MACKA'S SAND PTY LTD

MACKAS SAND ANNUAL REVIEW 2021

January - December 2021

FINAL

March 2022

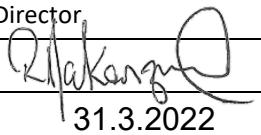
Annual Review Title Block	
Name of operation	Mackas Sand Project
Name of operator	Mackas Sand Pty Limited
Development Consent / Project Approval No.	PA 08_0142 (as modified)
Name of holder of development consent/project approval	Mackas Sand Pty Limited
Mining lease No.	No Mining Lease applicable to site under the *Mining Act* (1992).
Name of holder of mining lease	N/A
Water licence #	N/A
Name of holder of water licence	N/A
MOP/RMP start date	N/A
MOP/RMP end date	N/A
Annual Review start date	1 January 2021
Annual Review end date	31 December 2021

I, Robert Mackenzie, certify that this audit report is a true and accurate record of the compliance status of Macka's Sand Pty Ltd for the period 1 January 2021 to 31 December 2021 and that I am authorised to make this statement on behalf of Macka's Sand Pty Ltd.

Note.

a) *The Annual Review is an 'environmental audit' for the purposes of section 122B (2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, $1 million and for an individual, $250,000.*

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

Name of authorised reporting officer:	Robert MacKenzie
Title of authorised reporting officer:	Director
Signature of authorised reporting officer:	
Date:	31.3.2022

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1.0 Statement of Compliance

Mackas Sand Pty Limited (Mackas Sand) operate the Mackas Sand Project (the Project), a sand quarry on Lot 218/DP 1044608 and Lot 220/DP 1049608, located approximately 25 kilometres (km) north-east of Newcastle, near Salt Ash in the Port Stephens Local Government Area (LGA) of New South Wales (NSW). The Mackas Sand directors have operated sand extraction operations in the area since 1992.

Lot 218 and Lot 220 are owned by the Worimi Local Aboriginal Land Council, with the Project being operated under agreement with Mackas Sand.

This Annual Review provides a summary of Mackas Sands' operational performance against the approvals listed in **Table 1-1** over the period 1 January to 31 December 2021 (referred to hereafter as the reporting period).

The compliance of the operation against relevant approvals was managed during the reporting period by Mackas Sand and is summarised in **Table 1-1**. For the reporting period, 2 non-compliances were identified. These 2 non-compliances have been ranked according to the risk matrix included in **Table 1-3** and a brief description of each is provided in **Table 1-3**. Further information is provided in **Section 11.0**.

The 2021 Independent Environmental Audit (IEA) audit was undertaken between 3/06/2021 to 30/07/2021. The 2021 IEA was the fourth IEA for the Project and covered the period from 1/01/2018 to 31/05/2021. See **Section 10.0** for a full summary of non-compliances identified during the 2021 IEA.

As of December 2021, two IEA audit recommendation actions remain in progress. These recommendations relate to:

- Mackas Sand ensuring that inspections of high visibility fencing and any structures built to control public access are conducted and records of the inspections and outcomes are retained.
- Mackas Sand updating the complaints register to ensure that all required information is collected and documented.

The next audit is proposed to be undertaken in April 2024. Further details of which can be found in **Section 11.0.**

Table 1-1 Statement of Compliance

Relevant approval	All conditions complied with?
Development consent PA 08_0142	No – refer to **Table 1-3** for further details
Environment Protection Licence EPL 13218	No – refer to **Table 1-3** for further details
EPBC Approval 2011/6214	Yes
Hunter Water Corporation Regulation 2015 Clause 15(1)	No – refer to **Table 1-3** for further details

The non-compliances for the reporting period are detailed below in **Table 1-3**.

Table 1-2 Compliance Status Key (NSW Government, 2015)

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

Table 1-3 Non-Compliances During the Reporting Period

Relevant Approval	Condition No.	Condition Description	Compliance Status	Comment	Where addressed in Annual Review
PA 08_0142	Schedule 3, Condtion 18	Mackas Sand is required to prepare and implement the Soil and Water Management Plan.	**Low**	Groundwater quality monitoring results were above levels nominated in the Soil and Water Management Plan (Umwelt, 2014). DPE have been notified of the issue and no further action has been requested or undertaken.	**Section 11.1.1**
PA 08_0142	Schedule 3, Condtion 18	Mackas Sand is required to prepare and implement the Soil and Water Management Plan.	**Administrative**	The elevated groundwater quality monitoring result recorded at SP4 for iron during the September 2021 quarterly monitoring round was not reported to the DPE in accordance with Section 6.2 of the SWMP (Umwelt, 2014).	**Section 11.1.2**

2.0 Introduction

Mackas Sand was granted PA 08_0142 on 20 September 2009 by the Minister for Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to operate sand extraction operations at Lot 220 and Lot 218. It is estimated that in excess of 21 million tonnes of sand resource will be extracted from Lot 218 and Lot 220, with Lot 218 having an indefinite extraction life due to the ongoing movement of sand from the adjoining mobile dunes.

A modification to PA 08_0142 (MOD 1) was approved on 30 September 2013 by the then NSW Planning Assessment Commission (PAC) under delegation of the Minister for the former Planning and Infrastructure (DPI), now Department of Planning and Environment (DPE). The modification included a reduction in extraction level during operations, and the approval of an alternate route to access Lot 218. The alternate route connects directly from Lot 218, northward to Nelson Bay Road, as depicted within **Figure 2-1**.

A second modification to PA 08_0142, (MOD 2), was approved by the PAC on 16 March 2016. The modification allows for an increase in maximum hourly truck movements from Lot 218 via the approved alternate access road.

Mackas Sand submitted a modification application (MOD 3) during October 2020 which sought to temporarily increase the 2020 calendar year transportation limit of sand product from Lot 218 by 100,000 tonnes (increase of 10%) to assist with meeting the continued demand from construction and infrastructure projects across NSW. The modification however was withdrawn during January 2021 following timing constraints associated with the approval of the modification.

Mackas Sand has prepared this Annual Review document for the reporting period to meet the requirement of PA 08_0142 (as modified), Schedule 5, Condition 4. The report has been produced in accordance with the NSW Government *Annual Review Guideline: Post-approval requirements for State significant mining developments (October, 2015)*.

Requirements for the Annual Review under PA 08_0142 (as modified) are presented in **Table 2-1**.

Table 2-1 Project Approval Conditions for the Annual Review

Project Approval Condition	Section of Document
4. By the end of March each year, or other timing agreed by the Secretary, the Proponent shall review the environmental performance of the Project to the satisfaction of the Secretary. This review must:	**This Document**
a) **describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development that is proposed to be carried out over the next year.**	**Section 4.0** and **Section 8.0**
b) **include a comprehensive review of the monitoring results and complaints records of the project over the past calendar year, which includes a comparison of these results against the:** • **relevant statutory requirements, limits or performance measures/criteria** • **requirements of any plan, program or strategy required under this approval** • **monitoring results of previous years** • **relevant predictions in the EA and the EA (MOD 1).**	**Section 6.0**

Project Approval Condition	Section of Document
c) **identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to ensure compliance**	**Sections 1.0, 10.0** and **11.0**
d) **identify any trends in the monitoring data over the life of the project**	**Sections 6.0** and **7.0**
e) **identify any discrepancies between the predicted and the actual impacts of the Project, and analyse the potential cause of any significant discrepancies**	**Sections 6.0** and **7.0**
f) **describe what measures will be implemented over the current calendar year to improve the environmental performance of the Project.**	**Sections 6.0** and **12.0**

2.1 Quarry Contacts

The Mackas Sand Quarry Manager is responsible to the regulatory authorities for all aspects of environmental compliance at the site including day-to-day site environmental management, reporting, monitoring and supervision of operations including any environmental works.

The Quarry Manager contact details are listed in **Table 2-2.**

Table 2-2 Personnel Responsible for Environmental Management during 2021

Name	Position	Company	Contact Phone No.
Robert Mackenzie	Quarry Manager	Mackas Sand Pty Ltd	(w) 02 4982 6227 (m) 0408 490 911

Image Source: Nearmap (Jan 2021)

Legend

- Lot Boundaries
- Biodiversity Offset Area
- Approval Areas
- Approved Site Access (not-utilised)
- Approved Site Access (utilised)
- Approved Alternate Site Access (utilised)

FIGURE 2.1

Locality Plan

3.0 Approvals and Management Plans

3.1 Status of Approvals, Licences and Permits

The operation of the Mackas Sand quarry during the reporting period was regulated by a range of approvals and licences. **Table 3-1** provides a list of the relevant approvals, licences and their status for the reporting period.

Table 3-1 Current Approvals, Licences and Permits

Approval	Development	Date Granted	Expiry Date	Status	Authority
Project Approval 08_0142 (as modified)	Sand Extraction Operations from Lots 218 and 220, Salt Ash	20 September 2009	31 December 2029	Current	DPE
Department of Environment Approval EPBC 2011/6214	Construction and use of Alternate Access Road (Lot 218)	29 November 2013	31 December 2029	Current	DAWE
Environment Protection Licence 13218	Mackas Sand	24 December 2009	Renewed annually	Current	EPA
Hunter Water Regulation (2015) Approval	Mackas Sand	7 June 2012	31 December 2029	Current	DPE-Water

No changes were made to the above approvals, licences and permits during the reporting period. As noted in **Section 2.0**, Mackas Sand submitted MOD 3 to DPE during October 2020 which was withdrawn during January 2021 due to timing constraints associated with the determination of the approval.

3.2 Management Plans

In accordance with PA 08_0142 (as modified), Mackas Sand is required to implement a range of environmental management plans and the Environmental Management Strategy (EMS) for the Project.

Table 3-2 identifies the environmental management strategy and plans and their approval status as at the end of the reporting period.

Mackas Sand operated under a set of DPE approved environmental management plans during the reporting period.

In accordance with Schedule 5, Condition 4A, the respective management plans for the Mackas Sand quarry were reviewed during 2021 following the submission of the 2021 Independent Environmental Audit (IEA).

Table 3-2 Status of Management Plans

Management Strategy/Plan	Revision Date of the Approved Plan	Relevant Agency	Review Staus
Environmental Management Strategy (EMS)	July 2016	DPE	Reviewed following the submission of the 2021 Independent Environmental Audit Report (IEA) on 30 July 2021. – No update required.
Noise Management Plan (NMP)	November 2018	DPE	Reviewed following the submission of the 2021 Independent Environmental Audit Report (IEA) on 30 July 2021. – No update required.
Air Quality Management Plan (AQMP)	June 2018	DPE	Reviewed following the submission of the 2021 Independent Environmental Audit Report (IEA) on 30 July 2021. – No update required.
Soil and Water Management Plan (SWMP)	November 2014	DPE	Reviewed. Minor revision required to address 2021 IEA recommendation. Revision submitted to DPE 30 November 2021. Awaiting DPE approval.
Unexploded Ordnance Management Plan (UOMP)	September 2011	DPE	Reviewed following the submission of the 2021 Independent Environmental Audit Report (IEA) on 30 July 2021. – No update required.
Landscape and Rehabilitation Management Plan	April 2019	DPE	Reviewed. Minor revision required to address 2021 IEA recommendations. Revision submitted to DPE 30 November 2021. Awaiting DPE approval.
Aboriginal Cultural Heritage Management Plan (ACHMP)	July 2016	DPE	Reviewed following the submission of the 2021 Independent Environmental Audit Report (IEA) on 30 July 2021. – No update required.
Non-Indigenous Heritage Management Plan (IHMP)	July 2016	DPE	Reviewed following the submission of the 2021 Independent Environmental Audit Report (IEA) on 30 July 2021. – No update required.
Drivers Code of Conduct (DCoC)	December 2017	DPE	Reviewed following the submission of the 2021 Independent Environmental Audit Report (IEA) on 30 July 2021. – No update required.
Pollution Incident Response Management Plan (PIRMP)	April 2021	EPA	Reviewed following the PIRMP being tested on 15 December 2021. – No update required.

Management Strategy/Plan	Revision Date of the Approved Plan	Relevant Agency	Review Staus
EPBC Landscape Management Plan	December 2013	DAWE	Reviewed following the submission of the 2021 Independent Environmental Audit Report (IEA) on 30 July 2021. – No update required.
Operations Management Procedures	January 2014 [Draft]	Hunter Water Corporation	Reviewed following the submission of the 2021 Independent Environmental Audit Report (IEA) on 30 July 2021. – No update required.

Note: All references to management plans within this document refer to the current DPE approved version of the management plan unless specified.

4.0 Operations Summary

A summary of the operations undertaken at Mackas Sand Quarry during the report period is included in the following sections.

4.1 Extraction Operations

During the reporting period, sand extraction was undertaken at both Lot 218 and Lot 220. Due to changes in the demand for product, extraction operations at Lot 220 were reduced by 55%. An overview of the operations for each Lot is below.

There were no hydrocarbon spills recorded during the reporting period.

4.1.1 Lot 218

Sand extraction operations at Lot 218 commenced during February 2015 following the construction of an alternate haul route, as approved by Modification 1 of the Project Approval.

During the reporting period, there were no significant changes to operations in Lot 218. Sand extraction activities at Lot 218 were approximately 4% less than 2020 sand extraction activities. Overall, the sand extraction activities in Lot 218 operated at approximately 95% of the PA 08_0142 (as modified) product limit (1,000,000 tonnes). Sand continued to be extracted from the dune face using front end loaders, screened, and stockpiled before being transported offsite by road truck via the alternate haul route.

No trucks used the Lavis Lane haul route to enter or exit the site.

Extraction activities continued to progress to the east and west adjacent to the northern (i.e. landward) extraction boundary. With the extraction activities primarily undertaken at the eastern and western extremities of the extraction area, the approved sand resource has not been exhausted in either location (i.e. reached the full extent of the extraction boundary). Extraction activities are therefore continuing to progress in a linear fashion.

At the time of preparing this report, the lastest aerial imagery for Lot 218 was from July 2021. This aerial imagery shows that the western operations are around 1.1 km from the nearest residential receiver at Lavis Lane.

An automated traffic light system at the weighbridge servicing Lot 218 is used to manage vehicle movement compliance with the requirements of PA 08_0142 (as modified). In addition to this traffic light system, Mackas Sand completes a secondary validation process on the weighbridge logs to confirm compliance with truck movement Project Approval conditions.

4.1.2 Lot 220

Sand extraction operations in Lot 220 commenced during November 2009.

During the reporting period, due to changes in the demand for product, sand extraction activities at Lot 220 were reduced by approximately 55% in comparison to 2020 sand extraction activities. Overall, sand

extraction activities in Lot 220 operated at approximately 20% of the PA 08_0142 (as modified) product limit (1,000,000 tonnes). When the extraction of sand took place in Lot 220, the sand continued to be extracted primarily from the dune face by a front end loader. A mobile screen and stacker was utilised to process the excavated sand before it was loaded into a truck and transported offsite.

Active operations at Lot 220 are within 250 m of the nearest resident (R27). Operations conducted within 250 m of the R27 are undertaken within the hours outlined within Schedule 3 Condition 3 of PA 08_0142.

No land was cleared during the reporting period at Lot 220.

4.2 Extraction Depth and Extent Survey Control

Mackas Sand operates a GPS unit in at least one operating loader at Lot 218 and Lot 220 which is used to check the vertical and horizontal extraction limits of the active extraction/processing areas at each lot.

GPS checks have been supported by quarterly surveys. These surveys have confirmed that the extraction activities during the reporting period remained above the maximum extraction depth and also within the extraction boundary at Lot 218 and 220.

Copies of the quarterly surveys are provided in **Appendix 1**.

4.3 Production Limits

During the reporting period a total of 949,295 tonnes of product was transported from Lot 218 and 202,882 tonnes of product was transported from Lot 220. This is below the 1,000,000 tonnes per annum for each Lot permitted under PA 08_0142 (as modified).

Table 4-1 provides the annual amount of product transported for the 2020 and 2021 reporting years and a forecast for the 2022 reporting period. The 2020 and 2021 tonnages provided are based on the weighbridge data.

Table 4-1 Production Summary 2021 (Lot 218 and Lot 220)

Material	Approved Limit (Source – PA 08_0142 (as modified))	2020 Reporting Period (Actual Tonnes)	2021 Reporting Period (Actual Tonnes)	2022 Reporting Period (Forecast Tonnes)	Compliance with Approved Limit (Yes/No)
Total Saleable Product from Lot 218	1,000,000 tonnes from Lot 218	992,258	949,295	1,000,000	Yes
Total Saleable Product from Lot 220	1,000,000 tonnes from Lot 220	447,809	202,882	200,000	Yes
Total Saleable Product from Lot 218 and 220 combined	2,000,000 tonnes of product in a calendar year (1,000,000 tonnes from Lot 218; 1,000,000 tonnes from Lot 220).	1,440,067	1,152,177	1,200,000	Yes

4.3.1 Hours of Operations

Mackas Sand confirms that the extraction and haulage activities during the reporting period complied with the operating hours as detailed in Schedule 3, Condition 9 of the Project Approval (as modified).

Quarrying operations at Lot 220 are generally undertaken between 7:00am and 5:30pm Monday to Friday. Therefore, the need to hold an extended hours agreement with the owners of private residence R27 has not been triggered, as per Schedule 3, Condition 9(a) of the Project Approval (as modified).

Quarrying operations at Lot 218 are permitted 24 hours/7 days a week.

Mackas Sand holds agreements with the owners of specified residences on Nelson Bay Road and Oakvale Drive for extended trucking hours, in accordance with Schedule 3, Condition 9(a) of the Project Approval (as modified). Copies of these agreements have previously been provided to the DPE.

4.4 Construction and Demolition Activities

Mackas Sand did not import Excavated Natural Material (ENM) during the reporting period because there is currently an ENM stockpile onsite. ENM continues to be used onsite to construct trafficable surfaces and extension of haul routes within the Lot 218 and 220 extraction areas to:

- Allow for heavy vehicle movements; and
- Minimise trucks being bogged in the dune sand environment.

If the onsite ENM stockpile is exhausted, Mackas Sand will need to import nominal volumes of ENM for the ongoing development of internal haul roads during the next reporting period. Mackas Sand will note in the annual review for the next reporting period if it had to import ENM.

There were no demolition activities undertaken during the reporting period at Lot 218 or Lot 220.

4.5 2022 Report Period Extraction Operations

2022 is expected to see a continuation of sand extraction operations at both Lot 218 and Lot 220 in accordance with statutory approvals.

Mackas Sand does not expect any significant changes to quarrying methods during the next reporting period, related to that undertaken in 2021.

5.0 Actions Required from Previous Annual Review

In accordance with Schedule 5, Condition 4 of PA 08_0142 (as modified), the 2020 Annual Review was submitted to DPE on 31/03/2021.

DPE acknowledged their satisfaction with the 2020 Annual Review on 30 June 2021 and requested the following be included in future Annual Review documents:

1. *Locality Plan – please include the location of offset area(s)*

2. *Performance Criteria for the Biodiversity Offset Area – in accordance with Schedule 5, Condition 4(b):*
   a. Provide a comprehensive review of biodiversity offset area monitoring results in comparison to "Performance Criteria for the Biodiversity Offset Area" in Section 4.4 of the 2019 Landscape Management Plan including, but not limited to, the following performance criteria:
   i. the diversity or density of weed species compared to revised baseline results; and
   ii.orchid habitat disturbance either by natural processes or anthropogenic processes.

   b. Provide a comprehensive review of performance in relation to the requirements detailed in the 2019 Landscape Management Plan, including, but not limited to:
   i. the annual weed removal program described in section 4.2.2 of the Landscape Management Plan; and
   ii.the vertebrate pest management program described in section 4.2.2 of the Landscape Management Plan

The above requests have been addressed in **Figure 2-1**, **Section 6.5.4** and **6.5.5** of this report.

A summary of additional Mackas Sand management commitments made in the 2020 Annual Review, are provided in **Table 5-1**.

Table 5-1 Mackas Sand Response to Actions identified in 2020 Annual Review

Action	Status	Section	Comment
Continue to implement the requirements of the Mackas Sand VCA	Ongoing	**Section 6.5.2.2**	See **Section 6.5.2.2** for how Mackas Sand continues to implement the requirements of the Mackas Sand VCA recommendations.
Mackas Sand will implement the rehabilitation recommendations as noted in Section 8 of the Mackas Sand 2020 Annual Review. Progress against these recommendations will be reported in the 2021 Annual Review.	Completed Ongoing	**Section 8.0**	See **Section 8.0** for the progress on the rehabilitation recommendations which were noted in Section 8 of the Mackas Sand 2020 Annual Review.
Mackas Sand will review the Rehabilitation Bond following the completion of the 2021 IEA.	Completed.	**Section 8.4**	Mackas Sand reviewed the Rehabilitation Bond following the completion of the 2021 IEA and submitted it to DPE for approval on 30/11/2021.

6.0 Environmental Performance

The following sections provide a summary of environmental monitoring and management undertaken during the reporting period. In accordance with the *Annual Review Guideline* (NSW Government, 2015) this report contains a summary of environmental monitoring data where it is required to explain trends or environmental performance during the reporting period.

It is noted that environmental monitoring data has also been published on the Mackas Sand website (http://www.Mackassand.com.au) in accordance with Schedule 5, Condition 10 of the Project Approval.

A range of environmental monitoring is required to be undertaken by the Development Consent, EPL and management plans.

Figure 6-1 shows the Mackas Sand environmental monitoring locations.

Image Source: Nearmap (Jan 2021)

Legend

- Lot Boundaries
- Approval Area
- Approved Site Access (not-utilised)
- Approved Site Access (utilised)
- Approved Alternate Site Access (utilised)
- Noise Monitoring Location
- Dust Monitoring Location
- Groundwater Monitoring Location
- Residential Receivers
- Williamtown RAAF BOM Meteorological Station

FIGURE 6.1

Mackas Sand Monitoring Locations

File Name (A4): R113/1646_537.dgn
20200331 15.56

6.1 Noise

Noise management is undertaken in accordance with the Noise Management Plan (NMP) (Umwelt, November 2018). The NMP sets out the procedures and management measures to monitor, mitigate and assess the Project's noise impacts.

Mackas Sand holds agreements with the specified residences on Nelson Bay Road and Oakvale Drive for extended trucking hours and noise levels above that stated in the PA 08_0142 (as modified). Copies of these agreements have been provided to the DPE. Attended noise monitoring is undertaken at up to five representative receiver locations, as shown on **Figure 6-1**.

6.1.1 Environmental Assessment Predictions

Operational Noise

A Noise Impact Assessment (2009) was developed in support of the Mackas Sand Project Environmental Assessment (2009). The Noise Impact Assessment concluded that operational noise would remain within project specific noise criteria during all operational periods at all residential receivers nearest to Lot 218 and Lot 220, if project specific controls were put in place whilst operations were within 250 m of private residence R27.

Controls included limiting work to daytime only (7.00 am – 6.00 pm Monday – Saturday and 8.00 am-6.00 pm on Sundays and Public Holidays).

Sleep Disturbance

Predicted noise levels are expected to be less than the project specific noise criteria. The Noise Impact Assessment further stated that predicted noise levels are expected to comply with the recommended sleep disturbance noise goals at all residential receivers of 41dB(a) $L_{A1,1\ minute}$.

The noise impact assessment criteria specified in the PA 08_0142 (as modified) Schedule 3 Condition 4 that relate to operational noise generated specifically by sand quarrying are set out in **Table 6-1**.

Alternate Access Road Traffic Noise

Noise impact assessment criteria specified in the PA 08_0142 (as modified) Schedule 3 Condition 4A that relate to the Alternate Access Road are shown in **Table 6-2**.

Table 6-1 Industrial Noise Impact Assessment Criteria, dB(A)

Location	Day[1] $LA_{eq,15\ minute}$	Evening[1] $LA_{eq,15\ minute}$	Night[1] $LA_{eq,15\ minute}$	Night[1] $LA_{1,1\ minute}$
R18 – 300 Nelson Bay Road	39	39	40	45
R1 –Lavis Lane residence	39	39	39	45
R19 – 316 Nelson Bay Road	36	36	37	45
R26 – Residence opp. Oakvale Farm	36	36	35	45
R27 – Hufnagl residence	36	35	35	45
R17 – 287 Nelson Bay Road	35	35	36	45

Location	Day[1] $LA_{eq,15\ minute}$	Evening[1] $LA_{eq,15\ minute}$	Night[1] $LA_{eq,15\ minute}$	Night[1] $LA_{1,1\ minute}$
All other residences	35	35	35	45

Table 6-2 Alternate Access Road Noise Impact Assessment Criteria dB(A)

Location	Shoulder[1] $LA_{eq,15\ minute}$	Day [1] $LA_{eq,15\ minute}$	Evening[1] $LA_{eq,15\ minute}$
2344 Nelson Bay Road, Williamtown	38	40	40
2353 Nelson Bay Road, Williamtown	39	41	41
2367 Nelson Bay Road, Williamtown	36	38	38
2368 Nelson Bay Road, Williamtown	38	40	40
All other residences	35	35	35

Note 1: Day time is 7.00am to 6.00pm Monday to Saturday and 8.00 am to 6.00 pm Sundays and Public Holidays, evening is 6.00pm to 10.00pm (NSW Industrial Noise Policy (INP) EPA, 2000). Shoulder is the period from 5am to 7am on Monday to Friday, but only for the use of the Alternate access road (see Condition 4A of Schedule 3 of Project Approval 08_0142 MOD 2).

As noted in PA 08_0142 Schedule 3, Condition 4, the Alternate Access Road noise impact assessment criteria do not apply if Mackas Sand has an agreement with the relevant owner/s of these residences/land to generate higher noise levels, and Mackas Sand has advised the DPE in writing of the terms of this agreement.

Road Traffic Noise

The following noise criteria were assigned to road traffic from trucks servicing the Mackas Sand quarry using Lavis Lane, Oakvale Road and Nelsons Bay Road in PA 08_0142 (as modified), Schedule 3 Condition 7.

Table 6-3 Traffic Noise Impact Assessment Criteria, dB(A)

Road	Day/Evening	Night - Shoulder
Lavis Lane, Oakvale Drive	60 $LA_{eq,1\ hour}$	55 $LA_{eq,1\ hour}$
Nelson Bay Road	60 $LA_{eq,15\ hour}$	55 $LA_{eq,9\ hour}$

6.1.2 Noise Monitoring Results

In accordance with the NMP and EPL 13218 noise compliance monitoring is undertaken on an annual basis by a suitably qualified consultant. Monitoring is generally undertaken during winter to early spring as this is when noise propagation from the premises is likely to be at its worst.

During the reporting period monitoring was undertaken over three days being, 25, 26 and 27 August 2021, at the noise monitoring locations shown on **Figure 6-1**. These locations are representative of the nearest sensitive receivers to the extractive and haulage operations in accordance with NSW Industrial Noise Policy (EPA, 2000) and Australian Standard 1055:2018. For example, measurements of industrial noise levels at Site 6 are taken to be representative of industrial noise levels received at Site 5, as Site 5 is slightly farther than Site 6 from Lot 218 and from the Alternative Access Road.

