this section

*Where indicated AHD from ground level (m) estimated based on handheld GPS

Surface water Monitoring Data

Report Number: 13243

Date Issued: 28/07/2022

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface Water

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

The following water sample(s) were received on 27/07/2022

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	27/07/2022	13243/1	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 28/07/2022.

Test Report Number: 13243

Date Issued: 28/07/2022

Revision No: 00

Results

Physicals	Method	Units	13243/1 Basin 1 - Mod 1 27/07/2022
Date Tested	--	--	27/07/2022
Temperature	Temp	°C	16.8
pH	APHA 4500-H B	pH Units	4.8
Turbidity	APHA 2130 B	NTU	14

Solids	Method	Units	13243/1 Basin 1 - Mod 1 27/07/2022
Date Tested	--	--	28/07/2022
Total Suspended Solids	AS3550.4	mg/L	11

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 : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 13243

Date Issued: 28/07/2022

Revision No: 00

Sampling Conditions: Fine, 14°- 17°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
13243/1	Basin 1 - Mod 1		T & D.Walker	27/07/2022 1:52 PM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
13243/1	Basin 1 - Mod 1			Trickle discharge.

Sampling procedures have been approved and report finalised on 28/07/2022.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 13322

Date Issued: 25/08/2022

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface water

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

The following water sample(s) were received on 24/08/2022

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	24/08/2022	13322/1	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 25/08/2022.

Test Report Number: 13322

Date Issued: 25/08/2022

Revision No: 00

Results

Field Analysis	Method	Units	13322/1 Basin 1 - Mod 1 24/08/2022
Date Tested	--	--	24/08/2022
Temperature	Temp	°C	14.8
pH	APHA 4500-H B	pH Units	4.7
Turbidity	APHA 2130 B	NTU	9.9

Solids	Method	Units	13322/1 Basin 1 - Mod 1 24/08/2022
Date Tested	--	--	24/08/2022
Total Suspended Solids	AS3550.4	mg/L	9

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 : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 13322

Date Issued: 25/08/2022

Revision No: 00

Sampling Conditions: Fine, 14°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
13322/1	Basin 1 - Mod 1		T.Walker	24/08/2022 11:24 AM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
13322/1	Basin 1 - Mod 1			No Visible Oil and Grease, trickle discharge.

Sampling procedures have been approved and report finalised on 25/08/2022.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 13466

Date Issued: 23/09/2022

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following water sample(s) were received on 23/09/2022

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	21/09/2022	13466/1	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 23/09/2022.

Test Report Number: 13466

Date Issued: 23/09/2022

Revision No: 00

Results

Field Analysis		Lab ID Sample Date Sample ID Units	13466/1 21/09/2022 Basin 1 - Mod 1
Date Tested	--	--	21/09/2022
Temperature	Temp	°C	20.2
pH	APHA 4500-H B	pH Units	4.7
Turbidity	APHA 2130 B	NTU	3.2

Solids		Lab ID Sample Date Sample ID Units	13466/1 21/09/2022 Basin 1 - Mod 1
Date Tested	--	--	23/09/2022
Total Suspended Solids	AS3550.4	mg/L	<5

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 : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 13466

Date Issued: 23/09/2022

Revision No: 00

Sampling Conditions: 20°C, cloudy

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
13466/1	Basin 1 - Mod 1		D.Walker	21/09/2022 1:13 PM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
13466/1	Basin 1 - Mod 1			Trickle discharge

Sampling procedures have been approved and report finalised on 23/09/2022.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 13650

Date Issued: 20/10/2022

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following water sample(s) were received on 19/10/2022

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	19/10/2022	13650/1	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 20/10/2022.

Test Report Number: 13650

Date Issued: 20/10/2022

Revision No: 00

Results

Field Analysis		Lab ID Sample Date Sample ID Units	13650/1 19/10/2022 Basin 1 - Mod 1
Date Tested	--	--	19/10/2022
Temperature	Temp	°C	24.2
pH	APHA 4500-H B	pH Units	4.8
Turbidity	APHA 2130 B	NTU	40

Solids		Lab ID Sample Date Sample ID Units	13650/1 19/10/2022 Basin 1 - Mod 1
Date Tested	--	--	19/10/2022
Total Suspended Solids	AS3550.4	mg/L	21

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 : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 13650

Date Issued: 20/10/2022

Revision No: 00

Sampling Conditions: Cloudy, 24°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
13650/1	Basin 1 - Mod 1		T.Walker	19/10/2022 12:02 PM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
13650/1	Basin 1 - Mod 1			

Sampling procedures have been approved and report finalised on 20/10/2022.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 13807

Date Issued: 17/11/2022

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface water

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

The following water sample(s) were received on 16/11/2022

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	16/11/2022	13807/1	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 17/11/2022.

Test Report Number: 13807

Date Issued: 17/11/2022

Revision No: 00

Results

Field Analysis		Lab ID Sample Date Sample ID Units	13807/1 16/11/2022 Basin 1 - Mod 1
Date Tested	--	--	16/11/2022
Temperature	Temp	°C	23.4
pH	APHA 4500-H B	pH Units	4.5
Turbidity	APHA 2130 B	NTU	9.2

Solids		Lab ID Sample Date Sample ID Units	13807/1 16/11/2022 Basin 1 - Mod 1
Date Tested	--	--	17/11/2022
Total Suspended Solids	AS3550.4	mg/L	8

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 : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 13807

Date Issued: 17/11/2022

Revision No: 00

Sampling Conditions: Cloudy, 18 °C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
13807/1	Basin 1 - Mod 1		T.Walker	16/11/2022 1:20 PM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
13807/1	Basin 1 - Mod 1			

Sampling procedures have been approved and report finalised on 17/11/2022.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 13913

Date Issued: 9/12/2022

Revision Number: 00

Site/Job: Haerses Rd- 6 Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following water sample(s) were received on 8/12/2022

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Stage 1 Pit Sump	8/12/2022	13913/1	Water	
Stage 2 West Sediment	8/12/2022	13913/2	Water	
Stage 2 West Pit Sump	8/12/2022	13913/3	Water	
Stage 2 East Sediment Dam	8/12/2022	13913/4	Water	
Basin 1 - Mod 1	8/12/2022	13913/5	Water	Not Discharging
Basin 4	8/12/2022	13913/6	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 9/12/2022.

Test Report Number: 13913

Date Issued: 9/12/2022

Revision No: 00

Results

Physicals		Lab ID Sample Date Sample ID Units	13913/1 8/12/2022 Stage 1 Pit Sump	13913/2 8/12/2022 Stage 2 West Sediment	13913/3 8/12/2022 Stage 2 West Pit Sump	13913/4 8/12/2022 Stage 2 East Sediment Dam	13913/5 8/12/2022 Basin 1 - Mod 1
Date Tested	--	--	08/12/2022	08/12/2022	08/12/2022	08/12/2022	08/12/2022
Temperature	Temp	°C	23.1	23.6	23.6	22.6	27.5
pH	APHA 4500-H B	pH Units	6.4	6.4	5.4	6.3	4.5
Electrical Conductivity	APHA 2510 B	µS/cm	50.0	54.0	53.0	42.0	227
Turbidity	APHA 2130 B	NTU	5.0	15	12	28	14

Physicals		Lab ID Sample Date Sample ID Units	13913/6 8/12/2022 Basin 4
Date Tested	--	--	08/12/2022
Temperature	Temp	°C	23.9
pH	APHA 4500-H B	pH Units	5.5
Electrical Conductivity	APHA 2510 B	µS/cm	62.0
Turbidity	APHA 2130 B	NTU	13

Solids		Lab ID Sample Date Sample ID Units	13913/1 8/12/2022 Stage 1 Pit Sump	13913/2 8/12/2022 Stage 2 West Sediment	13913/3 8/12/2022 Stage 2 West Pit Sump	13913/4 8/12/2022 Stage 2 East Sediment Dam	13913/5 8/12/2022 Basin 1 - Mod 1
Date Tested	--	--	9/12/2022	9/12/2022	9/12/2022	9/12/2022	9/12/2022
Total Suspended Solids	AS3550.4	mg/L	<5	10	8	19	15

Solids		Lab ID Sample Date Sample ID Units	13913/6 8/12/2022 Basin 4
Date Tested	--	--	9/12/2022
Total Suspended Solids	AS3550.4	mg/L	7



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 : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 13913

Date Issued: 9/12/2022

Revision No: 00

Sampling Conditions: Fine, 21°- 26°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
13913/1	Stage 1 Pit Sump		T & D.Walker	8/12/2022 9:43 AM	AS5667.4 Lake, Grab	AS5667.1
13913/2	Stage 2 West Sediment		T & D.Walker	8/12/2022 12:55 PM	AS5667.4 Lake, Grab	AS5667.1
13913/3	Stage 2 West Pit Sump		T & D.Walker	8/12/2022 12:41 PM	AS5667.4 Lake, Grab	AS5667.1
13913/4	Stage 2 East Sediment Dam		T & D.Walker	8/12/2022 10:49 AM	AS5667.4 Lake, Grab	AS5667.1
13913/5	Basin 1 - Mod 1		T & D.Walker	8/12/2022 11:44 AM	AS5667.4 Lake, Grab	AS5667.1
13913/6	Basin 4		T & D.Walker	8/12/2022 11:14 AM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
13913/1	Stage 1 Pit Sump			
13913/2	Stage 2 West Sediment			
13913/3	Stage 2 West Pit Sump			
13913/4	Stage 2 East Sediment Dam			
13913/5	Basin 1 - Mod 1			
13913/6	Basin 4			

Sampling procedures have been approved and report finalised on 9/12/2022.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 14053

Date Issued: 12/01/2023

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following water sample(s) were received on 11/01/2023

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	11/01/2023	14053/1	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 12/01/2023.

Test Report Number: 14053

Date Issued: 12/01/2023

Revision No: 00

Results

Field Analysis		Lab ID Sample Date Sample ID Units	14053/1 11/01/2023 Basin 1 - Mod 1
Date Tested	--	--	11/01/2023
Temperature	Temp	°C	25.9
pH	APHA 4500-H B	pH Units	4.8
Turbidity	APHA 2130 B	NTU	11

Solids		Lab ID Sample Date Sample ID Units	14053/1 11/01/2023 Basin 1 - Mod 1
Date Tested	--	--	12/01/2023
Total Suspended Solids	AS3550.4	mg/L	8

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 : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 14053

Date Issued: 12/01/2023

Revision No: 00

Sampling Conditions: Cloudy, 27°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
14053/1	Basin 1 - Mod 1		T.Walker	11/01/2023 12:31 PM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
14053/1	Basin 1 - Mod 1			No Flow

Sampling procedures have been approved and report finalised on 12/01/2023.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 14154

Date Issued: 10/02/2023

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface water

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

The following water sample(s) were received on 8/02/2023

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	8/02/2023	14154/1	Water	Not Discharging

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 10/02/2023.

Test Report Number: 14154

Date Issued: 10/02/2023

Revision No: 00

Results

Field Analysis		Lab ID Sample Date Sample ID Units	14154/1 8/02/2023 Basin 1 - Mod 1
Date Tested	--	--	08/02/2023
Temperature	Temp	°C	28.3
pH	APHA 4500-H B	pH Units	5.0
Turbidity	APHA 2130 B	NTU	33

Solids		Lab ID Sample Date Sample ID Units	14154/1 8/02/2023 Basin 1 - Mod 1
Date Tested	--	--	9/02/2023
Total Suspended Solids	AS3550.4	mg/L	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 : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 14154

Date Issued: 10/02/2023

Revision No: 00

Sampling Conditions: Cloudy, 28°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
14154/1	Basin 1 - Mod 1		T & D.Walker	8/02/2023 1:01 PM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
14154/1	Basin 1 - Mod 1			No Flow

Sampling procedures have been approved and report finalised on 10/02/2023.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 14278

Date Issued: 9/03/2023

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following water sample(s) were received on 8/03/2023

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	8/03/2023	14278/1	Water	Not Discharging

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 9/03/2023.

Test Report Number: 14278

Date Issued: 9/03/2023

Revision No: 00

Results

Field Analysis		Lab ID Sample Date Sample ID Units	14278/1 8/03/2023 Basin 1 - Mod 1
Date Tested	--	--	08/03/2023
Temperature	Temp	°C	27.5
pH	APHA 4500-H B	pH Units	4.9
Turbidity	APHA 2130 B	NTU	65

Solids		Lab ID Sample Date Sample ID Units	14278/1 8/03/2023 Basin 1 - Mod 1
Date Tested	--	--	09/03/2023
Total Suspended Solids	AS3550.4	mg/L	59

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 : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 14278

Date Issued: 9/03/2023

Revision No: 00

Sampling Conditions: Fine, 29°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
14278/1	Basin 1 - Mod 1		T.Walker	8/03/2023 12:45 PM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
14278/1	Basin 1 - Mod 1			No Flow

Sampling procedures have been approved and report finalised on 9/03/2023.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 14395

Date Issued: 6/04/2023

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following water sample(s) were received on 5/04/2023

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	5/04/2023	14395/1	Water	Discharging

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 6/04/2023.

Test Report Number: 14395

Date Issued: 6/04/2023

Revision No: 00

Results

Field Analysis		Lab ID Sample Date Sample ID Units	14395/1 5/04/2023 Basin 1 - Mod 1
Date Tested	--	--	05/04/2023
Temperature	Temp	°C	23.1
pH	APHA 4500-H B	pH Units	4.8
Turbidity	APHA 2130 B	NTU	7.2

Solids		Lab ID Sample Date Sample ID Units	14395/1 5/04/2023 Basin 1 - Mod 1
Date Tested	--	--	6/04/2023
Total Suspended Solids	AS3550.4	mg/L	7

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 : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 14395

Date Issued: 6/04/2023

Revision No: 00

Sampling Conditions: Cloudy, 23°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
14395/1	Basin 1 - Mod 1		T.Walker	5/04/2023 12:43 PM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
14395/1	Basin 1 - Mod 1			No Visible Oil and Grease. No flow.

Sampling procedures have been approved and report finalised on 6/04/2023.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 14593

Date Issued: 4/05/2023

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following water sample(s) were received on 3/05/2023

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	3/05/2023	14593/1	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 4/05/2023.

Test Report Number: 14593

Date Issued: 4/05/2023

Revision No: 00

Results

Field Analysis		Lab ID Sample Date Sample ID Units	14593/1 3/05/2023 Basin 1 - Mod 1
Date Tested	--	--	03/05/2023
Temperature	Temp	°C	20.7
pH	APHA 4500-H B	pH Units	5.0
Turbidity	APHA 2130 B	NTU	12

Solids		Lab ID Sample Date Sample ID Units	14593/1 3/05/2023 Basin 1 - Mod 1
Date Tested	--	--	4/05/2023
Total Suspended Solids	AS3550.4	mg/L	12

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 : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 14593

Date Issued: 4/05/2023

Revision No: 00

Sampling Conditions: Fine, 22

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
14593/1	Basin 1 - Mod 1		T & D.Walker	3/05/2023	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
14593/1	Basin 1 - Mod 1			Clear, gentle (trickle) flow

Sampling procedures have been approved and report finalised on 4/05/2023.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 14655

Date Issued: 5/06/2023

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following water sample(s) were received on 31/05/2023

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	31/05/2023	14655/1	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 5/06/2023.

Test Report Number: 14655

Date Issued: 5/06/2023

Revision No: 00

Results

Field Analysis		Lab ID Sample Date Sample ID Units	14655/1 31/05/2023 Basin 1 - Mod 1
Date Tested	--	--	31/05/2023
Temperature	Temp	°C	15.4
pH	APHA 4500-H B	pH Units	4.9
Turbidity	APHA 2130 B	NTU	11

Solids		Lab ID Sample Date Sample ID Units	14655/1 31/05/2023 Basin 1 - Mod 1
Date Tested	--	--	1/06/2023
Total Suspended Solids	AS3550.4	mg/L	16

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 : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 14655

Date Issued: 5/06/2023

Revision No: 00

Sampling Conditions: Cloudy, 21°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
14655/1	Basin 1 - Mod 1		T.Walker	31/05/2023 1:10 PM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
14655/1	Basin 1 - Mod 1			Clear, no flow.

Sampling procedures have been approved and report finalised on 5/06/2023.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 14679

Date Issued: 16/06/2023

Revision Number: 00

Site/Job: Haerses Rd 6 Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following water sample(s) were received on 13/06/2023

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Stage 1 Pit Sump	13/06/2023	14679/1	Water	
Stage 2 West Sediment	13/06/2023	14679/2	Water	
Stage 2 West Pit Sump	13/06/2023	14679/3	Water	
Stage 2 East Sediment Dam	13/06/2023	14679/4	Water	
Basin 1 - Mod 1	13/06/2023	14679/5	Water	
Basin 4	13/06/2023	14679/6	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 16/06/2023.

Test Report Number: 14679

Date Issued: 16/06/2023

Revision No: 00

Results

Physicals		Lab ID Sample Date Sample ID Units	14679/1 13/06/2023 Stage 1 Pit Sump	14679/2 13/06/2023 Stage 2 West Sediment	14679/3 13/06/2023 Stage 2 West Pit Sump	14679/4 13/06/2023 Stage 2 East Sediment Dam	14679/5 13/06/2023 Basin 1 - Mod 1
Date Tested	--	--	13/06/2023	13/06/2023	13/06/2023	13/06/2023	13/06/2023
Temperature	Temp	°C	10.2	15.3	16.7	14.1	14.0
pH	APHA 4500-H B	pH Units	5.4	5.6	4.7	5.5	4.7
Electrical Conductivity	APHA 2510 B	µS/cm	41.0	48.0	62.0	44.0	113
Turbidity	APHA 2130 B	NTU	32	11	5.4	16	12

Physicals		Lab ID Sample Date Sample ID Units	14679/6 13/06/2023 Basin 4
Date Tested	--	--	13/06/2023
Temperature	Temp	°C	14.6
pH	APHA 4500-H B	pH Units	4.6
Electrical Conductivity	APHA 2510 B	µS/cm	89.0
Turbidity	APHA 2130 B	NTU	6.9

Solids		Lab ID Sample Date Sample ID Units	14679/1 13/06/2023 Stage 1 Pit Sump	14679/2 13/06/2023 Stage 2 West Sediment	14679/3 13/06/2023 Stage 2 West Pit Sump	14679/4 13/06/2023 Stage 2 East Sediment Dam	14679/5 13/06/2023 Basin 1 - Mod 1
Date Tested	--	--	14/06/2023	14/06/2023	14/06/2023	14/06/2023	14/06/2023
Total Suspended Solids	AS3550.4	mg/L	20	10	7	14	18

Solids		Lab ID Sample Date Sample ID Units	14679/6 13/06/2023 Basin 4
Date Tested	--	--	14/06/2023
Total Suspended Solids	AS3550.4	mg/L	9

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 : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 14679

Date Issued: 16/06/2023

Revision No: 00

Sampling Conditions: Cloudy, 14°- 20°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
14679/1	Stage 1 Pit Sump		T & D.Walker	13/06/2023 9:34 AM	AS5667.4 Lake, Grab	AS5667.1
14679/2	Stage 2 West Sediment		T & D.Walker	13/06/2023 12:37 PM	AS5667.4 Lake, Grab	AS5667.1
14679/3	Stage 2 West Pit Sump		T & D.Walker	13/06/2023 12:24 PM	AS5667.4 Lake, Grab	AS5667.1
14679/4	Stage 2 East Sediment Dam		T & D.Walker	13/06/2023 11:21 AM	AS5667.4 Lake, Grab	AS5667.1
14679/5	Basin 1 - Mod 1		T & D.Walker	13/06/2023 12:03 PM	AS5667.4 Lake, Grab	AS5667.1
14679/6	Basin 4		T & D.Walker	13/06/2023 11:46 AM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
14679/1	Stage 1 Pit Sump			No flow
14679/2	Stage 2 West Sediment			
14679/3	Stage 2 West Pit Sump			
14679/4	Stage 2 East Sediment Dam			
14679/5	Basin 1 - Mod 1			No flow
14679/6	Basin 4			

Sampling procedures have been approved and report finalised on 16/06/2023.

Where method is "unknown" sampling procedures are not endorsed

Appendix D – Noise Compliance Reports

Dixon Sand (No.1) Pty Ltd

Haerses Road Quarry, Maroota

Noise monitoring report
December 2022

Doc no. 19020-NV-RP-9-0





Dixon Sand (No.1) Pty Ltd
Haerses Road Quarry, Maroota

Title	Noise monitoring report
Document no.	19020-NV-RP-9-0
Revision	0
Date	21 January 2022
Author	John Hutchison
Reviewer	Scott Hughes

Hutchison Weller Pty Ltd
ABN 37 001 024 095
13/357 Military Road
Mosman NSW 2008

www.hutchisonweller.com

Revision history

0	21 January 2022	Draft report to client
---	-----------------	------------------------



Table of Contents

Definition of terms..... ii

1. Introduction..... 1

2. Noise compliance criteria 3

3. Monitoring methodology..... 4

4. Monitoring results 5

4.1 Attended measurements..... 5

4.2 Modifying factors..... 5

4.3 Extrapolated measurements 8

4.4 Compliance summary 8



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	<p>L_{A90} – The A-weighted sound pressure level exceeded 90% of the monitoring period. This is considered to represent the background noise.</p> <p>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.</p> <p>L_{A1} – The A-weighted sound pressure level exceeded 1% of the monitoring period.</p> <p>L_{Amax} – The maximum A-weighted noise level associated with the measurement period.</p> 
RBL	The Rating Background Level for each period is the medium value of the ABL values for the period over all 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)	<p>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.</p> <p>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 $20 \mu\text{Pa}$ equivalent to 0 dB).</p>
Tonal noise	Noise with perceptible and definite pitch or tone



1. Introduction

Dixon Sand (No.1) Pty Ltd operates the Haerses Road Quarry in Maroota, NSW (the Quarry). The Quarry is located off Wisemans Ferry Road, as illustrated in Figure 1.

Operations at the quarry include extraction of sand and sandstone blocks, processing by screening and grading and loading of trucks for shipment.

The Quarry operates under Development Consent DA 165-7-2005 and Environment Protection Licence (EPL) 12513, which set noise limits for its operation. Extraction in the areas described in Modification 1 of the development consent and utilisation of the processing plant area commenced in December 2019 and require attended noise monitoring 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 7 December 2022.

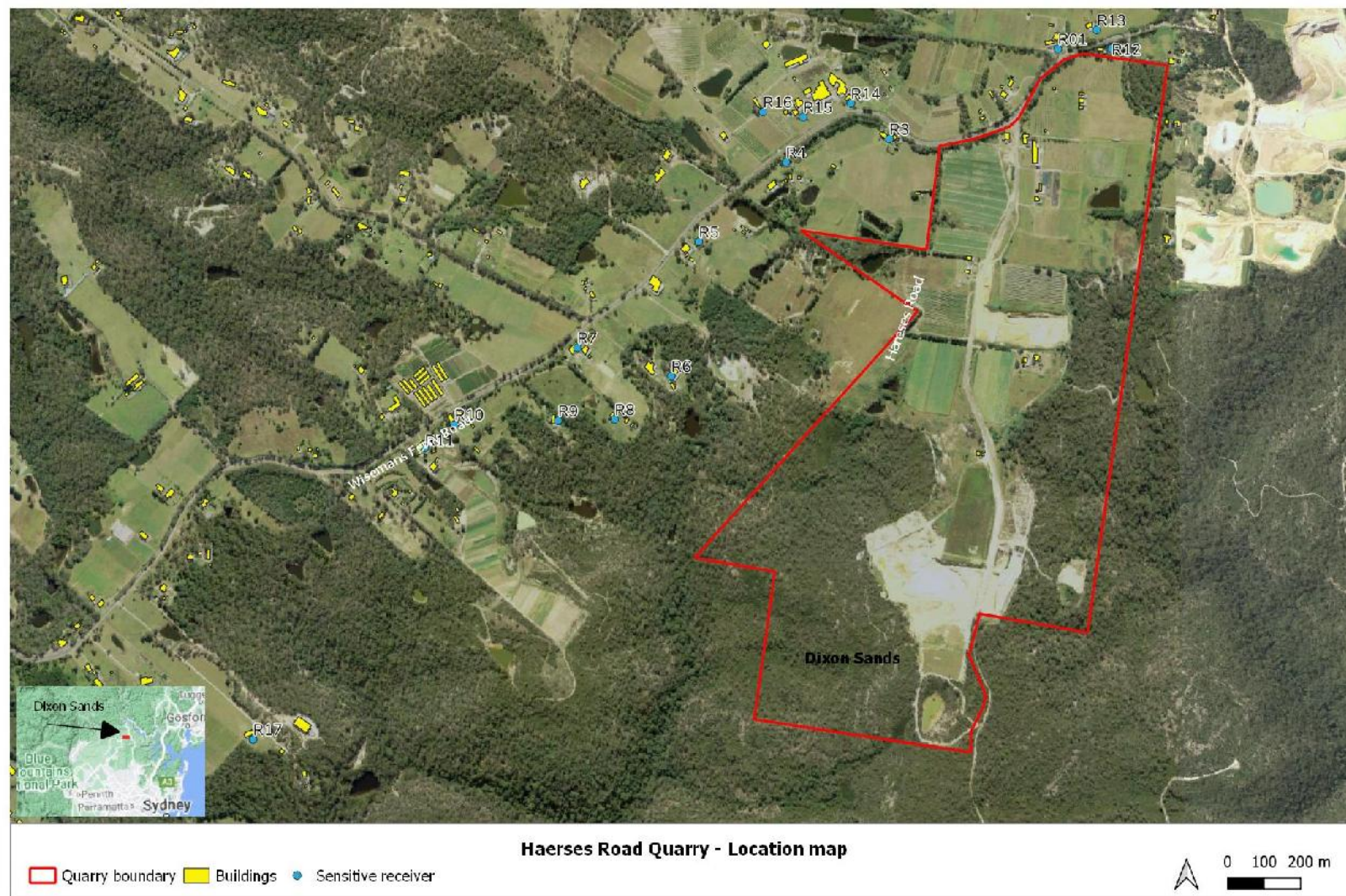


Figure 1 Location of the Quarry

2. Noise compliance criteria

Conditions 1 and 2 of Schedule 3 of development consent DA 165-7-2005 outline the Quarry operating hours and condition 3 defines the noise criteria for compliance.

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, loading and dispatch	6.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays
Acoustic bund construction and road and intersection works on Haerses Road and Wisemans Ferry Road	8.00 am to 5.00 pm Monday to Friday. At no time on Saturdays, Sundays, or public holidays
Maintenance	At any time, provided that these activities are not audible at any privately-owned residence outside of permissible hours for quarrying operations.

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 (excluding acoustic bund construction) does not exceed the criteria in Table 2 at any residence on privately-owned land.

Table 2 Noise criteria dB(A)

Receiver	Day	Shoulder (6.00 am to 7.00 am)	
	LAeq (15 minute)	LAeq (15 minute)	LAmix
R05, R06	41	35	52
R03	40	37	
R13, R14	40	36	
All other receivers	40	35	

Noise generated by the development must be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the NSW Noise Policy for Industry.

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.

Agreements are currently in place between Dixon Sand and adjacent private landowners including:

- Residential receivers identified as R2 and R12 in the planning consent and
- All identified receivers to the east of Haerses Road quarry on Hitchcock Road



3. Monitoring methodology

Operator-attended noise monitoring was undertaken on 7 December 2022 by John Hutchison of Hutchison Weller, an independent acoustic specialist. Monitoring locations included those described in the Quarry Noise Management Plan, as illustrated in Figure 1 and summarised in Table 3.

Table 3 Monitoring locations

Receiver	Address	Description
R3	1643 Wisemans Ferry Road	Private residence adjacent plant nursery
R4	1617 Wisemans Ferry Road	No access granted – levels extrapolated instead
R6	1543 Wisemans Ferry Road	Private residence. Monitoring conducted on the southeastern side of the residence facing the quarry.
R8	1521 Wisemans Ferry Road	Private residence. Monitoring conducted at boundary between R7 and R8 since no access granted to R8.
HAS1	Haerses Road Quarry	Close to equipment within Haerses Road boundary

Monitoring was conducted in general accordance with 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 2024.

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 was recorded during each monitoring period adjacent to the Maroota public school, including wind speed, direction, temperature, relative humidity, and sigma-theta (to establish the Pascall-Guifford stability category). This data was used to establish whether meteorological conditions were suitable for monitoring.

Where extraneous noise such as road traffic or insects 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. This involved extrapolation from the near-distance location to the sensitive receiver location.



4. Monitoring results

4.1 Attended measurements

Results of noise monitoring for each location are presented in Table 4.

The main sources of noise from quarry operations were sand processing and truck loading (screening, front end loaders, trucks) and rock grinding and sawing.

In all cases, the Haerses Road quarry was compliant with the project noise objectives.

Quarry operations were inaudible at all residential receivers prior to 7am, with traffic noise in all cases the dominant source of noise. No L_{Amax} noise levels were attributable to the quarry in the shoulder period.

During the day period, quarry noise was inaudible at all monitoring 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 pressure 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 4.3.

4.2 Modifying factors

No tonal, impulsive, or low frequency noise characteristics were observed at any residential monitoring location during the monitoring period. Therefore, application of modifying factors is not appropriate in this instance.



Table 4 Monitoring results

Monitoring period	Time	Location	Noise criterion	Measured 15-minute noise level			Estimated LAeq, 15 min quarry contribution	Observations	Meteorological conditions
				LAeq	LA90	LAmix			
Shoulder (6.00am to 7.00am)	6:01AM	R3	37	50.1	37.4	63.5	<35	Traffic on Wisemans Ferry Road is dominant source of noise with pass-bys of around 56 – 59 dBA. No quarry-related activity audible. No LAmix attributable to the quarry.	Calm to light breeze from N - NNW @ 3 – 9 km/h Temperature 15°C Clear sky Mostly extremely unstable conditions (A class)
	6:23 AM	R6	35	42.4	37.3	56.5	<35	Distant road traffic ~48-49 dBA Breaks in traffic drops to ~38-39 dBA and local creek audible at this level Birdsong Quarry inaudible.	
	6.47 AM	R7 (R8)	35	47.0	38.5	70.6	<35	Traffic on Wisemans Ferry Road is dominant source of noise ~ 44-48 dBA for light vehicles Around 53 dBA for trucks No quarry-related activity audible. Birds ~ 70.6 dBA - Lmax No LAmix values attributable to the quarry	
Day (7.00am to 6.00pm)	7:30 AM	Various locations around quarry	N/A	56	-	-	56	2 x excavator working on stock pile in northern pit – SWL 102 dBA	Calm to light breeze from - NW @ 1 – 9 km/h Temperature 17-19°C Clear sky Extremely unstable conditions (A class)
	7:40 AM			62	-	-	62	Rock saw operating 60 metres from measurement point: 62 dBA, SWL 105 dBA Twin head grinder at 40 metres. Twin head alone ~ 61-63 dBA, SWL ~ 102-104 dBA	
	8.00am			68	-	-	68	36 tonne excavator loading moxy @ 22m	
	8:15 AM			56	-	-	56	Saw operating in southern pit, 120 m from microphone, includes cut, idle, move cycles. SWL ~ 105-106 dBA	
	8:30 AM			62	-	-	62	Screen in central processing area from 40 metres, SWL ~ 103 dBA	



Monitoring period	Time	Location	Noise criterion	Measured 15-minute noise level			Estimated LAeq, 15 min quarry contribution	Observations	Meteorological conditions
				LAeq	LA90	LAmx			
	8:56 AM	R3	40	47.1	37.6	60.2	<40	Quarry inaudible. Wisemans Ferry Road dominant with light and heavy vehicles at 53-54 dBA (HV) and 47-48 (LV).	Calm to light breeze from N - W @ 2 – 6 km/h Temperature 20-21°C Clear sky Extremely unstable conditions (A class)
	9:15 AM	R6	41	-	-	-	-	Gate locked and location not accessible this time.	
	9:35 AM	R8	40	42.6	35.2	60.8	<40	Traffic on Wisemans Ferry Road dominant with light and heavy vehicles at 60 dBA (HV) and 44-47 (LV). Quarry inaudible Insects and birds vary between 40 and 60 dBA	



4.3 Extrapolated measurements

A conclusive noise level attributable to the Quarry was not possible in all locations due to ambient noise levels affected by road traffic and other ambient sounds. Therefore, measurements captured on-site without substantial influence from this source were used to calculate sound pressure levels at each receiver.

Calculations were based on 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.

Based on measurements described in Table 4, extrapolated noise results for each receiver are presented in Table 5. Results are shown for all equipment operating (screen / loader and rock saw/twin head).

Extrapolated results demonstrate the Quarry is compliant with the criteria for shoulder and daytime operations when all observed equipment is operating.

Table 5 Extrapolated monitoring results

Receiver	Noise criteria	Extrapolated noise level, LAeq, 15 minute	Comment
R12	40	31	Predicted levels correlate well with measured levels and all locations shown to comply with noise limits.
R3	40	35	
R4	40	36	
R6	41	37	
R7	40	35	
R8	40	37	
All other receivers	40	See Figure 2	

4.4 Compliance summary

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

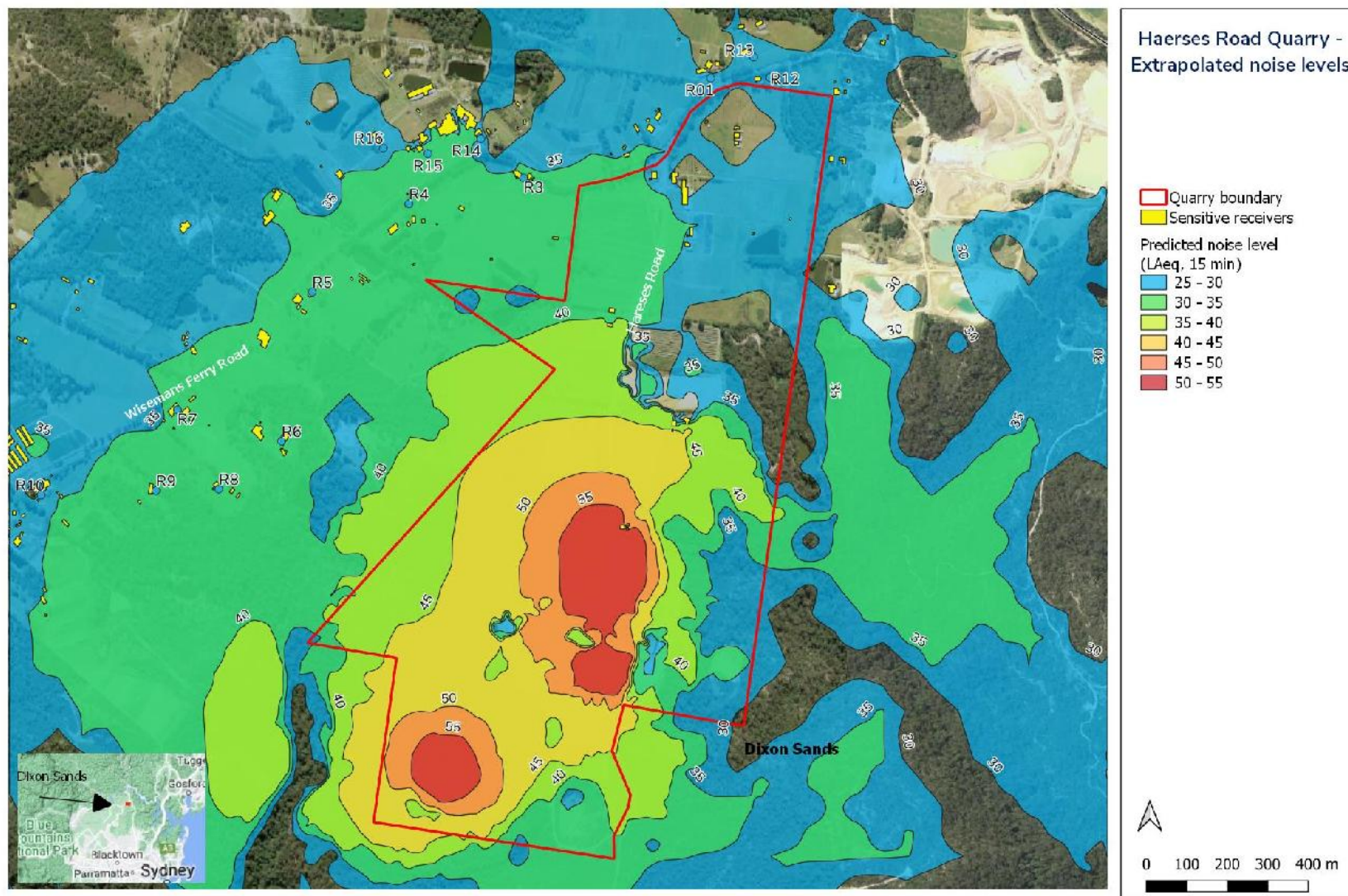


Figure 2 Extrapolated noise levels from Haerses Road quarry based on on-site measurements.

Dixon Sand (No.1) Pty Ltd

Haerses Road Quarry, Maroota

Noise monitoring report
June 2023

Doc no. 19020-NV-RP-13-0





Dixon Sand (No.1) Pty Ltd
Haerses Road Quarry, Maroota

Title	Noise monitoring report
Document no.	19020-NV-RP-13-0
Revision	0
Date	15 September 2023
Author	John Hutchison
Reviewer	Scott Hughes

Hutchison Weller Pty Ltd
ABN 37 001 024 095
13/357 Military Road
Mosman NSW 2008

www.hutchisonweller.com

Revision history

0	15 September 2022	Draft report to client
---	-------------------	------------------------



Table of Contents

Definition of terms..... ii

1. Introduction..... 1

2. Noise compliance criteria 3

3. Monitoring methodology..... 4

4. Monitoring results 5

4.1 Attended measurements..... 5

4.2 Modifying factors..... 5

4.3 Extrapolated measurements 9

4.4 Compliance summary 10



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	<p>L_{A90} – The A-weighted sound pressure level exceeded 90% of the monitoring period. This is considered to represent the background noise.</p> <p>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.</p> <p>L_{A1} – The A-weighted sound pressure level exceeded 1% of the monitoring period.</p> <p>L_{Amax} – The maximum A-weighted noise level associated with the measurement period.</p> 
RBL	The Rating Background Level for each period is the medium value of the ABL values for the period over all 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)	<p>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.</p> <p>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).</p>
Tonal noise	Noise with perceptible and definite pitch or tone



1. Introduction

Dixon Sand (No.1) Pty Ltd operates the Haerses Road Quarry in Maroota, NSW (the Quarry). The Quarry is located off Wisemans Ferry Road, as illustrated in Figure 1.

Operations at the quarry include extraction of sand and sandstone blocks, processing by screening and grading and loading of trucks for shipment.

The Quarry operates under Development Consent DA 165-7-2005 and Environment Protection Licence (EPL) 12513, which set noise limits for its operation. Extraction in the areas described in Modification 1 of the development consent and utilisation of the processing plant area commenced in December 2019 and require attended noise monitoring 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 7 June 2023.

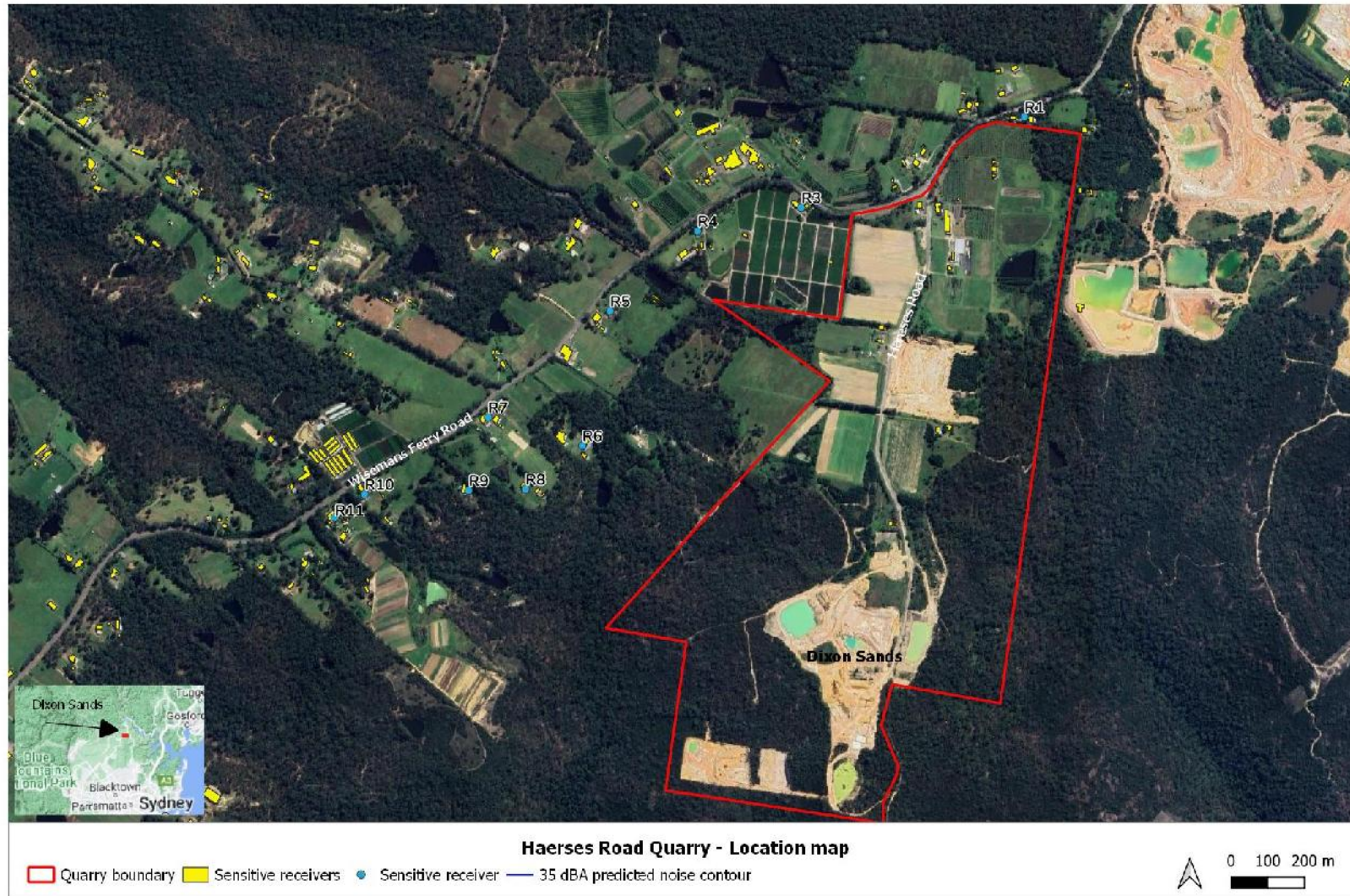


Figure 1 Location of the Quarry

2. Noise compliance criteria

Conditions 1 and 2 of Schedule 3 of development consent DA 165-7-2005 outline the Quarry operating hours and condition 3 defines the noise criteria for compliance.

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, loading and dispatch	6.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays
Acoustic bund construction and road and intersection works on Haerses Road and Wisemans Ferry Road	8.00 am to 5.00 pm Monday to Friday. At no time on Saturdays, Sundays, or public holidays
Maintenance	At any time, provided that these activities are not audible at any privately-owned residence outside of permissible hours for quarrying operations.

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 (excluding acoustic bund construction) does not exceed the criteria in Table 2 at any residence on privately-owned land.

Table 2 Noise criteria dB(A)

Receiver	Day	Shoulder (6.00 am to 7.00 am)	
	LAeq (15 minute)	LAeq (15 minute)	LAmix
R05, R06	41	35	52
R03	40	37	
R13, R14	40	36	
All other receivers	40	35	

Noise generated by the development must be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the NSW Noise Policy for Industry.

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.

Agreements are currently in place between Dixon Sand and adjacent private landowners including:

- Residential receivers identified as R2 and R12 in the planning consent and
- All identified receivers to the east of Haerses Road quarry on Hitchcock Road



3. Monitoring methodology

Operator-attended noise monitoring was undertaken on 7 June 2023 by John Hutchison of Hutchison Weller, an independent acoustic specialist. Monitoring locations included those described in the Quarry Noise Management Plan, as illustrated in Figure 1 and summarised in Table 3.

Table 3 Monitoring locations

Receiver	Address	Description
R3	1643 Wisemans Ferry Road	Private residence adjacent plant nursery
R4	1617 Wisemans Ferry Road	No access granted – levels extrapolated instead
R6	1543 Wisemans Ferry Road	Private residence. Monitoring conducted on the southeastern side of the residence facing the quarry.
R8	1521 Wisemans Ferry Road	Private residence. Monitoring conducted at boundary between R7 and R8 since no access granted to R8.
HAS1	Haerses Road Quarry	Close to equipment within Haerses Road boundary

Monitoring was conducted in general accordance with 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 2024.

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 was recorded during each monitoring period adjacent to the Maroota public school, including wind speed, direction, temperature, relative humidity, and sigma-theta (to establish the Pascall-Guifford stability category). This data was used to establish whether meteorological conditions were suitable for monitoring.

Where extraneous noise such as road traffic or insects 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 outlines in Noise Policy for Industry. This involved extrapolation from the near-distance location to the sensitive receiver location.



4. Monitoring results

4.1 Attended measurements

Results of noise monitoring for each location are presented in Table 4.

The main sources of noise from quarry operations were sand processing and truck loading (screening, front end loaders, trucks) and rock grinding and sawing.

In all cases, the Haerses Road quarry was compliant with the project noise objectives.

Quarry operations were inaudible at all residential receivers prior to 7am, with traffic noise in all cases the dominant source of noise. No L_{Amax} noise levels were attributable to the quarry in the shoulder period.

During the day period, quarry noise was inaudible at all monitoring locations.

On-site measurements were taken to determine the noise level of various noise sources without the influence of traffic noise. Measurements were undertaken to establish representative sound pressure 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 4.3.

4.2 Modifying factors

No tonal, impulsive, or low frequency noise characteristics were observed at any residential monitoring location during the monitoring period. Therefore, application of modifying factors is not appropriate in this instance.