In determining compliance, since noise levels reduce with increasing distance from a noise source, it is deemed that the noise level at receivers located further from Site 6, for example at Site 5 being located in approximately the same direction, would therefore be lower than noise levels measured at Site 6.

Table 6-4 2021 Night Time Industrial Noise Levels – Sand Extraction Activities versus Noise Criteria, dB(A)

Location	$LA_{eq,15\ minute}$		$LA_{1,1\ minute}$	
	Noise criteria	Mackas Sand noise level contribution	Noise criteria	Mackas Sand noise level contribution
Site 1	35	Inaudible	45	Inaudible
Site 2	35	Inaudible	45	Inaudible
Site 4	36	Inaudible	45	Inaudible
Site 5[1]	35	-	45	-
Site 6	35	Inaudible	45	Inaudible

[1] Monitoring not required as Site 6 is representative of Site 5 and if compliance is measured at Site 6 then compliance is achieved at Site 5.

Table 6-5 2021 Day Time Industrial Noise Levels – Sand Extraction Activities versus Noise Criteria, dB(A)

Location	$LA_{eq,15\ minute}$	
	Noise criteria	Mackas Sand noise level contribution
Site 1	36	< 30
Site 2	36	Inaudible
Site 4	35	Inaudible
Site 5[1]	35	-
Site 6	35	Inaudible

[1] Monitoring not required as Site 6 is representative of Site 5 and if compliance is measured at Site 6 then compliance is achieved at Site 5.

Table 6-6 2021 Evening Industrial Noise Levels –Sand Extraction Activities versus Noise Criteria, dB(A)

Location	$LA_{eq,15\ minute}$	
	Noise criteria	Mackas Sand noise level contribution
Site 1	35	Inaudible
Site 2	36	Inaudible
Site 4	36	Inaudible
Site 5[1]	35	-
Site 6	35	Inaudible

[1] Monitoring not required as Site 6 is representative of Site 5 and if compliance is measured at Site 6 then compliance is achieved at Site 5.

Table 6-7 2021 Industrial Noise Levels – Alternate Access Road to Lot 218

Location	Period	$LA_{eq,15\ minute}$	
		Noise criteria	Mackas Sand noise level contribution
Site 5	Day Time	41	-
Site 6	Day Time	40	36
Site 5[1]	Night Time/Shoulder	39	-

Location	Period	$LA_{eq,15\ minute}$	
		Noise criteria	Mackas Sand noise level contribution
Site 6	Night Time/Shoulder	38	38
Site 5[1]	Evening	41	-
Site 6	Evening	40	Inaudible

[1] Monitoring not required as Site 6 is representative of Site 5 and if compliance is measured at Site 6 then compliance is achieved at Site 5.

Table 6-8 Mackas Sand 1 hour Night and Day Time Road Traffic Noise Level Contribution versus Noise Criteria, dB(A)

Road	Period	Noise criteria $LA_{eq,\ 1hour}$	Noise level contribution $LA_{eq,1hour}$	
			Cnr Oakvale Dr and Nelson Bay Rd (Site 4)	2353 Nelson Bay Road (Site 6)
Lavis Lane, Oakvale Drive as measured at corner of Oakvale and Nelson Bay Road	Night	55	Inaudible	48
	Day	60	42	47

6.1.3 Trends in Data

2021 attended noise monitoring indicates that Mackas Sand was complying with the industrial and traffic noise criteria at all sites in accordance with PA 08_0142, Schedule 3 Conditions 4 to 8, and EPL 13218 Condition L3.

The 2021 annual noise monitoring results are consistent with the long term trend of complying with the industrial and traffic noise criteria at all sites in accordance with PA 08_0142, Schedule 3 Conditions 4 to 8, and EPL 13218 Condition L3.

6.1.4 Proposed Improvements or Actions for the Next Reporting Period

No additional management or mitigation measures are proposed to be implemented which are outside the NMP.

6.2 Air Quality

Air quality monitoring is undertaken in accordance with the approved Air Quality Management Plan (AQMP) (Umwelt, June 2018) which sets out the procedures and mitigation measures for the management of dust. The air quality monitoring network consists of two dust deposition gauges (DDG1 and DDG2), which are used to measure depositional dust on a monthly basis (refer **Figure 6-1**).

Particulate Matter (PM_{10}) and Total Suspended Particulate (TSP) monitoring are not currently undertaken. The trigger for commencing PM_{10} and TSP monitoring is the receipt of a written request from Resident R27, the nearest residential receiver to operations at Lot 220. As of the end of the reporting period, R27 had not issued such a request.

Previous years have demonstrated that Aeolian transport of dune sand during periods of high winds result in conditions where deposition levels can naturally exceed the air quality impact assessment criteria of 4 g/m^2/month.

6.2.1 Environmental Assessment Predictions

An Air Quality Impact Assessment (2009) was developed in support of the Mackas Sand Project Environmental Assessment (2009) (EA). The Air Quality Impact Assessment considered the direct and cumulative air quality impacts associated with the Project's ongoing operations. Modelling was undertaken which concluded that dust control measures at Lot 218 and Lot 220 would be required to remain within relevant compliance limits for PM_{10}, TSP and Depositional Dust. As noted in the EA, the primary source of the dust generation at Mackas Sand was predicted to be from Wheel Generated Dust (Haulage). The alternate access road has been fully sealed to mitigate the risk of dust generation from this potential source.

Air Impact Assessment Criteria are specified in Schedule 3 Condition 11 of PA 08_0142 (as modified). These criteria are used to assess the environmental performance of the Project and are represented in **Table 6-9** to **Table 6-11.**

Table 6-9 Long term Impact Assessment Criteria for Particulate Matter

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

Table 6-10 Short term Impact Assessment Criterion for Particulate Matter

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

Table 6-11 Long term Impact Assessment Criteria for Deposited Dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 g/m^2/month	4 g/m^2/month

6.2.2 Air Quality Monitoring Results

Twelve depositional dust gauge samples were collected during the reporting period on approximately a monthly basis from each of the monitoring location DDG1 and DDG2. The monthly and annual average results for DDG1 and DDG2 are shown in **Table 6-12** and **Table 6-13**.

Table 6-12 Total Dust Deposition Levels at DDG 1 – Lot 220 (g/m^2/month)

Sample date:	Exposure Period (Days)	Ash Content g/m^2/month	Total Insoluble Matter g/m^2/month
28/01/2021	32	0.5	0.8
27/02/2021	30	8.1	12.8

Sample date:	Exposure Period (Days)	Ash Content g/m²/month	Total Insoluble Matter g/m²/month
27/03/2021	28	2.5	5.6
25/04/2021	29	0.5	1.1
26/05/2021	31	0.3	0.7
26/06/2021	31	4.7	6.4
27/07/2021	31	1.0	1.6
26/08/2021	30	0.5	0.7
26/09/2021	31	0.5	0.8
27/10/2021	31	0.2	0.2
26/11/2021	30	0.1	0.1
24/12/2021	28	1.8	2.8
Annual Average			**2.8**

Table 6-13 Total Dust Deposition Levels at DDG 2 – Lot 218 (g/m²/month)

Sample date:	Exposure Period (Days)	Ash Content g/m²/month	Total Insoluble Matter g/m²/month
28/01/2021	32	0.4	0.5
27/02/2021	30	5.2	7.6
27/03/2021	28	1.0	3.5
25/04/2021	29	0.3	0.6
26/05/2021	31	0.3	0.7
26/06/2021	31	0.7	0.8
27/07/2021	31	1.6	1.7
26/08/2021	30	0.8	1.2
26/09/2021	31	13.3	13.4
27/10/2021	31	8.7	8.9
26/11/2021	30	25.5	26
24/12/2021	28	11.3	11.4
Annual Average			**6.4**
Annual Average (excluding September and November 2021 results)			**3.7**

6.2.3 Trends in Data

The monthly results during the reporting period for DDG1 range from 0.1 g/m²/month to 12.8 g/m²/month, with an annual average of 2.8 g/m²/ month. The monthly results for DDG2 varied from 0.5 g/m²/month to 26 g/m²/ month, with an annual average of 6.4 g/m²/ month.

Table 6-14 provides a comparison of annual average deposition dust monitoring data for the previous five years. The 2021 DDG1 annual average of 2.8 g/m²/month is the highest recorded since 2016. The 2021 DDG2 annual average of 6.4 g/m²/month is the highest recorded since 2016. The DDG2 average was largely influenced by the September and November results and, to a lesser extent, elevated results in October and December. A combination of factors are suspected to have contributed to the elevated annual average. Mackas Sand notes that sand extraction activities increased in intensity at Quality Sands and Ceramics, a sand quarry adjacent to Lot 218, during September to December 2021, and may have impacted deposited dust results at DDG2. It is also possible agricultural works such as slashing on adjacent properties may have influenced the results recorded at DDG2. Furthermore, DDG2 is located North of the Lot 218 operations and the wind direction during September, October and November 2021 was predominately coming from the North i.e background activities not related to Mackas Sand operations had the potential to impact DDG2.

Given there have been no major operational changes on Lot 218 during the reporting period, the elevated results are not considered to be attributable to Mackas Sand operations. Excluding the September and November results, the 2021 annual average at DDG2 is 3.7 g/m2/month.

No community complaints relating to operational dust or air quality were received by Mackas Sand during the report period. Mackas Sand will continue to monitor deposited dust levels in accordance with the (AQMP) (Umwelt, June 2018) in 2022.

Table 6-14 Annual Averages for Dust Deposition 2016-2021

Year	Total Insoluble Solids (g/m2/month)	
	DDG1 (Lot 220)	DDG2 (Lot 218)
2016	1.3	1.6
2017	2.0	2.5
2018	1.6	1.7
2019	1.7	3.4
2020	0.9	5.3
2021	2.8	6.4, adjusted 3.7 (see description in **Section 6.2.3**)

6.2.4 Proposed Improvements or Actions for the Next Reporting Period

No additional management or mitigation measures are proposed to be implemented which are outside the approved AQMP.

6.3 Meteorology

Meteorological data is collected from the Bureau of Meteorology station at the nearby Williamtown RAAF Base (Station 061078). As shown on **Figure 6-1**, Station 061078 is located approximately 5.3 km north-west of Lot 218 and 7.8 km west of Lot 220 and has been active prior to the commencement of operations at Lot 218 and Lot 220.

6.3.1 Rainfall

Rainfall data for 2021 is summarised **Table 6-15**. **Figure 6-2** provides a comparison of monthly rainfall from 2018-2021. During the reporting period, 1547 mm of rainfall was recorded across 132 days. Approximately 56% of the annual recorded rainfall was experienced during January, March, and November 2021.

Table 6-15 Monthly Rainfall and Number of Rain Days during 2021

Month	Rainfall (mm)	Highest Daily (mm)	Rain Days (i.e. >0.2 mm)
January	186.2	50.6	10
February	156.6	29.2	17
March	459.0	96.4	20
April	68.6	40.2	5
May	90.6	31.4	11
June	103.8	30.8	13
July	43.0	24.8	9
August	48.2	22.2	7
September	84.8	39.8	8
October	73.6	23.6	9
November	213.2	56.8	15
December	19.4	10.0	8
TOTAL	**1547.0**	**455.8**	**132**

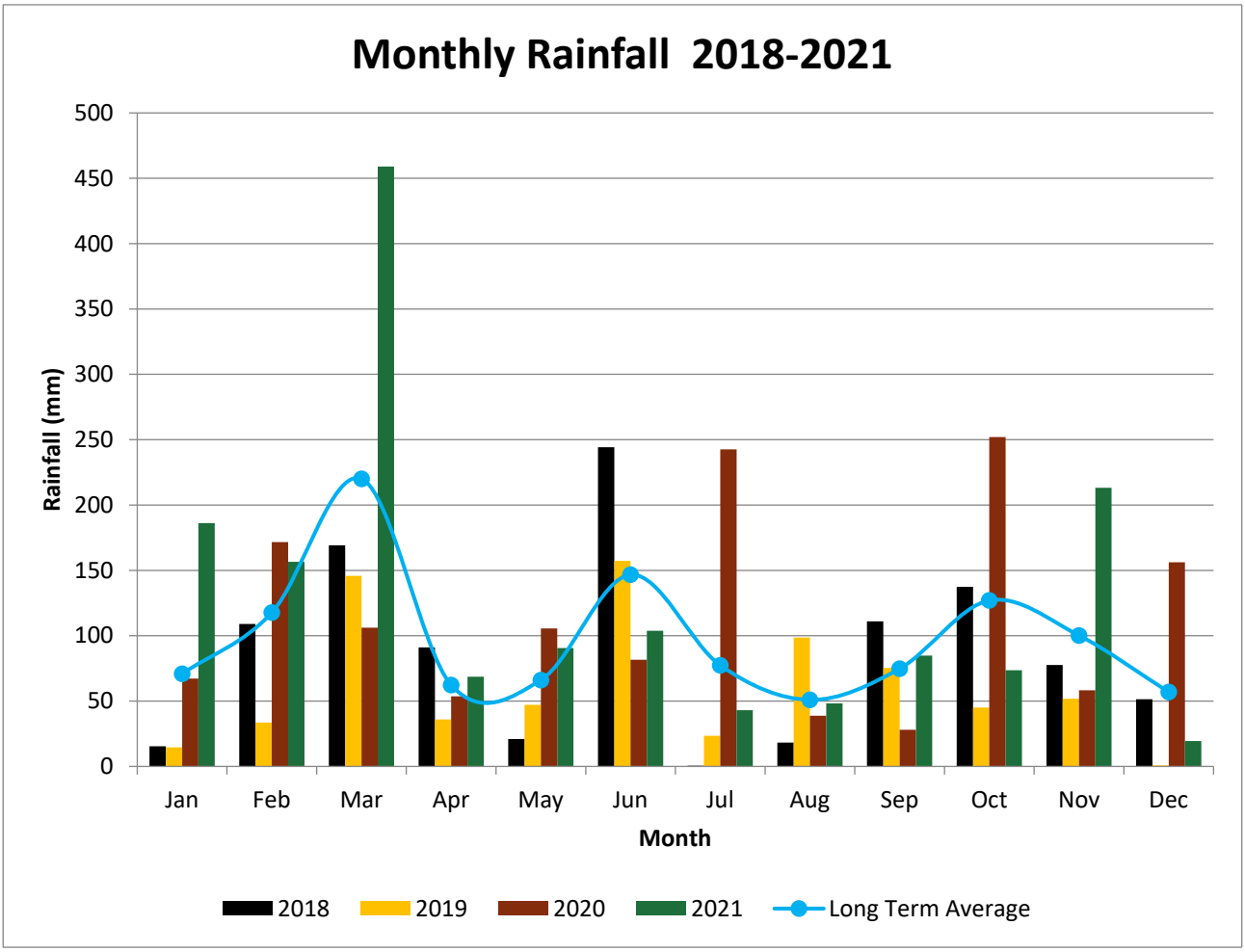


Figure 6-2 Monthly Rainfall 2018-2021

6.3.2 Temperature

2021 minimum and maximum daily and monthly average minimum and maximum temperatures are summarised below in **Table 6-16**. January was the warmest month of the year with an average maximum daily temperature of 28.0°C. July was the coolest month of the year with a minimum daily temperature of 6.7°C.

Table 6-16 Monthly Minimum and Maximum Daily Temperatures during 2021

Month	Minimum Temperature (°C)	Average Minimum Temperature (°C)	Average Maximum Temperature (°C)	Maximum Temperature (°C)
January	11.4	17.7	28.0	38.4
February	13.7	18.9	26.1	31.3
March	12.7	17.4	25.3	32.1
April	7.3	12.0	23.0	29
May	5.9	10.3	20.7	25.5
June	3.7	7.8	17.4	21.2
July	2.0	6.7	17.8	25.9

Month	Minimum Temperature (°C)	Average Minimum Temperature (°C)	Average Maximum Temperature (°C)	Maximum Temperature (°C)
August	3.1	7.1	20.3	26.6
September	5.3	9.3	23.0	30.7
October	7.9	12.6	24.8	34.3
November	8.7	15.6	23.8	30.7
December	13.7	17.7	26.9	36.8

6.4 Landscape and Biodiversity Offset

In accordance with the project approval Mackas Sand holds an approved Landscape Management Plan (LMP) (Umwelt, April 2019). The LMP sets out the procedures and management requirements associated with the sites rehabilitation areas.

Originally, the Biodiversity Offset Strategy (BOS) (as required by Schedule 3, Condition 28A of PA 08_0142) for Mackas Sand was included as part of the Mackas Sand LMP (Umwelt, April 2019). In accordance with correspondence received from the DPE on 01/07/2021, Mackas Sand extracted all the relevant BOS information from the LMP (Umwelt, April 2019) to create a standalone BOS document. The updated standalone BOS was submitted to DPE for approval on 19 August 2021. At the time of preparing this report, no response to the standalone BOS document has been received from the DPE.

During the IEA period, it was identified that some requirements of the Mackas Sand LMP (Umwelt, April 2019) had not been consistently implemented. See **Section 10.0** for a full summary of non-compliances identified during the 2021 IEA period.

6.5 Environmental Assessment Predictions

A detailed ecological assessment was undertaken to support the Mackas Sand Project Environmental Assessment (2009) (EA). This assessment identified the existing natural environment and likely impacts of the proposal on the biodiversity of the area, particularly on threatened species, populations and communities.

No threatened flora species, endangered flora populations or threatened ecological communities were observed in the study area during surveys undertaken for the ecological assessment. Four threatened fauna species were identified and fourteen threatened or endangered fauna species are considered to have potential habitat in the study area.

The ecology impacts are limited to the clearance of vegetation primarily at Lot 220, but also the alternate access road to Lot 218. To address these impacts a pre-clearance procedure, rehabilitation of Lot 220 and the establishment of a biodiversity area to offset the impact on two orchids (i.e. Newcastle Doubletail *(Diuris praecox)* and Leafless Tongue-orchid *(Cryptostylis hunteriana)*) and a number of fauna species were recommended.

6.5.1 Impact Assessment Criteria

The rehabilitation, ecological and biodiversity impact assessment criteria are associated with following the procedures as detailed in the LMP and BOS strategy, being:

- Ecological pre-clearance surveys
- Limiting vegetation impacts to the approved areas (e.g., extraction area and haul roads)
- Salvage of topsoil and woody debris for rehabilitation of the extraction area at Lot 220
- Weed management
- Bushfire management
- Rehabilitation of the extraction area at Lot 220
- Monitoring the performance and progression of the rehabilitation areas
- Arranging for the long term security of the biodiversity offset area.

6.5.2 Monitoring Results

6.5.2.1 Rehabilitation and Ecological

The alternate access road to Lot 218 has been constructed and fully sealed. As the alternate access road is in use, rehabilitation of the alternate access road and subsequent rehabilitation performance monitoring has not been commenced.

During the reporting period, Mackas Sand implemented the following land management procedures in accordance with the LMP at Lot 220:

- Continue to add to the total area of land under rehabilitation at Lot 220. Refer to **Section 8.0** for further details
- Monitoring the performance and progression of the rehabilitation areas.

6.5.2.2 Biodiversity Offset

In accordance with Schedule 3, Condition 28B of PA 08_0142, Mackas Sand is required to provide long-term security for the Mackas Sand Biodiversity Offset Area (BOA). On 30 June 2020, the Coordinator General, Environment, Energy and Science Group, Department of Planning, Industry and Environment executed the Mackas Sand BOA Conservation Agreement (VC00532).

Monitoring of the biodiversity offset area is undertaken generally during August/September to align with the peak flowering season of the Newcastle Doubletail *(Diuris praecox)* and Leafless Tongue-orchid *(Cryptostylis hunteriana)*. During the reporting period, monitoring was undertaken on 13 and 14 September 2021. While the timing of the monitoring is designed to target and monitor the orchid population numbers, the following additional ecological information is also collected:

- Habitat Assessment - including dominant flora species in each stratum, groundcover, evidence of disturbance and dieback, presence of standing and fallen dead timber and hollow-bearing trees.

- Vegetation Structure Assessment - Two permanent 50 m transects have been established at the eastern section of the Lot and are surveyed to monitor structural change to vegetation assemblage and habitat surrounding known orchid populations.
- Photo Monitoring – Five photo monitoring points have been established to monitor structural development in vegetation assemblage.
- Exotic Species Monitoring and Management – Monitoring and management of Whiskey Grass population and other exotic species.

Orchid Monitoring

The results of the monitoring data for Newcastle doubletail (*Diuris praecox*) and Sand doubletail (*Diuris arenaria*) between 2016 and 2021 are shown in **Table 6-17** and **Table 6-18**. Baseline results recorded during 2014 and the management criteria from the BOA strategy are also provided in **Table 6-17** and **Table 6-18** for reference.

Table 6-17 Results of *Diuris praecox* Searches Baseline, 2016 - 2021

	2014 (Baseline)	Criteria (25% of baseline for 3 consecutive years)	2016	2017	2018	2019	2020	2021
Date of survey	27/08/14	N/A	26/08/16	25/08/17	7/09/18	28/08/19	1 and 11/09/20	13/09/21
Number of stems	64	16	39	93	20	23	0	0
Maximum flowers per stem	9	N/A	7	8	9	6	0	0
Minimum flowers per stem	0	N/A	0	0	0	1	0	0
Mean flowers per stem	4.2	N/A	2.7	3.4	4.3	4	0	0

Table 6-18 Results of *Diuris arenaria* Searches Baseline, 2016 - 2021

	2014 (Baseline)	Criteria (25% of baseline for 3 consecutive years	2016	2017	2018	2019	2020	2021
Date of survey	10/08/14	N/A	14/09/16	7/09/17	7/09/18	28/08/19	1 and 11/09/20	13/09/21
Number of stems	72	18	200	150	119	39	2	82
Maximum flowers per stem	7	N/A	7	5	6	3	2	7
Minimum flowers per stem	1	N/A	0	0	0	0	0	0
Mean flowers per stem	2.2	N/A	2.7	1.3	1	1	1	2.5

Habitat Assessment Monitoring

The results of the 2021 habitat monitoring are shown in **Table 6-19** below. The table also shows the accumulated results from 2017-2021 and baseline survey results from 2014.

Table 6-19 Results of Habitat Assessment for Baseline, 2017-2021

Habitat Attribute	2014 (Baseline)	2017	2018	2019	2020	2021
Disturbances						
Weeds (density/species)	Low/whiskey grass (*Andropogan virginicus*)	Low/whiskey grass (*Andropogon virginicus*)	Low/whiskey grass (*Andropogon virginicus*)	Low Whiskey grass (*Andropogon virginicus*)	Low Whiskey grass (*Andropogon virginicus*)	Moderate Whiskey grass (*Andropogon virginicus*), several mapped clusters as well as scattered individual occurrences throughout. Bitou bush (*Chrysanthemoides monilifera* subsp. *rotundata*) saplings scattered throughout. Low levels of fireweed (*Senecio madagascariensis*), catsear (*Hypochaeris radicata*) and quaking grass (*Briza maxima*) scattered throughout

Habitat Attribute	2014 (Baseline)	2017	2018	2019	2020	2021
Pests	Nil identified	Nil Identified	Nil Identified	Rabbit (*Oryctolagus cuniculus*)	Nil Identified	Rabbit (*Oryctolagus cuniculus*) – minimal impact
Fire	Evidence of previous	Nil during reporting year	Nil during reporting year	Nil	Nil	Nil
Grazing	Cattle	Cattle	Ground vegetation and small shrubs impacted by cattle grazing	Cattle present at the time of survey. Signs of historic cattle grazing during Stage 1 inspection; cattle grazing in the Biodiversity Offset Area during Stage 2 inspection. Grazing impacts present.	Cattle present at the time of both surveys. Extensive grazing affecting all vegetation <2 m in height. Some smaller shrubs pushed over. Ground cover very sparse.	No cattle present at time of survey
Erosion	Minor (Aeolian)	Minor (Aeolian)	Minor (Aeolian)	Minor (Aeolian)	Moderate (trampling exacerbated by Aeolian soils)	None identified

Habitat Attribute	2014 (Baseline)	2017	2018	2019	2020	2021
Logging	Historic (cut stumps)	Nil during reporting year; Vegetation removed to install fence*	Nil during reporting year - Vegetation removed by grazing	Nil during reporting year; minor impacts to ground vegetation by grazing.	Nil logging; vegetation removed by intense grazing. Some shrubs pushed over by cattle from grazing and rubbing. Bark stripping on some vegetation from cattle rubbing.	Nil since 2014
Features (Relative Abundance)						
Fallen timber/logs	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Stags	Nil	Nil	Nil	Nil	Scarce	Scarce

Habitat Attribute	2014 (Baseline)	2017	2018	2019	2020	2021
Ground cover (litter)**	Moderate	Common	Moderate	Sparse – Moderate Signs of minor vegetation recovery and litter production following 2018 cattle grazing event. Signs of 2019 grazing impacts.	Low-Moderate Areas of litter concentrated under denser vegetation but bare areas common where cattle activity was highest. High proportion of vegetative ground cover removed from intense grazing.	Moderate areas of litter concentrated under dense vegetation but bare areas common where cattle activity was highest previously (albeit improving). Native ground cover now moderate (grasses, forbs, ferns and lichens) in terms of foliage cover now grazing no longer occurring
Mistletoe	Nil	Few	Few	Few	Scarce	Scarce
Dieback	Nil	Nil	Minor canopy dieback	Nil	Minor canopy dieback	Minor canopy dieback
Loose bark on trees	Moderate	Moderate	Few	Few	Few. Some bark rubbed off by cattle.	Scarce. Former damage to tree bark as a result of cattle rubbing recovering.
Tree Hollows						
Number of trees with hollows	12	12	12	12	12	12

Habitat Attribute	2014 (Baseline)	2017	2018	2019	2020	2021
Size classes present	Very small (vs), small (s), medium (m), large (l) and very large (vl)	vs, s, m, l, vl	vs, s, m, l, vl	vs, s, m, l, vl	vs, s, m, l, vl	Vs, s, m, l, vl

*Vegetation removed along northern and western boundary – approx. 5m – 7m in width along with additional areas to stockpile.

** Categories of ground cover range from scarce, low, moderate, abundant and very abundant.

Vegetation Structure Assessment, Exotic Species and Photo Monitoring

The results of the 2021 vegetation structure monitoring are shown in **Table 6-20** and **Table 6-21**. The tables also show the accumulated results since 2017.

Table 6-20 Transect 1 Results of 50 m Transect Data

% Cover	2017	2018	2019	2020	2021
Canopy Cover					
Native Over-storey	12%	6%	7%	27.5%	21%
Native Mid-storey	4.5%	4%	6.6%	7%	4.5%
Ground Cover					
Native Grass	20%	16%	41%	14%	42%
Native Shrubs	24%	8%	6%	8%	6%
Native other (eg. Forbs)	22%	10%	20%	28%	16%
Exotic	4%	6%	2%	12%	2%
Bare Earth	34%	62%	40%	42%	44%

Table 6-21 Transect 2 Results of 50 m Transect Data

% Cover	2017	2018	2019	2020	2021
Canopy Cover					
Native Over-storey	34%	18%	17%	17%	10%
Native Mid-storey	1%	0.1%	3.8%	15%	11.5%
Ground Cover					
Native Grass	12%	6%	4%	20%	34%
Native Shrubs	2%	2%	0%	14%	26%
Native other (eg. Forbs)	46%	8%	48%	24%	20%
Exotic	12%	4%	2%	10%	4%
Bare Earth	34%	80%	48%	38%	36%

6.5.3 Trends in Data

6.5.3.1 Orchids

Table 6-17 and **Table 6-18** show that there are annual fluctuations in the monitoring data for Newcastle doubletail (*Diuris praecox*) and sand doubletail (*Diuris arenaria*). For the second consecutive year, surveys in 2021 identified no Newcastle doubletail (*Diuris praecox*). Prior to 2021, the average population size in the BOA was 51.3 stems. The absence of records again in 2021 is a significant decline from baseline records and the highest population count of 93 in 2017. This population is below the 25 percent baseline threshold for the second consecutive year. It is possible that the monitoring surveys missed the key flowering period of this species in 2021, however there is typically evidence of plants above ground for a time after flowering. In a small BOA such as this and with known previous locations, it is likely that withered stems, leaves and flowers would have been observed if present. Attention to the flowering of local reference populations did not indicate early flowering of this species.

Contrastingly, the population of Sand doubletail (*Diuris arenaria*) has substantially improved since 2020 from two to 82 individuals. This population is above the 25 percent baseline threshold. However, the distribution of this local population appears to have contracted.

The meteorological conditions leading up to the monitoring in 2021 saw a continuation of the drought breaking rains from 2020. These spring flowering orchids can remain as underground tubers until favourable conditions trigger them to emerge, however despite the return of favourable conditions, the extended drought may have impacted the capacity of these species to persist underground.

6.5.3.2 Habitat Assessment

The 2021 monitoring detected substantial improvement in vegetation condition from 2020. This is largely because of cattle removal from the BOA combined with favourable weather conditions – both have encouraged recovery of the vegetation. Little observable change was detected in the provision of habitat structures such as hollow bearing trees and fallen logs.

6.5.3.3 Vegetation Structure, Exotic Species and Photo Monitoring

In 2021 the BOA comprised a historically modified but improving understory where groundcover vegetation was generally moderate in coverage and increasingly diverse (grasses, forbs, shrubs, sedges, and rushes). This observed improvement is primarily due to the removal of cattle from the BOA, as well as favourable rainfall conditions relating to the breaking of the drought.

The shrub layer has also substantially improved in 2021 (both coverage and diversity), with no observed defoliation in 2021. Grasses, sedges, and bracken fern are now very dense along the eastern boundary around Transect 2 and between the biodiversity monitoring area Photo Points 4 and 1. This was previously an area connecting a north and south population of the threatened orchids but now is very dense with recovering ground cover.

Open areas of Coastal Apple – Blackbutt Forest generally consisted of a grassy understory, areas with higher canopy cover featured an open shrubby understory. The regenerating shrub layer was dominated by tree broom-heath (*Monotoca elliptica*), old-man banksia (*Banksia serrata*), Dillwynia retorta, prickly-leaved paperbark (*Melaleuca nodosa*), Sydney golden wattle (*Acacia longifolia*) and Hakea spp. New recruitment of canopy species was recorded in 2021, however was limited to old-man banksia (*Banksia serrata*).

Compared to 2020, the ground cover percentage of exotic flora in the BOA has decreased (refer to **Table 6-20** and **Table 6-21**) however, whiskey grass (*Andropogon virginicus*) continues to be identified in BOA. Whiskey grass (*Andropogon virginicus*), formed three distinct infestations, generally within and on the edges of inundated depressions located at:

• near biodiversity monitoring area Photo monitoring Point 5 (low to moderate density)

• south-west part of BOA on the edge of an inundated area (low to moderate density) and

• north-west part of BOA on the edge of an inundated area (low density).

One new exotic species was identified in 2021 and this requires management - being bitou bush (*Chrysanthemoides monilifera*). Numerous new saplings were identified scattered relatively uniformly throughout the BOA. This species had not previously been identified as being as prevalent as recorded in 2021.

Scattered occurrences of the significant weed species fireweed (*Senecio madagascariensis*) were also identified throughout the BOA, however not at numbers warranting management at this stage. It is likely that these weed species have flourished due to favourable weather conditions combined with potentially no longer being suppressed by cattle grazing and trampling.

The photos taken during the 2021 monitoring surveys of the Biodiversity Monitoring area were compared to those taken in 2018 (as shown in Annexure B of CA) and are accompanied by a description of vegetation (type, health,changes and management issues). Photo monitoring in 2021 generally depicts an improvement in groundcover and shrubby vegetation.

Dominant ground cover species included blady grass (*Imperata cylindrica*), bracken fern (*Pteridium Esculentum*), curly wig (*Caustis flexuosa*), pomax (*Pomax umbellata*), kangaroo grass (*Themeda australis*) and assorted regenerating heaths. These are progressively colonising previously open areas, however grazing impacts have previously impeded the growth and cover of these species

Mackas Sand will continue to undertake future monitoring events in accordance with relevant obligations within the Mackas Sand Landscape Management Plan and approved Conservation Agreement. Mackas Sand is planning to implement a weed management and disturbance regime in consultation with the Biodiversity Conservation Trust before May 2022.

6.5.4 Comparison of Results against LMP Performance

To track the biodiversity value changes of the BOA, the 2021 monitoring results were compared to their relevant performance criteria of the LMP (Umwelt, April 2019). **Table 6-22** summarises how aspects of the BOA are performing against the relevant action triggers. If a management action trigger is activated it is assessed to determine whether it is likely to be a result of natural fluctuation in the biological system or whether it relates to current management actions. It does not directly identify as a non-compliance with the LMP performance criteria.

Table 6-22 Comparison of 2021 BOA Monitoring Results Against Performance Criteria from the LMP

BOA Performance Criteria	Trigger Response	Further Action / Comment
Short Term Action Triggers		
Any area of Coastal Sands Apple – Blackbutt Forest identified during the revised baseline survey is cleared either by natural processes such as fire or anthropogenic processes such as clearing	**Trigger: Not triggered**	N/A
Any area of specified Newcastle doubletail (*Diuris praecox*) or Sand doubletail (*Diuris arenaria*) habitat is disturbed either by natural processes such as fire or anthropogenic processes. In this instance, the approved strategic slashing is not considered to represent clearing however advice from the BCT confirms that all future disturbance must be done in consultation with the BCT and only with their written permission.	**Trigger: Trigger Activated** Disturbance to orchid habitat because of dense recruitment of colonising native species such as blady grass (*Imperata cylindrica*) and bracken fern (*Pteridium esculentum*) is occurring.	Mackas Sand should: • Undertake appropriate habitat management measures outlined in Item 1 of Annexure C to the Conservation Agreement.
The Newcastle doubletail (*Diuris praecox*) or Sand doubletail (*Diuris arenaria*) stem count is less than 25% of the revised baseline count for three consecutive years	**Trigger: Not triggered but trending to triggered.** Second year of below 25% trigger numbers for Newcastle doubletail (*Diuris praecox*) population.	The 2021 Newcastle doubletail (*Diuris praecox*) stem counts have been well below the 25% trigger for the second consecutive year. Mackas Sand should implement the following to promote population numbers: • Continue to ensure permanent cattle exclusion and monitor to ensure effectiveness in permanently excluding stock. • Undertake appropriate habitat management measures outlined in Item 1 of Annexure C to the Conservation Agreement.
	Trigger: Not triggered Stem count is above threshold for Sand doubletail (*Diuris arenaria*).	Mackas Sand should implement the following to protect recovering population numbers: • Continue to ensure permanent cattle exclusion and monitor to ensure effectiveness in permanently excluding stock. • Undertake appropriate habitat management measures outlined in Item 1 of Annexure C to the Conservation Agreement.

BOA Performance Criteria	Trigger Response	Further Action / Comment
The diversity or density of weed species is higher than the revised baseline results for more than two consecutive years	**Trigger: Not triggered but trending to triggered.** Density of weeds across BOA is higher than baseline for the first consecutive year (particularly of whisky grass and bitou bush).	Hand weeding was not undertaken as part of the 2021 annual BOA monitoring round, however, weeds were identified at the time. Mackas Sand should: • Manage weed increases for whiskey grass (*Andropogon virginicus*) and bitou bush (*Chrysanthemoides monilifera* subsp. *rotundata*). • Continue to monitor weed populations.
Undertake management actions listed in Item 1 of Annexure C to the Conservation Agreement for a period of 10 years.	**Trigger: Trigger Activated** In 2021: Monitoring was undertaken to assess whether any form of disturbance regime is required to support the presence of *D. praecox* and *D. arenaria* orchids within the BOA. Weed management was not undertaken No slashing observed during the 2021 survey.	Mackas Sand should: • Manage weed increases for whiskey grass (*Andropogon virginicus*) and bitou bush (*Chrysanthemoides monilifera* subsp. *rotundata*). • Consider slashing or other management actions to reduce dense areas of bracken and blady grass outside of key flowering and fruiting seasons for areas of previously known populations of Newcastle doubletail (*Diuris praecox*)
Long term triggers		
Maintain the same area of Coastal Sands Apple – Blackbutt Forest as identified in the 2014 baseline surveys	**Trigger: Not triggered** In 2021 the same area of Coastal Sands Apple – Blackbutt Forest is managed through the establishment of the BOA.	No further actions required.
Maintain the same area of Newcastle doubletail (*Diuris praecox*) and sand doubletail (*Diuris arenaria*) habitat as identified in the 2014 baseline surveys	**Trigger: Trigger Activated** Monitoring in 2021 demonstrated continued decrease in the area of *D. praecox* compared to 2014 baseline surveys, where it was not recorded in the BOA. *D. arenaria* was recorded, however its distribution compared to 2014 has substantially contracted.	Mackas Sand should: • Undertake appropriate vegetation management measures outlined in Item 1 of Annexure C to the Conservation Agreement. • Continue to monitor potential weed increases now that the presence of grazing has decreased in the BOA. • Undertake works to remove weeds, in particular where new patches of whiskey grass were recorded establishing post-disturbance. • Undertake works to minimise competition from early colonising ground layer species within the maximum mapped orchid areas.

BOA Performance Criteria	Trigger Response	Further Action / Comment
Maintain or reduce the diversity and density of weed species	**Trigger: Trigger Activated** The 2021 results indicated increased levels of whisky grass and bitou bush. Beyond these, other key weed species commonly observed in 2021 included fireweed (*Senecio madagascariensis*), however management was not deemed necessary for this species. No weed management actions were completed in 2021.	Mackas Sand should: • Undertake appropriate weed management measures outlined in Item 1 of Annexure C to the Conservation Agreement, being bitou bush, whisky grass, fireweed and African lovegrass management works to be undertaken outside of orchid growth/flowering season to prevent harm to orchids, i.e. between summer and autumn. This approach is considered adequate given the small area of management and the low density of weeds. • Seek BCT written permission prior to any future disturbance. • Continue to monitor potential weed increases now grazing is effectively excluded from BOA.
Undertake management actions listed in Item 2 of Annexure C to the Conservation Agreement from Year 11 onwards	**Trigger: Not triggered**	Not triggered

6.5.5 Weed and Vertebrate Pest Management in the Biodiversity Offset Area

A weed management program is implemented within the BOA as part of the annual offset monitoring program. No disturbance works (weed removal) were undertaken during 2021 following a directive from BCT (VCA0532_Annual Audit Letter_2021). Weed management works are planned to occur prior to May 2022. These works will be incorporated into a disturbance regime that will aim to assist with maintaining the orchid populations of the BOA. The disturbance regime is planned to be discussed with and authorised by the BCT and the appropriate species experts to ensure its suitability prior to any disturbance works being undertaken in the next annual review period.

Vertebrate pest management for the BOA is in the form of a perimeter fence (consisting of wire and electric fence sections) to permanently prevent cattle accessing the area. During 2021, the perimeter fence was inspected during the BOA Monitoring Event and was found to be intact and electrified. No cattle were seen inside the BOA during the Monitoring Event.

6.5.6 Proposed Improvements or Actions for the Next Reporting Period

Mackas Sand will:

- Continue to implement the requirements of the Mackas Sand VCA during the next reporting period. Specifically, the implementation of a weed management and disturbance regime in consultation with the Biodiversity Conservation Trust before May 2022.

- Undertake the BOA management actions recommended in **Table 6-22,** as practicable.

6.6 Aboriginal Heritage

6.6.1 Aboriginal Cultural Heritage Management

In accordance with the project approval Mackas Sand holds an approved Aboriginal Cultural Heritage Management Plan (ACHMP) (Umwelt, July 2016). The ACHMP sets out the procedures and management requirements associated with the Aboriginal Cultural Heritage matters and consultation regarding the rehabilitation, ecological and biodiversity offset matters as well as the establishment of the Aboriginal Cultural Heritage Group (ACHG) as the primary consultation mechanism for ongoing Aboriginal Cultural Heritage management matters for the project.

It is noted that the Mackas Sand extraction area is owned by the Worimi Local Aboriginal Land Council (Worimi LALC), who at the time of the environmental assessment dedicated a significant area of remnant coastal vegetation adjacent to the sand extraction area to permanent conservation status. Worimi LALC members are members of the ACHG.

6.6.2 Environmental Assessment Predictions

A detailed Aboriginal Cultural Heritage Assessment (ACHA) was prepared to support the Mackas Sand Project Environmental Assessment (2009) (EA). The study area was determined to have high Aboriginal cultural significance through consultation undertaken with Aboriginal stakeholders.

The ACHA determined that the sand extraction operations at Lot 218 may uncover buried former soil horizons within the transient sand dunes that may contain archaeological material. As these soil surfaces are distributed discontinuously at varying depths across and within the dune field, significant logistical and safety issues have been experienced with traversing the transient sand dunes with mechanical sampling equipment prior to extraction occurring. As such, it has not been possible to safely undertake a typical sub-surface sampling program prior to extraction of the sand, in order to accurately identify where the remnant soil horizons occur prior to extraction commencing.

In contrast, all of Lot 220 consists of stabilised soils which will be impacted by the project, making it safe and achievable to undertake further archaeological investigations where required. One area of Potential Archaeological Deposit (PAD) was identified in the low-lying central area of Lot 220. Impacts to the area of PAD in the central section of this site were expected to be minimal, as any impact is limited to the construction of up to two vehicle access tracks across the narrowest sections of the PAD area. The key impacts associated with the proposal will occur in the elevated dunes and associated slopes that have been assessed as unlikely to contain PAD, although may contain low densities of archaeological material.

6.6.3 Aboriginal Cultural Heritage Impact Assessment Criteria

The Aboriginal cultural heritage impact assessment criteria are associated with the following procedures as detailed in the ACHP:

1) Establishment of an Aboriginal Cultural Heritage Group (ACHG)

2) Cultural awareness training

3) The recording and salvage of Archaeological sites and PADs

4) Monitoring inspections by the ACHG

5) Analysis and interpretation of results of mitigation activities

6) Care and control of salvaged material

6.6.4 Aboriginal Cultural Heritage Results

Mackas Sand has established an ACHG and the plant operators have completed cultural awareness training as part of the induction process. This training is supplemented by the plant operator(s) also attending and participating in the ACHG meeting and the monitoring inspections conducted by the ACHG.

During the reporting period, an ACHG inspection was not undertaken at either Lot 218 and Lot 220 due to COVID19 restrictions.

Artefacts identified during inspections are typically inspected and analysed by the ACHG. All artefacts are stored securely onsite as well as those found as part of ACHG inspections are buried at the ACHG's nominated keeping place.

The ACHG has previously indicated there is no need to bag materials from Lot 220 for later analysis, however any artefacts are to be stored and returned to Lot 220 as part of the site rehabilitation process.

6.6.5 Proposed Improvements or Actions for the Next Reporting Period

No additional management or mitigation measures are proposed to be implemented which are outside the ACHMP. The ACHG informed Mackas Sand to keep collecting artefacts from Lot 218 and Lot 220 in the next reporting period.

6.7 Non-Aboriginal Heritage

The Mackas Sand Environmental Assessment (2009) (EA) identified an alignment of World War II era tank traps traversing a section of Lot 220. These tank traps are also believed to exist beneath the mobile sand dunes on north-eastern end of Lot 218. No other historical heritage items were identified within the study area.

The tanks traps within the Lot 220 extraction area have been temporarily relocated during a previous reporting period. They will be returned to their original position when they will not restrict extraction and/or rehabilitation activities. No tanks traps were uncovered at Lot 218 and Lot 220 during the reporting period.

No actions or impacts in relation to non-Aboriginal heritage occurred during the 2021 reporting period.

No additional management or mitigation measures are proposed to be implemented.

6.8 Erosion and Sediment Control

In accordance with the project approval Mackas Sand holds an approved Soil and Water Management Plan (SWMP) (Umwelt, November 2014), which sets out the procedures and management requirements.

The Mackas Sand Environmental Assessment (2009) (EA) identified that small quantities of surface run-off will be generated from access roads and small parking areas. With this surface run-off readily managed through the establishment of table drains and flow dissipation structures, such as level spreaders along each access road.

Mackas Sand's experience in relation to the extraction area is that the sand is highly permeable. This in combination with the extraction area being the lowest point in the landscape results in there being negligible potential for the operation to generate runoff or impact on surface waters.

Mackas Sand completed an extensive road sealing program during 2017. This effectively eliminated the potential for erosion and sediment transport along the Lot 218 alternate and Lot 220 access roads. Spoon drains and localised erosion sediment controls are located near the entrance to the sand extraction areas where the road has not been sealed.

No additional erosion and sediment control works were completed during the 2021 reporting period.

No additional management or mitigation measures are proposed to be implemented which are outside the SWMP.

6.9 Waste Management

The Mackas Sand Environmental Assessment (2009) (EA) identified that wastes from the Project include sand processing and ablution wastes.

During the reporting period sand processing wastes (i.e. screen waste) have consisted of sand aggregates, fallen vegetation and litter. These wastes have been incorporated into the final landform of the site as per the EA.

No additional management or mitigation measures for waste are proposed to be implemented for the Project.

6.10 Traffic

Traffic Management at Mackas Sand is undertaken in accordance with the approved Drivers Code of Conduct (DCoC) (Umwelt, December 2017). The DCoC applies to drivers of all project-related vehicles, including trucks that haul sand from Mackas Sand operations on Lot 218 and Lot 220.

The DCoC details:

- potential safety issues on site and when on public road haulage routes
- times of heavy traffic
- school bus travel times and bus stop locations

- potential interactions with traffic and fauna on roads
- emergency and accident contact details (including details for care of injured fauna)
- local road condition updates
- measures to minimise truck noise impacts, and
- measures to minimise movement to site prior to 5am weekdays.

6.10.1 Environmental Assessment Predictions

A detailed Traffic Assessment was prepared by GHD to support a modification to the Mackas Sand Project and was included as an appendix within the Environmental Assessment (July 2015) (i.e. Modification 2). The modification allows for an increase in maximum hourly truck movements from Lot 218 via the approved alternate access road. All other traffic aspects remained unchanged from that approved as part of the 2009 EA. No changes to the transport routes were sought by this modification.

The traffic impact assessment concluded that the site access and the intersection with Nelson Bay Road will continue to operate with spare capacity from 2015 to 2035 and that the existing road network will continue to operate with minimal negative impacts as a result of the proposed modification to the approved truck movements.

6.10.2 Monitoring Results

6.10.2.1 Vehicle Movements

As part of standard site procedure, the DCoC is sent to all contracting companies.

Transport of product material was undertaken in accordance with the hourly limits specified in the Project Approval during the reporting period.

Mackas Sand is not aware of any traffic accidents involving trucks entering or departing via the Lot 218 or Lot 220 access roads intersection with Nelson Bay Road during the reporting period.

6.10.2.2 Road Haulage

Condition 33 of Schedule 3 of Project Approval 08_0142 (as modified) states that all vehicles entering and leaving the site are covered and that all loaded vehicles leaving the site are cleaned of materials that may fall on the road, before they leave the site.

Mackas Sand notes there were no non-compliances with Condition 33 of Schedule 3 during the reporting period.

6.10.2.3 Fauna Strikes

Conditions 33B and 33C of Schedule 3 of Project Approval 08_0142 (as modified) details the requirement for the DCoC to be assessed in each Annual Review. This shall include details of all fauna injured or killed by vehicle strikes, time and date of any such strike, species involved, action taken immediately following the strike and any consequent measures put in place to prevent or minimise a recurrence of fauna strikes.

There were no reported fauna strikes during the reporting period.

6.10.3 Trend in Data

In 2018 and 2019, Mackas Sand achieved almost 100% compliance with its traffic movements. From Lot 218, Mackas Sand identified that two additional traffic movements occurred in 2018 and one additional traffic movement occurred in 2019. Mackas Sand were compliant with its traffic movement requirements during 2020 and during the 2021 the reporting period.

6.10.4 Proposed Improvements or Actions for the Next Reporting Period

No additional management or mitigation measures are proposed to be implemented which are outside the approved DCoC.

7.0 Water Management

Mackas Sand does not extract groundwater for use at either Lot 218 or Lot 220 and does hold not any licences for the extraction of groundwater for use at either Lot 218 or Lot 220. Water management needs on-site are negligible and are limited to surface runoff from the sealed access road. The remainder of the site is comprised of sand which is free draining. There is no surface water runoff at either of the Lots that requires diversion or specific management.

The potential major water demands for the Project are the wash plant and dust suppression associated with the minimisation of vehicle generated dust emission. Mackas Sand has however, effectively minimised its water demand to nil, as the wash plant has not been constructed and the access roads have been sealed. As noted in Section 2.5 of the SWMP, Mackas Sand will keep a record of any extraordinary water usage on-site and will compile and present this information as part of the Annual Review.

No extraordinary water usage was recorded at Mackas Sand during the reporting period.

7.1 Surface Water

There are no surface flow or drainage lines on either Lot 218 or Lot 220 due to the high permeability of the underlying sand. As a result, there is no surface water that can be monitored to establish baseline conditions other than in low-lying areas that may intermittently flood following an intense rainfall event due to the infiltration rate being exceeded (i.e. perched water).

7.2 Groundwater

In accordance with the Project Approval, Mackas Sand holds an approved SWMP (Umwelt, November 2014), which sets out the procedures and management requirements for groundwater. The groundwater monitoring network consists of six bores, which are monitored each quarter. The location of the monitoring bores is shown on **Figure 6.1**.

7.2.1 Environmental Assessment Predictions

The Mackas Sand Environmental Assessment (2009) identified that the sand extraction areas are located on the Stockton Sandbeds, which form part of the Tomago-Tomaree-Stockton groundwater source that is managed in accordance with the Hunter Water (Special Areas) Regulation 2003, Tomago-Tomaree-Stockton Groundwater Management Plan 1996 and Water Sharing Plan for the Tomago-Tomaree-Stockton Groundwater Sources 2003.

A Groundwater Impact Assessment was developed in support of the Mackas Sand Project Environmental Assessment (2009). The EA predicted that the sand extraction operations at Lot 218 and Lot 220 would have a negligible impact at both locations under average rainfall conditions.

The EA does not include information on groundwater quality impacts. The assessment findings for the temporary reduction in extraction level (i.e. Modification 1 of the Project Approval) are unchanged from the 2009 EA.

7.2.2 Impact Assessment Criteria

7.2.2.1 Groundwater Level

To ensure adequate protection of the underlying groundwater resource, the SWMP includes a Maximum Extraction Depth Map (MEDM) for Lot 218 and Lot 220, which satisfies the requirements of Schedule 2, Conditions 7 and 7A of the Project Approval. The standing water level in the six bores is measured each quarter and compared to the predictions shown in **Table 7-1**.

Table 7.1 shows the predicted maximum groundwater levels at each groundwater monitoring bore.

Table 7-1 Predicted Maximum Groundwater Levels

Groundwater Monitoring Bore	Approximate Predicted Maximum (mAHD)
SP1	3.6
SP2	2.8
SP3	2.6
SP4	1.25
SP5	3.6
BL158	3.7

7.2.2.2 Groundwater Quality

The SWMP includes a suite of groundwater monitoring parameters and trigger levels which are measured each quarter, as shown in **Table 7-2**.

Table 7-2 Groundwater Quality Investigation Trigger Values

Parameter	Units	Minimum	Maximum
pH	pH Unit	4.5**	8.5*
Conductivity	µS/cm	NA	600**
Turbidity	NTU	NA	50**
Arsenic	mg/L	NA	0.01*
Manganese	mg/L	NA	0.1*
Iron	mg/L	NA	5.70**

*These values are based on NHMRC, NRMMC 2011.

**These values are based on long term groundwater monitoring from a previous operation in the local area.

7.2.3 Trends in Data

During the reporting period, four regular monitoring events were undertaken in accordance with the SWMP. The 2021 monitoring results are shown in **Table 7-3** to **Table 7-9.**

The results are compiled and compared against the trigger values in provided in **Table 7-1** and **Table 7-2**, the minimum/maximum range and trends in the previous results.

In accordance with Section 5.4 of the SWMP, if groundwater monitoring results exceed the nominated investigation trigger values and predictions of Table 5.5 of the approved SMWP, the Quarry Manager is required to further investigate.

If results are within 10% of the nominated trigger value, the Quarry Manager will further interrogate and explore any reasons for the elevated result. If results are greater than 10% of the nominated trigger value, the Quarry Manager will further interrogate and explore any reasons for the elevated result and provide a notification to DPE and relevant agencies of any findings of this investigation.

Mackas Sand provided notification to the DPE, Hunter Water and the NSW Office of Waterin April 2021 regarding groundwater results recorded above the SWMP trigger levels. Details of these notifications are summarised in the section below.

During the reporting period, Mackas Sand investigated elevated groundwater quality monitoring results recorded at SP1 for turbdity and SP4 for iron. The elevated groundwater quality monitoring result recorded at SP4 for iron during the September 2021 quarterly monitoring round was not reported to the DPE in accordance with Section 6.2 of the SWMP (Umwelt, 2014). Further details about this are provided in **Section 11.0**.

7.2.3.1 Groundwater Level

During the reporting period, the groundwater level at all locations was below the Predicted Maximum Groundwater Level, with the exception of the following:

- SP2 in March, June, September and December.
- SP3 in June, September and December.
- SP5 in June and September.