Table 4 Monitoring results

Monitoring period	Time	Location	Noise criterion	Measured 15-minute noise level			Estimated LAeq, 15 min quarry contribution	Observations	Meteorological conditions
				LAeq	LA90	LAmax			
At-receiver measurements									
Shoulder (6.00am to 7.00am)	6:02 AM	R3	37	48.1	37.9	57.4	<35	Traffic on Wisemans Ferry Road is dominant source of noise with pass-bys of around 54 – 58 dBA for HV and 42-47 dBA for LV. Trucks visible as they queue on Haerses Road but inaudible. No quarry-related activity audible. No LAmax attributable to the quarry.	Calm to light breeze from NE @ 1–2 km/h Temperature 11-12°C Clear sky Slightly to Extremely unstable conditions (A to C class)
	6:24 AM	R6	35	42.7	37.9	57.4	<35	Distant road traffic ~43-46 dBA Breaks in traffic drops to ~37 dBA and local creek audible at this level Birdsong/kookaburras ~ 52-56 dBA Barely audible intermittent banging from quarry direction and faint engine noise ~ 35 dBA for short duration	
	6.49 AM	R7 (R8)	35	49.2	39.9	62.7	<35	Traffic on Wisemans Ferry Road is dominant source of noise ~ 43-54 dBA Some engine noise faintly audible 2 -3 times in 15 minutes ~ <41-42 dBA Birds ~ 55-60 dBA - Lmax No LAmax values attributable to the quarry	

Monitoring period	Time	Location	Noise criterion	Measured 15-minute noise level			Estimated LAeq, 15 min quarry contribution	Observations	Meteorological conditions
				LAeq	LA90	LAmx			
Day (7.00am to 6.00pm)	7:19 AM	R3	40	49.5	41.3	61.3	<40	Visual confirmation operations commenced. Wisemans Ferry Road remains dominant noise source at 56-59 dBA for HVs and 44-47 dBA for LVs Quarry inaudible over traffic Some faint engine noise audible for short duration ~ 40 dBA but quickly masked again by traffic Traffic dropped away for around 5 seconds on a couple of occasions and quarry was not audible. Faint tonal reverse alarms audible from time to time.	Calm to light breeze from ENE to SE @ 1-3 km/h Temperature 12°C Clear sky Neutral to Extremely unstable conditions (A to D class)
	7:41 AM	R6	41	41.7	39	56.3	<41	Engine noise audible and steady ~ 36-37 dBA Creek around 36 – 37 dBA Occasional bangs faintly audible Traffic on Wisemans Ferry Road relatively quiet in this location – sheltered by house and topography ~ 46 dBA Birds responsible for Lmax ~ 56 dBA No low frequency or tonal characteristics Reverse beepers faintly audible Excavator tracking audible for a brief time ~ 35 dBA	
	8:06 AM	R8	40	47.9	40.6	65.9	<40	Traffic on Wisemans Ferry Road ~ 42-44 for LV and 52-57 dBA for HVs. Rooster crow 55-61 dBA Quarry noise is faintly audible when traffic is quiet – less than 40 dBA Intermittent noises such as bucket bang and excavator tracking	



Monitoring period	Time	Location	Noise criterion	Measured 15-minute noise level			Estimated LAeq, 15 min quarry contribution	Observations	Meteorological conditions
				LAeq	LA90	LAmaz			
Onsite measurements									
Onsite	8:54 AM	OAS1	N/A	62.9	58.6	75.7	-	Northwest corner of sandstone cutting area. Excavation results in 5-8 metre noise barriers between equipment and receivers. Operating equipment included 35 tonne excavator loading moxy, FEL pushing sand, telehandler collecting blocks	Calm to light breeze from SE @ 1 – 2 km/h Temperature 13-15°C Clear sky Extremely unstable conditions (A class)
	9:36 AM	OAS2a		72.0	67.9	78.6	-	Southern boundary of sand excavation. Large excavator loading moxy ~ 72 dBA. Only equipment operating at the time.	
	9:40 AM	OAS2b		71	62.2	88.6	-	2 excavators operating in this cell. 1 is ripping and the other is loading a spoil truck. 88 dBA while scraping, engine noise of combined machines 70 dBA Single machine engine noise 67 dBA	
	9:52 AM	OAS3		72.0	70.9	78.6	-	Excavator loading a screen with FEL handling spoil piles. Screen is steady noise at 70-71 dBA	
	10:02 AM	OAS4		72.8	72.4	75.1	-	Screen in central processing area 73 dBA @ 13 metres – steady noise source	
	10:12 AM	OAS5		76.0	75.5	78.7	-	Crushing plant in centre of processing area 76 dBA @ 35 metres. Excavator loading machine is inaudible.	

4.3 Extrapolated measurements

A conclusive noise level attributable to the Quarry was not possible in all locations due to ambient noise levels affected by other ambient sounds including road traffic. Therefore, measurements captured on-site without substantial influence from traffic were used to calculate sound pressure levels at each receiver.

Based on observations close to the quarry and processing area, the following plant and equipment was in use during the monitoring period. 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. See Figure 2 for work locations.

1. Processing plant – 2 screens, crusher, front end loader, moxies, haulage trucks
2. Quarry -
 - Area 1: Saw, FEL, Excavator and haul truck, excavator lifting blocks
 - Area 2: Excavator loading screen, FEL
 - Area 3: Excavator ripping stone, excavator loading truck
 - Area 4: Excavator working sand stockpile
 - Area 5: 2 blade saw



Haereses Road modelled work areas

- Quarry boundary
- Intermediate receiver
- Plant location
- Work area

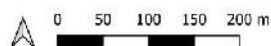


Figure 2 Work areas and noise sources included in the model



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.

Based on the above, modelled noise levels for each monitoring location are presented in Table 5. Results are shown for equipment operating in each quarry area and processing plant.

Table 5 Extrapolated monitoring results to intermediate measurement locations

Location	Modelled noise level, dBA	Measured noise level, LAeq, 15 minute, dBA
OAS1	63.7	62.9
OAS2	71.3	71.0
OAS3	71.7	72.0
OAS4	73.8	72.8

Based on measurements described in Table 4, extrapolated noise results for each receiver are presented in Table 6. Results are shown for all equipment operating.

Extrapolated results demonstrate the Quarry is compliant with the criteria for shoulder and daytime operations when all observed equipment is operating.

Table 6 Extrapolated monitoring results

Receiver	Noise criteria	Extrapolated noise level, LAeq, 15 minute	Comment
R3	40	37	All locations comply with noise limits.
R4	40	37	
R6	41	40	
R8	40	39	
All other receivers	40	See Figure 3	

4.4 Compliance summary

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

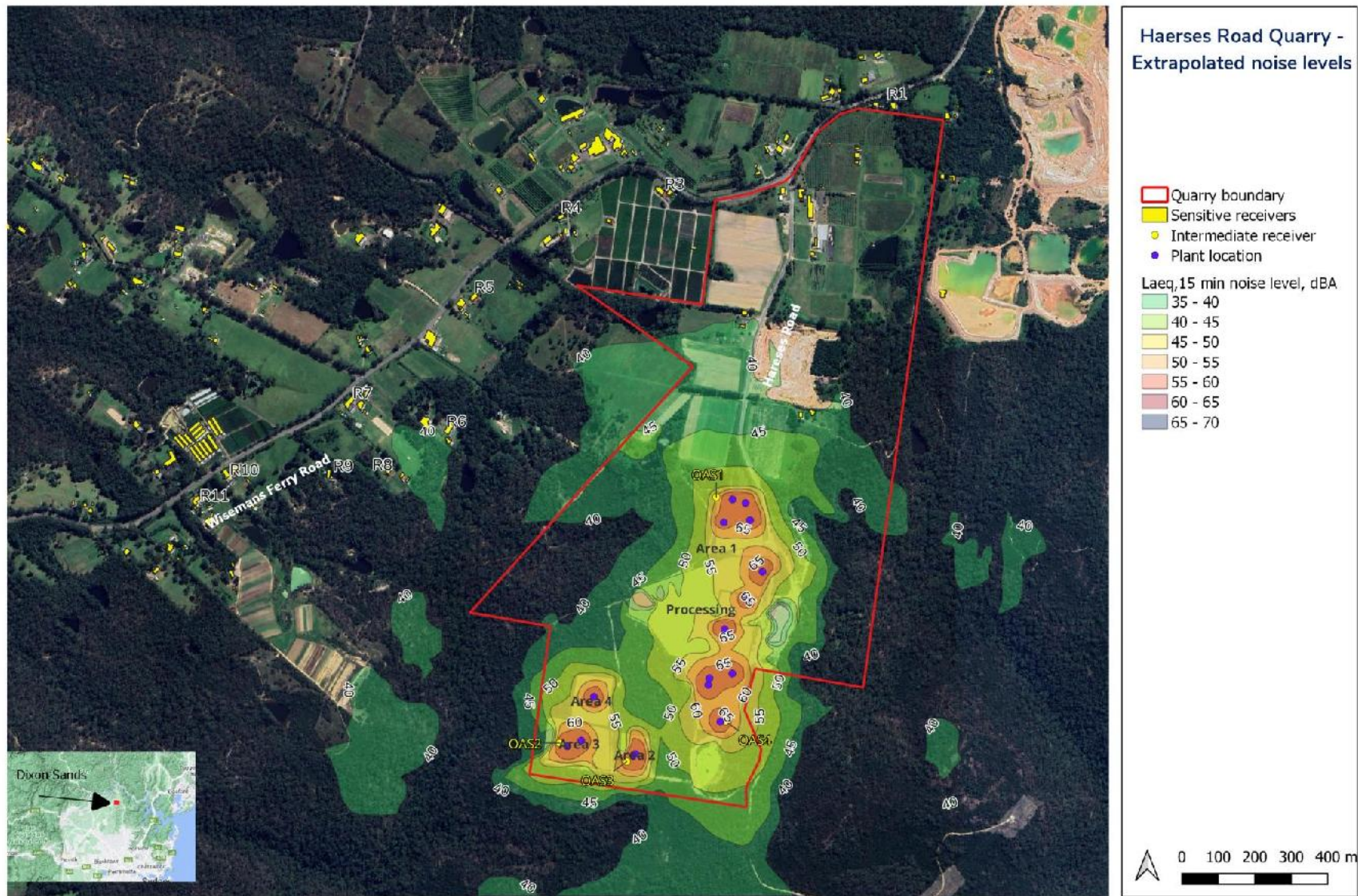


Figure 3 Extrapolated noise levels from Haerses Road quarry based on on-site measurements.



Appendix A. On-site measurements

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
35t excavator	2	102	92	96	93	100	100	107	108	108	114	107	103	103	97	95	96	95	91	94	92	92	91	89	88	88	84	83	79	77	72
Excavator popping stone	2	108	95	98	97	99	104	112	111	110	113	108	105	102	100	102	100	101	100	100	97	97	97	96	96	95	93	90	87	84	82
Noisy excavator	2	115	97	103	98	100	105	108	109	107	105	101	95	95	96	100	103	103	108	110	108	106	105	100	102	100	97	95	91	89	85
Two excavators	2	108	89	102	91	92	97	99	103	104	110	105	103	105	103	103	104	102	100	101	99	97	96	96	94	91	88	86	85	82	78
Excavator scraping	1	105	88	102	92	92	97	100	102	103	107	106	104	104	98	101	98	99	98	98	96	95	94	94	92	90	87	86	82	80	77
Screen with excavator loading	2	108	94	117	102	94	109	110	108	105	109	106	106	107	102	99	99	98	99	104	101	98	97	95	92	91	88	86	84	83	85
Washplant screen	2	105	104	98	105	97	104	105	104	107	107	97	103	107	96	98	92	93	95	93	94	95	95	95	92	92	91	92	88	86	84
Crusher	2	115	105	104	101	105	112	111	117	111	111	112	108	108	106	110	106	101	106	102	104	107	107	103	102	103	101	102	96	93	91
FEL load truck with rock	2	99	95	101	105	99	97	114	110	110	109	110	106	100	97	95	94	90	89	86	83	83	85	85	83	82	81	78	78	77	78
4 blade saw	1	109	87	91	89	92	95	104	102	103	102	100	99	103	98	99	103	104	100	100	101	101	99	96	94	92	88	86	83	80	76
2 blade saw	1	107	96	102	97	97	99	105	102	103	109	103	98	98	95	97	94	94	93	98	97	98	98	99	96	95	91	90	86	82	75

Appendix E – Monthly Site Inspection



HAERSES 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:		29/06/2023		
Inspection by:		Melissa Mass		
Measured monthly rainfall (mm)		31/05/2023 - 29/06/2023 Rainfall =		
	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 drains, basins etc clear		
Stockpiles located and maintained correctly	✓			
Tree clearance restricted to required area	N/A			
WATER QUALITY AND QUANTITY				
Monthly water quality samples collected from monitoring bores. Samples tested for pH and electrical conductivity	N/A			
Monthly surface water monitoring of the in-pit sump	✓			
6 monthly monitoring of groundwater quality at 13 bores	✓	undertaken by JAT		
Monthly depth measurement of all groundwater bores and comparison with rainfall	✓	undertaken on 29/06/2023		
Monthly inspection of drainage & sediment controls including water storages, pumps, pipes and dams' walls	✓			
Any Fuel or oil spills reported and maintained	✓	No spills recorded this period		
Fuels/chemicals stored in bunded areas	✓	EPA approved bunding		
AIR QUALITY				
Monitoring station (TEOM) and continuous automatic meteorological station are maintained and operating in the vicinity of the Maroota Public School	✓	TEOM and weather station managed by CBASED		
On site dust suppression	✓	use of water cart when required		

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	✓			
ROADS AND TRANSPORT				
Monthly inspection of haul roads, site access road and Haerses Road/site access road intersection	✓			
Weekly inspection of Haerses Road/site access road intersection and sand/clay removed as necessary	✓			
Continuous recording of the amount of quarry products transported from the site and total truck movements	✓	Refer to truck records		
Truck movements have not exceeded 56 per day, or 20 between 6:00 am and 7:00 am	✓	Refer to Humpy to check		
Weighbridge/log book records retained and recorded	✓	Refer to truck records		
At the Channelised Right Hand turning lane located at the intersection of Wisemans Ferry Road and Haerses Road, for each month, undertake 1-hour duration monitoring during each of the peak periods below: <ul style="list-style-type: none"> 6:00 – 7:00 am, 8:00 – 9:00 am, and 3:00 – 4:00 pm Identify (when applicable) when haulage truck queuing in the right-hand turn lane into Haerses Road is exceeding the design capacity:	✓	6:00 – 7:00 am: Nil 8:00 – 9:00 am: Nil 3:00 – 4:00 pm: nil		observed by Ashleigh Harb Mark (wins officer) 23/06/23
REPORTING				
Complaints register maintained	✓	updated and published monthly		
Environmental incidents reported to EPA and DPIE	✓	no incidents to report		
Monitoring results and statements of compliance with Development Consent and EPL conditions provided in the Annual Review and EPL Annual Return	✓	submitted on the 5/10/2022		
Staff and Contractors undergo relevant environmental inductions. Sighting of training/induction records	✓			
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 – Truck Movement Data

Example of Monthly Summary of Morning Truck Data

Dixon Sand Haerses Road - Maroota Quarry Morning Trucks

MARCH 2023 6.00am - 7.00am				Daily Morning Truck No
Date	Time in	Docket No.	Tonnes	
1/03/2023	6.03	H1586M\1	39.00 t	2
1/03/2023	6.06	H1587M\1	20.20 t	
2/03/2023	6.03	H1617M\1	39.00 t	6
2/03/2023	6.06	H1618M\1	20.20 t	
2/03/2023	6.12	H1619M\1	38.50 t	
2/03/2023	6.17	H1620M\1	31.70 t	
2/03/2023	6.23	H1621M\1	31.50 t	
2/03/2023	6.38	H1622M\1	19.30 t	
3/03/2023	6.06	H1643M\1	39.00 t	6
3/03/2023	6.10	H1644M\1	38.00 t	
3/03/2023	6.17	H1645M\1	46.90 t	
3/03/2023	6.24	H1646M\1	38.00 t	
3/03/2023	6.49	H1648M\1	18.00 t	
3/03/2023	6.54	H1649M\1	43.20 t	
4/03/2023	6.08	H1676M\1	38.00 t	5
4/03/2023	6.21	H1677M\1	39.00 t	
4/03/2023	6.29	H1678M\1	38.00 t	
4/03/2023	6.38	H1679M\1	38.50 t	
4/03/2023	6.47	H1680M\1	37.50 t	
6/03/2023	6.05	H1690M\1	39.00 t	4
6/03/2023	6.07	H1691M\1	20.20 t	
6/03/2023	6.11	H1692M\1	28.50 t	
6/03/2023	6.55	H1693M\1	19.80 t	
7/03/2023	6.07	H1733M\1	39.00 t	6
7/03/2023	6.09	H1734M\1	20.20 t	
7/03/2023	6.14	H1735M\1	38.50 t	
7/03/2023	6.25	H1736M\1	38.50 t	
7/03/2023	6.29	H1737M\1	38.90 t	
7/03/2023	6.49	H1738M\1	10.80 t	4
8/03/2023	6.06	H1777M\1	39.00 t	
8/03/2023	6.08	H1778M\1	20.20 t	
8/03/2023	6.21	H1779M\1	37.40 t	
8/03/2023	6.38	H1780M\1	18.00 t	
9/03/2023	6.07	H1823M\1	39.00 t	8
9/03/2023	6.09	H1824M\1	20.20 t	
9/03/2023	6.15	H1825M\1	37.40 t	
9/03/2023	6.18	H1826M\1	38.00 t	
9/03/2023	6.24	H1827M\1	28.50 t	
9/03/2023	6.31	H1828M\1	32.00 t	
9/03/2023	6.37	H1829M\1	18.50 t	
9/03/2023	6.41	H1830M\1	11.00 t	
10/03/2023	6.04	H1858M\1	39.00 t	6
10/03/2023	6.10	H1859M\1	37.40 t	
10/03/2023	6.44	H1860M\1	10.80 t	
10/03/2023	6.48	H1861M\1	42.20 t	
10/03/2023	6.56	H1863M\1	14.00 t	
10/03/2023	6.57	H1862M\1	18.00 t	
11/03/2023	6.11	H1902M\1	38.50 t	2
11/03/2023	6.28	H1903M\1	38.00 t	
13/03/2023	6.03	H1918M\1	20.20 t	5
13/03/2023	6.07	H1919M\1	37.40 t	
13/03/2023	6.12	H1920M\1	38.00 t	
13/03/2023	6.17	H1921M\1	19.80 t	
13/03/2023	6.22	H1922M\1	28.50 t	
14/03/2023	6.04	H1945M\1	39.00 t	
14/03/2023	6.06	H1946M\1	20.20 t	
14/03/2023	6.10	H1947M\1	28.70 t	

14/03/2023	6.15	H1948M\1	32.00 t	
14/03/2023	6.20	H1949M\1	32.00 t	
14/03/2023	6.35	H1950M\1	14.30 t	
14/03/2023	6.32	H1951M\1	32.00 t	
14/03/2023	6.47	H1952M\1	38.50 t	8
15/03/2023	6.04	H1989M\1	39.00 t	
15/03/2023	6.10	H1990M\1	37.40 t	
15/03/2023	6.13	H1991M\1	20.20 t	
15/03/2023	6.21	H1992M\1	38.50 t	
15/03/2023	6.25	H1993M\1	37.40 t	
15/03/2023	6.33	H1994M\1	38.50 t	
15/03/2023	6.41	H1995M\1	38.00 t	
15/03/2023	6.45	H1996M\1	19.80 t	
15/03/2023	6.51	H1997M\1	18.00 t	
15/03/2023	6.56	H1998M\1	32.00 t	10
16/03/2023	6.05	H2039M\1	39.00 t	
16/03/2023	6.07	H2040M\1	20.20 t	
16/03/2023	6.16	H2041M\1	38.50 t	
16/03/2023	6.18	H2042M\1	21.00 t	
16/03/2023	6.20	H2043M\1	16.00 t	
16/03/2023	6.25	H2044M\1	38.60 t	
16/03/2023	6.48	H2045M\1	9.90 t	
16/03/2023	6.55	H2046M\1	14.00 t	8
17/03/2023	6.03	H2074M\1	39.00 t	
17/03/2023	6.10	H2075M\1	38.50 t	
17/03/2023	6.11	H2076M\1	28.70 t	
17/03/2023	6.16	H2077M\1	32.00 t	
17/03/2023	6.21	H2078M\1	38.50 t	
17/03/2023	6.27	H2079M\1	30.50 t	
17/03/2023	6.33	H2080M\1	20.20 t	7
18/03/2023	6.10	H2111M\2	19.50 t	
18/03/2023	6.24	H2112M\1	12.00 t	
18/03/2023	6.46	H2113M\1	28.20 t	3
20/03/2023	6.08	H2129M\1	39.00 t	
20/03/2023	6.10	H2130M\1	38.50 t	
20/03/2023	6.16	H2131M\1	37.30 t	
20/03/2023	6.14	H2132M\1	18.00 t	
20/03/2023	6.26	H2133M\1	38.50 t	
20/03/2023	6.46	H2134M\1	38.60 t	
20/03/2023	6.38	H2135M\1	16.00 t	7
21/03/2023	6.06	H2166M\1	39.00 t	
21/03/2023	6.09	H2167M\1	20.20 t	
21/03/2023	6.58	H2168M\1	16.00 t	3
22/03/2023	6.04	H2200M\1	39.00 t	
22/03/2023	6.07	H2201M\1	20.20 t	
22/03/2023	6.13	H2202M\1	28.80 t	
22/03/2023	6.19	H2203M\1	32.00 t	
22/03/2023	6.26	H2204M\1	17.50 t	
22/03/2023	6.31	H2205M\1	38.50 t	
22/03/2023	6.48	H2206M\1	14.00 t	
22/03/2023	6.51	H2207M\1	37.50 t	
22/03/2023	6.53	H2208M\1	19.80 t	
22/03/2023	6.57	H2209M\1	16.00 t	10
23/03/2023	6.02	H2252M\1	39.00 t	
23/03/2023	6.07	H2253M\1	20.20 t	
23/03/2023	6.23	H2254M\1	32.00 t	
23/03/2023	6.31	H2255M\1	37.80 t	
23/03/2023	6.59	H2256M\1	16.00 t	5
24/03/2023	6.04	H2289M\1	39.00 t	
24/03/2023	6.06	H2290M\1	20.20 t	
24/03/2023	6.10	H2291M\1	35.00 t	

24/03/2023	6.19	H2292M\1	32.00 t	
24/03/2023	6.32	H2293M\1	43.20 t	
24/03/2023	6.37	H2294M\1	37.40 t	6
25/03/2023	6.09	H2328M\1	16.80 t	
25/03/2023	6.47	H2329M\1	39.00 t	2
27/03/2023	6.03	H2339M\1	39.00 t	
27/03/2023	6.05	H2340M\1	20.20 t	
27/03/2023	6.12	H2341M\1	38.50 t	
27/03/2023	6.18	H2342M\1	38.50 t	
27/03/2023	6.46	H2343M\1	11.70 t	
27/03/2023	6.52	H2344M\1	30.40 t	6
28/03/2023	6.05	H2374M\1	39.00 t	
28/03/2023	6.08	H2375M\1	20.20 t	
28/03/2023	6.14	H2376M\1	38.50 t	
28/03/2023	6.19	H2377M\1	38.00 t	
28/03/2023	6.41	H2378M\1	40.00 t	
28/03/2023	6.52	H2379M\1	20.00 t	6
29/03/2023	6.05	H2413M\1	39.00 t	
29/03/2023	6.08	H2414M\1	20.20 t	
29/03/2023	6.14	H2415M\1	38.50 t	
29/03/2023	6.23	H2416M\1	38.50 t	
29/03/2023	6.24	H2417M\1	28.50 t	
29/03/2023	6.37	H2418M\1	39.00 t	
29/03/2023	6.57	H2419M\1	8.50 t	7
30/03/2023	6.05	H2441M\1	39.00 t	
30/03/2023	6.06	H2442M\1	20.20 t	
30/03/2023	6.19	H2444M\1	32.00 t	
30/03/2023	6.21	H2445M\1	20.00 t	
30/03/2023	6.23	H2446M\1	12.00 t	
30/03/2023	6.28	H2447M\1	37.40 t	
30/03/2023	6.34	H2448M\1	32.00 t	
30/03/2023	6.42	H2449M\1	40.00 t	
30/03/2023	6.58	H2450M\1	8.50 t	9
31/03/2023	6.03	H2472M\1	39.00 t	
31/03/2023	6.10	H2473M\1	38.90 t	
31/03/2023	6.11	H2474M\1	20.20 t	
31/03/2023	6.16	H2475M\1	38.50 t	
31/03/2023	6.21	H2476M\1	28.80 t	
31/03/2023	6.28	H2477M\1	38.50 t	
31/03/2023	6.31	H2478M\1	32.00 t	
31/03/2023	6.34	H2479M\1	19.80 t	
31/03/2023	6.41	H2480M\1	47.00 t	
31/03/2023	6.57	H2481M\2	18.00 t	10

**Max Daily Morning Truck
No (outbound)**

10

**Max Daily Morning Truck
No (in and outbound)**

20

Appendix G – Bush Regeneration Report



Dixon Sand (No.1) – Haerses Road
(Haerses Road DA 165-7-2005)



Annual Report

July 2022 – June 2023

Bush Regeneration Works

Author: Zoe Ridgway

Date finalised: 12/07/2023

CONTENTS

Introduction	3
Haerses Road Offset Site and (2009) Translocation Area	9
Scope.....	9
Resources – 142.5 Hours	10
Recommendations	10
Visual Buffer Screen – Wisemans Ferry Road	11
Scope.....	11
Resources – 85 Hours.....	11
Recommendations	12
APPENDIX	13
Weed Species Controlled at Haerses Rd	13
REgister of Herbicide records	14
Distribution of hours across management zones and monthly rainfall	14

INTRODUCTION

This report summarises the assisted bush regeneration work undertaken by Bush-it Pty Ltd for Dixon Sand (No.1) Pty Ltd between July 2022 and June 2023 in accordance with Haerses Road DA 165-7-2005. A total of 243 hours (\$14,538.69 excluding GST) were worked throughout the year with an average team size of four per visit.

Dixon Sand (No.1) Pty Ltd operate a mineral sand quarry on the Old Northern Road at Maroota, NSW. Under the Haerses Road DA 165-7-2005, Bush-it manages the vegetation of approximately 8.7 hectares on Haerses Road.

The Haerses Road (HR) offset is a strip of remnant native vegetation that is attached to the Haerses Road Biodiversity Offset Area. It is example of intact bushland with an area of rehabilitated open forest at the southern end herein referred to as the (2009) translocation area. The visual screen is a 30m wide vegetation buffer adjoining Wisemans Ferry Road. The vegetation at the Haerses Road offset site is managed under a biodiversity stewardship agreement between Dixon Sand and NSW Office of Environment and Heritage.

This agreement offers permanent protection for the native vegetation and any threatened species at Haerses Road. It also enables Dixon Sand to manage and enhance the biodiversity values of this land with the help of Bush-it Pty Ltd.

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

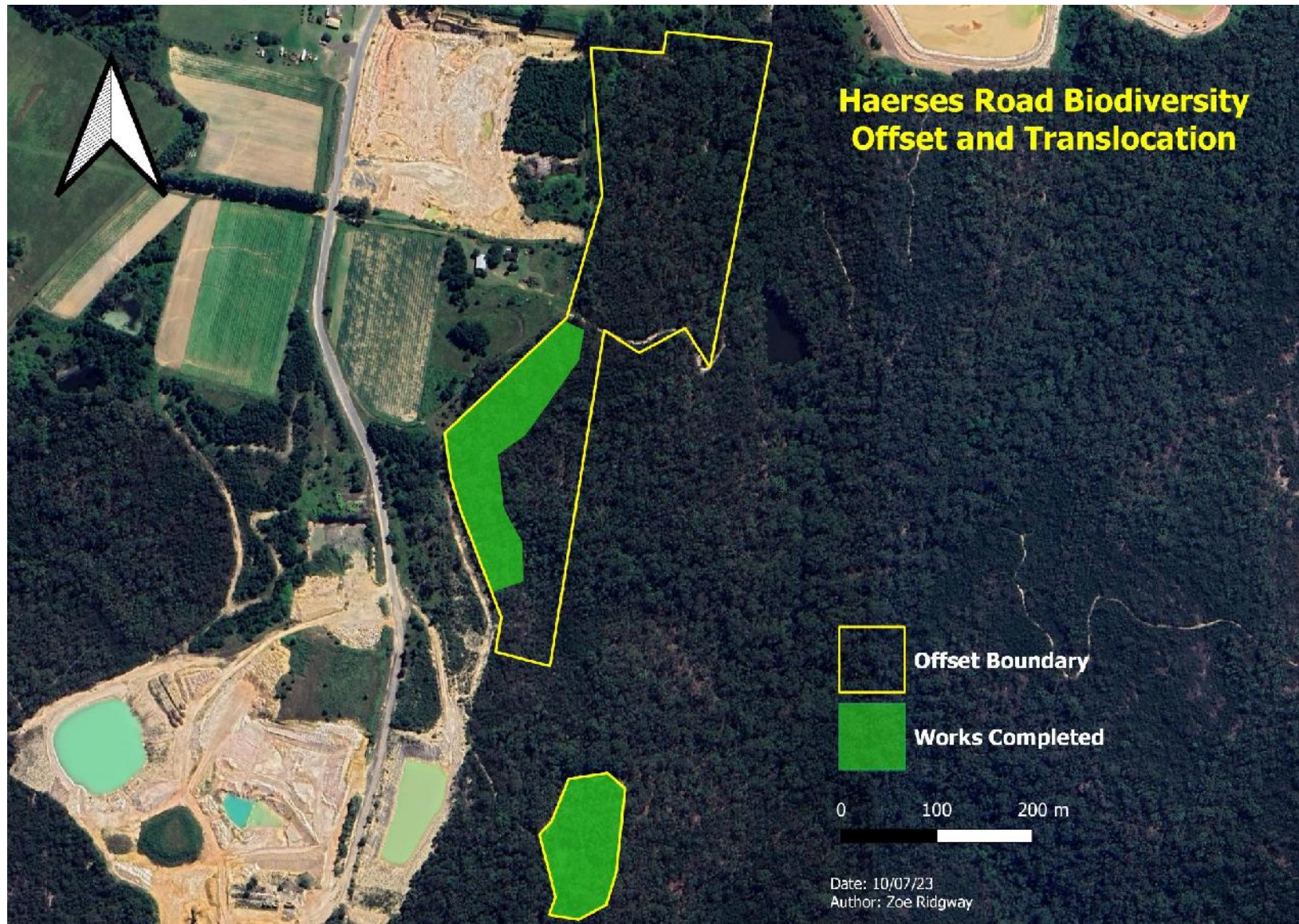


Figure 1 – Aerial photo illustrating the areas worked and overall biodiversity offset boundary

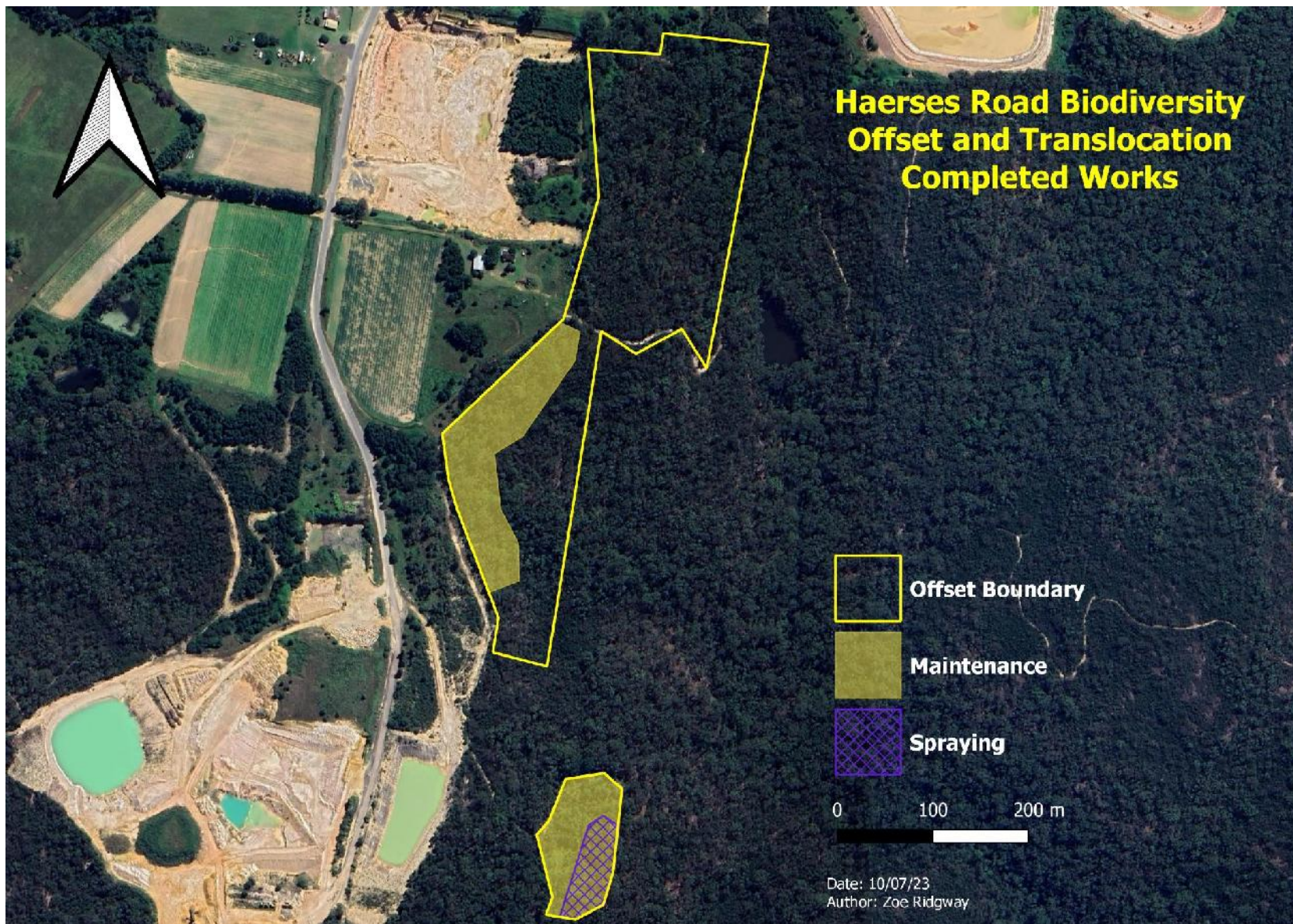


Figure 2 – Activities undertaken at Haerses Rd for 2022-2023.

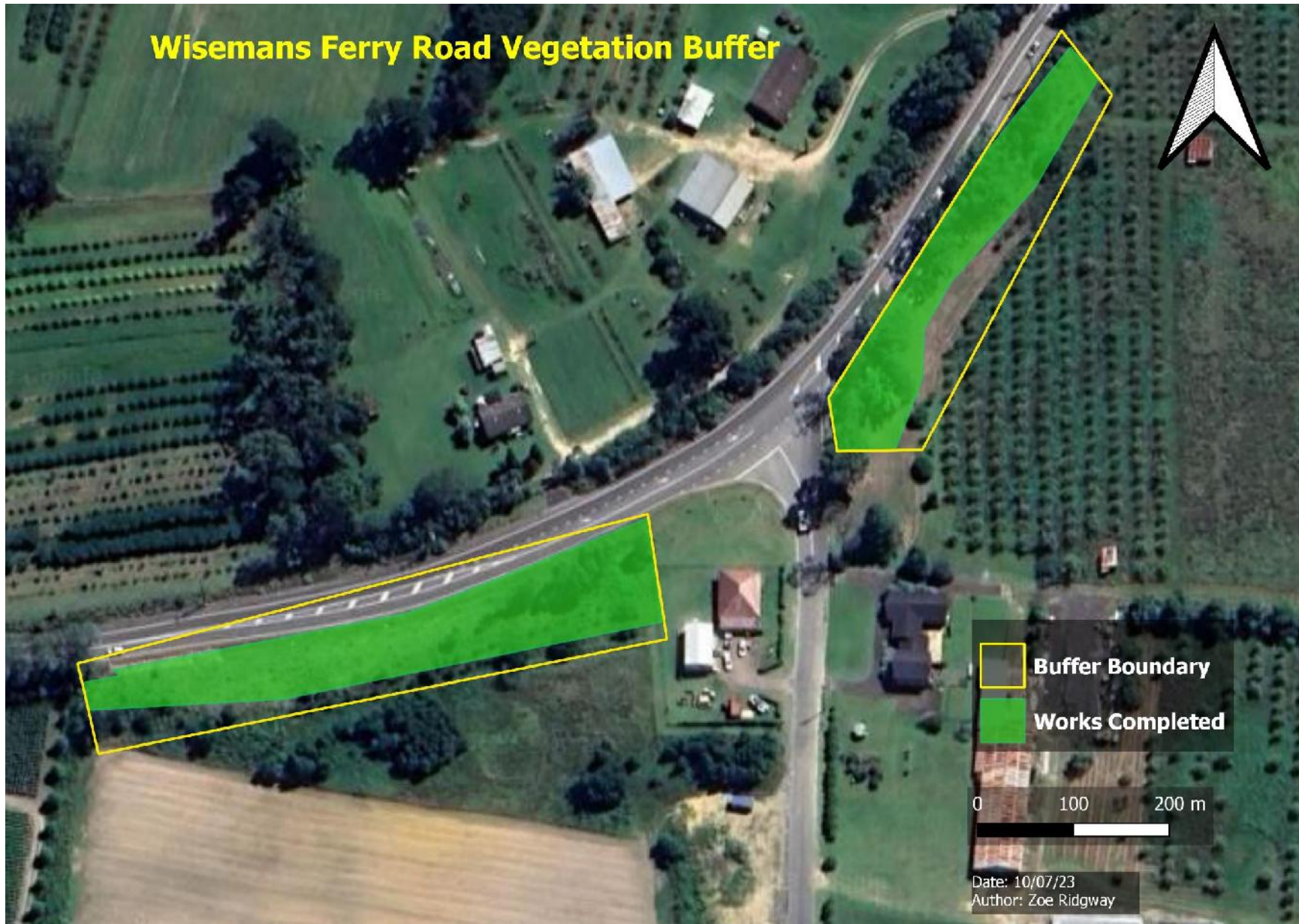


Figure 3 – Aerial photo illustrating the areas worked in the Wisemans Ferry Rd vegetation buffer

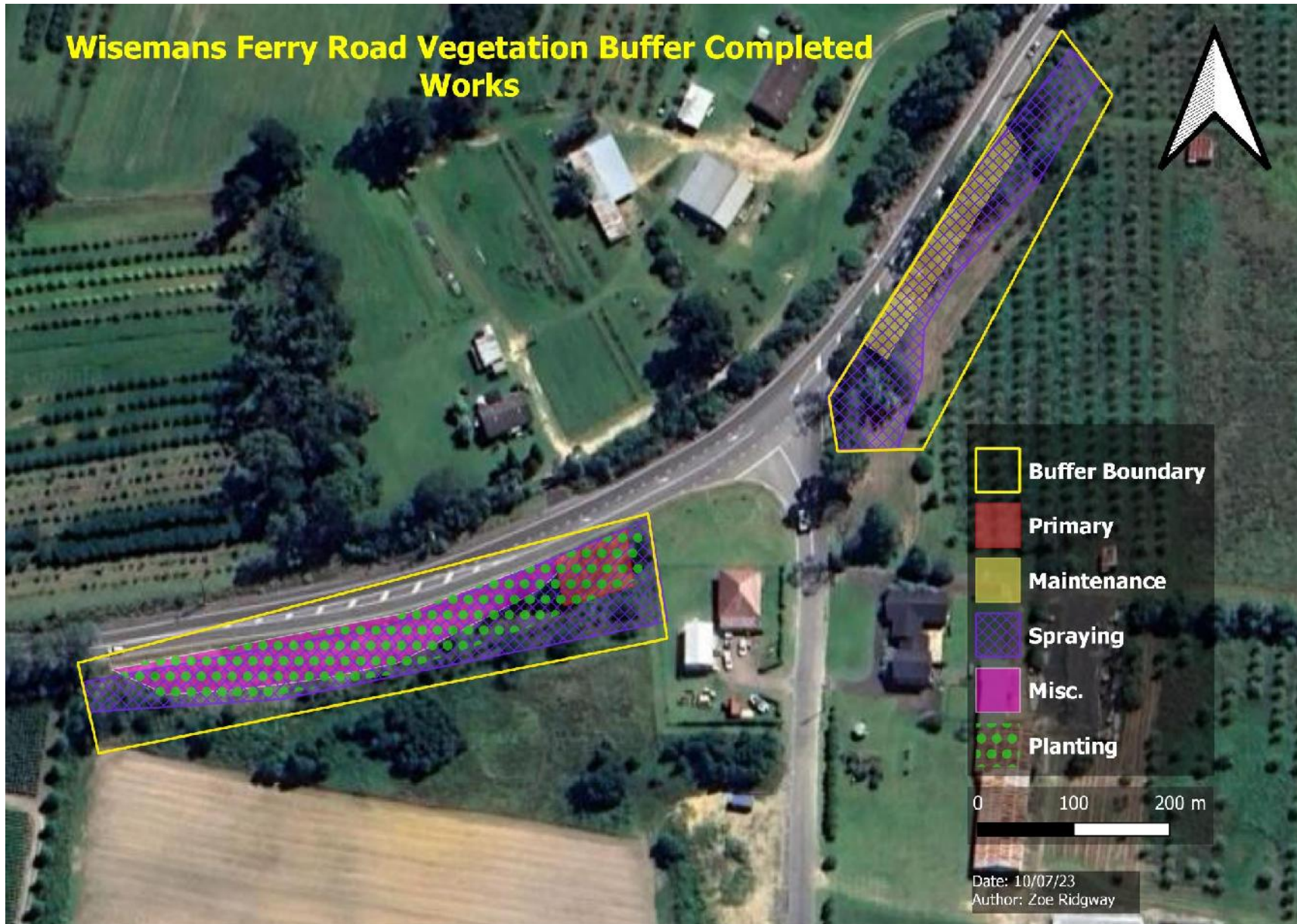


Figure 4 – Activities undertaken at Wisemans Ferry Road for 2022-2023

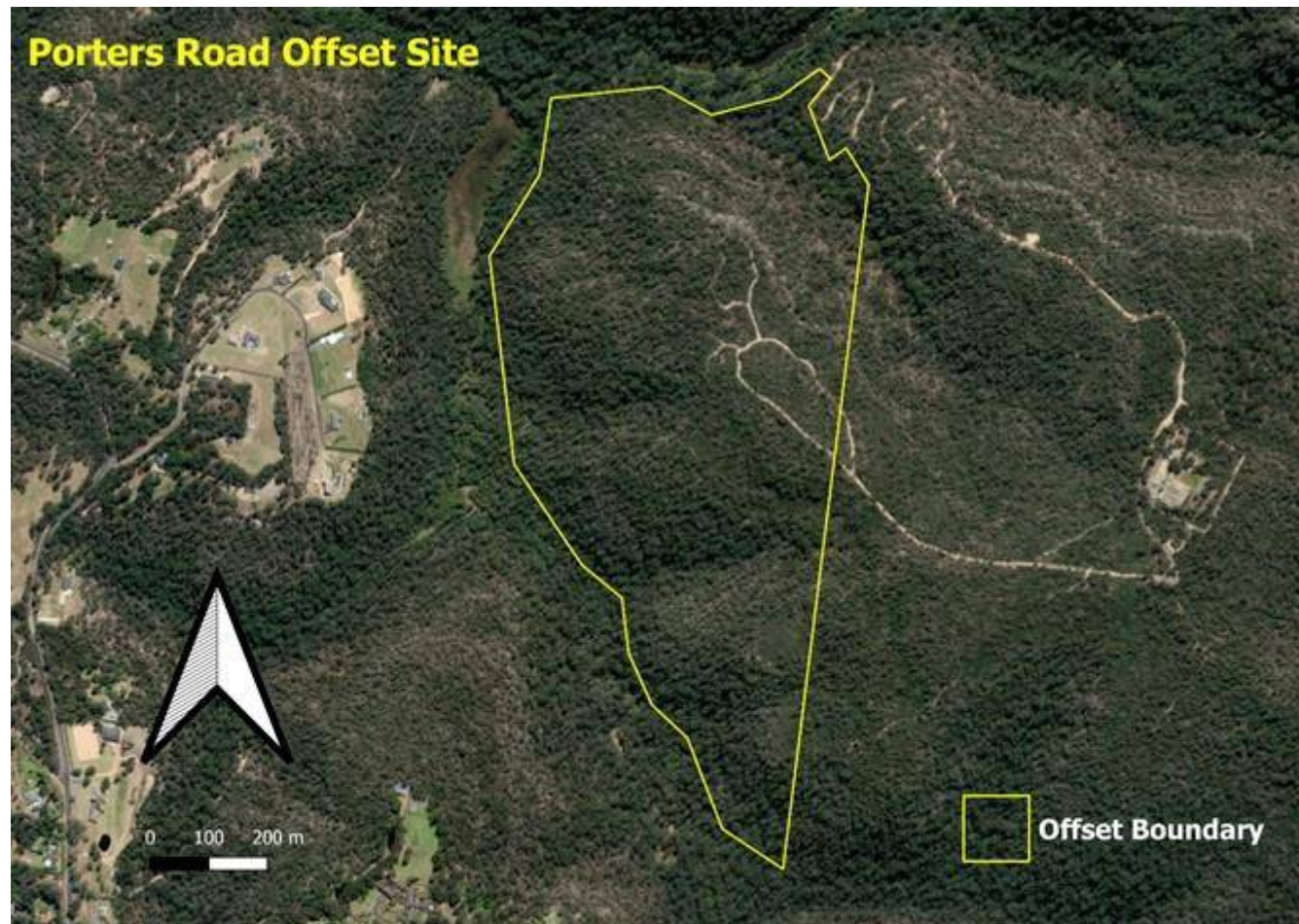


Figure 5 – Porters Rd Offset Site (BCT) still under passive management

Haerses Road Offset Site and (2009) Translocation Area

SCOPE

Haerses Road (HR) offset site is 'passively' managed under a BCT agreement according to HR DA 165-7-2005.

The vegetation communities represented at HR offset include Sydney Sandstone Ridgetop Woodland and Sydney Sandstone Gully Forest.

The dominant canopy species along the top of the site 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 HR offset is bordered along its western edge by an exotic grassland containing several different species of invasive perennial grass and numerous exotic annuals. The drainage line bisecting the site is also a vector for water and wind dispersed perennial brush weeds like crofton and lantana.

The open areas of the (2009) translocation site support a mix of exotic and native grasses interspersed with thickets of *Pallaea* fern. The forested areas are largely overgrown by *Kunzea ambigua*. Indeed, this species really dominates the translocation site.

The maintenance work in this area is spent controlling infestations of whiskey, African love grass and couch. Regeneration is assisted by managing the growth of *K.ambigua* and other canopy trees that inhibit light filtering its way to the ground.

RESOURCES – 142.5 HOURS

Most of the hours spent working at the HR offset were used to control incursions of exotic grasses and annuals along the western boundary. Large stands of whiskey grass were brush-cut to prevent the spread and production of seed. Specimens amongst native regenerating shrubs were manually removed. The same manual method applied to African lovegrass, as we are keen to discover if disturbing the soil in this manner will stimulate native regeneration.

A new method was implemented for the control of couch, where we applied glyphosate to tongs and swiped large stands of the invasive grass. So far, this method has proven to be effective in areas that were once dominated by the species. A spray of 50:1 glyphosate was also conducted to target couch in March.

The other major focus in works at the (2009) translocation site was spent on continuing the previous year's works in controlling light levels, cutting back thickets of *Kunzea* and culling canopy trees where smaller shrubs and groundcovers are struggling to get sunlight.

We successfully prevented the establishment of any new infestations and pursued crofton and lantana down the drainage lines. We also began targeting stands of crofton with the cut-paint method just outside of the BCT border to prevent seed from blowing into the site in the future.

.

RECOMMENDATIONS

Regular select spraying of herbicide and hand removal of seeding annuals is required to control incursions in and around the perimeter of the HR offset area.