The groundwater level was recorded as 3.62 mAHD at SP2 during the scheduled quarterly monitoring events in June and September. The groundwater level at SP2 was again monitored during the scheduled quarterly groundwater monitoring event in December, where it decreased to a result of 3.40mAHD.

The groundwater level at SP3 was recorded at 3.31 mAHD during the scheduled quarterly monitoring event in June. The grounwater level at SP2 decreased to 3.22 mAHD during the September monitoring event and again to 3.05 mAHD during the December monitoring event.

The groundwater level at SP5 was recorded at 3.82 mAHD during the scheduled quarterly monitoring event in June. The groundwater level at SP5 decreased to 3.61 mAHD during the September monitoring event and again to 3.49 mAHD, below its predicted maximum groundwater level, during the December monitoring event.

The groundwater results since 2016 are shown graphically in **Appendix 2**. Since 2016, the groundwater levels generally show rising and falling trends over time. The predicted maximum groundwater levels for monitoring bores SP1-SP5 and BL158 are based on the Maximum Extraction Depth Map reported by Umwelt (2011). The Mackas Sand MEDM Review (Umwelt, 2021) undertaken during the reporting period noted that the recently observed groundwater levels measured at quarterly intervals during 2020 and 2021 show a new observed maximum groundwater level at four monitoring locations (SP2, SP3, SP5 and BL158). The maximum groundwater level in three of these bores (SP2, SP3 and SP5) is higher than the maximum

predicted groundwater levels in the MEDM reported by (Umwelt ,(2011). Further discussion regarding the review of the MEDM is provided in **Section 7.2.4**.

Table 7-3 shows the recorded groundwater levels for the reporting period.

Table 7-3 Groundwater Levels (mAHD)

Sample Date	Groundwater Monitoring Bore (mAHD)					
	SP1	SP2	SP3	SP4	SP5	BL158
Approximate Predicted Maximum (mAHD)	3.6	2.8	2.6	1.25	3.6	3.7
17/03/21	0.83	3.12	2.04	0.99	2.98	2.18
15/06/21	1.65	3.62	3.31	1.13	3.82	3.14
15/09/21*	2.68	3.62	3.22	1.11	3.61	3.00
14/12/21	2.51	3.40	3.05	1.00	3.49	2.71

*Monitoring was also conducted on the 20/09/2021 at SP2, SP3, SP4, and SP5 due to pump issues.

7.2.3.2 Groundwater pH

All pH results for the reporting period remained within the SWMP specified trigger value range and were generally consistent with historical records.

The groundwater pH results since 2016 are shown graphically in **Appendix 2**. SP4 pH levels continue to exhibit more fluctuation compared to the other monitoring bores.

All results for the reporting period are within the historical range of results.

Table 7-4 shows the recorded pH groundwater levels for the reporting period.

Table 7-4 Groundwater Quality – pH

Sample Date	Groundwater Monitoring Bore (pH)					
	SP1	SP2	SP3	SP4	SP5	BL158
Trigger Value Minimum/Maximum	4.5/8.5	4.5/8.5	4.5/8.5	4.5/8.5	4.5/8.5	4.5/8.5
17/03/21	5.58	4.86	4.88	4.98	5.31	5.05
15/06/21	5.79	5.01	4.59	5.28	5.33	4.92
15/09/21*	5.68	5.2	4.86	5.2	5.23	5.62
14/12/21	5.61	5.29	4.83	5.39	5.41	5.18

*Monitoring was also conducted on the 20/09/2021 at SP2, SP3, SP4, and SP5 due to pump issues.

7.2.3.3 Groundwater Conductivity

With the exception of the 612 µS/cm electrical conductivity (EC) result at BL158 recorded in March 2021, all EC results recorded during the reporting period remained below the trigger value of 600 µS/cm. BL158 EC results for June, September and December were all below the trigger level and show declining EC.

The March EC result recorded at BL158 (612 µS/cm) was within 10% of the trigger value range and was within the historical range of results for EC, as such no further investigation was undertaken.

The groundwater EC results recorded since 2016 are shown graphically in **Appendix 2**. All results obtained during the reporting period are generally consistent with historical trends.

Table 7-5 shows the recorded EC groundwater levels for the reporting period.

Table 7-5 Groundwater Quality – Conductivity (µs/cm)

Sample Date	Groundwater Monitoring Bore (µs/cm)					
	SP1	SP2	SP3	SP4	SP5	BL158
Trigger Value Maximum	600	600	600	600	600	600
17/03/21	118	82	175	261	168	612
15/06/21	141	86	325	244	151	582
15/09/21*	82	97	253	252	96	539
14/12/21	69	79	253	220	74	489

*Monitoring was also conducted on the 20/09/2021 at SP2, SP3, SP4, and SP5 due to pump issues.

All results for the reporting period are within the historical range of results.

7.2.3.4 Groundwater Turbidity

The turbidity results for SP2, SP3, SP4, SP5 and BL158 during the reporting period remained below the specified trigger value and were generally consistent with historical records.

Elevated turbidity results were recorded at SP1 (62.1 NTU) during March 2021. Mackas Sand subsequent investigation found:

- The sampling notes stated the sample taken from SP1 was visibly clear.
- 24.6 mm of rainfall occurred in the week immediately prior to sampling.
- The SP1 results were within the historical range.

It has been concluded that the rainfall may have influenced the results.

A summary of the investigation undertaken by Mackas Sand and actions taken as result of the ongoing investigation were provided to DPE and relevant agencies in April 2021.

The groundwater turbidity results since 2016 are shown graphically in **Appendix 2**. **Table 7-6** shows the recorded NTU groundwater levels for the reporting period.

Table 7-6 Groundwater Quality – Turbidity (NTU)

Sample Date	Groundwater Monitoring Bore (NTU)					
	SP1	SP2	SP3	SP4	SP5	BL158
Trigger Value Maximum	50	50	50	50	50	50
17/03/21	62.1	12.4	5.7	16.9	21.1	2.8
15/06/21	5.2	5.2	1.9	32.0	5.8	2.5
15/09/21*	14.0	8.1	2.9	3.9	5.2	2.0
14/12/21	15.5	2.7	1.4	2.4	14.7	1.0

*Monitoring was also conducted on the 20/09/2021 at SP2, SP3, SP4, and SP5 due to pump issues.

7.2.3.5 Groundwater Arsenic

During the reporting period the arsenic results for all locations were recorded below the SWMP trigger value of 0.01mg/L.

The groundwater arsenic results since 2016 are shown graphically in **Appendix 2**. The arsenic results during the reporting period were below the trigger value maximum for arsenic (0.01 mg/L), which is consistent with previous results.

Table 7-7 shows the recorded arsenic groundwater levels for the reporting period.

Table 7-7 Groundwater Quality – Arsenic (mg/L)

Sample Date	Groundwater Monitoring Bore (mg/L)					
	SP1	SP2	SP3	SP4	SP5	BL158
Trigger Value Maximum	0.01	0.01	0.01	0.01	0.01	0.01
17/03/21	<0.001	<0.001	<0.001	0.003	0.001	<0.001
15/06/21	<0.001	<0.001	<0.001	0.002	<0.001	0.001
15/09/21*	<0.001	<0.001	<0.001	0.002	0.007	<0.001
14/12/21	<0.001	<0.001	<0.001	<0.001	0.002	<0.001

*Monitoring was also conducted on the 20/09/2021 at SP2, SP3, SP4, and SP5 due to pump issues.

7.2.3.6 Groundwater Manganese

During the reporting period, manganese results for all monitoring locations were below the trigger level.

The groundwater manganese results since 2016 are shown graphically in **Appendix 2**. The manganese results recorded during the reporting period are generally consistent with trends observed since 2016.

Table 7-8 shows the recorded manganese groundwater levels for the reporting period.

Table 7-8 Groundwater Quality – Manganese (mg/L)

Sample Date	Groundwater Monitoring Bore (mg/L)					
	SP1	SP2	SP3	SP4	SP5	BL158
Trigger Value Maximum	0.1	0.1	0.1	0.1	0.1	0.1
17/03/21	0.006	0.005	0.004	0.030	0.031	0.011
15/06/21	0.005	0.008	0.001	0.031	0.019	0.010
15/09/21*	0.001	0.010	<0.001	0.031	0.022	0.010
14/12/21	0.001	0.007	0.006	0.021	0.018	0.006

*Monitoring was also conducted on the 20/09/2021 at SP2, SP3, SP4, and SP5 due to pump issues.

7.2.3.7 Groundwater Iron

During the reporting period, the iron results for all bores were below the trigger level, with the exception of SP4 during March (6.94mg/L) and September 2021 (6.96mg/L).

Following the receipt of the elevated result in March, Mackas Sand completed a review into the possible cause. It was concluded that iron levels recorded at SP4 have historically been highly variable, fluctuating between 0.27 mg/L to 34mg/L, as shown in **Appendix 2**.

The elevated groundwater quality monitoring result recorded at SP4 for iron during the September 2021 quarterly monitoring round was not reported to the DPE in accordance with Section 6.2 of the SWMP (Umwelt, 2014). As previously stated and shown in **Appendix 2**, Iron levels recorded at SP4 have historically been highly variable. All iron results obtained during the reporting period for SP4 were lower than the historical maximum. Since September 2021, iron concentrations declined from 6.96mg/L to 2.83mg/L in December 2021 and have returned to concentrations below the trigger level of 5.7mg/L. If elevated groundwater monitoring results are detected during future quarterly groundwater monitoring rounds, Mackas Sand will report it to the DPE in accordance with Section 6.2 of the SWMP (Umwelt, 2014).

The groundwater iron results since 2016 are shown graphically in **Appendix 2**, which demonstrates the highly variable and fluctuating nature of iron concentrations at SP4, especially since December 2017. This trend continued throughout the reporting period.

Table 7-9 shows the recorded iron groundwater levels for the reporting period.

Table 7-9 Groundwater Quality – Iron (mg/L)

Sample Date	Groundwater Monitoring Bore (mg/L)					
	SP1	SP2	SP3	SP4	SP5	BL158
Trigger Value Maximum	5.70	5.70	5.70	5.70	5.70	5.70
17/03/21	0.18	0.32	0.05	6.94	0.75	0.97
15/06/21	0.05	0.69	0.12	5.07	0.54	1.27
15/09/21*	0.05	0.76	0.11	6.96	1.17	1.04
14/12/21	<0.05	0.63	0.28	2.83	1.16	0.63

*Monitoring was also conducted on the 20/09/2021 at SP2, SP3, SP4, and SP5 due to pump issues.

7.2.4 Groundwater Model Validation

Following completion of the 2021 Mackas Sand Project Independent Environmental Audit (IEA) on 30 July 2021 and in accordance with Schedule 3 Condition 3 of PA 08_0142, a review and any subsequent update of the Maximum Extraction Depth Map (MEDM) was required to be undertaken. Mackas Sand engaged Umwelt to undertake the revision of the MEDM for the Project.

The review of the MEDM recommended that the MEDM was not required to be updated until additional monitoring data was collected to improve the hydrogeological understanding of the site, in particular the response of groundwater levels to rainfall events. This was communicated to the DPE in a letter (letter reference: 1646_DPIE_MEDM_Review211203) via submission through the NSW Major Projects Portal on the 26/12/2021.

Furthermore, to improve the hydrogeological understanding of the Project site, Mackas Sand is progressing the recommendations that have been provided by Umwelt in their review of the MEDM (see **Section 7.2.5**).

7.2.5 Proposed Improvement or Actions Next Reporting Period

In the next reporting period, Mackas Sand will undertake the following:

- A physical review of the Mackas Sand groundwater monitoring bores to assess the integrity of the bores e.g. potential for leakage of surface water within the bore annulus.

- For a minimum six-month period, increase the frequency of groundwater level monitoring by way of installation of groundwater level loggers in at least three monitoring bores to monitor groundwater levels at hourly intervals. This will give a greater resolution of groundwater data that can be used to better understand how groundwater levels respond after rainfall events.
- After six months of additional data collection, undertake a further review of the data. Pending data review and bore integrity status, update the existing groundwater model and Maximum Extraction Depth Map.

Also, if elevated groundwater monitoring results are detected during future quarterly groundwater monitoring rounds, Mackas Sand will report it to the DPE in accordance with Section 6.2 of the SWMP (Umwelt, 2014).

No other additional management or mitigation measures are proposed to be implemented which are outside the approved SWMP.

8.0 Rehabilitation

8.1 Rehabilitation of Disturbed Land

In accordance with Schedule 3, Condition 24 of the Project Approval (as modified), progressive rehabilitation of disturbed areas at Lot 220 is being undertaken in a manner that is generally consistent with the final landform in the EA, in alignment with statutory conditions and requirements within plans.

8.1.1 Lot 218

Rehabilitation requirements at Lot 218 include the establishment of a vegetative bund on the western edge of the extraction area as the site is governed by the natural movement of sand into the extraction area.

As active quarrying occurred within the western portion of the pit during 2021, the bund has not yet been constructed and vegetated. The objective of the bund is to provide a physical barrier between the mobile sand and native vegetation on the landward side of the mobile dunes.

8.1.2 Lot 220

Rehabilitation at Lot 220 is being undertaken progressively as sand extraction and operating space on the active quarry floor permits.

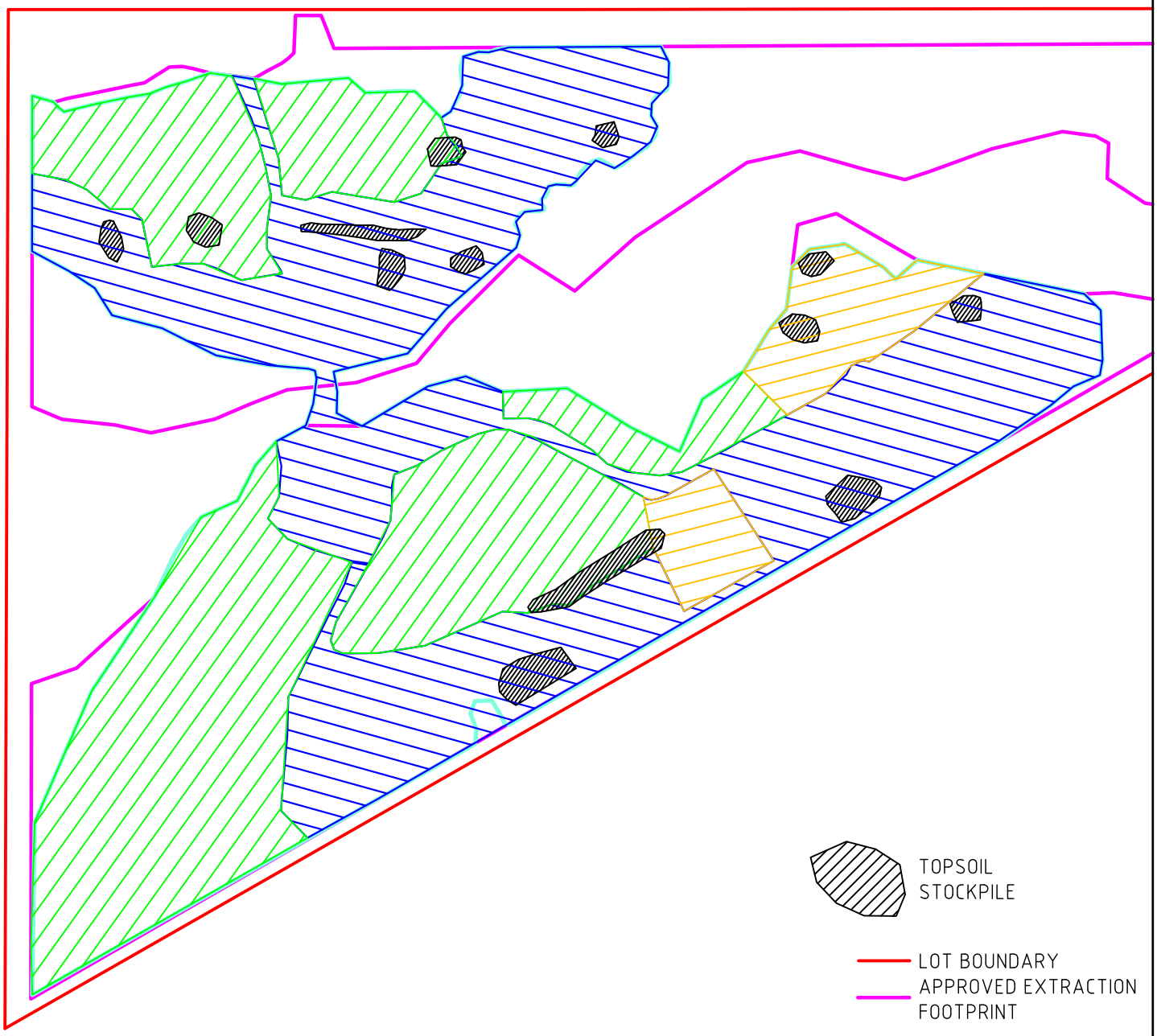
Approximately 2.5 ha of land in the South section of Lot 220 commenced rehabilitation during 2021.

Mackas Sand is planning to harvest seeds, grow trees and spread topsoil during 2022 as part of the next rehabilitation works program. Other works include the utilisation of vegetative material cleared ahead of sand extraction operations. **Table 8-1** and **Figure 8.1** show the status of rehabilitation at Lot 220.

Table 8-1 Summary of Rehabilitation Status at Mackas Sand (Lot 220)

	2020 Report Period (ha)	2021 Report Period (ha)	2022 Report Period (ha) (forecast)
Total Mine Footprint	33.7	36.2	36.2
Total Active Disturbance	17.1	17.6	17.6
Land being prepared for rehabilitation	0	2.5	2.5
Land under active rehabilitation	16.6	16.1	16.1
Completed Rehabilitation	0	0	0

CENTURION SURVEY



	AREA DESCRIPTION	2021 REPORT PERIOD (ha)
	TOTAL MINE FOOTPRINT	36.2
	TOTAL ACTIVE DISTURBANCE	17.6
	LAND BEING PREPARED FOR REHABILITATION	2.5
	LAND UNDER ACTIVE REHABILITATION	16.1
	COMPLETED REHABILITATION	0.0

SITE: **LOT 220 DP 1049608**	**1** DRAWING NO.		**0014** PROJECT NO.	**31/12/2021** DATE.
TITLE: **SITE CLEARING PLAN 31/12/2021**	**NOT TO SCALE** SCALE AT A4.	**CEJ** DRAWN.	**CEJ** CHECKED.	**A** REVISION.

8.2 Annual Rehabilitation Inspection

During the 2021 IEA a site inspection was undertaken on Thursday 3 June by a biodiversity and rehabilitation specialist which included inspections of rehabilitation areas.

Rehabilitation areas at Mackas Sand range in age from approximately 12 months to five years. The older rehabilitation areas were noted by the auditor as progressing well with good native diversity in the canopy, mid and groundcover layers, despite the drought conditions experienced in recent years.

The more recent rehabilitation areas which Mackas Sand planted in early 2020 were noted by the auditor as being less diverse, with only the planted canopy and shrub species observed along with a sparse ground cover. The auditor noted that whilst this is to be expected in developing rehabilitation areas, ongoing monitoring was recommended to continue to review these areas to determine if any supplementary planting or seeding is required to improve the native diversity and cover to desired levels.

During the inspection, salvaged natural resources such as hollow-bearing logs and topsoil were observed by the auditor to have been stockpiled and re-used at various locations on both Lot 218 and Lot 220. Whilst Mackas Sand site personnel confirmed that stockpiled topsoil was generally re-used within 12 months of stripping, the auditor recommended that topsoil management practices be improved to reduce the likelihood of weed growth on stockpiles and subsequent rehabilitation areas.

Alongside the rehabilitation site inspection that was undertaken during the 2021 IEA, the annual rehabilitation inspection of Lot 220 was undertaken during the reporting period. The annual monitoring is undertaken to track current rehabilitation processes and to further inform any rehabilitation management actions required onsite. The rehabilitation inspection focused on all of the rehabilitation zones in Lot 220 (refer to **Figure 8.1**):

Key observations made during the 2021 rehabilitation monitoring inspection included:

- Exotic species such as red natal grass (Melinis repens), kikuyu grass (Pennisetum clandestinum), bitou bush (Chrysanthemoides monilifera), farmer's friend (Bidens pilosa), Large-leaved Pennywort (Hydrocotyle bonariensis), Lantana (Lantana camara), Acanthospermum austral and flax leaf fleabane (Conyza bonariensis) were present thoughrout some of the rehabilitation zones.
- Eucalyptus species that were planted in rehabilitation zones were observed to be healthy and progressing well.
- Continued salvaging and placement of tree hollows and other woody debris was observed throughout all rehabilitation zones.

As noted within the LMP (April, 2019), the annual rehabilitation inspection utilises qualitative monitoring practices during the early stages of rehabilitation and typically until vegetation within the rehabilitation zone has reached a level of maturity where a quantitative assessment is of benefit. As a result, qualitative monitoring practices continue to be undertaken across all rehabilitation zones at Mackas Sand due to the level of maturity of the rehabilitation.

Mackas Sand were provided with a number of recommendations for all rehabilitation zones following the 2021 rehabilitation inspection with recommendations including:

- the completion of weed management across all rehabilitation zones, including topsoil stockpiles
- Where possible, undertake vegetation infill works (including seeding and/or planting) in rehabilitation zones.

Mackas Sand will continue to provide an update of the actions completed against the rehabilitation monitoring recommendations in the next annual review document.

8.3 Rehabilitation Trials and Research

No rehabilitation trials were undertaken during the report period.

8.4 Rehabilitation Bond

Following the completion of the 2021 Mackas Sand IEA, Mackas Sand reviewed and revised the rehabilitation bond associated with Lot 218 and 220 in accordance with Schedule 3, Condition 28 of PA 08_0142. The reviewed and revised rehabilitation bond was submitted to DPE for approval on 31 November 2021. At the time of preparing this report, no response to the reviewed and revised rehabilitation bond has been received from the DPE.

8.5 2020 Annual Review Rehabilitation Recommendations Progress

The progress on the 2020 Mackas Sand Annual Review rehabilitation recommendations are presented in **Table 8-2**.

Table 8-2 2020 Mackas Sand Annual Review Rehabilitation Recommendations

Action	Status	Comment
Mackas Sand will continue to salvage woody debris / trees and spread over rehabilitation areas.	Completed - Ongoing	During the IEA inspection and the 2021 annual rehabilitation inspection, salvaged natural resources such as hollow-bearing logs were observed in the rehabilitation zones.
Mackas Sand will continue to identify opportunities to rehabilitate areas which are no longer required for operational purposes/activities.	Completed - Ongoing	Rehabilitation at Lot 220 is undertaken progressively as sand extraction and operating space on the active quarry floor permits.
Mackas Sand will review the Rehabilitation Bond following the completion of the 2021 IEA.	Completed	Mackas Sand reviewed the Rehabilitation Bond following the completion of the 2021 IEA and submitted it to DPE for approval on 30/11/2021.

8.6 Proposed Improvements or Actions for the Next Reporting Period

Mackas Sand will continue to salvage woody debris / trees and spread over rehabilitation areas.

Mackas Sand will continue to identify opportunities to rehabilitate areas which are no longer required for operational purposes/activities.

9.0 Community

9.1 Community Complaints

Mackas Sand did not receive any community complaints during the 2021 reporting period.

A summary of community complaints received for the last five reporting periods is displayed in **Figure 9.1**. It is noted that 1 community complaint has been received between 2017-2021.

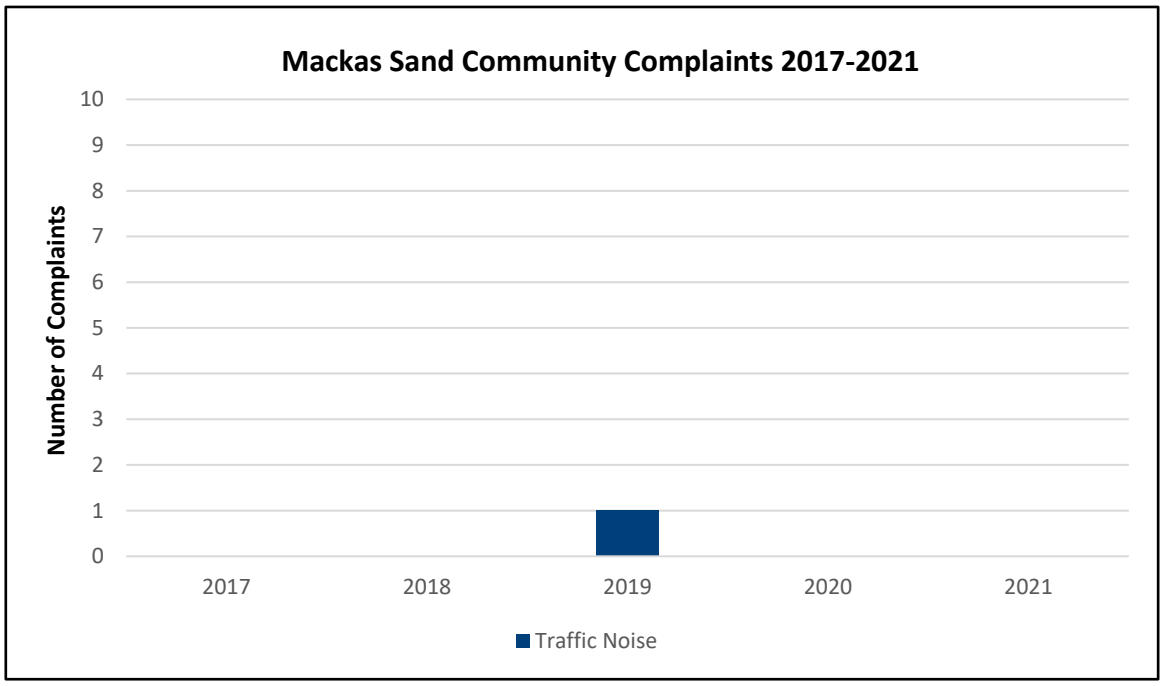


Figure 9-1 Summary of Mackas Sand Community Complaints from 2016-2021

9.2 Community Consultative Committee

Community Consultative Committee (CCC) representatives act as a point of contact to provide feedback between Mackas Sand and the wider community. The 2021 Mackas Sand CCC was undertaken on 7 April 2021. Attendees of the 2021 Mackas Sand CCC are listed in **Table 9-1**.

Table 9-1 Mackas Sand CCC Attendees for the 2021 Report Period

Name	Organisation
Ms Margaret Macdonald-Hill	Chairperson
Mr Robert Mackenzie	Mackas Sand
Ms Julie Towers	Community Representative
Mr Kent Sansom	Community Representative

Name	Organisation
Mr Daniel Sullivan	Umwelt (Australia) Pty Ltd.