Monitor and manage competitive native shrubs and trees in the (2009) translocation area, especially *K. ambigua* where it overshadows or encroaches on ground dwelling plants. Bush-it will selectively cull or cut back growth to encourage the most diverse assemblage of plants possible.

Monitor and manage invasive grasses in the translocation area, especially common couch that has vigorously established itself.

SCOPE

The roadwork undertaken by Roads and Maritime Services (RMS) at the corner of Haerses Road and Wisemans Ferry Road in February 2020. This had severely impacted our ability to work in this area in the past. The road widening and resurfacing closed off our access, and in the intervening period, thickets of blackberry, moth vine and turkey rhubarb flourished.

This year, it was seen to that the western buffer strip was stripped back and capped with a sandstone crush. This has allowed Bush-it to manage the area once again without having to attend to the previous large weed infestations that would have detracted from hours dedicated to protecting areas with higher regeneration potential.

RESOURCES – 85 HOURS

Prior to the sandstone capping on the western buffer, a session of primary works was conducted in the removal of lantana and turkey rhubarb seed. After the area had been capped, Bush-it was able to plant approximately 240 native trees, shrubs and ground covers throughout the area. The plantings were revisited for watering and installing remaining guards. Two sprays were also conducted in the area; one of round up targeting exotic grasses such as Kikuyu and couch, and another with metsulfuron targeting remaining stands of blackberry.

In the eastern buffer, one spray of metsulfuron was conducted targeting blackberry, asparagus and bridal creeper. A large infestation of moth vine was also deseeded and treated with skirting out of canopy and scraping large bases with glyphosate. Maintenance works were conducted to deseed turkey rhubarb and cut-paint wild tobacco.

Regular brief inspections were conducted of these areas throughout the year for WONS and high priority weeds.

RECCOMENDATIONS

Regular scans of buffer zones for high priority WONS species, in particular regenerating or new infestations of turkey rhubarb, asparagus, bridal creeper moth vine and blackberry. Ongoing maintenance of weed species in the area is also recommended, in particular with biannual targeted sprays and deseeding when required. Ensure all weeds are treated in the section south of Haerses Road which has recently been capped and planted out.

Regular maintenance of most recent plantings; watering as required if season is particularly dry.

APPENDIX

WEED SPECIES CONTROLLED AT HAERSES RD

Common name	Scientific name
Crofton	Ageratina adenophora
Whiskey Grass	Andropogon virginicus
Moth vine	Araujia sericifera
Asparagus	Asparagus aethiopicus
Bridal creeper	Asparagus asparagoides
Cobblers Pegs	Bidens pilosa var. pilosa
Italian Thistle	Carduus pycnocephalus
Kikuyu Grass	Cenchrus clandestinus
Pampus Grass	Cortaderia selloana
Common Couch	Cynodon dactylon var. dactylon
Fleabane	Conyza sp.
African Lovegrass	Eragrostis curvula
Flatweed	Hypochaeris radicata
Lantana	Lantana camara
Scotch Thistle	Onopordum acanthium
Dallas Grass	Paspalum dilatatum
Vasey's Grass	Paspalum urvillei
Green Cliff Brake	Pellaea viridis
Inkweed	Phytolacca octandra
Castor Oil Plant	Ricinus communis
Blackberry	Rubus fruticosus
Turkey Rhubarb	Rumex sagittatus
Paddy'ss Lucerne	Sida rhombifolia
Wild Tobacco	Solanum mauritianum
Sand Couch	Sporobolus virginicus var. virginicus
Southern Cone Marigold	Tagetes minuta

REGISTER OF HERBICIDE RECORDS

Date	Operator name	Herbicide name	Wind description	Direction	Notes	Application method	Qty	Volume	Start time	End time
10/11/2022	Tim Baker	Metsulfuron-methyl 600g/kg	13	ENE	Targeted WONS and high priority weed species.	Spray	1.5	10	13:30:00	14:30:00
8/03/2023	Zoe Ridgway	Glyphosate 360g/L	5.5	NW	Sprayed large patches of couch with 50:1 roundup in HR translocation.	Spray	200	10	10:30:00	12:30:00
28/04/2023	Joshua Freeman	Glyphosate 360g/L	7.4	NNW	Targeted exotic grasses in capped area mostly	Spray	900	90	8:30:00	13:30:00
28/04/2023	Tim Baker	Metsulfuron-methyl 600g/kg	7.4	NNW	Targeted re-sprouting Blackberry which was still actively growing.	Spray	1	10	12:30:00	13:30:00

DISTRIBUTION OF HOURS ACROSS MANAGEMENT ZONES AND MONTHLY RAINFALL

Zone	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Admin	0	1.5	1	0.5	0.5	0	0	1	2.5	2	0.5	6	15.5
HR - Offset Site (BCT site)	0	0	0	4	0	0	0	0	0	0	0	34	38
HR - Translocation area	8	29.5	9	8	0	0	0	4	6	0	14	26	104.5
HR - Visual Screen Buffer	0	0	0	0	7	0	0	0	11.5	52.5	6	8	85
HR - Porters Rd Offset Site (BCT site)	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	8	31	10	12.5	7.5	0	0	5	20	54.5	20.5	74	243
Monthly Rainfall													
<i>Median</i>	27.4	23.1	41.2	51.8	70.2	76.6	70.9	83.2	88.5	55.3	43.7	52	906
<i>Highest</i>	250.6	497.4	174	220.3	208.3	375	395.5	464.9	581.2	467.2	370.1	445.4	1773.6

Appendix H - Annual Biodiversity & Rehabilitation Management Report

**ANNUAL
BIODIVERSITY
&
REHABILITATION
MANAGEMENT
REPORT
HAERSES ROAD MAROOTA
2023**

Prepared for Dixon Sand Pty Ltd

August 2023 V.1



Tel: 02 4847 1207

Mob: 0411 812 775

Email: mmass@southeastenvironmental.com.au

Website: www.southeastenvironmental.com.au

**Annual Biodiversity
&
Rehabilitation Management
Report
Haerses Road Maroota
2023
Dixon Sand Pty Ltd**

This assessment has been prepared by

Melissa Mass

August 2023 V.1

Date

© COPYRIGHT

This report is Copyright Protected, and is not to be reproduced in part or whole or used by a third party without the express written permission of South East Environmental

TABLE OF CONTENTS

1	Introduction	1
1.1	Background	1
1.2	Objectives.....	1
2	Methodology.....	3
2.1	Site history	3
2.1.1	Extraction area stage 1.....	3
2.1.2	Extraction area stage 2.....	3
2.1.3	Extraction area A and B.....	3
2.1.4	Wisemans Ferry Road buffer area	3
2.1.5	Maroota State Forest buffer area	3
2.2	Field survey	3
2.3	Criteria to monitor success of rehabilitation	4
3	Results.....	5
3.1	Extraction area stage 1	5
3.2	Extraction area stage 2	6
3.3	Extraction Area A and B	9
3.4	Wisemans Ferry Road buffer area	17
3.5	Maroota State Forest buffer area	18
4	Discussion and recommendations	19
5	Bibliography	20
6	Appendix	21

List of Tables

Table 1 Performance and criteria for Haerses Road Quarry	4
Table 2 Survey summary from Haerses Road monitoring quadrat 1	12
Table 3 Survey summary from Haerses Road monitoring quadrat 2	14
Table 4 Survey summary from Haerses Road monitoring quadrat 4	16

List of Images

Image 1 Haerses Road Quarry site	2
Image 2. Extraction area stage 1 stockpile locations	5
Image 3. Extraction area stage 1 active rehabilitation area	6

Image 4. Extraction area stage 2 dam construction site	7
Image 5. Extraction area stage 2 rehabilitation west of dam	7
Image 6. Extraction area stage 2 active rehabilitation area aerial image	8
Image 7. Emerging <i>Darwinia bifora</i> in stage 2 rehabilitation area	8
Image 8. <i>Acacia bynoeana</i> on the dam wall in stage 2 rehabilitation area	9
Image 9. Quadrat 1 start of midline point	11
Image 10. Quadrat 2 start of midline point	13
Image 11. Quadrat 4 start of midline point	15
Image 12. Western side of Haerses Road within the Wisemans Ferry Road buffer area	17
Image 13. Eastern side of Haerses Road within the Wisemans Ferry Road buffer area.....	18

Abbreviations

Abbreviation	Description
BAM	Biodiversity Assessment Method
BC Act	<i>Biodiversity Conservation Act 2016</i>
BCT	Biodiversity Conservation Trust
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 1	Modification 1
Mod 2	Modification 2
NSW OEH	New South Wales Office of Environment and Heritage
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 Haerses Road Maroota. The Biodiversity Biobank offset at Porters Road Kenthurst and within the Haerses Road site is not addressed in detail within this report. A separate report is submitted to the Biodiversity Conservation Trust (BCT) throughout the reporting period addressing these areas.

1.1 BACKGROUND

Dixon Sand Pty Ltd operates a sand extraction and processing operation across 71 hectares on Lot 170 DP664766, Lot 170 DP664767, Lot A and B DP407341, Lot 176 and 177 DP752039 and Lot 216 DP752039 Haerses Road Maroota. The quarry operates in compliance to Development Consent 165-7-2005 issued by the Minister for Planning in 2006. The development consent was modified on the 22 January 2018 (Mod 1) and again on 29 January 2019 (Mod 2).

The development consent for the extraction and processing at Haerses Road permits operations to continue until 14 February 2046.

1.2 OBJECTIVES

The objectives of this Annual Biodiversity and Rehabilitation Management Report is to describe the current condition of the Haerses Road site and to advise Dixon Sand on the appropriate management measures required to be implemented in order to meet the expectations of the Haerses Road Quarry Biodiversity and Rehabilitation Management Plan v5 (2020) 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 Haerses Road site;
- describe the native vegetation and habitats within the Haerses Road site;
- describe the current condition of the threatened flora and its habitat found within the Haerses Road site;
- determine the legislative and conservation significance of species, populations and ecological communities known or likely to occur within the Haerses Road site 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 Haerses Road Quarry Biodiversity and Rehabilitation Management Plan v5 (2020);
- provide an independent monitoring report for inclusion as part of the external reporting for the quarry Annual Review.

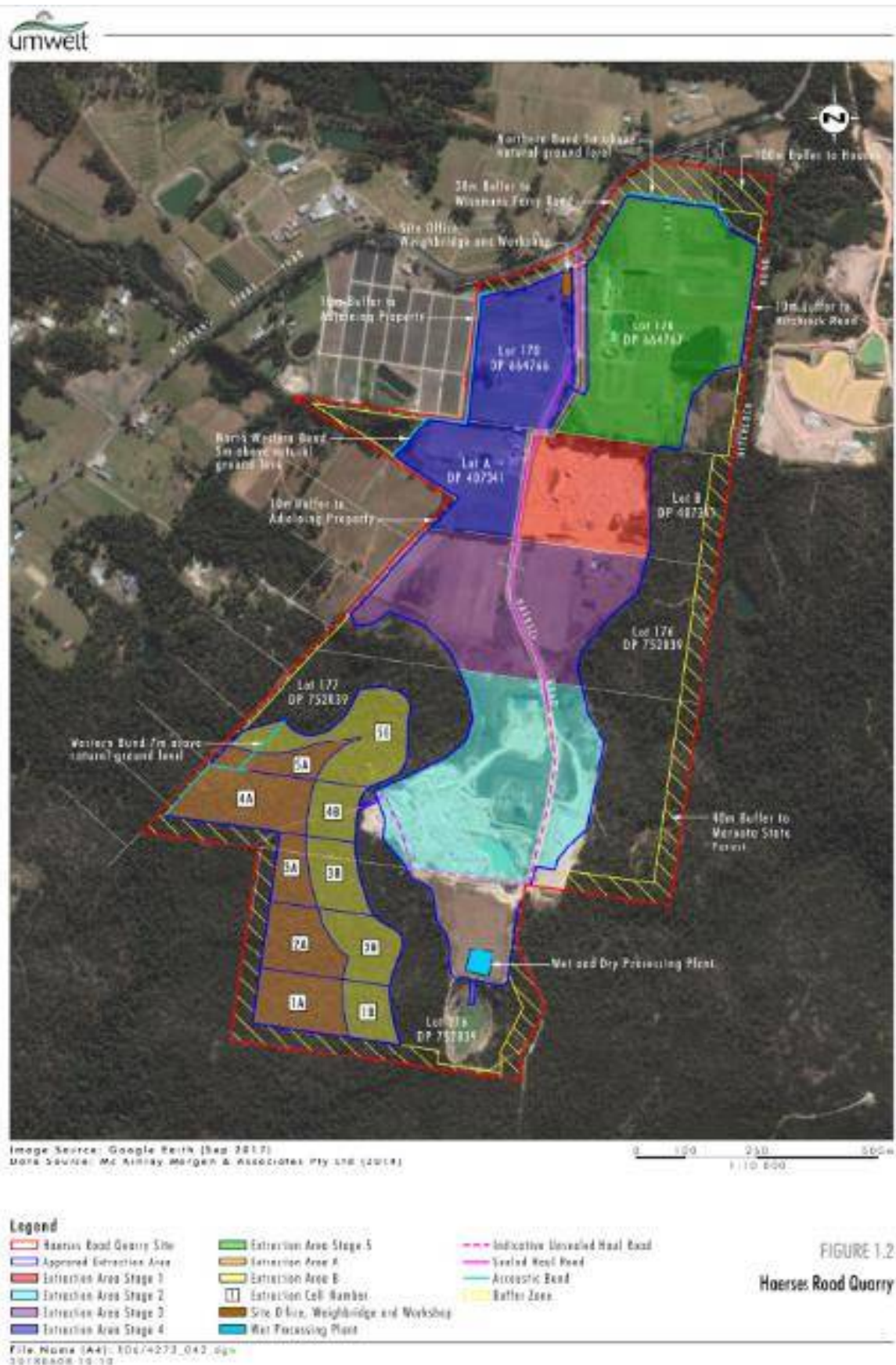


FIGURE 1.2
Haerses Road Quarry

Image 1. Haerses Road Quarry site (source Umwelt Australia 2019)

2 METHODOLOGY

2.1 SITE HISTORY

2.1.1 Extraction area stage 1

Extraction area stage 1 is Lot B of DP407341 comprising of 9.5416ha. Approximately 5.68ha have been disturbed for sand extraction while the remaining 3.86ha is remnant native vegetation. Currently 3ha are in the process of agricultural rehabilitation with work continuing into the next reporting period.

2.1.2 Extraction area stage 2

Extraction area stage 2 is within Lot 177 of DP752039, utilising approximately 14.38ha of the 39.4956ha lot. Extraction is continuing in this area however approximately 2ha of rehabilitation has begun in earnest.

2.1.3 Extraction area A and B

Extraction areas A and B extend across Lot 177 of DP752039 and Lot 216 DP752039. Current extraction is underway in Cell 1A, 1B, 2A, 2B and 3B. Rehabilitation of these areas has not taken place within this reporting period, and is unlikely to take place in the next reporting period. The use and storage of soil with native seed bank and translocation of removed vegetation is worthy of discussion in this report to monitor success of the current process in use.

2.1.4 Wisemans Ferry Road buffer area

Assisted screen planting within the Wisemans Ferry Road buffer area took place in 2016 to supplement the existing native vegetation which was present. The buffer area is to be 30m wide extending along the boundary of Wisemans Ferry Road for the purpose of providing a visual screen to motorists. During the upgrade to the Haerses Road intersection in early 2020 the buffer area was disturbed by civil contractors. This work was deemed as essential. Assisted rehabilitation has been undertaken during the reporting period to aid with the restoration of the 30m buffer.

2.1.5 Maroota State Forest buffer area

The Maroota State Forest buffer area extends along the southern, eastern and western boundaries of extraction area A and B as well as the southern and eastern boundary of Lot B of DP407341, Lot 176 of DP752039 and Lot 177 of DP752039. Buffer areas are fenced along the boundary of extraction area A and B. An area within the Maroota State Forest buffer area was previously disturbed and is under current active rehabilitation management to restore a Scribbly Gum, Hairpin Banksia, Dwarf Apple heathy woodland. Rehabilitation is in advanced stages with weed management continuing.

2.2 FIELD SURVEY

The Biobanking offset areas are subject to separate reporting for the BCT providing annual photo monitoring, information regarding active management actions and reporting any disturbance within the site. To date, passive management is taking place throughout all locations of Biobanking offset.

Baseline monitoring locations within each vegetation community at Haerses Road have been established. Monitoring locations have been undertaken in a manner consistent with the Biodiversity Assessment Method (BAM) survey as described within Appendix 4 of the Haerses Road

Quarry Biodiversity and Rehabilitation Management Plan v5 2020. Details and results of the field survey can be found within Chapter 3 of this report.

2.3 CRITERIA TO MONITOR SUCCESS OF REHABILITATION

The Key Performance Indicators (KPI) to measure success of the biodiversity and rehabilitation effort of the Haerses Road site have been outlined by Umwelt (Australia) 2019. The following tables depict the performance and completion criteria required for both native vegetation areas and agricultural land.

Table 1. Performance and completion criteria for Haerses Road Quarry (taken from Umwelt (Australia) 2019)

<i>Rehabilitation Performance and Completion Criteria</i>	
<i>Native Vegetation</i>	Revegetation areas contain flora species assemblages characteristic and ground cover is within OEH benchmark of the target 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
	Ground cover species are characteristic of target vegetation communities
	The presence of weeds is within OEH benchmark of the target native vegetation communities
<i>Agricultural Land</i>	Rehabilitated land is compatible with proposed agricultural land use as demonstrated by soil assessment
	Landform comprised broad gentle slopes between 2-5%
<i>Weeds and Pests</i>	Land capable of supporting suitable sterile cover crop
	Regular inspections indicate a decline in weed diversity, density and abundance and a decline in signs of feral animal activity
	The presence of weeds is within OEH benchmark of the target native vegetation communities
	There is no evidence of significant damage resulting from feral animal activity

3 RESULTS

Annual vegetation surveys were undertaken for the Haerses Road Quarry site during this reporting period. Rehabilitation work has continued in extraction area stage 2 with rehabilitation of agricultural land in extraction area stage 1 set to begin in earnest over the next reporting period. Further rehabilitation work will also take place within the Wisemans Ferry Road buffer area within the next reporting period.

3.1 EXTRACTION AREA STAGE 1

Extraction of sand products is still taking place within the western portion of extraction area stage 1. Rehabilitation work in the eastern portion stage 1 has begun with overburden clay material from stage 2 and 3 being used to raise ground levels. The wattle regrowth on the eastern stockpile was removed during the reporting period and the material within the stockpile was rescreened for use in rehabilitating the site. The stockpiles were found to contain rock which was deemed unsuitable for an agricultural soil profile. These works are expected to continue during the 2023-2024 reporting period with an aim at rehabilitating stage 1 to agricultural usage sometime in the next few years.



Image 2. Extraction area stage 1 with rehabilitation material located within the area



Image 3. Extraction area stage 1 active rehabilitation area (Image sourced from Google Earth Pro Feb 2023)

3.2 EXTRACTION AREA STAGE 2

Extraction area stage 2 is still in active operation however rehabilitation of the previous sandstone extraction area has commenced.

The construction of a farm dam has taken place to fill the void and make the area beneficial for agricultural use. The expanse between the dam and native vegetation to the west has been spread with soil from extraction area A and B which contains native seed bank. The natural regeneration process has begun in earnest with a good diversity of ground cover species emerging. Threatened flora species *Darwinia biflora* and *Tetratheca glandulosa* have emerged with *Darwinia biflora* being prolific across the site. *Acacia bynoeana* has also emerged in the compact soils immediately surrounding the dam.

The dam wall which had previously sunk slightly on the western edge has undergone some remediation work to improve structural integrity. The dam has been leaking and therefore soils to the west became saturated and much of the rehabilitating vegetation was effected. Monitoring of this area will continue to ensure the vegetation is able to recover without assistance. Soil with native seed bank will be spread over the area should it be required to assist with recovery.



Image 4. Extraction area stage 2 dam

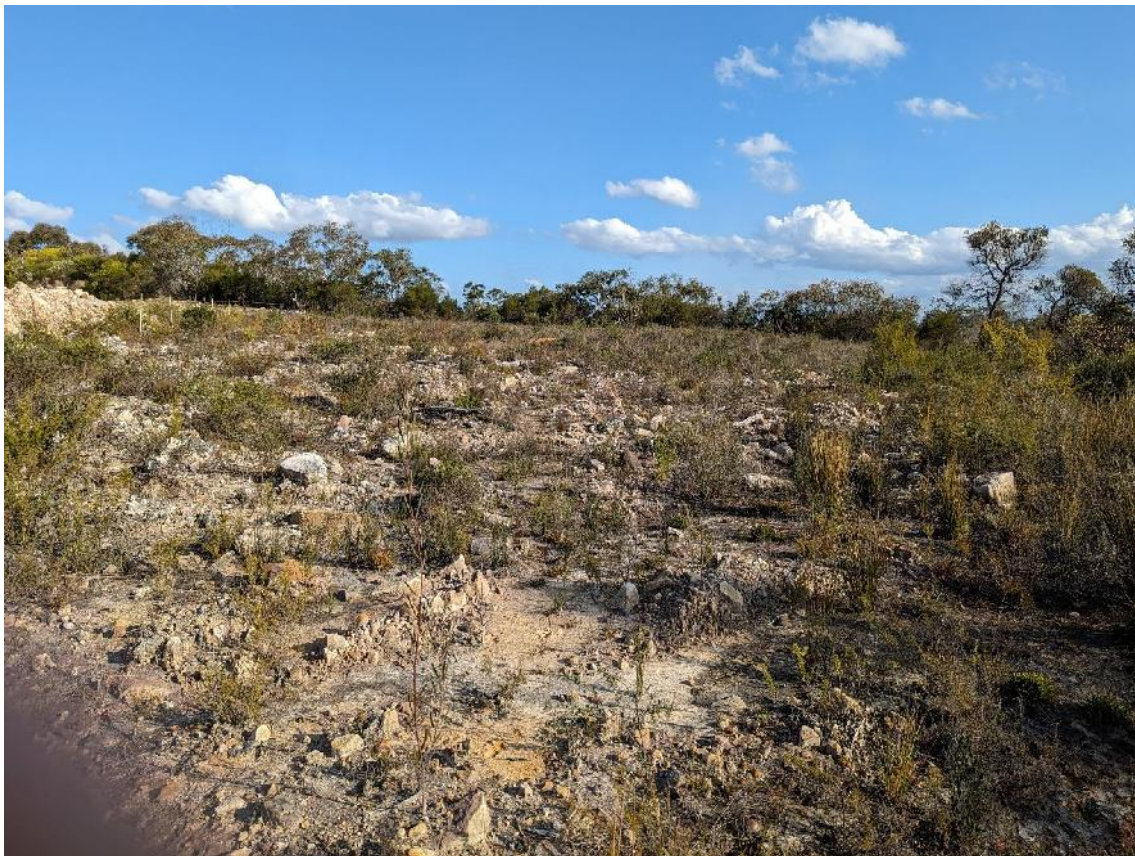


Image 5. Stage 2 rehabilitation area west of the dam



Image 6. Extraction area stage 2 active rehabilitation area



Image 7. Emerging *Darwinia biflora* in stage 2 rehabilitation area



Image 8. *Acacia bynoeana* emerging on the dam wall in stage 2 rehabilitation area

3.3 EXTRACTION AREA A AND B

Sand and sandstone extraction is currently in active operation within Cell 1A, 1B, 2B, 2B and 3B within Lot 216 DO 752039.

Offsetting requirements for these areas incorporate vegetation conservation areas within the Haerses Road envelope and Porters Road at Kenthurst. Both of these conservation management areas are still in passive management phase.