General items discussed during the 2021 CCC meeting included:

- Confirmation that RMS had carried out roadworks on the Lemon Tree Passage/Nelsons Bay roundabout at a cost of $5.8 million.
- Confirmation that the minor modification to Lot 218 that was discussed at the CCC meeting in April 2020 had been withdrawn.
- Discussion about the modification to lower the floor level on Lot 218.
- General discussion of operational matters.

In consultation with the Mackas Sand CCC members, the chairperson confirmed during the April 2020 CCC meeting that the meeting remain on an annual basis and the next one be held one week prior to school holidays and the Easter period.

9.3 Community Engagement

During the reporting period, Mackas Sand contributed $1,022.75 to the local community across a variety of organisations. These included:

- Rural and Remote Mental Health
- Newcastle Special Children's Christmas Party
- Breast Cancer Institute
- Other various community groups and events.

10.0 Independent Audit

After being endorsed by the DPE on 7 May 2021, James Hart (lead environmental auditor), Tom Scott (rehabilitation and biodiversity specialist), and Katarina David (groundwater specialist) were engaged by Mackas Sand to undertake an IEA of the Mackas Sand Project in 2021 for the operational period from 1 January 2018 to 31 May 2021.

The IEA report was finalised, submitted and approved by DPE during the 2021 reporting period.

A number of the administrative and low risk non-compliances and recommendations were identified during the 2021 reporting period, refer to **Table 10-1**.

As of December 2021, two audit recommendation actions remain in progress. These recommendations relate to:

- Mackas Sand ensuring that inspections of high visibility fencing and any structures built to control public access are conducted and records of the inspections and outcomes are retained.
- Mackas Sand updating the complaints register to ensure that all required information is collected and documented.

The next IEA is scheduled to be undertaken post April 2024.

Table 10-1 Mackas Sand IEA Non-compliance Summary

Referenced ID	Condition ID and Text	Audit Finding / Description	Audit Recommendation	Response	Action Status
NC-01	*Schedule 2, Condition 2 PA08_0142 Statement of Commitments 1.1.1* The Proponent must carry out the project: (a) generally in accordance with the EA, EA (MOD 1), EA (MOD 2) and the project layout; and (b) in accordance with the statement of commitments and the conditions of this approval.	Seven non-compliances were raised where compliance with the conditions of consent was not demonstrated.	Mackas Sand should ensure that appropriate processes are developed and implemented to ensure compliance with the requirements of the conditions of consent.	Noted. **Action:** Mackas Sand will address associated non-compliances and auditor recommendations via the *Mackas Sand Response and Action Plan* document.	Completed - Mackas Sand will ensure that compliance with the conditions of PA 08_0142 is maintained throughout the next audit period.

NC-02	*Schedule 3 Condition 4B PA08_0142* The Proponent shall ensure, for the use of the Alternate access road, that: (a) a speed limit of 40 km/hour is applied and enforced for all vehicles; (b) trucks slowing to use the intersection of the access road and Nelson Bay Road do not use engine or compression braking systems; (c) laden truck movements exiting the site do not exceed 14 per hour during the period from 5 am to 6 am, Monday to Friday (except for Public Holidays); (d) laden truck movements exiting the site do not exceed 8 per hour during the period from 6 am to 9 am, Monday to Friday (except for Public Holidays); (e) laden truck movements exiting the site do not exceed 24 per hour during the period from 9 am to 10 pm, Monday to Friday (except for Public Holidays);	Two instances where truck movements exceeded the allowable movements for the designated period. • 15/11/18 5am-6am Two additional truck movements - computer system error occurred when three drivers used a swipe card to exit the site instead of manually entering information via the inbound and outbound weighbridge terminals. • 17/10/19 – One additional truck movement as a result of an error in the weighbridge's coding following a software update.	Actions to address these issues were identified in reports to DPIE and have been implemented. No exceedances have been recorded since October 2019. No further action required.	No recommendation sought. Non-compliances closed during audit period. **Action:** No action required	Completed. Non-compliances were closed out during the audit period.

Referenced ID	Condition ID and Text	Audit Finding / Description	Audit Recommendation	Response	Action Status
	(f) laden truck movements exiting the site do not exceed 5 per hour between 5 am and 6 am on Saturdays (except for Public Holidays); (g) laden truck movements exiting the site do not exceed 9 per hour between 6 am and 7 am on Saturdays (except for Public Holidays); (h) laden truck movements exiting the site do not exceed 24 per hour between 7 am and 4 pm on Saturdays (except for Public Holidays); and (i) combined laden truck movements exiting from Lots 218 and 220 do not exceed 10 per hour in total on Sundays and Public Holidays. Note: In this condition, "per hour" means within any period of 60 minutes following the change of hour.				

NC-03	*Schedule 3 Condition 22 PA08_0142* The Ground Water Monitoring Program must include: (a) detailed baseline data on ground water levels and quality, based on statistical analysis (including available HWC data); (b) groundwater impact assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts; (c) a program to monitor groundwater levels and quality, including a groundwater core sample testing program to monitor changes in metallic species above the maximum predicted groundwater level at Lot 218, that; (i) is developed in consultation with EPA; (ii) samples to a depth at least 2 m below the proposed extraction depth of 0.7 m above the maximum	While further groundwater modelling has been conducted (GHD, 21/08/2020); the SWMP does not include protocol for further groundwater modelling to confirm the limits to excavation depth.	Mackas Sand should ensure that a protocol for further groundwater modelling to confirm the limits to excavation depth is developed and included in the Ground Water Monitoring Program.	The review of the groundwater model is driven by Schedule 3 Condition 3 of PA08_0142 following the completion of respective Independent Environmental Audits. There is also an existing provision for further groundwater modelling made in Section 5.4 of the approved Soil and Water Management Plan. **Action:** Mackas Sand will revise the Soil and Water Management Plan to clearly outline model review requirements in plan.	Completed - A revised SWMP that outlines model review requirements in the plan was submitted to the DPE on 30/11/2021.

Referenced ID	Condition ID and Text	Audit Finding / Description	Audit Recommendation	Response	Action Status
	predicted groundwater level, from at least two locations within the area proposed to be extracted within the first 3 years; and (iii) includes testing for acid forming minerals at regular depth and time intervals; (d) a protocol for further groundwater modelling to confirm the limits to excavation depth across the site permitted in accordance with condition 7 of schedule 2; and (e) a protocol for the investigation, notification and mitigation of identified exceedances of the ground water impact assessment criteria.				

NC-04	*Schedule 3 Condition 26* *PA08_0142* *Statement of Commitments 1.2.3* *LMP Cl 3.7.5* *LMP Cl 3.7.10* The Rehabilitation Management Plan must include: (a) the objectives for the site rehabilitation and site landscaping; (b) a description of the short, medium, and long term measures that would be implemented to rehabilitate and landscape the site; (c) detailed performance and completion criteria for the site rehabilitation and site landscaping; (d) a detailed description of the measures that would be implemented over the next 3 years, including the procedures to be implemented for: • progressively rehabilitating disturbed areas;	Requirements of the LMP had not been consistently implemented. The following issues were observed: • While it was reported the Mackas Sand had engaged a local nursery for collection and stocking of seeds, records were not available to show that preclearance surveys and seed collection had been undertaken. • Records were not available to verify preclearance surveys had been completed, • Topsoil stockpiles had not been delineated or signposted to reduce the potential for inadvertent disturbance; and • Stockpiles that will not be re-used within 3 months had not been seeded with a cover crop and/or native seed mix to prevent ingress of weed species.	Mackas Sands should ensure that all the requirements of the LMP are understood and implemented on site, including: • Ensuring topsoil stockpiles are managed in accordance with the requirements of the LMP • Records should be maintained as evidence of completion of activities, including preclearance surveys and seed collection.	Noted. **Action:** Mackas will review and revise the LMP and site documentation to incorporate these requirements and provide training to staff in regards to the revised requirements	Completed - The Mackas Sand LMP was revised to include a section on training so that Mackas Sand staff are aware of their roles and responsibilities when implementing the requirements of the Mackas Sand LMP. The revised Landscape Management Plan was submitted to the DPE on 30/11/2021.

	• landscaping the site to minimise visual impacts; • protecting vegetation and soil outside the disturbance areas; • preventing and/or minimising the accretion of sand dunes outside the project disturbance areas; • undertaking pre-clearance surveys; • salvaging and reusing material from the site for habitat enhancement; • managing impacts on fauna; • maintaining koala habitat linkages; • conserving and reusing topsoil; • collecting and propagating seed for rehabilitation works; • salvaging and reusing material from the site for habitat enhancement; • controlling weeds and feral pests; • controlling access; and				

Referenced ID	Condition ID and Text	Audit Finding / Description	Audit Recommendation	Response	Action Status
	• bushfire management; (e) a program to monitor the effectiveness of these measures, and progress against the performance and completion criteria; (f) a description of the potential risks to successful rehabilitation, and a description of the contingency measures that would be implemented to mitigate these risks; and (g) details of who would be responsible for monitoring, reviewing, and implementing the plan.				

Referenced ID	Condition ID and Text	Audit Finding / Description	Audit Recommendation	Response	Action Status
NC-05	*Schedule 5, Condition 2 PA08_0142* Within 24 hours of detecting an exceedance of the limits/performance criteria in this approval or the occurrence of an incident that causes (or may cause) material harm to the environment, the Proponent shall notify the Department and other relevant agencies of the exceedance/incident.	Two extra truck movements exited Lot 218 during the hours of 5am and 6am on 15 November 2018. DPIE were notified of the exceedance on 6 December 2018, with a detailed report provided to DPE on 18 December 2018. Not Reported to DPIE within 24 hours.	Where non-compliances with limits/performance criteria occur, Mackas Sand should notify the Department and other relevant agencies with 24 hours of the exceedance/incident.	Noted.	Completed - where non-compliances with limits/performance criteria occur, Mackas Sand will notify the Department and other relevant agencies within 24 hours of the exceedance/incident as practically possible.

NC-06	*Schedule 5 Condition 5 PA08_0142* Within 2 years of the date of the commencement of quarrying operations, and every 3 years thereafter, unless the Secretary directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must: (a) be conducted by a suitably qualified, experienced, and independent team of experts whose appointment has been approved by the Secretary; (b) assess the environmental performance of the project, and its effects on the surrounding environment; (c) assess whether the project is complying with the relevant standards, performance measures and statutory requirements; (d) review the adequacy of any	Previous audit conducted 24/01/2018, with the Audit report submitted April 2018. Current audit conducted 3-4/06/2021. Not completed within 3 years of completion of the previous audit.	Audits should be planned to ensure that they are commissioned within 3 years of the date of commencement of quarrying operations.	Noted. **Action:** Mackas Sand will seek Secretary's written approval should any changes to future audit schedule be required.	Completed - Mackas Sand will seek the Secretary's written approval should any changes to the future audit schedule be required.

Referenced ID	Condition ID and Text	Audit Finding / Description	Audit Recommendation	Response	Action Status
	strategy/plan/program required under this approval; and, if necessary, (e) recommend measures or actions to improve the environmental performance of the project, and/or any strategy/plan/program required under this approval.				
NC-07	*Schedule 5 Condition 6 PA08_0142* Within 1 month of completion of each Independent Environmental Audit, the Proponent shall submit a copy of the audit report to the Secretary and relevant agencies, with a response to any of the recommendations in the audit report.	The previous audit report was not submitted within one month of completion of the independent environmental audit.	Audit reports should be submitted to the Secretary within 1 month of the completion of the audit (date of inspection).	Noted. **Action:** Mackas Sand will seek Secretary's written approval should any changes to future audit schedule be required.	Completed - Mackas Sand will seek the Secretary's written approval should any changes to the future audit schedule be required.

Referenced ID	Condition ID and Text	Audit Finding / Description	Audit Recommendation	Response	Action Status
NC-08	*Statement of Commitments 1.8.2* Any refuelling of equipment used for the proposal will be undertaken by a registered contractor to remove the need for on-site storage of fuels. No maintenance of equipment or storage of chemicals will occur at either site.	Refuelling of mobile equipment undertaken off-site. Fixed equipment undertaken by Mackas Sand utilising a dedicated refuelling trailer.	Mackas Sand should consider seeking approval for refuelling to be undertaken by site staff.	Mackas Sand notes that there are no fuels stored within the operational boundary of Lot 218 or Lot 220 (i.e. operational boundaries). Mobile plant is refuelled outside the sand dune environment along the alternate access haul road (Lot 218) or other facilities outside Lot 220 boundary (R Mackenzie pers comm) Semi-static plant (i.e. plant which remain generally in-situ during operations) such as screens are re-fuelled in operational area. **Action:** Mackas Sand will review relevant plans and procedures in consultation with DPE	Completed - A revised SWMP that states equipment on-site will be refuelled by appropriately qualified personnel in accordance with the Mackas Sand Operational Management Procedure (Umwelt, 2014) with no fuel or oil being stored on-site, was submitted to the DPE on 30/11/2021.

Referenced ID	Condition ID and Text	Audit Finding / Description	Audit Recommendation	Response	Action Status
NC-09	*Statement of Commitments 1.10.3* *EMS 4.2* Inspections of high visibility fencing and any structures built to control public access to the sites will be undertaken every week. Maintenance or repair of any fences and structures will occur within this timeframe, as required.	No records available of inspections available. Noted that fencing is visible form the quarry.	Mackas Sand should ensure that inspections are conducted and records of the inspections and outcomes are retained.	Noted. **Action:** Mackas Sand will review record keeping practices	Ongoing – to be completed in the next annual review period (1/01/2022 – 31/12/2022).

Referenced ID	Condition ID and Text	Audit Finding / Description	Audit Recommendation	Response	Action Status
NC-10	*EPL 13218 Condition O4.1* The licensee must maintain, and implement as necessary, a current Pollution Incident Response Management Plan (PIRMP) for the premises. The licensee must keep the incident response plan on the premises at all times. The incident response plan must document systems and procedures to deal with all types of incidents (e.g. spills, explosions or fire) that may occur at the premises or that may be associated with activities that occur at the premises and which are likely to cause harm to the environment. The PIRMP must be tested at least annually or following a pollution incident. The licensee must develop the Pollution Incident Response Management Plan in accordance with the requirements in Part 5.7A of the Protection of the Environment Operations (POEO) Act 1997 and POEO regulations.	Records did not show that the PIRMP had been tested at least annually. Conducted 8/12/2020. Not conducted in 2019 or 2018.	Mackas Sand should ensure that trials of the PIRMP are conducted at least annually in accordance with the re.	Noted. Mackas Sand notes this is not an ongoing non-compliance. PIRMP tests have since been undertaken during both 2019 and 2020. **Action:** No action required.	Completed - PIRMP tests have since been undertaken during 2019, 2020 and 2021.

Referenced ID	Condition ID and Text	Audit Finding / Description	Audit Recommendation	Response	Action Status
NC-11	*EPL 13218 Condition M4.2* The (complaint) record must include details of the following: a) the date and time of the complaint; b) the method by which the complaint was made; c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect; d) the nature of the complaint; e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and f) if no action was taken by the licensee, the reasons why no action was taken.	Complaints register includes date, time nature of complaint and response (includes details of complaint). Does not include: • any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect.	Mackas Sand should update the complaints register to ensure that all required information is collected and documented.	**Action:** Mackas Sand will update internal complaints register to include personal details of complainant (if complainant wishes to be identified).	Ongoing – to be completed in the next annual review period (1/01/2022 – 31/12/2022).

11.0 Incidents and Non-compliances during the Report Period

11.1 Incidents, Notifications and Non-Compliances

As noted in **Section 1.0,** Mackas Sand identified 2 non-compliances during the 2021 reporting period. 11 non-compliances were identified during the IEA period. For a full summary of non-compliances identified during the 2021 IEA period refer to **Section 10.0** of this document.

Mackas Sand has addressed the two non-compliances that were identified during the reporting period, further details of which are provided in **Sections 11.1.1** and **11.1.2**.

11.1.1 Groundwater Water Monitoring Program Notification

Elevated turbidity and iron results were recorded as part of the routine groundwater monitoring during the reporting period. These results are restricted to SP1 and SP4. Mackas Sand reviewed and investigated the elevated March 2021 groundwater monitoring results in accordance with the Mackas Sand SWMP.

11.1.2 Groundwater Water Incident Reporting

The elevated groundwater quality monitoring result recorded at SP4 for iron during the September 2021 quarterly monitoring round was not reported to the DPE in accordance with Section 6.2 of the SWMP (Umwelt, 2014). Iron levels recorded at SP4 have historically been highly variable, fluctuating between 0.27 mg/L to 34mg/L, as shown in **Appendix 2**. All iron results obtained during the reporting period for SP4 were lower than the historical maximum. Since September 2021, iron concentrations declined from 6.96mg/L to 2.83mg/L in December and have returned to concentrations below the trigger level of 5.7mg/L. If elevated groundwater monitoring results are detected during future quarterly groundwater monitoring rounds, Mackas Sand will report it to the DPE in accordance with Section 6.2 of the SWMP (Umwelt, 2014).

11.2 Regulatory Correspondence

A summary of official regulatory correspondence received during the reporting period outside the scope of non-compliances identified in **Section 11.1** is provided in **Table 11-1**.

Table 11-1 Regulatory Compliance Correspondence Summary

Date	Agency	Summary	Outcome
07/05/2021	DPE	• The DPE reviewed the nominations and information provided for the 2021 IEA and was satisfied that the experts were suitably qualified and experienced.	• Mackas Sand engaged the nominated specialists to undertake the IEA of the Mackas Sand Project in 2021 for the operational period from 1 January 2018 to 31 May 2021.
30/06/2021	DPE	• The DPE was satisfied with the 2020 Annual Review and considers it to satisfy the reporting requirements of the approval and the DPE's Annual Review Guideline (October 2015). • Under the provisions of Schedule 2, Condition 4 of the approval, the DPE required more information in future Annual reviews.	• Mackas Sand noted that the DPE was satisfied with the 2020 Annual Review. • Mackas Sand has provided the requested information in this report.
01/07/2021	DPE	• Warning letter from the DPE for cattle grazing in the BOA during 2020.	• Mackas Sand has excluded the cattle from the BOA. During 2021, the perimeter fence was inspected during the BOA Monitoring Event and was found to be intact and electrified. No cattle were seen inside the BOA during the Monitoring Event. • As requested, Mackas Sand also extracted all the relevant BOS information from the LMP (Umwelt, April 2019) to create a standalone BOS document. The updated standalone BOS was submitted to DPE for approval on 19 August 2021. At the time of preparing this report, no response to the standalone BOS document has been received from the DPE.
18/10/2021	DPE	• The DPE reviewed the nominations and information provided for the 2021 rehabilitation bond and was satisfied that the experts were suitably qualified and experienced.	• Mackas Sand engaged the nominated specialists to review and revise the rehabilitation bond. The reviewed and revised rehabilitation bond was submitted to DPE for approval on 31 November 2021. At the time of preparing this report, no response to the reviewed and revised rehabilitation bond has been received from the DPE.

12.0 Activities Proposed in the 2022 Report Period

The anticipated environmental management activities for Mackas Sand during the 2022 report period are included in **Table 12-1**.

Table 12-1 Environmental Management Activities Proposed for 2022

2021 Document Section	Area/Nature of Activity	Action Proposed
6.4.5	Landscape and Biodiversity Offset	• Mackas will implement the requirements of the Mackas Sand VCA during the next reporting period. Specifically, the implementation of a weed management and disturbance regime in consultation with the Biodiversity Conservation Trust before May 2022. • Undertake the BOA management actions recommended in **Table 6-22**, as practicable.
6.5.5	Aboriginal Heritage	• Mackas Sand will continue collecting artefacts from Lot 218 and Lot 220 in the next reporting period.
7.2.6	Groundwater	• As recommended in the review of the MEDM, Mackas Sand will undertake the actions specified in **Section 7.2.5.** • If elevated groundwater monitoring results are detected during future quarterly groundwater monitoring rounds, Mackas Sand will report it to the DPE in accordance with Section 6.2 of the SWMP (Umwelt, 2014).
8.0	Rehabilitation	• Mackas Sand will salvage woody debris / trees and spread over rehabilitation areas. • Mackas Sand will identify opportunities to rehabilitate areas which are no longer required for operational purposes/activities.
10.0	Independendent Audit	• Mackas Sand will complete NC-09 in the next annual review period (1/01/2022 – 31/12/2022). • Mackas Sand will complete NC-11 in the next annual review period (1/01/2022 – 31/12/2022).

13.0 References

ANZECC (2000) National Water Quality Management Strategy Vol 1.

Department of Primary Industries (2019). *Seasonal Conditions Information Portal: Combined Drought Indicator*. Accessed September 2021 from: https://edis.spaceport.intersect.org.au/

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NSW Government (*2015) Annual Review Guideline: Post-approval requirements for State significant mining developments.*

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Umwelt (Australia) Pty Limited (2021) *Mackas Sand Environmental Noise Monitoring Report 2021.* Prepared for Macka's Sand Pty Limited.

Umwelt (Australia) Pty Limited (2020) *Mackas Sand Annual Review 2020.* Prepared for Macka's Sand Pty Limited.

Umwelt (Australia) Pty Limited (2021) *Mackas Sand EPBC 2011/6214 2021 Annual Compliance Report.* Prepared for Macka's Sand Pty Limited.

Umwelt (Australia) Pty Limited (2019) *Landscape Management Plan*. Prepared for Macka's Sand Pty Limited. – Including Rehabilitation Management Plan and Long Term Management Strategy.

Umwelt (Australia) Pty Limited (2015) Environmental Assessment of Modifications to Macka's Sand Extraction Operations on Lot 218, Salt Ash. Prepared for Macka's Sand Pty Limited.

Umwelt (Australia) Pty Limited (2012) Environmental Assessment of Modifications to Macka's Sand Extraction Operations on Lot 218 and Lot 220, Salt Ash. Prepared for Macka's Sand Pty Limited.

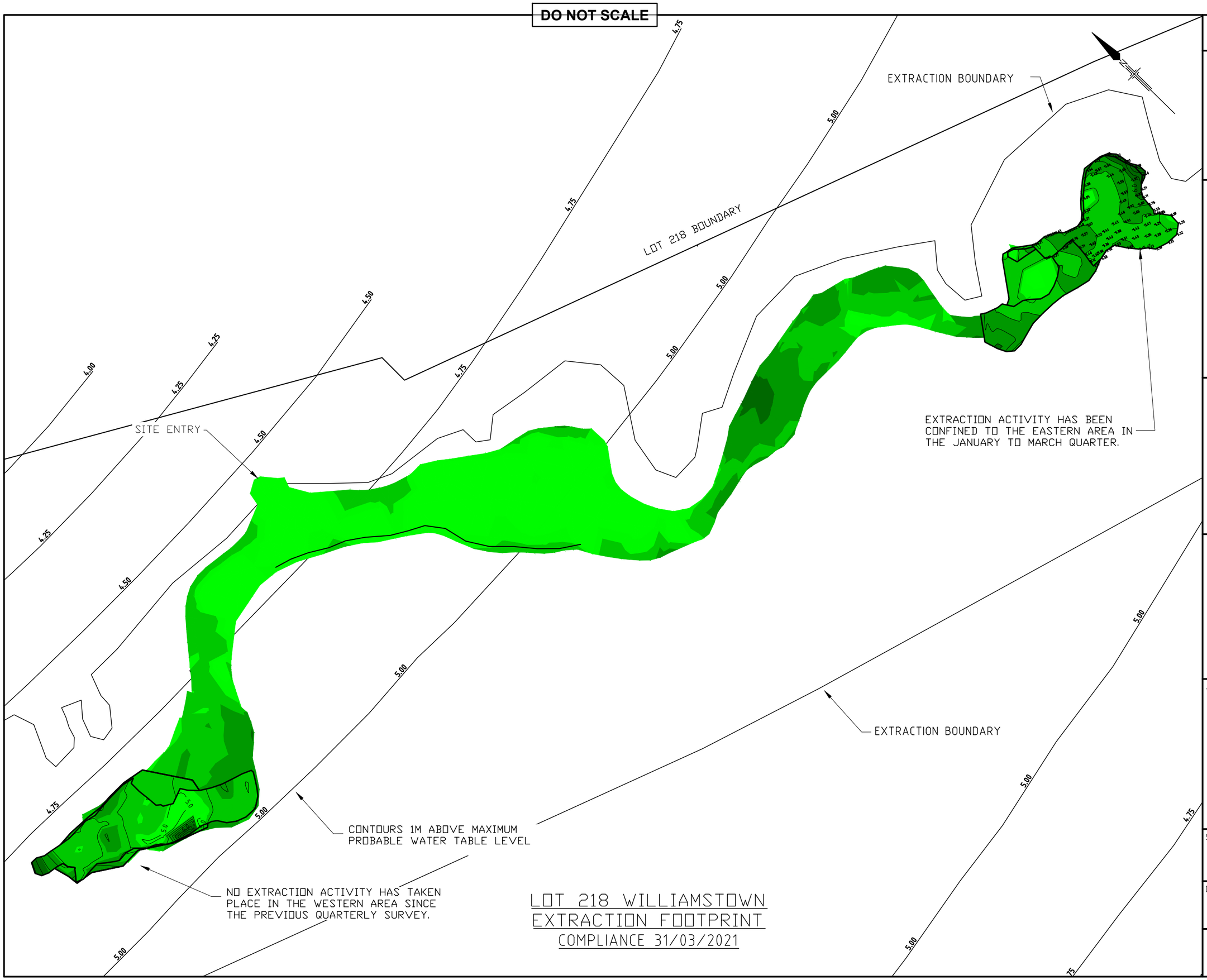
Umwelt (Australia) Pty Limited (2011) *Determination of Maximum Predicted Groundwater Level and Maximum Extraction Level at Lot 218 and Lot 220, Salt Ash.* Prepared for Macka's Sand Pty Limited.

Umwelt (Australia) Pty Limited (2009) *Environmental Assessment of Sand Extraction Operations from Lot 218 DP 1044608 and Lot 220 DP 1049608, Salt Ash*. Prepared for Macka's Sand Pty Limited.

APPENDIX 1

Quarterly Extraction Level Survey Plans of the Lot 218 and 220 Extraction Area

DO NOT SCALE



LOT 218 WILLIAMSTOWN
EXTRACTION FOOTPRINT
COMPLIANCE 31/03/2021

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CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	8/04/2021
REVISION:	A

CLIENT & JOB:

MACKAS
SAND & SOIL

WILLIAMSTOWN
COMPLIANCE
REPORTING

CENTURION SURVEY PTY LTD

ABN: 66 605 045 314
P: (02) 4967 5927
M: 0429 987 821
Unit 11 56 Industrial Dr
Mayfield NSW 2304

TITLE:

LOT 218
EXTRACTION LEVEL
COMPLIANCE

STATUS:

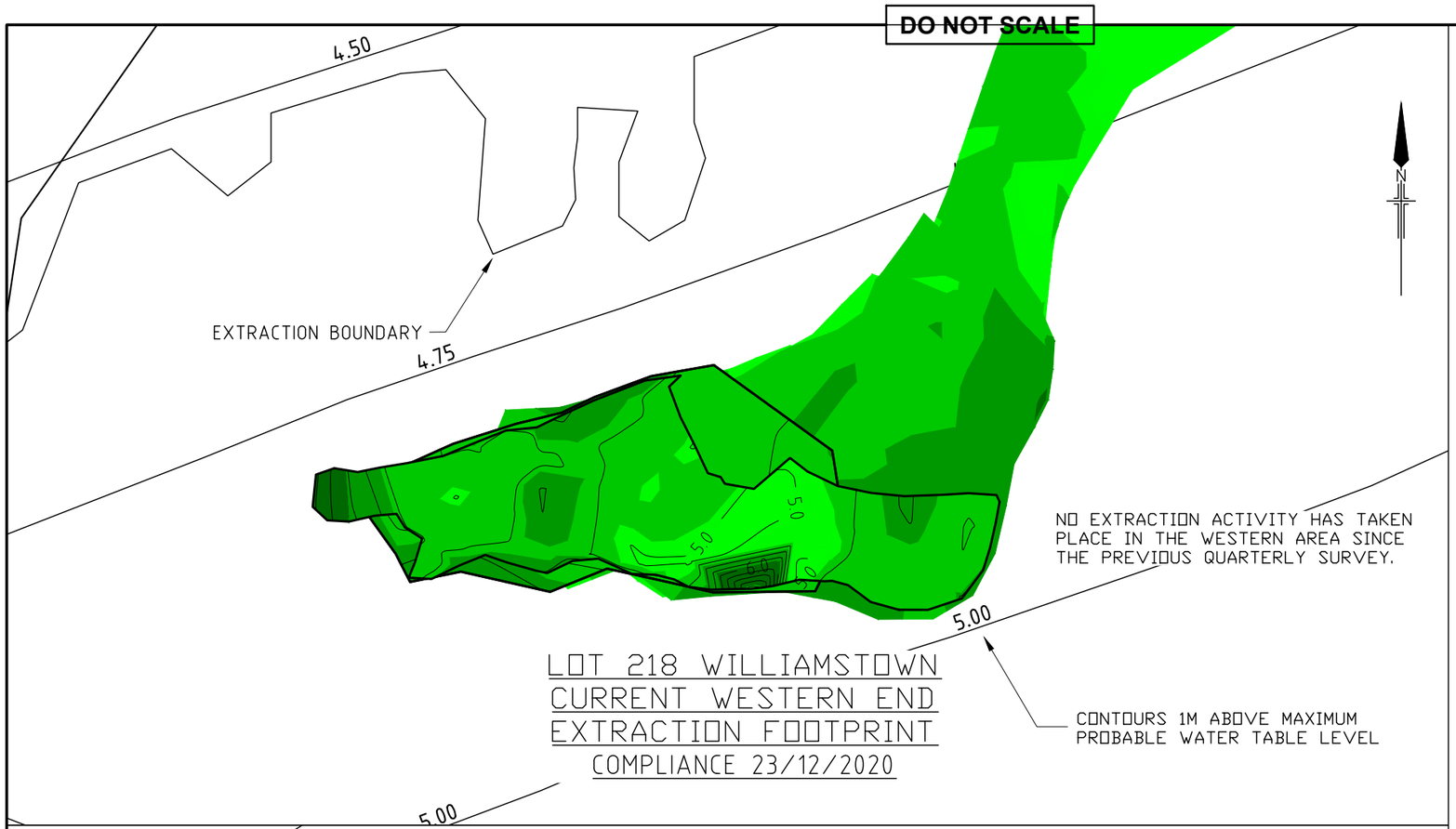
MARCH 2021

DRAWING NUMBER:

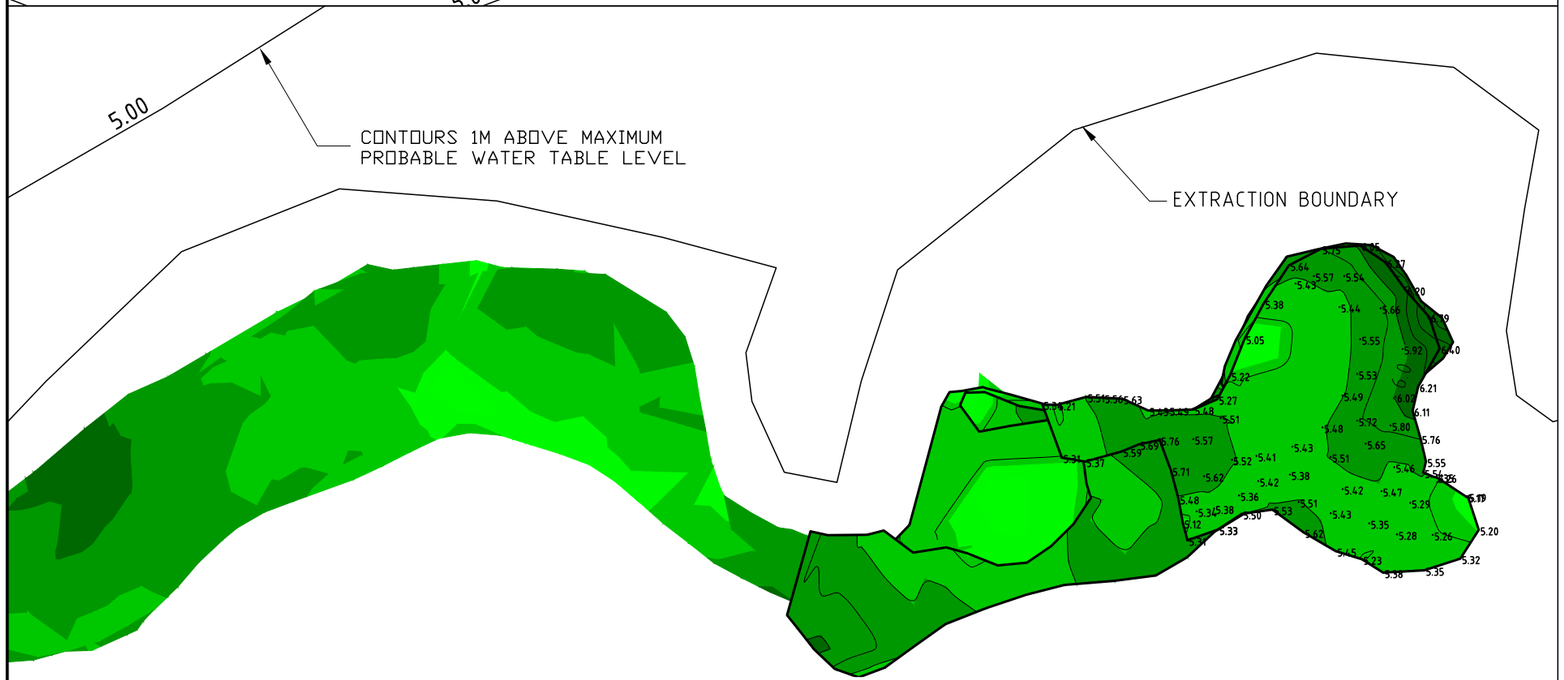
SHEET 1 OF 1 SHEETS

A3

DO NOT SCALE



LOT 218 WILLIAMSTOWN
CURRENT WESTERN END
EXTRACTION FOOTPRINT
COMPLIANCE 23/12/2020



LOT 218 WILLIAMSTOWN
CURRENT EASTERN END
EXTRACTION FOOTPRINT
COMPLIANCE 31/03/2021

NOTES:

1. THE ROAD SURFACE LEVEL HAS BEEN RAISED TO A MINIMUM OF 300mm-400mm ABOVE THE EXTRACTION SURFACE.
2. THE SURFACE LEVEL EITHER SIDE OF THE ACCESS ROAD IS COMPLIANT AS AT 23/12/2020.
3. SHOT HEIGHTS SHOWN ARE FOR THE CURRENT WORKING AND CAN BE USED TO IDENTIFY THE EXTENT OF THE SURVEY. OTHER AREAS WHERE IDENTIFIED AS COMPLYING IN PREVIOUS SURVEYS. THESE AREAS DO NOT FROM PART OF THE ACTIVE EXTRACTION OPERATION.

DEPTH COMPLIANCE COMPARISON TO 1m ABOVE MAXIMUM PROBABLY GROUND WATER LEVEL

LOWER VALUE		UPPER VALUE		COLOUR
-0.35	to	-0.3	m	
-0.3	to	-0.2	m	
-0.2	to	-0.1	m	
-0.1	to	0.0	m	
0.0	to	0.1	m	
0.1	to	0.2	m	
0.2	to	0.5	m	
0.5	to	1.0	m	
1.0	to	2.0	m	

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_218_Compliance_210331.dwg
SURVEYED:	CJ & LC
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	8/04/2021
REVISION:	A

CLIENT & JOB:

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SAND & SOIL

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COMPLIANCE
REPORTING

CENTURION SURVEY PTY LTD

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P: (02) 4967 5927
M: 0429 987 821
Unit 11 56 Industrial Dr
Mayfield NSW 2304

TITLE:

LOT 218
EXTRACTION LEVEL
COMPLIANCE

STATUS:

MARCH 2021

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3

DO NOT SCALE

DEPTH COMPLIANCE COMPARISON TO 0.7m ABOVE MAXIMUM PROBABLY GROUND WATER LEVEL

LOWER VALUE		UPPER VALUE		COLOUR
-0.35	to	-0.3	m	
-0.3	to	-0.2	m	
-0.2	to	-0.1	m	
-0.1	to	0.0	m	
0.0	to	0.1	m	
0.1	to	0.2	m	
0.2	to	0.5	m	
0.5	to	1.0	m	
1.0	to	2.0	m	

HATCHED AREAS WELL ABOVE THE EXTRACTION LEVEL AS REHAB HAS BEGUN.

SITE ENTRY

LOT 220 BOUNDARY

EXTRACTION BOUNDARY

NOTE: THIS AREA HAS NOT BEEN EXTRACTED AT THIS POINT IN TIME

NO EXTRACTION HAS OCCUERED IN THIS AREA IN THE JANUARY TO MARCH QUARTER.

AREA WAS SURVEYED ON THE 01/10/2020. NO ACTIVITY SINCE.

CONTOURS 0.7m ABOVE MAXIMUM PROBABLE WATER TABLE LEVEL

HATCHED AREAS WELL ABOVE THE EXTRACTION LEVEL AS REHAB HAS BEGUN.

SPOT LEVEL IDENTIFY ACTIVE AREA WHICH WAS SURVEYED AT THE END OF THE MARCH 2021 QUARTER. .
ALL OTHER NEAR BY AREA IS UNDER ACTIVE REHABILITATION AND WERE WELL ABOVE THE EXTRACTION LIMIT.

STOCKPILE OF SCREENED SAND

SPOT LEVEL IDENTIFY ACTIVE AREA WHICH WAS SURVEYED AT THE END OF THE MARCH 2021 QUARTER. ALL OTHER NEAR BY AREA IS UNDER ACTIVE REHABILITATION AND WERE WELL ABOVE THE EXTRACTION LIMIT.

LOT 220 BOUNDARY

EXTRACTION BOUNDARY

CURRENT EXTRACTION FLOOR COMPLIANCE 31/03/2021

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_220_Compliance_210331.dwg
SURVEYED:	LC & MH
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	8/04/2021
REVISION:	A

CLIENT & JOB:

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SAND & SOIL
SALT ASH

COMPLIANCE REPORTING

CENTURION SURVEY PTY LTD

ABN: 66 605 045 314
P: (02) 4967 5927
M: 0429 987 821
Unit 11 56 Industrial Dr
Mayfield NSW 2304

TITLE:

LOT 220
EXTRACTION LEVEL
COMPLIANCE

STATUS:

MARCH 2021

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3

DO NOT SCALE

EXTRACTION BOUNDARY

LOT 218 BOUNDARY

IMPROVEMENTS HAD BEEN MADE TO THE ENTRY TURNING CIRCLE DURING THE PREVIOUS QUARTER. AS MINOR SHAPING ACTIVITY HAD TAKEN PLACE AS PART OF THE ROAD IMPROVEMENTS COMPLIANCE WAS CONFIRMED.

SITE ENTRY

NO EXTRACTION HAS TAKEN PLACE IN THIS AREA FOR APPROXIMATELY 12 MONTHS.

EXTRACTION ACTIVITY HAS BEEN CONFINED TO THE EASTERN AREA OF THE EASTERN END IN THE MARCH TO JUNE QUARTER HOWEVER STOCKPILING AND SCREENING ACTIVITIES WERE TAKING PLACE IN THE OTHER AREAS SO COMPLIANCE IN THE ENTIRE EASTERN WORK ARE WAS CONFIRMED. .

MAXIMUM EXTENT OF EXTRACTED FLOOR

NO EXTRACTION HAS TAKEN PLACE IN THIS AREA FOR 18 TO 24 MONTHS.

CONTOURS 1M ABOVE MAXIMUM PROBABLE WATER TABLE LEVEL

EXTRACTION BOUNDARY

LOT 218 WILLIAMSTOWN
EXTRACTION FOOTPRINT
COMPLIANCE 30/06/2021

SCALE: NOT TO SCALE

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SURVEYED:	JW & LC
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CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	05/07/2021
REVISION:	A

CLIENT & JOB:

MACKAS
SAND & SOIL

WILLIAMSTOWN
COMPLIANCE
REPORTING

CENTURION SURVEY PTY LTD

ABN: 66 605 045 314
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M: 0429 987 821
Unit 11 56 Industrial Dr
Mayfield NSW 2304

TITLE:

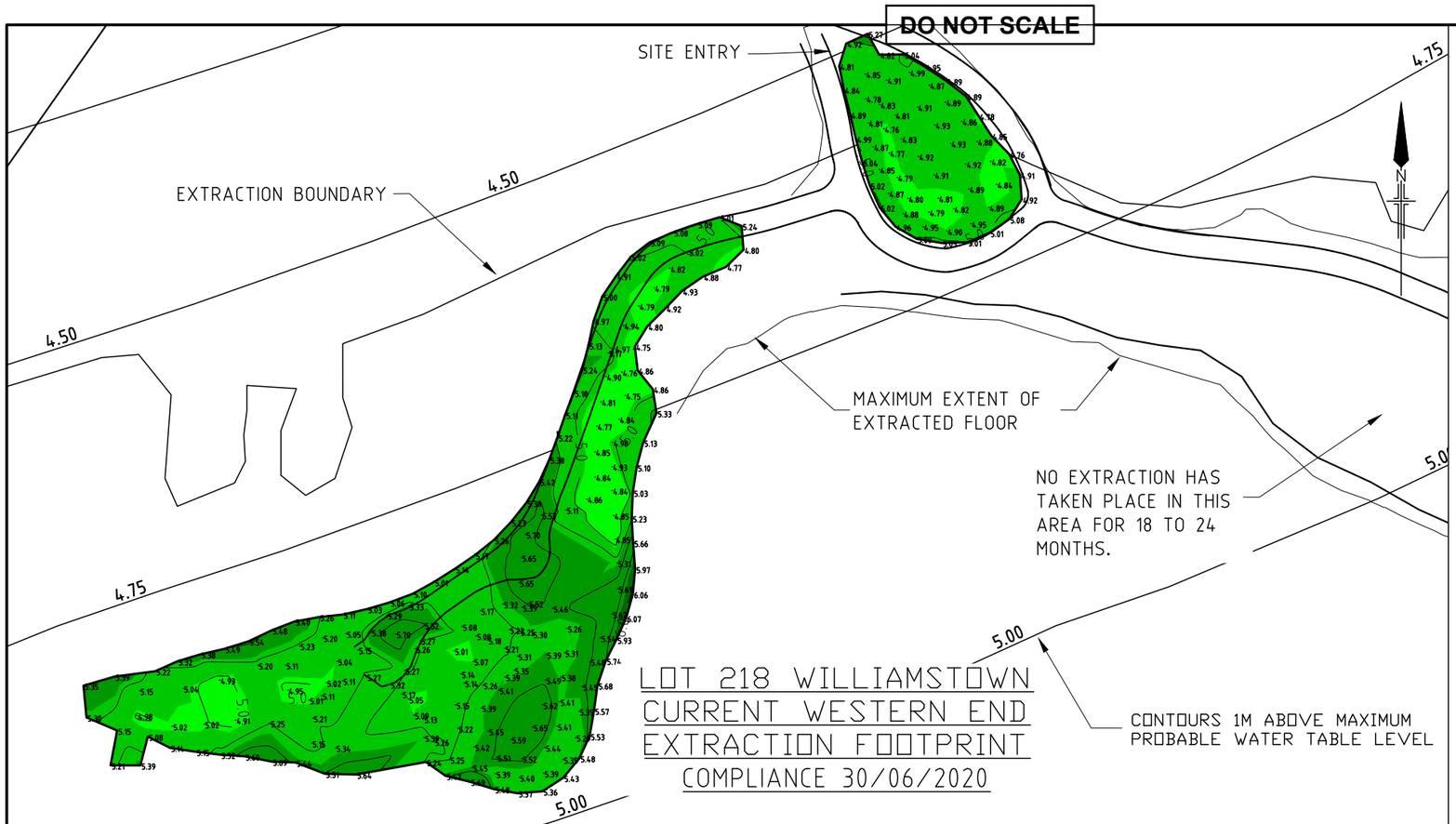
LOT 218
EXTRACTION LEVEL
COMPLIANCE

STATUS:

JUNE 2021

DRAWING NUMBER:

DO NOT SCALE



LOT 218 WILLIAMSTOWN
CURRENT WESTERN END
EXTRACTION FOOTPRINT
COMPLIANCE 30/06/2020

LOT 218 WILLIAMSTOWN
CURRENT EASTERN END
EXTRACTION FOOTPRINT
COMPLIANCE 30/06/2021

NOTES:

1. THE ROAD SURFACE LEVEL HAS BEEN RAISED TO A MINIMUM OF 300mm-400mm ABOVE THE EXTRACTION SURFACE.
2. THE SURFACE LEVEL EITHER SIDE OF THE ACCESS ROAD IS COMPLIANT AS AT 30/06/2021.
3. SHOT HEIGHTS SHOWN ARE FOR THE CURRENT WORKING AND CAN BE USED TO IDENTIFY THE EXTENT OF THE SURVEY. OTHER AREAS WHERE IDENTIFIED AS COMPLYING IN PREVIOUS SURVEYS. THESE AREAS DO NOT FROM PART OF THE ACTIVE EXTRACTION OPERATION.

DEPTH COMPLIANCE COMPARISON TO 1m ABOVE MAXIMUM PROBABLY GROUND WATER LEVEL

LOWER VALUE		UPPER VALUE		COLOUR
-0.35	to	-0.3	m	
-0.3	to	-0.2	m	
-0.2	to	-0.1	m	
-0.1	to	0.0	m	
0.0	to	0.1	m	
0.1	to	0.2	m	
0.2	to	0.5	m	
0.5	to	1.0	m	
1.0	to	2.0	m	

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_218_Compliance_210630.dwg
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DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	05/07/2021
REVISION:	A

CLIENT & JOB:

MACKAS
SAND & SOIL

WILLIAMSTOWN
COMPLIANCE
REPORTING

CENTURION SURVEY PTY LTD

ABN: 66 605 045 314
P: (02) 4967 5927
M: 0429 987 821
Unit 11 56 Industrial Dr
Mayfield NSW 2304

TITLE:

LOT 218
EXTRACTION LEVEL
COMPLIANCE

STATUS:

JUNE 2021

DRAWING NUMBER:

SHEET 2 OF 2 SHEETS

A3

DO NOT SCALE

DEPTH COMPLIANCE COMPARISON TO 0.7m ABOVE MAXIMUM PROBABLY GROUND WATER LEVEL

LOWER VALUE		UPPER VALUE		COLOUR
-0.35	to	-0.3	m	
-0.3	to	-0.2	m	
-0.2	to	-0.1	m	
-0.1	to	0.0	m	
0.0	to	0.1	m	
0.1	to	0.2	m	
0.2	to	0.5	m	
0.5	to	1.0	m	
1.0	to	2.0	m	

HATCHED AREAS WELL ABOVE THE EXTRACTION LEVEL AS REHAB HAS BEGUN.

SITE ENTRY

LOT 220 BOUNDARY

EXTRACTION BOUNDARY

NOTE: THIS AREA HAS NOT BEEN EXTRACTED AT THIS POINT IN TIME

NO EXTRACTION HAS OCCUERED IN THIS AREA IN THE JANUARY TO JUNE 1/2 YEAR.

AREA WAS SURVEYED ON THE 01/10/2020. NO ACTIVITY SINCE.

CONTOURS 0.7m ABOVE MAXIMUM PROBABLE WATER TABLE LEVEL

HATCHED AREAS WELL ABOVE THE EXTRACTION LEVEL AS REHAB HAS BEGUN.

SPOT LEVEL IDENTIFY ACTIVE AREA WHICH WAS SURVEYED AT THE END OF THE MARCH 2021 QUARTER. .
ALL OTHER NEAR BY AREA IS UNDER ACTIVE REHABILITATION AND WERE WELL ABOVE THE EXTRACTION LIMIT.

STOCKPILE OF SCREENED SAND

SPOT LEVEL IDENTIFY ACTIVE AREA WHICH WAS SURVEYED AT THE END OF THE JUNE 2021 QUARTER. ALL OTHER NEAR BY AREA IS UNDER ACTIVE REHABILITATION AND WERE WELL ABOVE THE EXTRACTION LIMIT OR WAS COMPLIANT UNDER A PREVIOUS SURVEY AND NOT EXTRACTION HAS TAKEN PLACE.

EXTRACTION BOUNDARY

LOT 220 BOUNDARY

CURRENT EXTRACTION FLOOR COMPLIANCE 30/06/2021

SCALE: NOT TO SCALE

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CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	05/07/2021
REVISION:	A

CLIENT & JOB:

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SALT ASH

COMPLIANCE REPORTING

CENTURION SURVEY PTY LTD

ABN: 66 605 045 314
P: (02) 4967 5927
M: 0429 987 821
Unit 11 56 Industrial Dr
Mayfield NSW 2304

TITLE:

LOT 220
EXTRACTION LEVEL
COMPLIANCE

STATUS:

JUNE 2021

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3

DO NOT SCALE

EXTRACTION BOUNDARY

LOT 218 BOUNDARY

SITE ENTRY

NO EXTRACTION HAS TAKEN PLACE IN THIS AREA FOR APPROXIMATELY 12 MONTHS.

EXTRACTION ACTIVITY HAS BEEN CONFINED TO THE EASTERN AREA OF THE EASTERN END IN THE JULY TO SEPTEMBER QUARTER HOWEVER STOCKPILING AND SCREENING ACTIVITIES WERE TAKING PLACE IN THE OTHER AREAS SO COMPLIANCE IN THE ENTIRE EASTERN WORK ARE WAS CONFIRMED. .

MAXIMUM EXTENT OF EXTRACTED FLOOR

NO EXTRACTION HAS TAKEN PLACE IN THIS AREA FOR OVER 24 MONTHS.