Baseline vegetation data was obtained during the previous reporting period in areas within the future extraction cells as outlined within the Haerses Road Quarry Biodiversity and Rehabilitation Management Plan v5 2020. The Haerses Road Quarry Biodiversity and Rehabilitation Management Plan outlines the annual monitoring of the extraction cells prior to disturbance for the purpose of providing baseline data for rehabilitation of the site post extraction. Each cell (A & B combined) is to have a monitoring location established within it. Cell 1 (A & B) had already begun extraction so therefore establishing a monitoring site was not possible. The monitoring location within cell 2B and 3B has been disturbed in preparation for material extraction therefore monitoring of these site will not continue. A baseline vegetation survey was undertaken within cell 2A before disturbance was undertaken in July 2023. The remaining two monitoring locations, within Cells 4 – 5, were surveyed in July 2023 to collect further monitoring data which will contribute to the final rehabilitation of the site. Information collected was in line with the DPIE Biodiversity Assessment Methods as approved via the *Biodiversity Conservation Act 2016* and the *Biodiversity Conservation Regulation 2017*.

The survey sites were selected for ongoing survey monitoring to reflect upon the two dominant vegetation communities identified within the Haerses Road Quarry Biodiversity and Rehabilitation Management Plan v5 2020. The PCT 978 previously identified within extraction cell 5b was not able to be located. A secondary, and larger, area of this PCT occurs within the Biodiversity Offset Area which is outside of the survey area required for this annual report. A small area of PCT1181 was located within Extraction Cell 2A. This area of PCT is not large enough to be encompassed by the vegetation survey undertaken, therefore, part of this PCT is within quadrat 3 where transition between PCT 1181, PCT 1083 and PCT 1134 occurs.

Within the three vegetation survey quadrats the following information was collected:

- Composition – native plant species richness by growth form
- Structure – foliage cover of native and exotic species by growth form
- Function –
 - Number of large trees
 - Tree stem size class
 - Canopy species regeneration
 - Length of fallen logs
 - Percentage of litter cover
 - Number of trees with hollows
 - High threat exotic cover

A photo was taken at the start of each quadrat. Each 12 month period a photo will be taken in the same location with the same aspect for comparison purposes.

Flora identified onsite has been listed within Appendix A.



Image 9. Quadrat 1 start midline point

Table 2. Survey summary from Haerses Road monitoring survey site quadrat 1.

1083 - Red Bloodwood – Scribbly Gum heathy woodland on sandstone plateaux of the Sydney Basin, Sydney Basin Bioregion					
AGD Zone 56 Easting – 0312510 Northing – 06296390 Midline - 0°					
Vegetation Layer		Height Range	Vegetation Layer		
Trees	15 – 20m	Corymbia gummifera, Eucalyptus haemastoma, Eucalyptus punctata, Angophora hispida, Eucalyptus oblonga			
Shrubs	0.5 – 2m	Grevillea buxifolia, Persoonia levis, Phyllanthus hirtellus, Lambertia Formosa, Calytrix tetragona			
Groundcover	0.1 – 0.5m	Lomandra multiflora, Entolasia stricta, Actinotus minor, Billardiera scandens, Cyathochaeta diandra			
Stem Class		Hollows			
Dbh	Eucalyptus	Non-Eucalypt	<20cm	>20cm	
80cm+					
50-79cm	✓		4	2	
30-49cm	✓		2		
20-29cm	✓				
10-19cm	✓				
5-9cm	✓				
<5cm	✓				
Composition & Structure		Composition Count		Structure cover %	
Trees		5		40	
Shrubs		26		70	
Grasses etc		13		30	
Forbs		8		10	
Ferns		0		0	
Other		3		1	
High Threat Weeds		0		0	
Ecosystem Functions					
Length of habitat logs					25m
Litter cover					35%
Bare ground cover					0%
Cryptogam cover					15%
Rock cover					5%
Overstorey foliage cover					30%
Mid-storey foliage cover					60%
Groundcover foliage cover		25%			



Image 10. Quadrat 2 centre midline point

Table 3. Survey summary from Haerses Road monitoring survey site quadrat 2.

1134 – Scribbly Gum – Hairpin Banksia – Dwarf Apple heathy woodland on sandstone plateaux of the Central Coast, Sydney Basin Bioregion				
AGD Zone 56 Easting – 0312226 Northing – 06293607 Midline - 190°				
Vegetation Layer		Height Range	Vegetation Layer	
Trees	15 – 20m	<i>Eucalyptus haemastoma</i> , <i>Angophora hispida</i> , <i>Eucalyptus squamosal</i> , <i>Banksia serrata</i>		
Shrubs	0.5 – 2m	<i>Banksia ericifolia</i> , <i>Grevillea buxifolia</i> , <i>Persoonia lanceolate</i> , <i>Lambertia Formosa</i> , <i>Petrophile pulchella</i> , <i>Banksia spinulosa</i>		
Groundcover	0.1 – 0.5m	<i>Lomandra multiflora</i> , <i>Cyathochaeta diandra</i> , <i>Lepidosperma neesii</i> , <i>Actinotus minor</i>		
Stem Class		Hollows		
Dbh	Eucalyptus	Non-Eucalypt	<20cm	>20cm
80cm+				
50-79cm				
30-49cm	✓		2	
20-29cm	✓			
10-19cm	✓			
5-9cm	✓			
<5cm	✓			
Composition & Structure		Composition Count		Structure cover %
Trees		4		20
Shrubs		22		70
Grasses etc		9		50
Forbs		3		5
Ferns		1		0.1
Other		2		0.1
High Threat Weeds		0		0
Ecosystem Functions				
Length of habitat logs	12.5m			
Litter cover	10%			
Bare ground cover	0%			
Cryptogam cover	10%			
Rock cover	0%			
Overstorey foliage cover	10%			
Mid-storey foliage cover	40%			
Groundcover foliage cover	50%			



Image 11. Quadrat 4 centre midline point

Table 4. Survey summary from Haerses Road monitoring survey site quadrat 4.

1083 - Red Bloodwood – Scribbly Gum heathy woodland on sandstone plateaux of the Sydney Basin, Sydney Basin Bioregion					
AGD		Zone 56	Easting – 0312062	Northing – 06293587	Midline - 310°
Vegetation Layer		Height Range	Vegetation Layer		
Trees	15 – 20m	Corymbia gummifera, Eucalyptus haemastoma, Angophora hispida, Eucalyptus oblonga			
Shrubs	0.5 – 2m	Grevillea buxifolia, Persoonia levis, Banksia ericifolia, Lambertia Formosa, Petrophile pulchella, Leptospermum trinervium			
Groundcover	0.1 – 0.5m	Entolasia stricta, Lomandra obliqua, Actinotus minor, Caustis pentandra, Rytidosperma racemosum			
Stem Class		Hollows			
Dbh	Eucalyptus	Non-Eucalypt	<20cm	>20cm	
80cm+					
50-79cm	✓		1	1	
30-49cm	✓		4		
20-29cm	✓				
10-19cm	✓				
5-9cm	✓				
<5cm	✓				
Composition & Structure		Composition Count		Structure cover %	
Trees		5		40	
Shrubs		25		50	
Grasses etc		12		40	
Forbs		13		10	
Ferns		2		1	
Other		3		1	
High Threat Weeds		0		0	
Ecosystem Functions					
Length of habitat logs					12 m
Litter cover					20%
Bare ground cover					0%
Cryptogam cover					0%
Rock cover					0%
Overstorey foliage cover					30%
Mid-storey foliage cover					40%
Groundcover foliage cover		30%			

3.4 WISEMANS FERRY ROAD BUFFER AREA

Assisted buffer planting commenced in 2016 with a variety of native species such as *Banksia*, *Melaleuca*, *Hakea* and *Acacia* to complement the existing native vegetation which occurred onsite. During early 2020 the buffer area was disturbed by civil contractors for road widening and intersection upgrade. Unfortunately this has resulted in much of the existing native vegetation buffer being removed and disturbance to some of the planted buffer area.

The buffer has been monitored throughout the reporting period for natural species regeneration. The western side of the Haerses Road intersection has begun natural regeneration with a diversity of *Eucalyptus*, *Acacia* and *Leptospermum* species emerging. Continued monitoring of this area will continue to ensure the buffer meets the expectations of providing suitable vegetation screening from Wisemans Ferry Road.

The Eastern side of the Haerses Road intersection has not shown any signs of natural regeneration therefore further buffer screening will be required to take place during the next reporting period.

Exotic species occur in both areas with Weeds of National Significance (WoNS) and High Threat Weeds (HTW) present. Weed management and control will commence during the next reporting period with the WoNS and HTW being the species of targeted priority.



Image 12. Western side of Haerses Road within the Wisemans Ferry Road buffer area



Image 13. Eastern side of Haerses Road within the Wisemans Ferry Road buffer area

3.5 MAROOTA STATE FOREST BUFFER AREA

There has been no further disturbance to any areas of the Maroota State Forest buffer. Disturbance did take place in 2006 of a small area in the south eastern portion of Lot 177 in DP752039. This area has been under active rehabilitation since 2015. Bush-it undertake bush regeneration work on a regular basis in this area. An annual report is provided to Dixon Sand outlining the rehabilitation work undertaken with achievements outlined in detail.

4 DISCUSSION AND RECOMMENDATIONS

The rehabilitation of the Haerses Road Quarry site has begun with work commencing in extraction area stage 1 and 2, work continuing in the Maroota State Forest buffer area and work due to recommence within the Wisemans Ferry Road buffer area within the next reporting period. Rehabilitation work is in the early stages and will increase with both intensity and measurable criteria within the next reporting period.

Vegetation surveys have been undertaken within the extraction A and B areas. The data collected will serve as baseline information for measurable and quantifiable analysis for future reporting periods. The vegetation condition recorded will provide specific data on the local vegetation biometric score which will assist in rehabilitation of the quarry areas once extraction is completed. This will provide a measure in which rehabilitation success can be evaluated against via the criteria outlined within the Haerses Road Biodiversity and Rehabilitation Management Plan v5 2020.

The coming twelve months should see the following rehabilitation effort take place:

Extraction area stage 1

- Screening of stockpile material
- Final landform for active rehabilitation areas
- Stockpile material layered to create suitable agricultural terrain
- First agricultural planting event

Extraction area stage 2

- Native vegetation growth to the west of the dam
- Dam wall repair/mitigation

Wisemans Ferry Road buffer area

- Assisted rehabilitation of eastern side of Haerses Road intersection buffer area where disturbance has taken place

Maroota State Forest buffer area

- Continued bush regeneration maintenance work in disturbed area
- Baseline monitoring locations established

Extraction area A and B

- Continued monitoring of vegetation quadrats

It is not expected any new areas of rehabilitation will take place within the next reporting period as extraction across the site continues.

5 BIBLIOGRAPHY

Australian Government Com Law. 2014. *Environment Protection and Biodiversity Conservation Act 1999*. [ONLINE] Available at:

<http://www.comlaw.gov.au/Details/C2014C00506> [Accessed 5th September 2021].

Australian Government Com Law. 2018. *Biosecurity Act 2015*. [ONLINE] Available at:

<https://www.legislation.gov.au/Details/C2018C00363> [Accessed 6th September 2021].

Department of Lands Spatial Information Exchange. 2018. SIX Maps. [ONLINE] Available at:

<http://maps.six.nsw.gov.au/> [Accessed 6th September 2021].

New South Wales Consolidated Acts. 2017. *Biodiversity Conservation Act 2016*. [ONLINE]

Available at: <https://www.legislation.nsw.gov.au/~view/act/2016/63> [Accessed 6th September 2021].

NSW Office of Environment and Heritage. 2018. *NSW BioNet*. [ONLINE] Available at:

<http://www.bionet.nsw.gov.au/> [Accessed 6th September 2021].

NSW Office of Environment and Heritage. 2018. *NSW BioNet Vegetation Classification*.

[ONLINE] Available at: <https://www.environment.nsw.gov.au/NSWVCA20PRapp/default.aspx> [Accessed 6th September 2021].

The Hills Shire Council (2019) *The Hills Local Environmental Plan 2019*. [ONLINE] Available at

<https://www.legislation.nsw.gov.au/view/html/inforce/current/epi-2019-0596> [Last accessed 6th September 2021].

South East Environmental 2020. *Haerses Road Annual Biodiversity and Rehabilitation Management Report 2020*. Unpublished report by South East Environmental.

Umwelt (Australia) Pty Ltd 2019. *Haerses Road Biodiversity and Rehabilitation Management Plan May 2019*. Unpublished report by Umwelt Teralba.

6 APPENDIX

APPENDIX A – FLORA IDENTIFIED ONSITE AT HAERSES ROAD

Status	Botanical Name	Common Name	Plot 1	Plot 2	Plot 3	Plot 4
	<i>Acacia linifolia</i>	White Wattle			1	
	<i>Acacia suaveolens</i>	Sweet Wattle			1	
	<i>Acacia ulicifolia</i>	Prickly Moses			1	1
	<i>Actinotus minor</i>	Lesser Flannel Flower	1			1
	<i>Allocasuarina distyla</i>	Scrub She-oak		1		
	<i>Angophora costata</i>	Smooth-barked Apple			2	
	<i>Angophora hispida</i>	Dwarf Apple	1	1	1	1
	<i>Aristida warburgii</i>	Fine Leaf Wire Grass	1			
	<i>Asplenium trichomanes</i>	Common Spleenwort				
	<i>Austrostipa pubescens</i>	Spear Grass	1		1	1
	<i>Banksia ericifolia</i>	Heath Leaved Banksia	1	1	1	2
	<i>Banksia oblongifolia</i>	Fern-leaved Banksia				
	<i>Banksia serrata</i>	Old Man Banksia		1	1	
	<i>Banksia spinulosa</i>	Hairpin Banksia	1	1	1	1
	<i>Billardiera scandens</i>	Hairy Apple Berry	1			1
	<i>Boronia floribunda</i>	Pale Pink Boronia	1		1	1
	<i>Boronia ledifolia</i>	Sydney Boronia			1	1
	<i>Bossiaea lenticularis</i>	Bossiaea			1	
	<i>Bossiaea obcordata</i>	Spiny Bossiaea			1	
	<i>Bossiaea scolopendria</i>	Sword Bossiaea	1		1	
	<i>Callicoma serratifolia</i>	Black Wattle			1	
	<i>Callistemon citrinus</i>	Crimson Bottlebrush			1	
	<i>Calytrix tetragona</i>	Common Fringe Myrtle	1	1		2
	<i>Cassytha glabella</i>	Slender Devils Twine	1	1		1
	<i>Caustis pentandra</i>	Thick Twist Rush	1		1	1
	<i>Ceratopetalum gummiferum</i>	New South Wales Christmas-bush			1	
	<i>Cheilanthes sieberi</i>	Mulga Fern			1	1
	<i>Corymbia gummifera</i>	Red Bloodwood	2		1	1
	<i>Cyathochaeta diandra</i>	Sheath Rush	2	2	1	2
V	<i>Darwinia biflora</i>		2	1		2
	<i>Dianella caerulea</i>	<i>Dianella caerulea</i>			1	
	<i>Dillwynia floribunda</i>	Showy Parrot Pea				
	<i>Dillwynia retorta</i>	Heathy Parrot Pea	2	1	1	1
	<i>Drosera peltata</i>	Sundew		1	1	
	<i>Entolasia stricta</i>	Wiry Panic	1	2	2	2
	<i>Epacris microphylla</i>	Coral Heath			1	
	<i>Epacris pulchella</i>	Wallum Heath	1	1	1	1
	<i>Eucalyptus haemastoma</i>	Scribbly Gum	1	1	1	1
	<i>Eucalyptus oblonga</i>	Narrow-leaved Stringybark	1			1
	<i>Eucalyptus piperita</i>	Sydney Peppermint			1	
	<i>Eucalyptus punctata</i>	Grey Gum	1		1	
	<i>Eucalyptus squamosa</i>	Scaly Gum		1		1
	<i>Gahnia sieberiana</i>	Red-fruit Saw-sedge			1	
	<i>Gleichenia dicarpa</i>	Pouched Coral Fern			1	
	<i>Gonocarpus teucrioides</i>	Raspwort				
	<i>Goodenia bellidifolia</i>	Daisy-leaved Goodenia	1			1

	<i>Goodenia hederacea</i>	Forest Goodenia	1			
	<i>Grevillea buxifolia</i>	Grey Spider Flower	2	1		1
En	<i>Grevillea parviflora</i> subsp <i>supplicans</i>	Small-flowered Grevillea	1			
	<i>Grevillea speciosa</i>	Red Spider Flower	1	1	1	1
	<i>Hakea dactyloides</i>	Broad Leaved Hakea	1		1	1
	<i>Hakea sericea</i>	Needlebush	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>Isopogon anemonifolius</i>	Broad-leaved Drumsticks	1	1		1
	<i>Juncus usitatus</i>	Common Rush		1		
	<i>Lambertia formosa</i>	Mountain Devil	2	1	2	2
	<i>Lepidosperma laterale</i>	Variable Swordsedge	1			2
	<i>Lepidosperma neesii</i>	Stiff Rapier-sedge		1		
	<i>Leptospermum trinervium</i>	Flaky-barked Tea-tree	2	2	1	2
	<i>Leptospermum polygalifolium</i>	Tantoon			1	
	<i>Leucopogon microphyllus</i>	Small Leaved White Beard	1	1	1	
	<i>Lomandra brevis</i>	Tufted Mat-rush	1			1
	<i>Lomandra filiformis</i>	Wattle Mat-rush		1		
	<i>Lomandra Lomandra</i>	Spiny-headed Mat-rush	1		2	
	<i>Lomandra multiflora</i>	Many Flowered Mat-rush	2	1	2	2
	<i>Lomandra obliqua</i>	Fish Bones	1		1	1
	<i>Lomatia silaifolia</i>	Crinkle Bush	1		1	1
	<i>Micrantheum ericoides</i>	Micrantheum	1			1
	<i>Micromyrtus ciliata</i>	Fringed Heath-myrtle		1		
	<i>Mirbelia rubrifolia</i>	Heath Mirbelia		1		
	<i>Mitrasacme polymorpha</i>	Varied Mitrewort				
	<i>Patersonia sericea</i>	Silky Purple Flag				
	<i>Persoonia lanceolata</i>	Lance Leaf Geebung				1
	<i>Persoonia levis</i>	Broad Leaved Geebung	1		1	1
	<i>Petrophile pulchella</i>	Conesticks	1	1	1	1
	<i>Phyllanthus hirtellus</i>	Thyme Spurge	1		1	1
	<i>Pimelea linifolia</i>	Slender Rice Flower			1	
	<i>Platysace linearifolia</i>	Carrot Tops			2	
	<i>Pteridium esculentum</i>	Bracken Fern			1	
	<i>Pultenaea villosa</i>	Hairy Bush-pea				
	<i>Rytidosperma racemosum</i>	Wallaby Grass	1			1
	<i>Scaevola ramosissima</i>	Purple Fan-flower				1
	<i>Schoenus ericetorum</i>	Heath Bog Rush		2		
	<i>Smilax glycyphylla</i>	Sweet Sarsaparilla			1	
	<i>Stylidium graminifolium</i>	Grass Trigger Plant			1	
V	<i>Tetradlea glandulosa</i>	Glandular Pink Bells	1			1
	<i>Tetradlea thymifolia</i>	Black-eyed Susan			1	
	<i>Thelymitra pauciflora</i>	Slender Sun Orchid				
	<i>Themeda australis</i>	Kangaroo Grass	1		1	1
	<i>Xanthorrhoea resinosa</i>	Grass Tree	1	1	1	1
	<i>Xanthosia tridentata</i>	Rock Xanthosia			2	

En – Endangered species V – Vulnerable species

Appendix I – Annual Management Reports for Year 4 - Passive Management of Stewardship Sites

Biodiversity Stewardship Site landholder annual report & BCT audit (passive management)

Audit details

Biodiversity stewardship agreement year: **2023**

Reporting period: **2022-2023**

BCT site inspection date (if required):

BCT Auditor:

BS agreement ID: **BA00414 Haerses Road**

Landowner/site contact details: **David Dixon, 0414 330 490**

Property address: **B/407341, 4610 Old Northern Road, Maroota**

BAM passive management actions		Annual report (landholder to complete)	BCT annual report audit	
Passive management actions as per Agreement	Management item description	Completion dates, actions undertaken and outcomes	Action completed Yes/No/N/A	Auditor comments and recommendations
1. Fire management	1.1 Implementation of the fire for conservation management plan	N/A until under active management. No actions taken to date. No fire within the BSA site boundary during the previous 12 month period. Last inspection 13/03/2023		
2. Grazing management	2.1 Exclusion of grazing by Stock	No stock kept or located on property. No unauthorised grazing of stock noted. Last inspection 13/03/2023		
	2.3 Removal of Stock when observed	N/A		
	2.1 & 2.2 Stock grazing in accordance with BSA restrictions	N/A		
	2.3 Removal of stock when contrary to BSA grazing restrictions	N/A		
3. Native vegetation management	3.1 Retaining native vegetation	No disturbance to native vegetation in past 12 month period		
	3.2 Burning of native vegetation	No burning of native vegetation in past 12 month period		

BAM passive management actions		Annual report (landholder to complete)	BCT annual report audit	
Passive management actions as per Agreement	Management item description	Completion dates, actions undertaken and outcomes	Action completed Yes/No/N/A	Auditor comments and recommendations
	3.4 Restricted use of fertilisers, pesticides and herbicides.	No use of fertilisers, pesticides or herbicides within the BSA site during the past 12 month period		
	3.6.4 Management of supplementary planting areas	N/A		
	3.6.5 Local provenance of plants used for supplementary planting and audit template	N/A		
4. Threatened species habitat management and enhancement	4.1 Protection of threatened species breeding habitat	No disturbance to any threatened species breeding habitat in the past 12 month period. The Haerses Road BSA site is fenced and sign posted as an environmental protection area to deter unauthorised persons from entering and disturbing significant habitat areas		
8. Management of human disturbance	8.1 Removal, movement or use of dead timber	No removal, movement or use of dead timber within the BSA site in the past 12 month period		
	8.3 Removal or movement of rocks	No removal or movement of rocks in the past 12 month period		
	8.6 No storage or disposal of rubbish	No storage or disposal of rubbish within the BSA site in the past 12 month period		
	8.9 Maintenance of tracks and fences	Maintenance of tracks with the BSA site has occurred, particularly following extreme rainfall events which cause damage to the track pavement. Work has been carried out with care and no disturbance has occurred to native vegetation alongside these tracks. Fences are regularly checked to ensure they remain visible		
9. Monitoring	9.2 Establishing and sampling photo-points	Photo points have been established. This is the fourth year of photo point monitoring.		
	9.4 Establishing vegetation integrity survey plots	Vegetation integrity survey plots have been established. The most recent survey was undertaken in August 2022.		

Additional site inspections

Management Actions		Landholder to complete	BCT annual report audit	
Description of additional site inspection or monitoring requirement	Required frequency	Completion dates, observations, actions undertaken and outcomes	Action completed Yes/No/N/A	Comments and recommendations by BCT
Inspection to determine percentage of living ground cover when grazing Stock.	Every 12 months	N/A		
Inspections to record grazing by Stock in accordance with Section 7A.2 of the management plan.	Every 3 months	N/A		
Inspections to document human disturbance, erosion or waste in accordance with Section 7A.2 of the management plan.	Every 6 months	The Haerses Road BSA site is inspected twice per year. During the last 12 month period the site was inspected during August 2022 and March 2023		
Inspection to document the condition of fences and gates in accordance with Section 7A.2 of the management plan.	Every 12 months	The fences at the Haerses Road BSA site are inspected regularly throughout the year with the last inspection occurring on the 13/03/2023		

Details of incidents or events that have had an adverse effect on biodiversity values on biodiversity stewardship site (landholder to complete)

Description of incident or event (e.g. natural events)	Actions taken and/or recommended actions
No incident recorded	

Any other comments or observations regarding the biodiversity stewardship site (landholder to complete)

Photo monitoring site 1.

A slight increase in grass cover diversity within the site.

No other changes noted.



Photo monitoring site 2.

No change to vegetation noted



Photo monitoring site 3.

Noticeable increase in shrub density within the site.



Landholder Annual Report signature and declaration

I hereby declare that the information supplied in this report is accurate and complies with the reporting requirements specified in Section 7 of Attachment 4 of the Biodiversity Stewardship Agreement.

All landowners must sign this annual report. If the land that forms the Biodiversity Stewardship Site is owned by multiple persons landowners may confirm in writing to the BCT that another person can complete and submit the annual report on their behalf.

Please submit a signed PDF version and a word version of your Annual Report submission to the BCT

Signed



Signed

Date 14/03/2023

Date

BCT approval of recommendations

Signature of auditor:

Authorisation signature:

Name of auditor:

Name of authorising officer:

Position of auditor:

Position of authorising officer:

Date:

Date:

Biodiversity Stewardship Site landholder annual report & BCT audit (passive management)

Audit details

Biodiversity stewardship agreement year: **2023**

Reporting period: **2022-2023**

BCT site inspection date (if required):

BCT Auditor:

BS agreement ID: **BA00415 Porters Road**

Landowner/site contact details: **David Dixon, 0414 330 490**

Property address: **1/565423, 143 Porters Road, Kenthurst**

BAM passive management actions		Annual report (landholder to complete)	BCT annual report audit	
Passive management actions as per Agreement	Management item description	Completion dates, actions undertaken and outcomes	Action completed Yes/No/N/A	Auditor comments and recommendations
1. Fire management	1.1 Implementation of the fire for conservation management plan	N/A until under active management. No actions taken to date. No fire within the BSA site boundary during the previous 12 month period. Last inspection 13/03/2023		
	2.1 Exclusion of grazing by Stock	No stock kept or located on property. No unauthorised grazing of stock noted. Last inspection 13/03/2023		
2. Grazing management	2.3 Removal of Stock when observed	N/A		
	2.1 & 2.2 Stock grazing in accordance with BSA restrictions	N/A		
	2.3 Removal of stock when contrary to BSA grazing restrictions	N/A		
	3.1 Retaining native vegetation	No disturbance to native vegetation in past 12 month period		

BAM passive management actions		Annual report (landholder to complete)	BCT annual report audit	
Passive management actions as per Agreement	Management item description	Completion dates, actions undertaken and outcomes	Action completed Yes/No/N/A	Auditor comments and recommendations
3. Native vegetation management	3.2 Burning of native vegetation	No burning of native vegetation in past 12 month period		
	3.4 Restricted use of fertilisers, pesticides and herbicides.	No use of fertilisers, pesticides or herbicides within the BSA site during the past 12 month period		
	3.6.4 Management of supplementary planting areas	N/A		
	3.6.5 Local provenance of plants used for supplementary planting and audit template	N/A		
4. Threatened species habitat management and enhancement	4.1 Protection of threatened species breeding habitat	No disturbance to any threatened species breeding habitat in the past 12 month period. The Porters Road BSA site is accessed via two locked gates which only RFS and property owners have keys for.		
8. Management of human disturbance	8.1 Removal, movement or use of dead timber	No removal, movement or use of dead timber within the BSA site in the past 12 month period		
	8.3 Removal or movement of rocks	No removal or movement of rocks in the past 12 month period		
	8.6 No storage or disposal of rubbish	No storage or disposal of rubbish within the BSA site in the past 12 month period		
	8.9 Maintenance of tracks and fences	No maintenance of tracks has occurred. The tracks within the BSA site are suitable for 4wd vehicle only. Maintenance is not expected to be required unless emergency services require access.		
9. Monitoring	9.2 Establishing and sampling photo-points	Photo points have been established. This is the fourth year of photo point monitoring.		
	9.4 Establishing vegetation integrity survey plots	Vegetation integrity survey plots have not been established.		

Additional site inspections

Management Actions		Landholder to complete	BCT annual report audit	
Description of additional site inspection or monitoring requirement	Required frequency	Completion dates, observations, actions undertaken and outcomes	Action completed Yes/No/N/A	Comments and recommendations by BCT
Inspection to determine percentage of living ground cover when grazing Stock.	Every 12 months	N/A		
Inspections to record grazing by Stock in accordance with Section 7A.2 of the management plan.	Every 3 months	N/A		
Inspections to document human disturbance, erosion or waste in accordance with Section 7A.2 of the management plan.	Every 6 months	The Porters Road site is currently inspected annually. There has been no human disturbance, erosion or waste noted within the site with last inspection being on the 13/03/2023		
Inspection to document the condition of fences and gates in accordance with Section 7A.2 of the management plan.	Every 12 months	The access into the Porters Road BSA site is via two locked RFS gates. The RFS may periodically inspect these gates and locks. The last inspection of the locked gates by the landowners representative was on the 13/03/2023		

Details of incidents or events that have had an adverse effect on biodiversity values on biodiversity stewardship site (landholder to complete)

Description of incident or event (e.g. natural events)	Actions taken and/or recommended actions
No incident	

Any other comments or observations regarding the biodiversity stewardship site (landholder to complete)

Photo monitoring site 1.

No change noted within the site over the past 12 month period



Photo monitoring site 2.

No change noted within the site over the past 12 month period

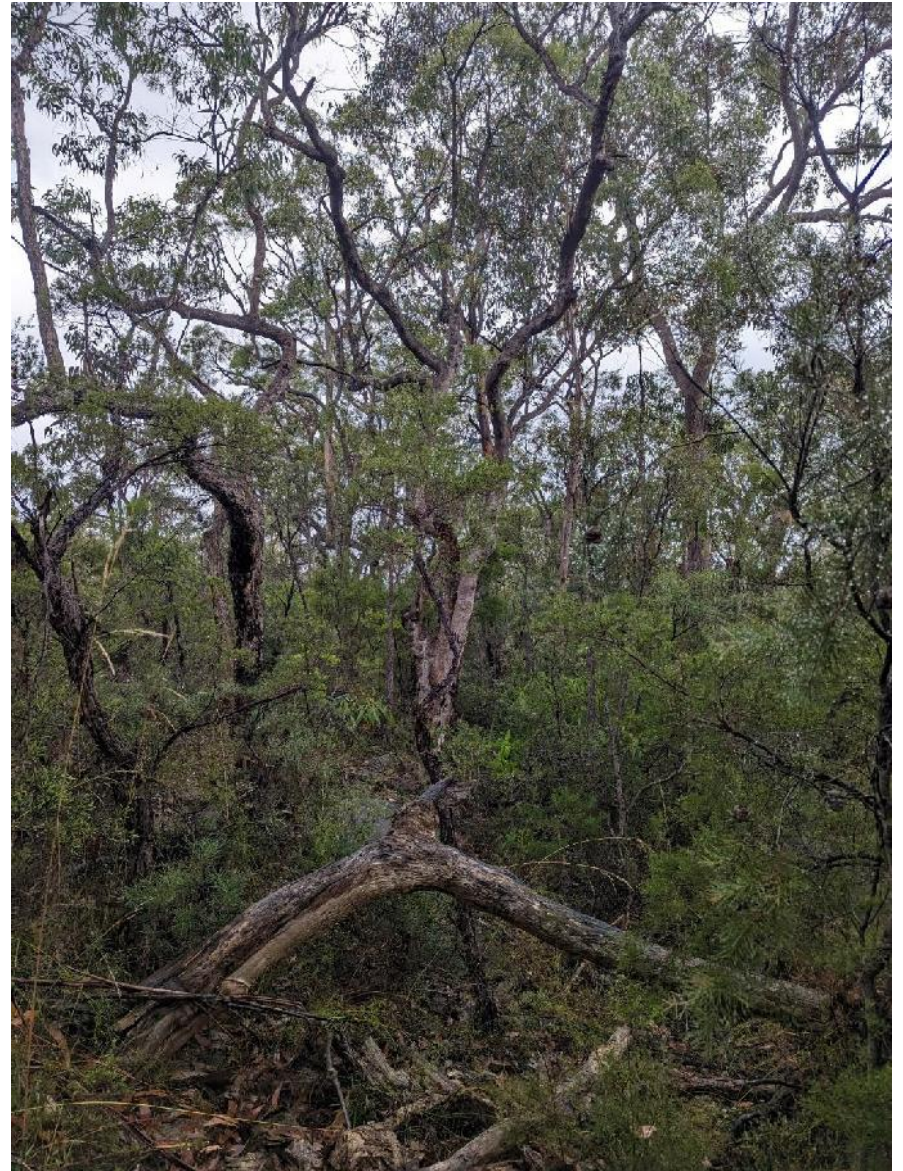
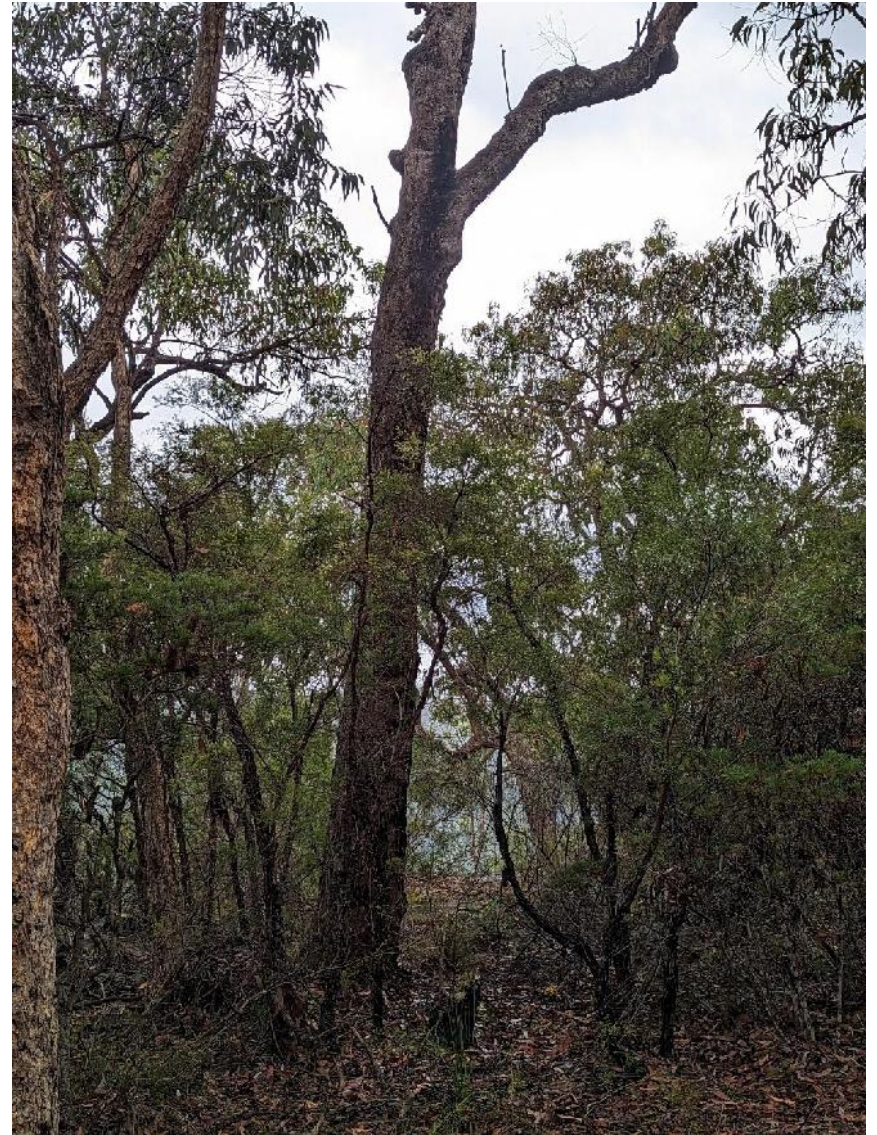


Photo monitoring site 3.

No change noted within the site over the past 12 month period



Landholder Annual Report signature and declaration

I hereby declare that the information supplied in this report is accurate and complies with the reporting requirements specified in Section 7 of Attachment 4 of the Biodiversity Stewardship Agreement.

All landowners must sign this annual report. If the land that forms the Biodiversity Stewardship Site is owned by multiple persons landowners may confirm in writing to the BCT that another person can complete and submit the annual report on their behalf.

Please submit a signed PDF version and a word version of your Annual Report submission to the BCT

Signed



Signed

Date 14/03/2023

Date

BCT approval of recommendations

Signature of auditor:

Authorisation signature:

Name of auditor:

Name of authorising officer:

Position of auditor:

Position of authorising officer:

Date:

Date:

Appendix J – Example of S94 Contribution



SECTION 94 CONTRIBUTION

SAND & SANDSTONE SALES SEPTEMBER 2022

1	304.50
2	101.32
3	
5	175.62
6	195.08
7	382.48
8	71.62
9	362.04
10	
12	152.46
13	349.08
14	225.23
15	85.50
16	141.30
17	94.26
19	94.96
20	123.12
21	77.34
22	
23	190.25
24	
26	24.06
27	173.62
28	389.16
29	286.48
30	31.48

4,030.96

Tonnes @ \$1.10
\$4,434.06

Appendix K – Community Engagement and CCC Meeting Minutes



DIXON SAND

MINUTES OF THE BI-ANNUAL COMMUNITY CONSULTATIVE COMMITTEE WEDNESDAY 9 NOVEMBER 2022 GLENORIE RSL CLUB

PRESENT	NAME	ORGANISATION
	Lisa Andrews (LA)	Independent Chairperson
	Kristine McKenzie (KM)	The Hills Shire Council Representative
	Daniel Giffney (DG)	The Hills Shire Council Representative
	Pat Schwartz (PS)	Community Representative
	Lisa Aylward (LAY)	Maroota Public School Representative
	Hunny Churcher (HC)	Environmental Officer, Dixon Sand
	Mark Dixon (MD)	Dixon Sand
	Melissa Mass (MM)	Dixon Sand - Ecologist
	David Dixon (DD)	General Manager, Dixon Sand
	Timothy Baker (TB)	Bush Regeneration Contractor (Bush-It)
	Farley Roberts (FR)	Community Representative
	Jamie Baker (JB)	Dixon Sand - Business Development Manager <i>[observer]</i>
	Tiarna Schinella (TS)	The Hills Council (Trainee EHO) <i>[observer]</i>
	Zoe Ridgway (ZR)	Bush-It alternate representative <i>[observer]</i>
APOLOGIES	Jemma Roberts (JR)	Community Representative (alternate)
	Robert Buckham (RB)	The Hills Shire Council Representative


WELCOME & INTRODUCTION	LA opened the meeting at 1pm following a light luncheon. All members were welcomed and LA acknowledged that HC was attending the meeting in person. LA introduced Zoe Ridgway, Jamie Baker and Tiarna Schinella as observers.												
DECLARATIONS OF INTEREST	LA declared that she is approved by the Department of Planning and Environment to chair the meeting and engaged by Dixon Sand.			No changes to previous declarations by members.									
BUSINESS ARISING FROM PREVIOUS MEETING (12/5/21)	<table><tr><th>Item</th><th>Issue</th><th>Responsibility</th></tr><tr><td>1</td><td>Follow-up response from Robyn Preston MP regarding the school zone (held over) – Nothing received back yet.</td><td>LA</td></tr><tr><td></td><td>KM to provide further information to MD on the diesel pump noise complaint. Following</td><td></td></tr></table>				Item	Issue	Responsibility	1	Follow-up response from Robyn Preston MP regarding the school zone (held over) – Nothing received back yet.	LA		KM to provide further information to MD on the diesel pump noise complaint. Following	
Item	Issue	Responsibility											
1	Follow-up response from Robyn Preston MP regarding the school zone (held over) – Nothing received back yet.	LA											
	KM to provide further information to MD on the diesel pump noise complaint. Following												

	<div> <div></div> <div>investigation it was determined that the complaint referred to an adjoining property. Dixon Sand passed on to the relevant person. Complete.</div> <div></div> </div>	
	No other business arising.	
CORRESPONDENCE (as emailed with Meeting Notice on 13/10/22 with 1 additional item)	<ul style="list-style-type: none"> 17/5/22 – Email from Robyn Preston MP's office stating that they are continuing to follow up The Hills Council for a response. 1/6/22- Draft minutes sent to members for review 14/6/22 – Email to members with the finalised minutes 8/7/22 – Email from HC advising that the Haerses Road Quarry - DA Modification 5 has been approved by DPE. 21/7/22 – Email from HC advising about the Haerses Road Quarry - EPBC 2015/7608 Variation of Conditions. 13/9/22 – Email from RWCorkery Co, appointed consultants, asking for input from CCC members on the IEA process. Forwarded to CCC members for feedback. 5/10/22 – Email to RWCorkery Co advising that no comments had been received from CCC members for inclusion in the Independent Audit. 5/10/22 – Email from HC advising that the Dixon Sand Quarries - Annual Review 2021-2022 are available on the project website. 13/10/22 – Email to CCC members with the Meeting Notice, Agenda, and Correspondence Report for this meeting and seeking interest in a site inspection. Responses received. 17/10/22 – Email to CCC members confirming that site inspection will proceed following the CCC. 7/11/22 – Email to members with the reminder for this meeting. 	
PROJECT REPORT, INCLUDING PRODUCTION/SALES	<p>DD advised that ONR's current operations are slowly shifting some products to Haerses Rd. Trying to balance out between the two sites to have a good run to Christmas.</p> <p>Haerses Rd is shifting some product from ONR site for future expansion for brickies sand, sand stone cutting and building blocks. Currently in the initial stages with sales very strong; mainly with sporting fields and golf courses. The building industry is also going strong.</p> <p>Credits have been retired (2A & 3B), waiting on things to dry out as it is too wet to get machinery in. Pre-clearance surveys will need to be redone prior.</p>	Questions asked and answered throughout the presentation.
HAERSES ROAD QUARRY (DEVELOPMENT CONSENT – MOD 5)	<p>MOD 5 was approved in June.</p> <ul style="list-style-type: none"> Relocation of the approved site office, maintenance shed and weighbridge to the Tertiary Sand extraction area in Stage 2 Minor increase in footprint of the site infrastructure envelope New extraction method within Sandstone Extraction Areas A and B using an excavator with 	See – Slides 9-10 (map)

	<p>an enclosed (less noise) hydraulic circular saw attachment to produce large blocks of sandstone to supplement the approved dozer ripping method.</p> <ul style="list-style-type: none"> ○ Designated Sandstone cutting workshop 	
ONR – Mod 6 Extraction within Crown Land – Old Northern Rd Quarry Lot 196	<p>ONR - Mod 6 proposal - Extraction within existing cells to maximise resource.</p> <ul style="list-style-type: none"> • Dixon Sand currently extracting within Crown Lands under Mod 3 approval "Cons Hills" to within 2m of active groundwater level. • Dixon Sand holds current agreement with Crown Lands to extract remaining resource within Lot 196 in Crown Land subject to approval by consent authority. Resource >5 mill tonne • Proposal is for further extraction of sand and sandstone materials within the existing previously extracted cells to greater depth utilising existing site infrastructure/existing movements • maximise resource of existing extraction cells within groundwater limits • no changes to development outputs (truck movements, plant processing rates) • Cells to be rehabilitated using tailings and importation of clean fill for rehab (VENM/ENM) • Update Noise and Air Quality assessments for compliance with latest legislation <p>DD explained that Lot 196 is leased but the first 15.24m of land is free hold, then the rest is Crown Land, which holds about 6-8Mt of resource.</p> <p>PS asked what the overburden was. MD responded that it was silt, no trees, with sandstone below 5-6m.</p> <p>DD commented that works need to stay above the aquifer.</p>	See – Sides 11(map) -12
ENVIRONMENTAL MONITORING RESULTS	Maps and explanation of points for environmental monitoring.	See Maps in Slides: 13-18
TEOM DATA	<ul style="list-style-type: none"> ○ TEOM and Meteorological station records PM10 levels and weather data such as rain, temperature, wind etc. ○ Monitoring Criteria – <ul style="list-style-type: none"> • 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 	See Slides 19-20 (map)

	<p>average (blue bars), and the prevailing wind is from the specific quadrant Dixon Sand is required to:</p> <ul style="list-style-type: none">• Notify EPA• Take immediate action to reduce PM10 levels• Stop works if levels do not fall below 42µg/m3 within 1 hour <p>○ TEOM station represent the EPL Points 1 & 3</p>													
DEPOSITIONAL DUST DATA	<p>Dust data for this monitoring period: Jul – Oct 2022</p> <table><tr><th>Location</th><th>Dust Gauge</th></tr><tr><td rowspan="4">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>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>	Location	Dust Gauge	Old Northern Road	D1A Access road	D4 Rehab area	D5 Bundwall	D7 Mullock Heap	Haerses Road	D8 Olive Grove	D10 Haerses Road (EPL Point 3)	D11 Receiver R6	D12 Receiver R8	See Slides 20-30 (maps)
Location	Dust Gauge													
Old Northern Road	D1A Access road													
	D4 Rehab area													
	D5 Bundwall													
	D7 Mullock Heap													
Haerses Road	D8 Olive Grove													
	D10 Haerses Road (EPL Point 3)													
	D11 Receiver R6													
	D12 Receiver R8													
NOISE MONITORING	<p>ONR & Haerses Rd:</p> <p>Tables of noise monitoring locations indicating: Receivers, property addresses, descriptions and extrapolated monitoring results.</p>	See Slides 31-36 For location of monitoring sites and summary of data.												
GROUND WATER MONITORING	<p>GW Monitoring wells</p> <ul style="list-style-type: none">• ONR 11 x BH• HR 9 x BH (original extraction in Tertiary Sand)• HR 13 x BH (100 MTSGS Buffer zone for Mod 1 extraction cells) <p>GW levels:</p> <ul style="list-style-type: none">• Monthly + continuous data loggers <p>GW quality sampling & lab analysis:</p> <ul style="list-style-type: none">• 6 monthly sampling and testing	Graphs explained - See Slides 37-51 (maps)												
SURFACE WATER MONITORING	<p>ONR</p> <ul style="list-style-type: none">• SW19 = Surface water monitoring at creek on Lot 196• LDP1 = EPL 3916 Licenced Discharge Point at Weir of Main Water Channel <p>HR</p> <ul style="list-style-type: none">• SW1 = Surface water monitoring at creek east of extraction Stage 2 East (inside the Biodiversity Offset Area)• SW2 = Surface water monitoring at creek west of extraction Cell 1A (Mod 1)• Basin 1	Graphs/Tables explained - See Slides 52-55												
BUSH REGENERATION WORKS	<p>TB provided the following presentation:</p> <p><u>Old Northern Rd Works Areas:</u></p> <p><u>Rehabilitation of Lot 196</u></p> <p>Challenges</p> <ul style="list-style-type: none">• Machinery-compacted soils on North-facing aspect• Extensive infestations of exotic tussock grass	See photographs in Slides 57-65												

	<p>Achievements:</p> <ul style="list-style-type: none"> • Treatment of exotic grass to prevent seed-set and spread. • Revegetation with shrubs and grasses. <p>Future Works</p> <ul style="list-style-type: none"> • Continued revegetation with locally endemic shrubs and grasses • Brush matting bare areas • Preparation of areas for small scale translocation of soil and leaf litter gathered in remnant bush adjacent to the site. <p><u>Assisted Regeneration - Native Vegetation Corridor (NVC)</u></p> <p>Challenges</p> <ul style="list-style-type: none"> • Minimal microbial and mycorrhizal fungi • Infestation of exotic grasses <p>Achievements</p> <ul style="list-style-type: none"> • Treatment of exotic grass has prevented seed-set and spread. • Propagation of brush-matted material <p>Future Work</p> <ul style="list-style-type: none"> • Continue to cull assertive shrub species to promote diversity • 25 Melaleuca deanii to be planted soon <p><u>Assisted Regeneration - Native Vegetation Corridor</u></p> <p>The 6 months to November has seen:</p> <ul style="list-style-type: none"> • Outstanding new growth of native species • Encouraging growth of Melaleuca deanii plantings • Excellent natural recruitment from the seed bank. • Selective dieback of certain species due to excessive moisture levels • Due to the wet conditions we have stayed off this area <p><u>Rehabilitation of Lot 2</u></p> <p>Challenges</p> <ul style="list-style-type: none"> • Excess nutrients, herbivory and BMAD • Extensive infestation of Bamboo, Lantana and exotic grass <p>Achievements</p> <ul style="list-style-type: none"> • Treatment of exotic grass to prevent seed-set and spread. • Control of Lantana in order to address BMAD • Bulk of the work has been undertaken here in the last 6 months due to access issues <p>Future Work</p> <ul style="list-style-type: none"> • Continued revegetation of disturbed grassy areas • 200 native canopy trees to be planted soon? 	<p>TB commented that it was the “best translocation site in Australia”.</p>
--	---	--

	<p>Assisted Regeneration - Haerses Road Biodiversity Offset</p> <p>Challenges</p> <ul style="list-style-type: none"> • Encroachment of invasive species along an extended edge and along drainage lines <p>Achievements</p> <ul style="list-style-type: none"> • Treatment of Crofton Weed along edge and down drainage lines • Manual treatment and minimal herbicide use has resulted in a dense buffer of native shrubs and canopy species. <p>Future Work</p> <ul style="list-style-type: none"> • Continued monitoring for incursions along the leading edge <p>Haerses Rd - Translocation</p> <p>Challenges</p> <ul style="list-style-type: none"> • Dominance of assertive native canopy species – Kunzea, Melaleuca and Acacia spp. • Infestation by invasive exotic grasses <p>Achievements</p> <ul style="list-style-type: none"> • Treatment of exotic grass to prevent seed-set and spread. • Select thinning of assertive native canopy species has promoted understorey natives. • Control of Crofton weed throughout <p>Future Work</p> <ul style="list-style-type: none"> • Continued treatment of grasses • Thinning of assertive native canopy <p>PS enquired if there were any yellow belly gliders? TB advised that he has heard them, but not seen them. FR advised that he has had some in his house. Discussions ensued regarding possible species.</p> <p>MD asked TB if they were ever asked to undertake controlled burns. TB stated that sometimes they work with RFS.</p> <p>DG recalled the 2019 bush fires and the impact that the smoke had on the seed banks causing regeneration.</p>	
<p>BIODIVERSITY AND REHABILITATION (Threatened Species Update)</p>	<p>MM provided the following presentation:</p> <p>Biodiversity and Rehabilitation Annual Report 2022</p> <p> The Biodiversity and Rehabilitation Annual Report for ONR 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.</p>	<p>See Slides 65 – 77 (see photographs)</p>

	<ul style="list-style-type: none"> The HR Biodiversity and Rehabilitation Annual Report identifies native flora and fauna onsite and monitors rehabilitation which is beginning to occur within the site. Both Biodiversity and Rehabilitation Annual Reports for 2022 were completed in September and submitted with the Annual Review on the 30th September. The results found the rehabilitation areas are thriving and increasing in diversity and density. Ideal growing conditions with favourable temperatures and regular rainfall has improved the overall biodiversity of the NVC and HRBOA sites. <p>Discussions regarding the <i>Melaleuca deanii</i>. There are 25 plants ready to go in the ground now, which will put the site up to 86 plants in the ground. MM commented that Dixon Sand were under no obligation to transport the <i>Melaleuca deanii</i> (old mother plant) and they should be commended for attempting to do this.</p> <p>DG commented on the genetic diversity of the plants as they may have a limited life span.</p> <p>DD informed the CCC that this is the bench mark site, compared to others.</p>	
INSPECTION AND ADMINISTRATIVE MATTERS	<p>Independent Environmental Audit</p> <ul style="list-style-type: none"> – October 2019 to October 2022 – Site Inspection on 18th October 2022. 	Slide 77
GENERAL BUSINESS	<ul style="list-style-type: none"> LAy asked if representations to Robyn Preston MP could include bigger signs (60km) as you come into Maroota where Sunrise Nursery is (corner Wisemans Ferry Rd & Old Northern Rd). Signs should be placed further back 	
MEETING SCHEDULE FOR 2023	<p>It was agreed that the CCC would continue to meet bi-annually (May and November), accordingly, LA proposed the following dates:</p> <ul style="list-style-type: none"> Wednesday 3 May 2023; and Wednesday 8 November 2023 <p>Glenorie RSL - 12.30pm with a light lunch, followed by the CCC commencing at 1pm.</p>	Agreed.

The meeting was closed at 2:32pm with the chair thanking all members for their attendance and as it was the last meeting for 2022, acknowledging their contribution throughout the year. Members were invited to drive to Haerses Rd Quarry to undertake the site inspection.

ACTION ITEMS.

Item	Issue	Responsibility
1	Follow-up response from Robyn Preston MP regarding the school zone (held over) and include request for larger 60kph signs (near corner of Wisemans Ferry Rd and Old Northern Rd)	LA



DIXON SAND

MINUTES OF THE BI-ANNUAL COMMUNITY CONSULTATIVE COMMITTEE WEDNESDAY 3 MAY 2023 GLENORIE RSL CLUB

	NAME	ORGANISATION
PRESENT	Lisa Andrews (LA)	Independent Chairperson
	Lisa Aylward (Lay)	Maroota Public School Representative
	Hunny Churcher (HC)	Environmental Officer, Dixon Sand
	Mark Dixon (MD)	Dixon Sand
	Melissa Mass (MM)	Dixon Sand - Ecologist
	Farley Roberts (FR)	Community Representative
	Robert Buckham (RB)	The Hills Shire Council Representative
APOLOGIES	Jemma Roberts (JR)	Community Representative (alternate)
	Kristine McKenzie (KM)	The Hills Shire Council Representative
	Pat Schwartz (PS)	Community Representative
	David Dixon (DD)	General Manager, Dixon Sand
	Timothy Baker (TB)	Bush Regeneration Contractor (Bush-It)

WELCOME & INTRODUCTION	LA opened the meeting at 1.05pm 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 and Environment to chair the meeting and engaged by Dixon Sand.		No changes to previous declarations by members.						
BUSINESS ARISING FROM PREVIOUS MEETING (9/11/22)	<table border="1"><thead><tr><th>Item</th><th>Issue</th><th>Responsibility</th></tr></thead><tbody><tr><td>1</td><td>Follow-up response from Robyn Preston MP regarding the school zone (held over) and include request for larger 60kph signs (near corner of Wisemans Ferry Rd and Old Northern Rd). – LA advised that she has contacted Ms Preston’s office twice since the last meeting and has received no response to date, noting that the original contact was made 3 years ago.</td><td>LA</td></tr></tbody></table> <p>No other business arising.</p>		Item	Issue	Responsibility	1	Follow-up response from Robyn Preston MP regarding the school zone (held over) and include request for larger 60kph signs (near corner of Wisemans Ferry Rd and Old Northern Rd). – LA advised that she has contacted Ms Preston’s office twice since the last meeting and has received no response to date, noting that the original contact was made 3 years ago.	LA	LAY advised that she had lodged a request through Fulton Hogan who have cleared some of the vegetation around the signs and agreed to change them. Complete.
Item	Issue	Responsibility							
1	Follow-up response from Robyn Preston MP regarding the school zone (held over) and include request for larger 60kph signs (near corner of Wisemans Ferry Rd and Old Northern Rd). – LA advised that she has contacted Ms Preston’s office twice since the last meeting and has received no response to date, noting that the original contact was made 3 years ago.	LA							

<p>CORRESPONDENCE (as emailed with Meeting Notice on 5/4/23 with 3 additional items)</p>	<ul style="list-style-type: none"> • 18/1/23 – Email from HC advising that the Dixon Sand Quarries has submitted its 2022 Independent Environmental Audit Reports and Proposed Actions to DPIE which are available on the project website. • 21/11/22- Draft minutes sent to members for review • 30/11/22 – Email to members with the finalised minutes. • 18/1/23 – Email to Robyn Preston MP following up previous representations and asking for larger 60kph signs to be erected on the corner (near corner of Wisemans Ferry Rd and Old Northern Rd). • 5/4/23 – Email to CCC members with the Meeting Notice, Agenda, and Correspondence Report for this meeting. • 28/4/23 – Email from HC with the information and letter to DPE regarding Modification 6 for DA 165-7-2005 for Haerses Road Quarry. • 1/5/23 – Email to Robyn Preston MP, following up again. We are now at the 3 year anniversary. • 2/5/23 – Email to members with the reminder for this meeting. 	
<p>PROJECT REPORT, INCLUDING PRODUCTION/SALES</p>	<p>MD advised that activities have been very busy on site with the building industry doing well. Sandstone blocks are coming out of Haerses Rd with the ones from ONR taken to Haerses Rd to finish off. Following approval of the Wash/Dry Plant in 2018 Stage 1 has now reached practical completion. The plant was designed and built by Rhomberg Sersa Australia under turnkey project with project permits and certification from Hills Shire Council and Urban City Group respectively. Will now be able to wash sand at Haerses Rd so each site will be stand alone.</p> <p>HC stated that Jamie advised that sandstone sales have increased due to regaining access to extraction pit areas which were flooded following the wet weather periods. Sales have therefore increased. In December 2022, Dixon Sand adopted the "Clearway" software which is recommended by the EPA and used extensively in the haulage and material tracking industry. The software tracks truck movements etc and provides live data. Information can go straight from the weighbridge to accounts, streamlining the system. Will soon update to include number plate recognition.</p> <p>MD advised that the consent has the ability to use clean VENM/ENM to assist with rehabilitation.</p> <p>HC stated that extraction at ONR is restricted to the same areas and increasing in depth. Extraction at</p>	<p>Questions asked and answered throughout the presentation.</p>


	<p>Haerses Road currently occur in Stages 1 and 2 (Tertiary sand, original DA) and Cells 1A, 1B, 2B and 3B (Friable sandstone, Mod 1 extraction area) Dixon Sand has retired enough biodiversity credits for Extraction Cells 1A, 1B, 2A, 2B & 3B, and looking to purchase 4B next.</p>	
<p>ONR – Proposed DA Mod 6 - Extraction within existing cells to maximise resource</p>	<ul style="list-style-type: none"> • 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. <p>Timeline</p> <ul style="list-style-type: none"> ○ 17 January 2023 - Scoping letter lodged with DPE ○ 21 March 2023 - DPE confirms pathway of modifying consent under section 4.56 of the EP&A Act. <p>DPE requests in addition to the matters identified in the scoping letter for the Modification Report to include:</p> <ul style="list-style-type: none"> ○ A traffic assessment that considers the growth in background traffic over the period of the proposed extension; and ○ An updated rehabilitation and final landform assessment that takes into account the proposed increase in extraction depth. 	<p>Sides: 9 & 10</p>
<p>Haerses Rd Quarry – Proposed Mod 6.</p>	<p>Dixon Sand has signed the lease agreement with Crown Lands extending the life of the activities and resource.</p> <p>Proposed Modification:</p> <ul style="list-style-type: none"> • Relocate the Site Building Envelope from the current approved location on Lot 177 (as per Mod 5) approximately 90m north within Lot 176 • Relocate the Site Office to the existing residence on Lot A DP 407341 <p>The Proposed Modification is sought under section 4.55(1A) of the EP&A Act on the basis that the proposed modification is of minimal environmental impact.</p> <p>CCC notified on 28 April 2023.</p> <p>Modification Report and Application lodged with DPE on 1 May 2023.</p>	<p>Slides: 11 & 12</p>

ENVIRONMENTAL MONITORING RESULTS	HC commenced by explaining the locations of all the monitoring points and the schedule for conducting the monitoring.	Slides: 13-18												
TEOM DATA	<p>HC explained the TEOM data and measurement criteria.</p> <ul style="list-style-type: none">TEOM and Meteorological station records PM10 levels and weather data such as rain, temperature, wind etc.Monitoring Criteria –<ul style="list-style-type: none">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:<ul style="list-style-type: none">Notify EPATake immediate action to reduce PM10 levelsStop works if levels do not fall below 42µg/m3 within 1 hourTEOM station represent the EPL Points 1 & 3	Slides: 19-20												
DEPOSITIONAL DUST DATA	<p>Dust data for this monitoring period: Jul 2022 – April 2023:</p> <table><tr><th>Location</th><th>Dust Gauge</th></tr><tr><td rowspan="4">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>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>	Location	Dust Gauge	Old Northern Road	D1A Access road	D4 Rehab area	D5 Bundwall	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: 21-30 (maps)
Location	Dust Gauge													
Old Northern Road	D1A Access road													
	D4 Rehab area													
	D5 Bundwall													
	D7 Mullock Heap													
Haerses Road	D8 Olive Grove													
	D10 Haerses Road (EPL Point 3)													
	D11 Receiver R6													
	D12 Receiver R8													
NOISE MONITORING	<p>ONR & Haerses Rd:</p> <p>Tables of noise monitoring locations indicating: Receivers, property addresses, descriptions and extrapolated monitoring results.</p>	See Slides 31-35 For location of monitoring sites and summary of data.												
GROUND WATER MONITORING	<p>GW Monitoring wells</p> <ul style="list-style-type: none">ONR 11 x BHHR 22 x BH <p>GW levels:</p> <ul style="list-style-type: none">Monthly + continuous data loggers <p>GW quality sampling & lab analysis:</p> <ul style="list-style-type: none">6 monthly sampling and testing	Graphs explained - See Slides 36-50 (maps)												

	MD advised that DPE & DPI-Water agreed on the locations. Golder WSP have been engaged to review the groundwater levels and revise the Maximum Extraction Depth Maps for both quarries, following the Independent Environmental Audit which are carried out every 3 years.							
SURFACE WATER MONITORING	<p>ONR</p> <ul style="list-style-type: none">SW19 = Surface water monitoring at creek on Lot 196LDP1 = EPL 3916 Licenced Discharge Point at Weir of Main Water Channel <p>HR</p> <ul style="list-style-type: none">SW1 = Surface water monitoring at creek east of extraction Stage 2 East (inside the Biodiversity Offset Area)SW2 = Surface water monitoring at creek west of extraction Cell 1A (Mod 1)Basin 1. <p>No discharges have been carried out. All within criteria.</p>	Graphs/Tables explained - See Slides 51-54						
	<p>ONR – Licensed Discharge Point on the EPL 3916 (Main Water Channel)</p> <table border="1"><thead><tr><th colspan="2">EPL 3916 water quality criteria</th></tr></thead><tbody><tr><td>pH</td><td>TSS (mg/L)</td></tr><tr><td>4.5 – 6.5</td><td>50</td></tr></tbody></table> <p>No planned discharge of water during period: November 2022 – May 2023.</p>	EPL 3916 water quality criteria		pH	TSS (mg/L)	4.5 – 6.5	50	
EPL 3916 water quality criteria								
pH	TSS (mg/L)							
4.5 – 6.5	50							
BUSH REGENERATION WORKS	<p>Presented by HC & MM:</p> <p><u>Old Northern Rd Works Areas: Rehabilitation of Lot 196</u></p> <p>Challenges:</p> <ul style="list-style-type: none">Machinery-compacted soils on North-facing aspectMissing all native vegetation strata <p>Achievements:</p> <ul style="list-style-type: none">Treatment of exotic grass (mostly Whiskey Grass) to prevent seed-set and spread.Revegetation with shrubs and trees (plus couple of Melalueca deanei) to be undertaken in May this year. <p>Future Works:</p> <ul style="list-style-type: none">Continued revegetation with locally endemic trees, shrubs and grasses (creating dense enrichment nodes)Further weed control works. <p><u>Assisted Regeneration - Native Vegetation Corridor (NVC)</u></p>	See photographs in Slides 55-64						

	<p>Challenges</p> <ul style="list-style-type: none"> • Minimal microbial and mycorrhizal fungi • Infestation of exotic grasses <p>Achievements</p> <ul style="list-style-type: none"> • Treatment of exotic grass has prevented seed-set and spread. • Propagation of brush-matted material <p>Future Work</p> <ul style="list-style-type: none"> • Continue to cull assertive shrub species to promote diversity • Melaleuca deanii to be planted in May <p><u>Assisted Regeneration - Native Vegetation Corridor</u></p> <p>The 6 months to November has seen:</p> <ul style="list-style-type: none"> • Outstanding new growth of native species • Encouraging growth of Melaleuca deanii plantings • Excellent natural recruitment from the seed bank. <p><u>Rehabilitation of Lot 2</u></p> <p>Challenges</p> <ul style="list-style-type: none"> • Excessive surface water flows and waterlogged soils. • Extensive infestation of Bamboo, Lantana and exotic grass. <p>Achievements</p> <ul style="list-style-type: none"> • Treatment of exotic grass to prevent seed-set and spread. • Removal of Lantana and recovery of native species. <p>Future Work</p> <ul style="list-style-type: none"> • Continued revegetation of disturbed grassy areas • Follow-up work on Lantana needed asap. <p><u>Assisted Regeneration - Haerses Road Biodiversity Offset</u></p> <p>Challenges</p> <ul style="list-style-type: none"> • Encroachment of invasive species along an extended edge and along drainage lines <p>Achievements</p> <ul style="list-style-type: none"> • Treatment of exotic grass/Crofton Weed to prevent seed-set and spread. • Manual treatment and minimal herbicide use has resulted in a dense buffer of native shrubs and canopy species. <p>Future Work</p> <ul style="list-style-type: none"> • Continued monitoring for incursions along the leading edge <p><u>Haerses Rd - Translocation</u></p> <p>Challenges</p> <ul style="list-style-type: none"> • Dominance of assertive native canopy species – Kunzea, Melaleuca and Acacia spp. 	
--	--	--

	<ul style="list-style-type: none"> • Infestation by invasive exotic grasses (Common Couch in particular). <p>Achievements</p> <ul style="list-style-type: none"> • Treatment of exotic grass to prevent seed-set and spread. • Select thinning of assertive native canopy species has promoted understorey natives. • Control of Crofton weed throughout <p>Future Work</p> <ul style="list-style-type: none"> • Continued treatment of grasses • Thinning of assertive native canopy. <p>Haerses Rd – Visual buffer along Wisemans Ferry Rd (30m)</p> <p>Challenges</p> <ul style="list-style-type: none"> • Exposed to surrounding impacts and fairly degraded soil • Weed density relatively high <p>Achievements</p> <ul style="list-style-type: none"> • Treatment of exotic vines and Blackberry mostly. • Outstanding clearing/capping works by some skilful operator • Planted ~240 trees, shrubs and groundcovers <p>Future Work</p> <ul style="list-style-type: none"> • Continued monitoring and maintenance weed control work. 	
BIODIVERSITY AND REHABILITATION (Threatened Species Update)	<p>MM provided the following presentation:</p> <p>Biodiversity and Rehabilitation Annual Report 2022</p> <ul style="list-style-type: none"> ✚ The Biodiversity and Rehabilitation Annual Report for ONR 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 2022 Biodiversity and Rehabilitation Annual Report was completed in September and submitted with the Annual Review of 30th September 2022. ✚ 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 2 years has improved the overall biodiversity of the NVC and HRBOA sites. ✚ Survey works have begun for the preparation of the 2023 report. <p>BCT Reporting</p> <p>The Annual Management Report for year 4 was completed in March - Passive Management at Haerses Road and Porters Road Biobank sites.</p>	See Slides 65 – 73 (see photographs)

GENERAL BUSINESS	<ul style="list-style-type: none"> ○ FR advised that trucks are still travelling too fast along Wisemans Ferry Rd, but not the sand trucks. Usually the single cab trucks (demolition, etc). ○ LAy thanked DD for the retaining wall at the school. The landscaping logs were installed by Cameron from CameX Contractors who did a great job. 	
NEXT MEETING	 Wednesday 8 November 2023. Glenorie RSL - 12.30pm with a light lunch, followed by the CCC commencing at 1pm.	Agreed.

The meeting was closed at 2:39pm with the chair thanking all members for their attendance.

NO ACTION ITEMS.

Appendix L – Complaints Register

Dixon Sand (No. 1) Pty Ltd
Haerses Road Quarry
Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
Jul 2022	0	30 Aug 2022
Aug 2022	0	13 Sep 2022
Sep 2022	0	05 Oct 2022
Oct 2022	0	11 Nov 2022
Nov 2022	0	27 Dec 2022
Dec 2022	0	17 Jan 2023
Jan 2023	0	08 Feb 2023
Feb 2023	0	14 Mar 2023
Mar 2023	0	04 Apr 2023
Apr 2023	0	05 Apr 2023
May 2023	1	02 Jun 2023
June 2023	0	03 Jul 2023p
Total No. of Complaints	1	

Dixon Sand (No. 1) Pty Ltd - Complaints Register

Date Received	04/05/2023	Time	8:33 AM	Complaint Received By	Gabi Basto
Contact Methodology	Phone Call	Complaint Nature	Truck driving dangerously		
Issue(s) raised					
<p>The Complainant claimed that a truck + dog was driving dangerously on a local road which almost resulted in the complainant running off the road.</p> <p>The Complainant was unable to provide details which could be used to identify the truck + dog.</p> <p>The Complainant said they will contact the other local quarries regarding this complaint.</p>					
Recommendation(s)					
<p>Undertake a re-education campaign for truck drivers at both Old Northern Road and Haerses Road Quarries.</p>					
Outcome / Action(s) / Future Action(s)					
<p>Management Staff were informed of the complaint immediately.</p> <p>All truck drivers at both quarries were reminded of their:</p> <ul style="list-style-type: none">responsibility and requirement to comply with the driver induction, quarry traffic management plan, site speed limit, public road safety and road rules.Non-compliance procedures and the Local Maroota Traffic Management Policy i.e. disciplinary action leading to being banned by all signatory quarries. <p>The Complaint was contacted and informed that the Quarry had undertaken a truck driver re-education campaign.</p>					
Closed Out Date	04/05/2023	Closed Out By	Gabi Busto		

Appendix M – Waste and ENM/VENM Registers

Haerses Road Waste Tracking Register 2022-2023						
Date	Waste Type	Amount	Measurement	Contractor	Disposal / Recycle	Receipt No
01/07/20 - 30/06/21	Genral Solid Waste - putrescible	26	cubic metre	Council Waste Contractor	Disposal	Council Rate
11/08/2022	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9381
13/09/2022	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9407
15/09/2022	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9411
28/09/2022	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9417
20/10/2022	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9431
8/11/2022	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9444
25/11/2022	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9506
16/12/2022	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9518
10/01/2023	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9524
12/01/2023	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9527
16/01/2023	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9528
24/01/2023	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9535
25/01/2023	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9537
1/02/2023	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9538
2/03/2023	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9561
7/03/2023	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9565
26/04/2023	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9595
28/04/2023	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9599
29/05/2023	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9624
29/05/2023	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9626
20/06/2023	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9638
21/06/2023	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9640
01/07/20 - 30/06/21	General Solid Waste - recyclable	26	cubic metre	Council Waste Contractor	Recycle	Council Rate

Total	Non-Putrescible skip	70	m3
	Council Putrescible	26	m3
	Council Recycle	26	m3

Haerses Road Quarry - Material Transport Register

Material	VENM Owner	Transport Company	Registration No.	Transport Date	Tip Time	Batch No	Testing Certificate	Quantity (t)	Application
		No ENM / VENM imported in during July 2022 - June 2023 period							

Total Annual Quantity (2022 Calendar year) (t)	-
Total Quantity (FY 2022 - 2023) (t)	-

End of document