CONTOURS 1M ABOVE MAXIMUM PROBABLE WATER TABLE LEVEL

EXTRACTION BOUNDARY

LOT 218 WILLIAMSTOWN
EXTRACTION FOOTPRINT
COMPLIANCE 30/09/2021

SCALE: NOT TO SCALE

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DATUM:	AHD
ISSUE DATE:	03/10/2021
REVISION:	A

CLIENT & JOB:

MACKAS
SAND & SOIL

WILLIAMSTOWN
COMPLIANCE
REPORTING

CENTURION SURVEY PTY LTD

ABN: 66 605 045 314
P: (02) 4967 5927
M: 0429 987 821
Unit 11 56 Industrial Dr
Mayfield NSW 2304

TITLE:

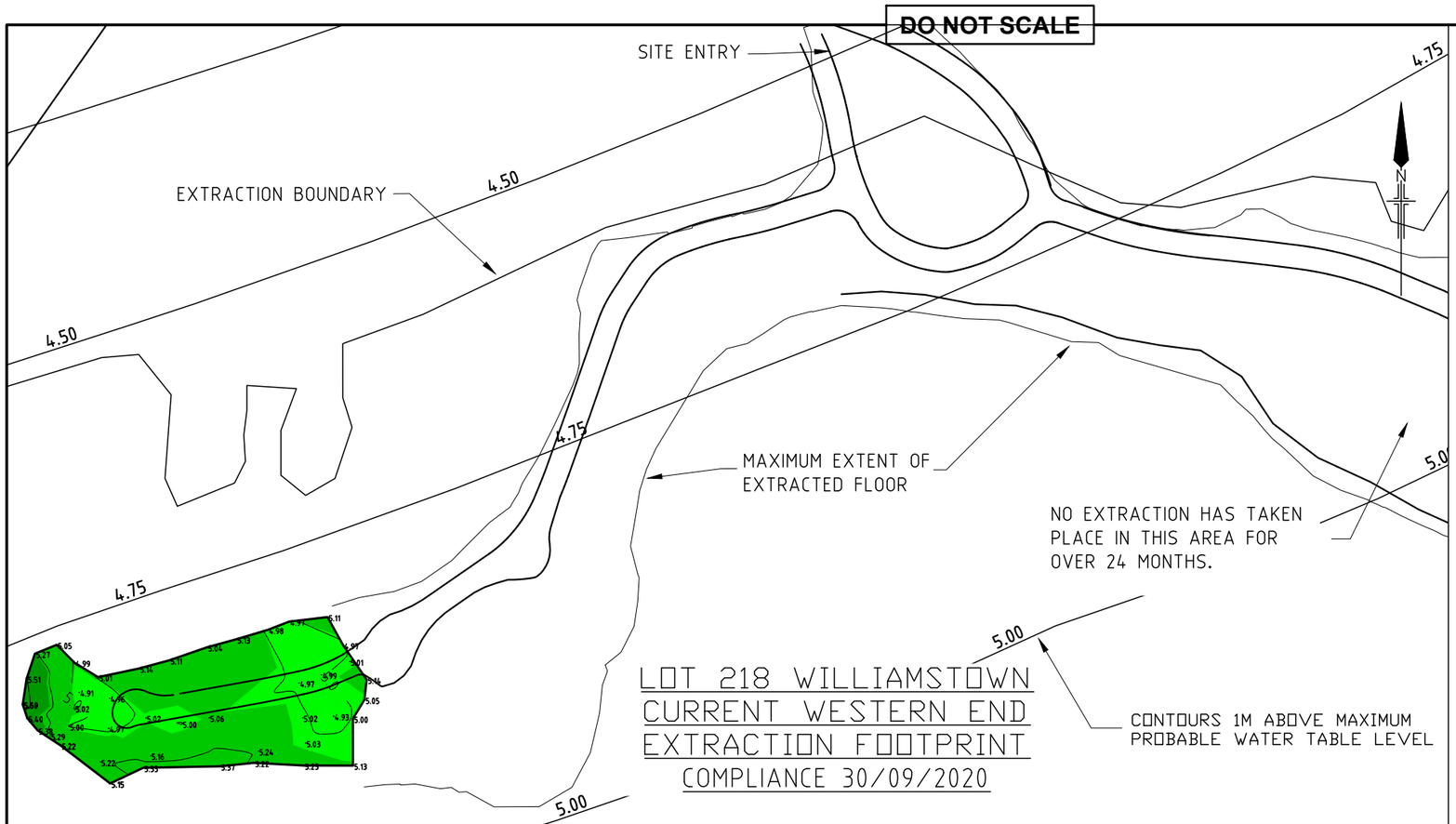
LOT 218
EXTRACTION LEVEL
COMPLIANCE

STATUS:

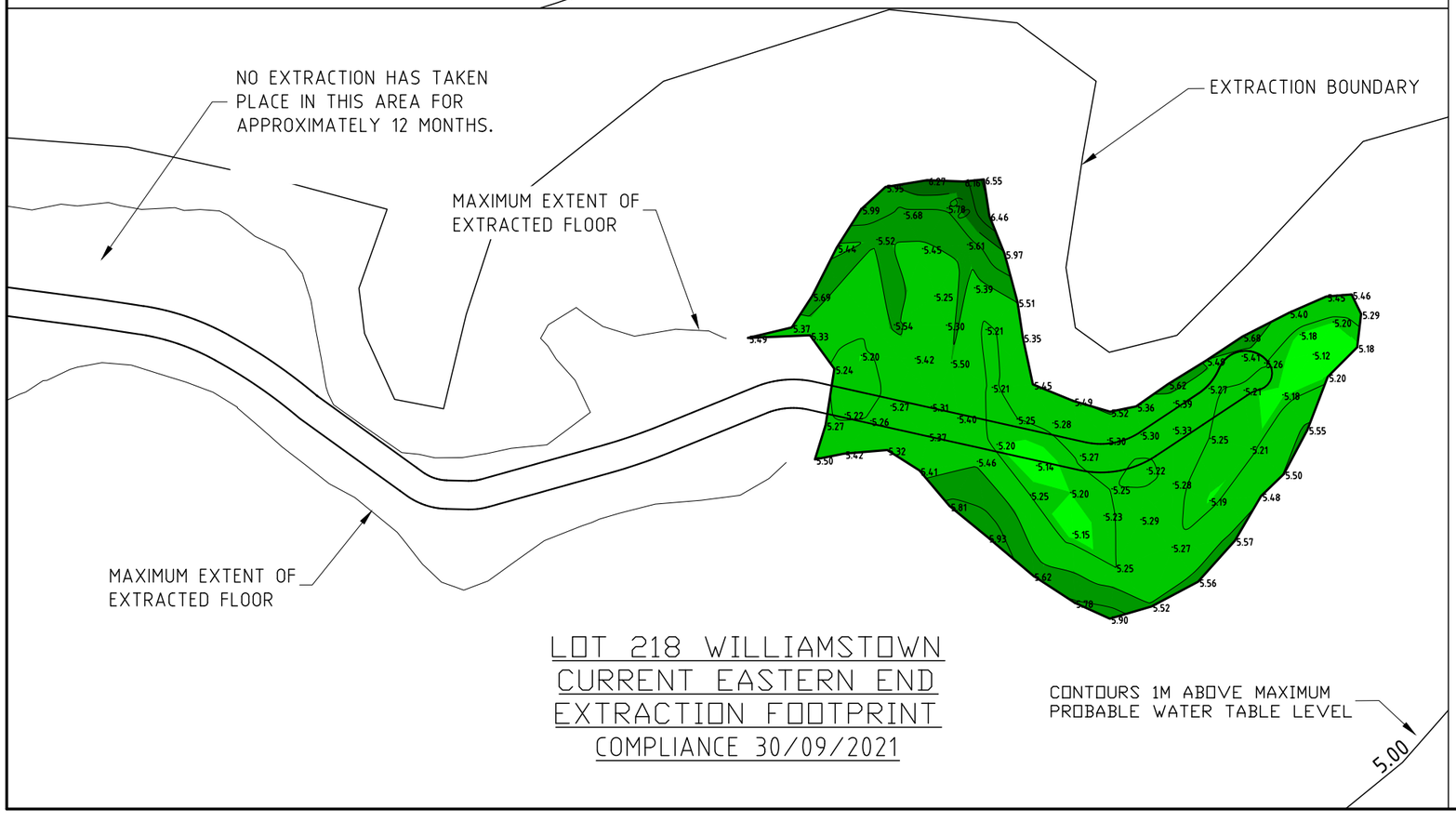
SEPTEMBER 2021

DRAWING NUMBER:

DO NOT SCALE



LOT 218 WILLIAMSTOWN
CURRENT WESTERN END
EXTRACTION FOOTPRINT
COMPLIANCE 30/09/2020



LOT 218 WILLIAMSTOWN
CURRENT EASTERN END
EXTRACTION FOOTPRINT
COMPLIANCE 30/09/2021

NOTES:

1. THE ROAD SURFACE LEVEL HAS BEEN RAISED TO A MINIMUM OF 300mm-400mm ABOVE THE EXTRACTION SURFACE.
2. THE SURFACE LEVEL EITHER SIDE OF THE ACCESS ROAD IS COMPLIANT AS AT 30/06/2021.
3. SHOT HEIGHTS SHOWN ARE FOR THE CURRENT WORKING AND CAN BE USED TO IDENTIFY THE EXTENT OF THE SURVEY. OTHER AREAS WHERE IDENTIFIED AS COMPLYING IN PREVIOUS SURVEYS. THESE AREAS DO NOT FROM PART OF THE ACTIVE EXTRACTION OPERATION.

DEPTH COMPLIANCE COMPARISON TO 1m ABOVE MAXIMUM PROBABLY GROUND WATER LEVEL

LOWER VALUE		UPPER VALUE		COLOUR
-0.35	to	-0.3	m	
-0.3	to	-0.2	m	
-0.2	to	-0.1	m	
-0.1	to	0.0	m	
0.0	to	0.1	m	
0.1	to	0.2	m	
0.2	to	0.5	m	
0.5	to	1.0	m	
1.0	to	2.0	m	

SCALE: NOT TO SCALE

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DATUM:	AHD
ISSUE DATE:	3/10/2021
REVISION:	A

CLIENT & JOB:

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COMPLIANCE
REPORTING

CENTURION SURVEY PTY LTD

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M: 0429 987 821
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Mayfield NSW 2304

TITLE:

LOT 218
EXTRACTION LEVEL
COMPLIANCE

STATUS:

SEPTEMBER 2021

DRAWING NUMBER:

SHEET 2 OF 2 SHEETS

A3

DO NOT SCALE

DEPTH COMPLIANCE COMPARISON TO 0.7m ABOVE MAXIMUM PROBABLY GROUND WATER LEVEL

LOWER VALUE		UPPER VALUE		COLOUR
-0.35	to	-0.3	m	
-0.3	to	-0.2	m	
-0.2	to	-0.1	m	
-0.1	to	0.0	m	
0.0	to	0.1	m	
0.1	to	0.2	m	
0.2	to	0.5	m	
0.5	to	1.0	m	
1.0	to	2.0	m	

SITE ENTRY

LOT 220 BOUNDARY

EXTRACTION BOUNDARY

NOTE: THIS AREA HAS NOT BEEN EXTRACTED AT THIS POINT IN TIME

NO EXTRACTION HAS OCCURRED IN THIS AREA IN THE JULY TO SEPTEMBER QUARTER. SURVEY WAS COMPLETED 29/10/2021 TO CONFIRM COMPLIANCE.

AREA WAS SURVEYED ON THE 29/10/2021. NO ACTIVITY IN PERVIOUS QUARTER.

CONTOURS 0.7m ABOVE MAXIMUM PROBABLE WATER TABLE LEVEL

HATCHED AREAS WELL ABOVE THE EXTRACTION LEVEL AS REHAB HAS BEGUN.

SMALL STOCKPILE OF SCREENED SAND

NO EXTRACTION HAS OCCURRED IN THIS AREA IN THE JULY TO SEPTEMBER QUARTER. SURVEY WAS COMPLETED 29/10/2021 TO CONFIRM COMPLIANCE AT THE REQUEST OF UMWELT.

EXTRACTION BOUNDARY

LOT 220 BOUNDARY

CURRENT EXTRACTION FLOOR COMPLIANCE 30/09/2021

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_220_Compliance_219030.dwg
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DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	18/11/2021
REVISION:	A

CLIENT & JOB:

MACKAS
SAND & SOIL
SALT ASH

COMPLIANCE REPORTING

CENTURION SURVEY PTY LTD

ABN: 66 605 045 314
P: (02) 4967 5927
M: 0429 987 821
Unit 11 56 Industrial Dr
Mayfield NSW 2304

TITLE:

LOT 220
EXTRACTION LEVEL
COMPLIANCE

STATUS:

SEPTEMBER 2021

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3

DO NOT SCALE

EXTRACTION BOUNDARY

LOT 218 BOUNDARY

SITE ENTRY

NO EXTRACTION HAS TAKEN PLACE IN THIS AREA FOR APPROXIMATELY 12 MONTHS.

MAXIMUM EXTENT OF EXTRACTED FLOOR

NO EXTRACTION HAS TAKEN PLACE IN THIS AREA FOR OVER 24 MONTHS.

CONTOURS 1M ABOVE MAXIMUM PROBABLE WATER TABLE LEVEL

EXTRACTION BOUNDARY

LOT 218 WILLIAMTOWN
EXTRACTION FOOTPRINT
QUATERLY COMPLIANCE 31/12/2021

NOTE: SURVEY TO CONFIRM COMPLIANCE FOR THE QUARTER ENDING 31/12/2021 WAS COMPLETED 13/01/2022

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_218_Compliance_211231.dwg
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CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	14/01/2022
REVISION:	A

CLIENT & JOB:

MACKAS
SAND & SOIL

WILLIAMTOWN
COMPLIANCE
REPORTING

CENTURION SURVEY PTY LTD

ABN: 66 605 045 314
P: (02) 4967 5927
M: 0429 987 821
Unit 11 56 Industrial Dr
Mayfield NSW 2304

TITLE:

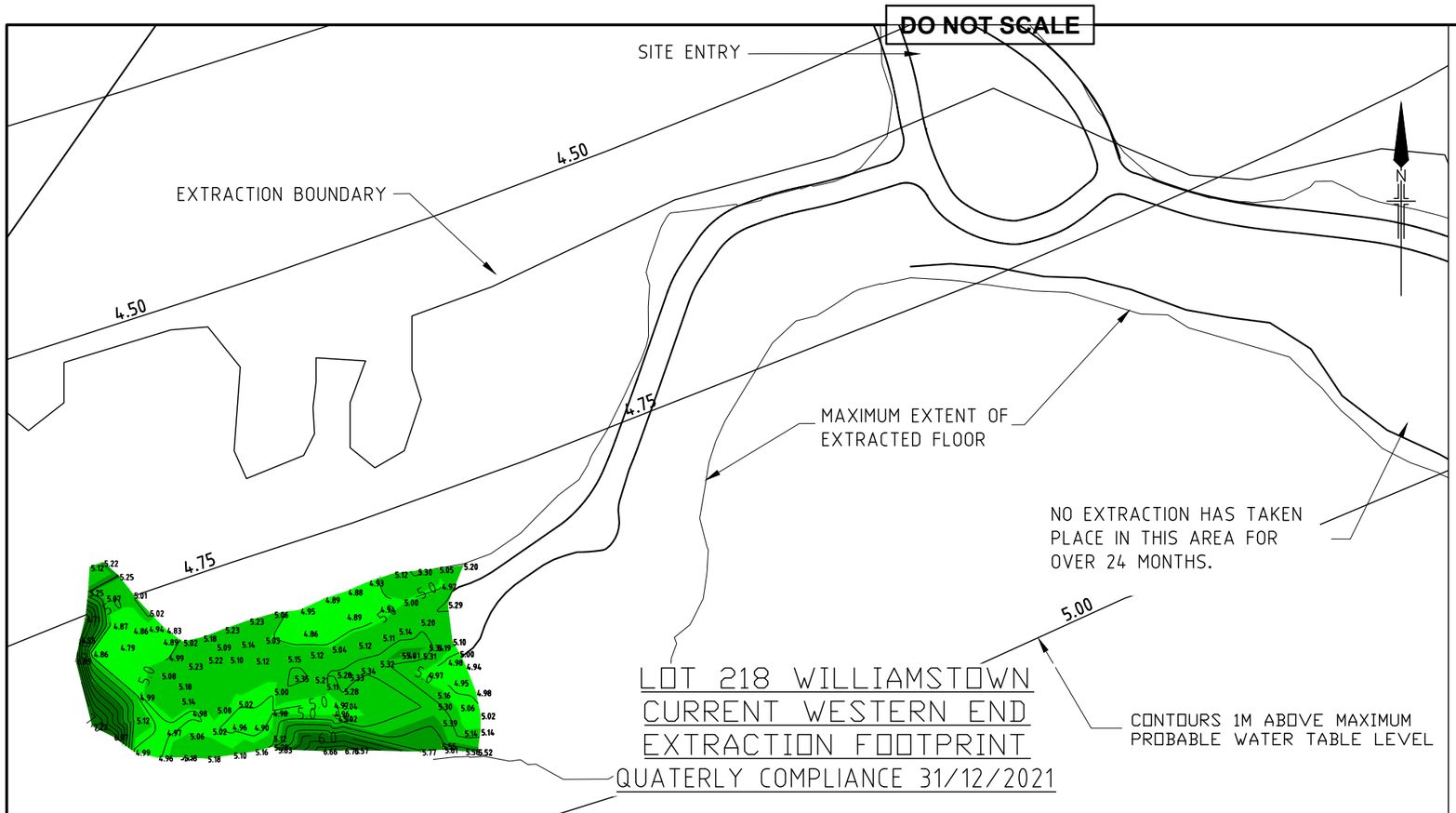
LOT 218
EXTRACTION LEVEL
QUATERLY COMPLIANCE

STATUS:

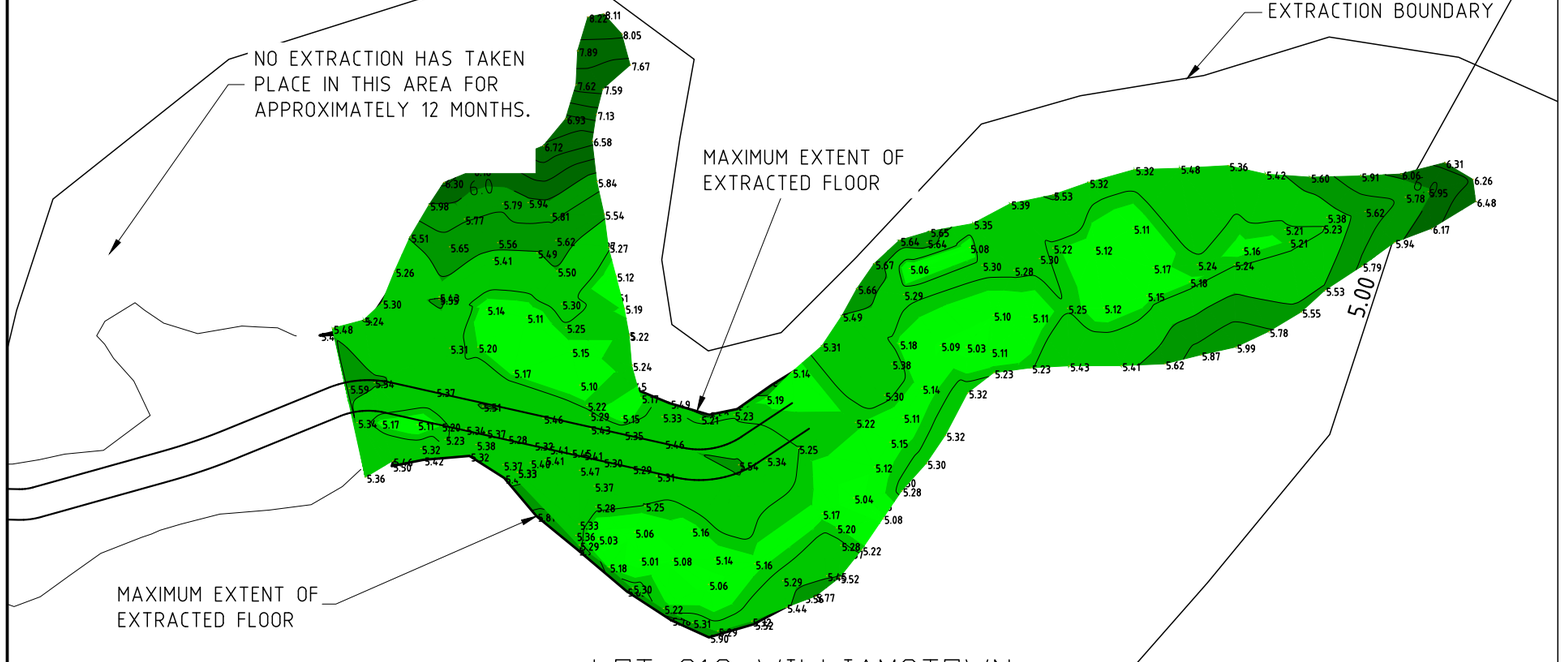
DECEMBER 2021

DRAWING NUMBER:

DO NOT SCALE



LOT 218 WILLIAMSTOWN
CURRENT WESTERN END
EXTRACTION FOOTPRINT
QUATERLY COMPLIANCE 31/12/2021



LOT 218 WILLIAMSTOWN
CURRENT EASTERN END
EXTRACTION FOOTPRINT
QUATERLY COMPLIANCE 31/12/2021

NOTES:

1. THE ROAD SURFACE LEVEL HAS BEEN RAISED TO A MINIMUM OF 300mm-400mm ABOVE THE EXTRACTION SURFACE.
2. THE SURFACE LEVEL EITHER SIDE OF THE ACCESS ROAD IS COMPLIANT AS AT 30/06/2021.
3. SHOT HEIGHTS SHOWN ARE FOR THE CURRENT WORKING AND CAN BE USED TO IDENTIFY THE EXTENT OF THE SURVEY. OTHER AREAS WHERE IDENTIFIED AS COMPLYING IN PREVIOUS SURVEYS, THESE AREAS DO NOT FROM PART OF THE ACTIVE EXTRACTION OPERATION.
4. SURVEY TO CONFIRM COMPLIANCE FOR THE QUARTER ENDING 31/12/2021 WAS COMPLETED 13/01/2022

DEPTH COMPLIANCE COMPARISON TO 1m ABOVE MAXIMUM PROBABLY GROUND WATER LEVEL

LOWER VALUE		UPPER VALUE		COLOUR
-0.35	to	-0.3	m	
-0.3	to	-0.2	m	
-0.2	to	-0.1	m	
-0.1	to	0.0	m	
0.0	to	0.1	m	
0.1	to	0.2	m	
0.2	to	0.5	m	
0.5	to	1.0	m	
1.0	to	2.0	m	

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_218_Compliance_211231.dwg
SURVEYED:	CJ & LC
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	14/01/2022
REVISION:	A

CLIENT & JOB:

MACKAS
SAND & SOIL

WILLIAMTOWN
COMPLIANCE
REPORTING

CENTURION SURVEY PTY LTD

ABN: 66 605 045 314
P: (02) 4967 5927
M: 0429 987 821
Unit 11 56 Industrial Dr
Mayfield NSW 2304

TITLE:

LOT 218
EXTRACTION LEVEL
QUATERLY COMPLIANCE

STATUS:

DECEMBER 2021

DRAWING NUMBER:

SHEET 2 OF 2 SHEETS

A3

DO NOT SCALE

DEPTH COMPLIANCE COMPARISON TO 0.7m ABOVE MAXIMUM PROBABLY GROUND WATER LEVEL

LOWER VALUE		UPPER VALUE		COLOUR
-0.35	to	-0.3	m	
-0.3	to	-0.2	m	
-0.2	to	-0.1	m	
-0.1	to	0.0	m	
0.0	to	0.1	m	
0.1	to	0.2	m	
0.2	to	0.5	m	
0.5	to	1.0	m	
1.0	to	2.0	m	

SITE ENTRY

LOT 220 BOUNDARY

EXTRACTION BOUNDARY

NOTE: THIS AREA HAS NOT BEEN EXTRACTED AT THIS POINT IN TIME

NO EXTRACTION HAS OCCURRED IN THIS AREA IN THE JULY TO SEPTEMBER QUARTER. SURVEY WAS COMPLETED 29/10/2021 TO CONFIRM COMPLIANCE.

AREA WAS SURVEYED ON THE 29/10/2021. NO ACTIVITY IN PERVIOUS QUARTER.

CONTOURS 0.7m ABOVE MAXIMUM PROBABLE WATER TABLE LEVEL

HATCHED AREAS WELL ABOVE THE EXTRACTION LEVEL AS REHAB HAS BEGUN.

SMALL STOCKPILE OF SCREENED SAND

NO EXTRACTION HAS OCCURRED IN THIS AREA IN THE JULY TO SEPTEMBER QUARTER. SURVEY WAS COMPLETED 29/10/2021 TO CONFIRM COMPLIANCE AT THE REQUEST OF UMWELT.

EXTRACTION BOUNDARY

LOT 220 BOUNDARY

CURRENT EXTRACTION FLOOR COMPLIANCE 31/12/2021

NOTE: NO EXTRACTION HAS OCCURRED IN THIS AREA IN THE JULY TO DECEMBER HALF YEAR. SURVEY WAS COMPLETED 29/10/2021 TO CONFIRM COMPLIANCE AT THE REQUEST OF UMWELT.

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_220_Compliance_211231.dwg
SURVEYED:	CJ
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	14/01/2022
REVISION:	A

CLIENT & JOB:

MACKAS
SAND & SOIL
SALT ASH

COMPLIANCE REPORTING

CENTURION SURVEY PTY LTD

ABN: 66 605 045 314
P: (02) 4967 5927
M: 0429 987 821
Unit 11 56 Industrial Dr
Mayfield NSW 2304

TITLE:

LOT 220
EXTRACTION LEVEL
QUATERLY COMPLIANCE

STATUS:

DECEMBER 2021

DRAWING NUMBER:

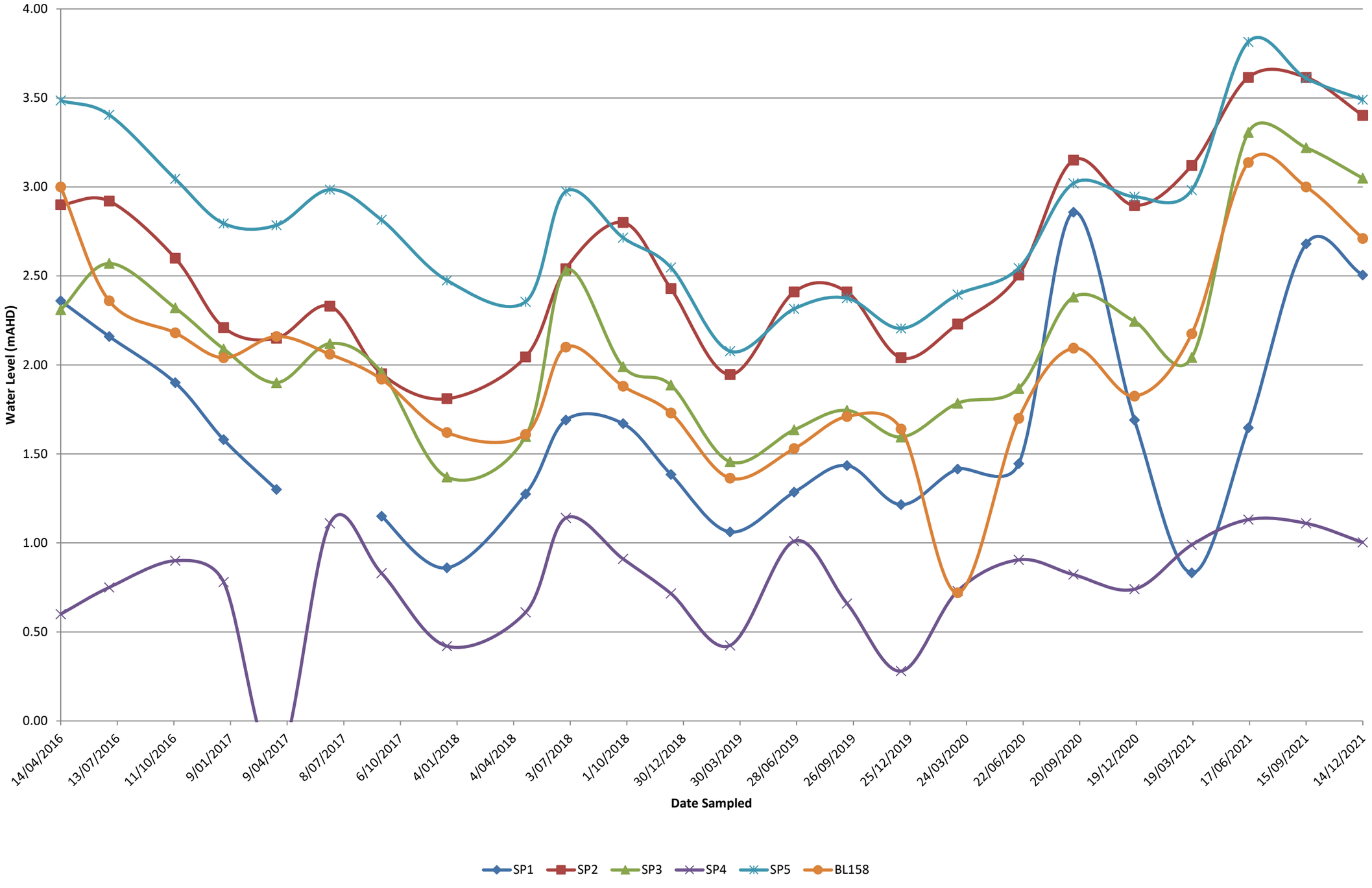
SHEET 1 OF 1 SHEETS

A3

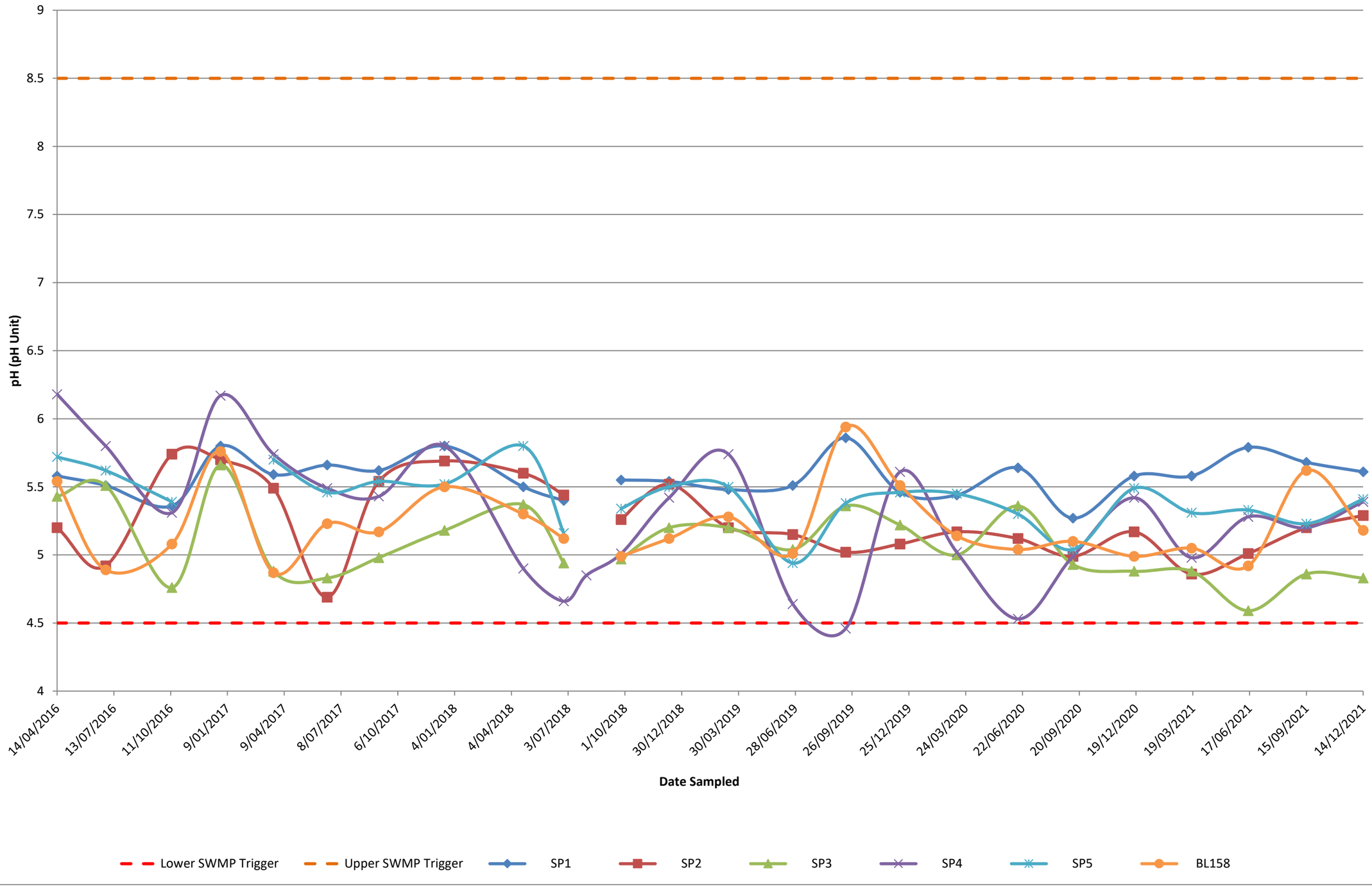
APPENDIX 2

Groundwater Monitoring Results

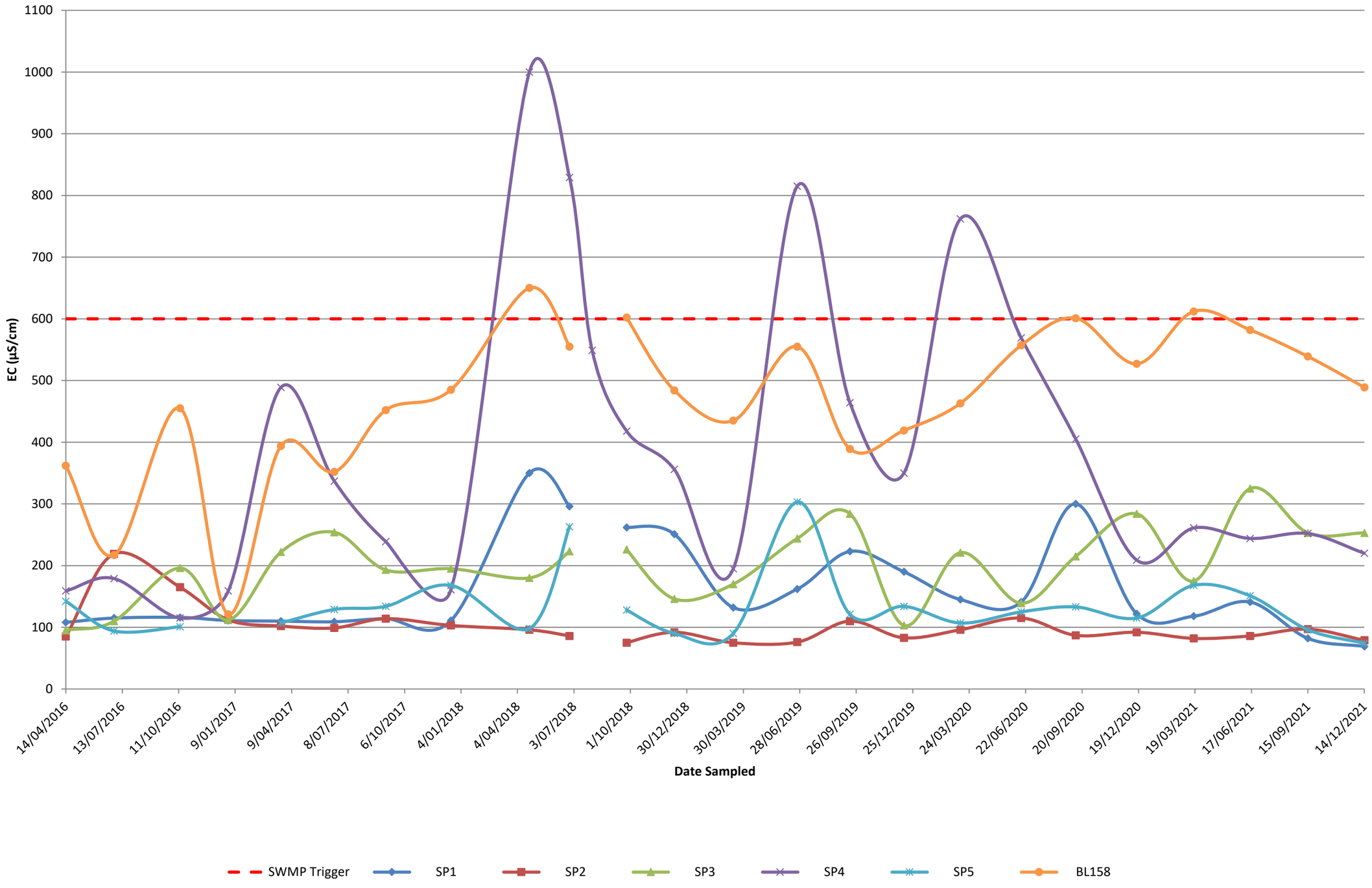
Groundwater Levels (mAHD)



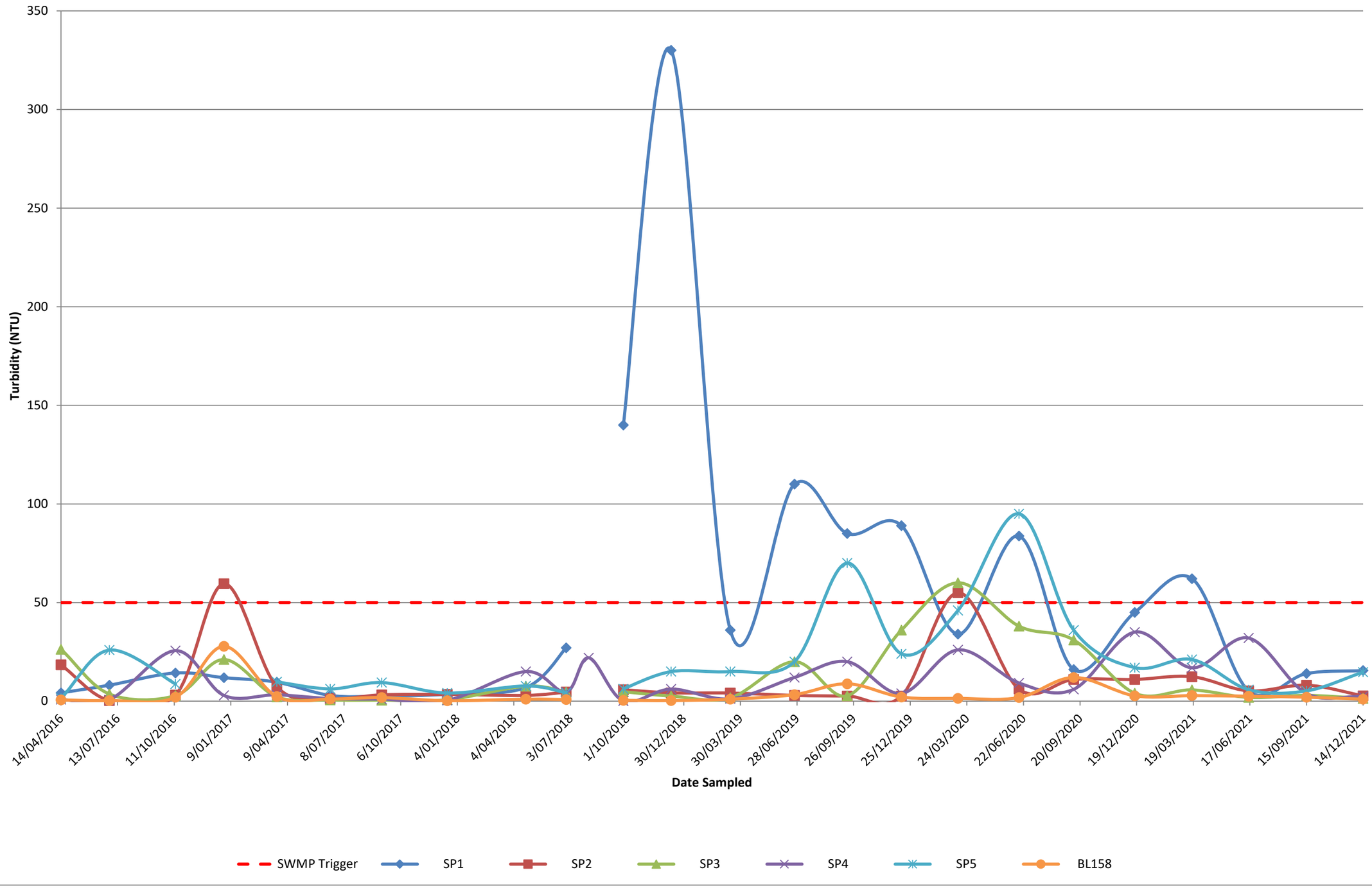
Groundwater - pH



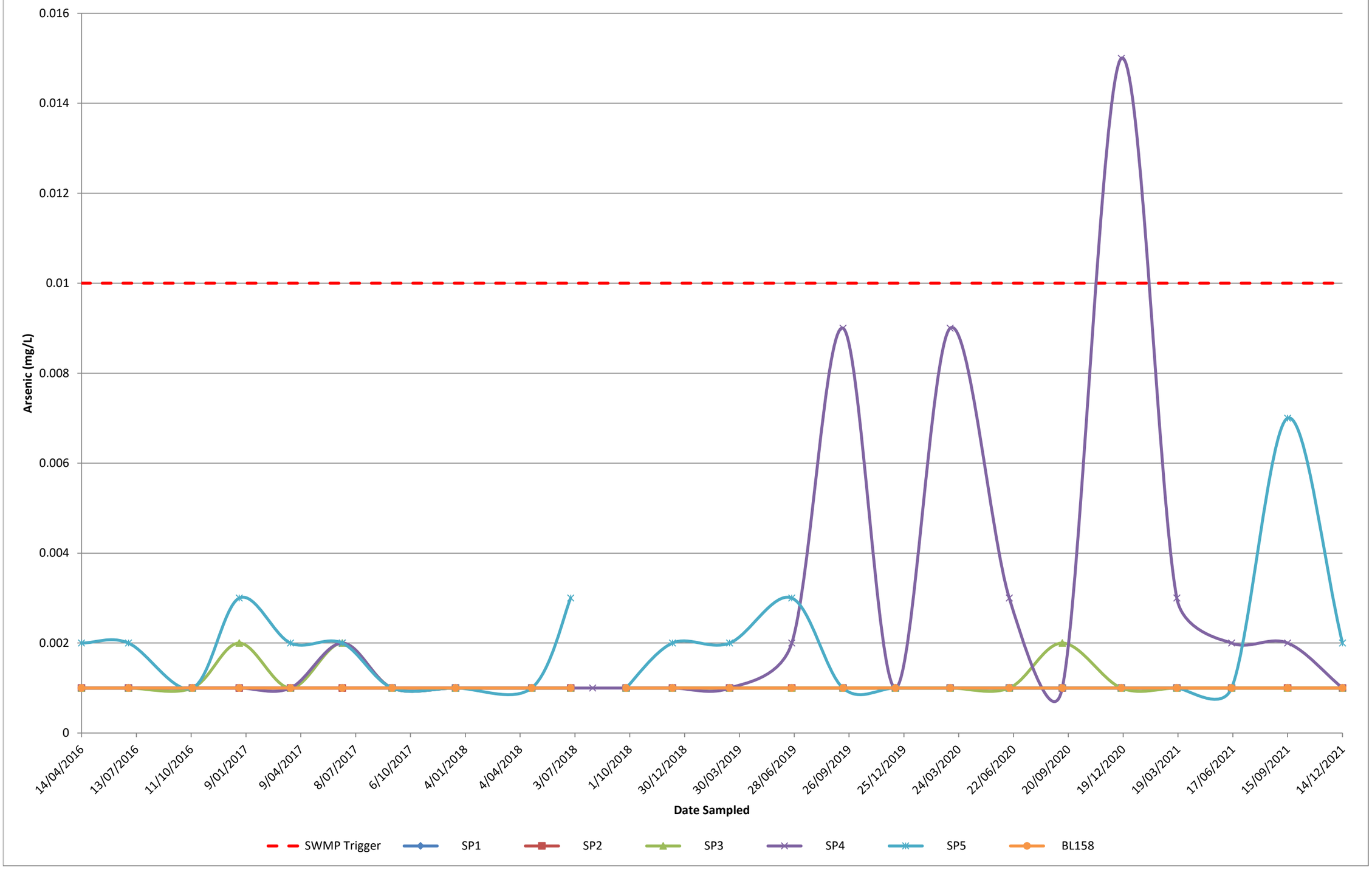
Groundwater - Electrical Conductivity (EC)



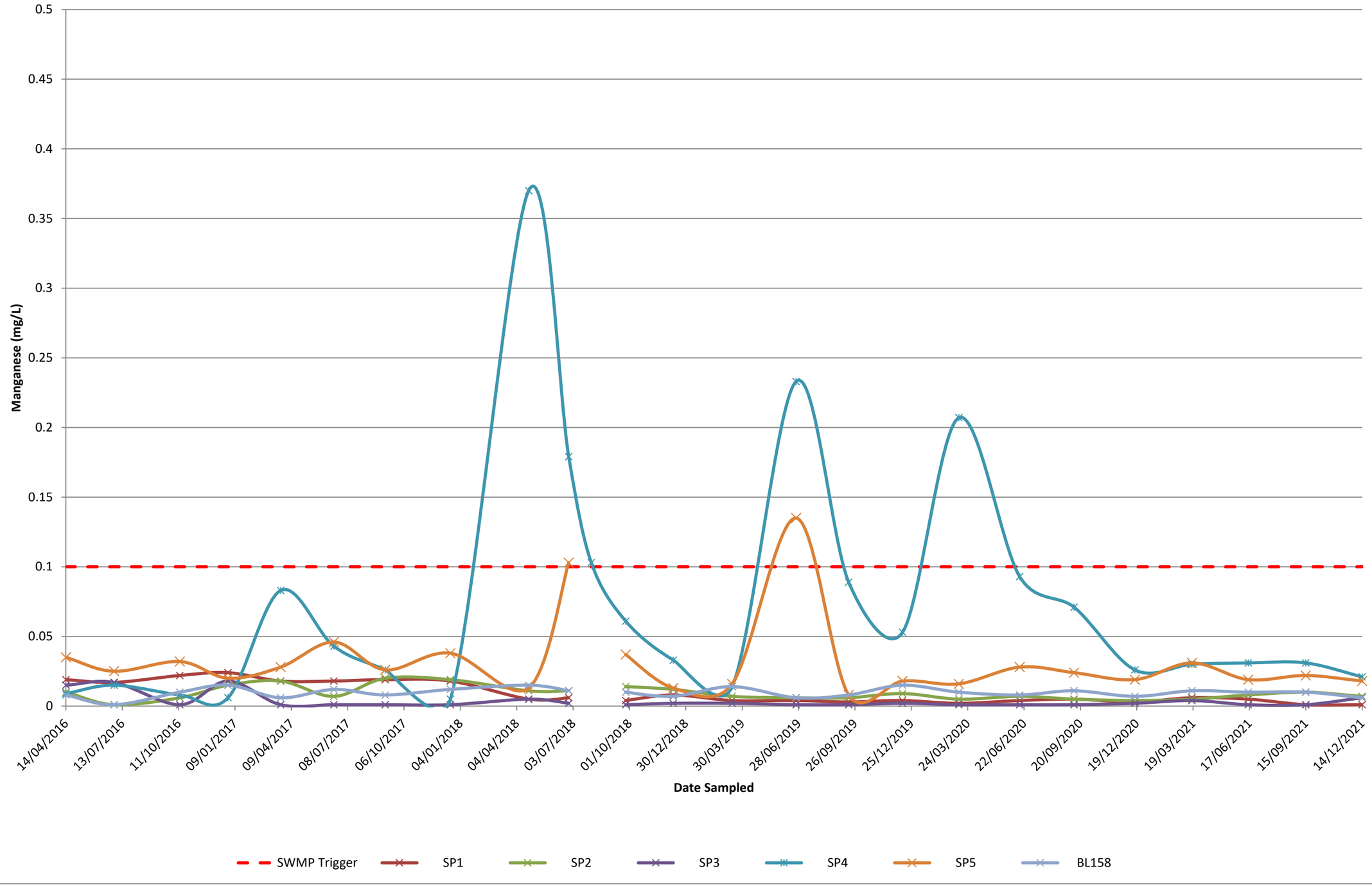
Groundwater - Turbidity (NTU)



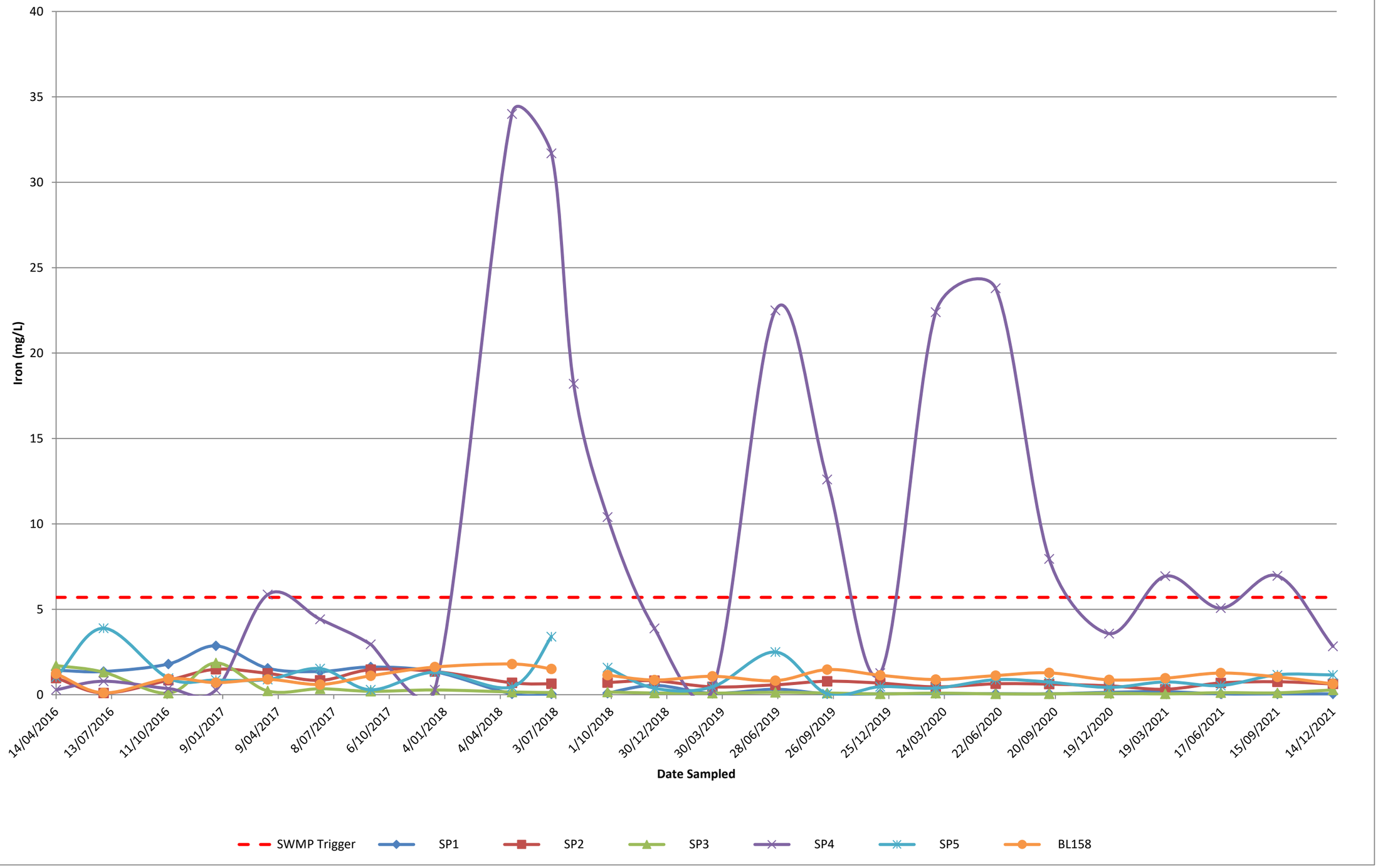
Groundwater - Arsenic (mg/L)



Groundwater - Manganese (mg/L)



Groundwater - Iron (mg/L)



APPENDIX 3

Operations Report

MACKA'S SAND PTY LTD

OPERATIONS REPORT

Approval for Extractive Industry in the
North Stockton Catchment Area

FINAL

March 2022

Table of Contents

Figures

1.0 Introduction

1.1 Project Background

Macka's Sand Pty Ltd (Macka's Sand) was granted Major Project Approval 08_0142 in September 2009 by the Minister for Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to operate sand extraction operations at Salt Ash, approximately 25 kilometres (km) north-east of Newcastle, New South Wales (NSW) (refer to **Figure 1.1**).

Macka's Sand has approval to extract and process sand from Lot 218 and Lot 220. Lot 220 has an identified resource of 9.6 million tonnes (Mt) however Lot 218 has a potentially indefinite extraction life due to the ongoing movement of sand from the mobile dunes into the approved extraction area. At the time of preparing this report, sand extraction was being undertaken on both Lot 218 and Lot 220.

1.2 Scope

In accordance with Condition 3 and 4 of Clause 9 of the NSW Office of Water (NOW) Approval under Clause 10(1) of the *Hunter Water Regulation 2015* (the 'NOW Approval'), Mackas is required to submit an annual report to summarise compliance against this approval.

Conditions 3 and 4 of Clause 9 of the NOW Approval states:

(3) On the date on which the AEMR is submitted in accordance with subclause (1), the Approval Holder must also submit the following to HWC and Office of Water;

- *a) 'an electronic copy of the monitoring results for groundwater levels and quality during the past year collected in accordance with the Soil and Water Management Plan, and*
- *b) A written report (**Operations Report**) addressing whether the Approval Holder has achieved compliance with:*
    - *i. the requirements for the method of Extractive Operations in Clause 3 of the Schedule;*
    - *ii. the Operations Management Procedure;*
    - *iii. the Hydrocarbon Spill Procedure; and*
    - *iv. the requirement for the progressive replacement of topsoil provided in Clause 6(3) of the Schedule*

(4) The Operations Report must:

- *a) identify any non-compliance during the previous year, and*
- *b) identify what actions were, or are being, taken to ensure compliance.*

The details of compliance with the above conditions are detailed in the sections below.

This report has been prepared by Mackas Sand. The reporting requirements for Mackas Sands are outlined in the DPI – Water (formerly NSW Office of Water (NOW)) Approval to undertake extraction works within the North Stockton Catchment Area. This report has been prepared to provide a summary of the performance of Mackas Sand during the 2021 calendar year.

Image Source: Nearmap (Jan 2021)

Legend

- Lot Boundaries
- Biodiversity Offset Area
- Approval Areas
- Approved Site Access (not-utilised)
- Approved Site Access (utilised)
- Approved Alternate Site Access (utilised)

FIGURE 1.1

Locality Plan

2.0 Statement of Compliance

This report has been prepared to provide a summary of the performance of the Mackas Sand operation over the period 1 January to 31 December 2021 (i.e. the compliance review period). The compliance status of the Mackas Sand operation against the NOW Approval and associated operations management procedure was managed during the reporting period by Mackas Sand.

This report specifically addresses and summarises compliance in accordance with Condition 3(b) and 4 of Clause 9 of the NOW Approval and its associated conditions.

No non-compliances were identified the 2021 Operations Report period.

3.0 Requirements for the Method of Extractive Operations

3.1 Laser Level Monitoring

As part of a compliance audit campaign on NSW sand quarries (DPE, 2015), DPE identified that one of the most common non-compliances related to the implementation of adequate controls to manage extraction depth.

As a result, Mackas Sand has engaged Centurion Civil to undertake quarterly surveys of the extraction area. Through the survey process compliance with the extraction depth and area is determined. Quarterly survey plans demonstrating compliance are provided in **Appendix 1** of the 2021 Annual Review.

3.2 Machinery and Equipment

As reported in previous Annual Operations Reports, Mackas Sand continues to experience difficulties operating in the soft dry sand, including significant machinery maintenance on extraction plant. The manufacturers of the Front-End-Loader advised that these failures are due to extremely harsh operating conditions (i.e. soft dry sand).

In addition, Mackas Sand reports that the Project Approval operating depth constraints that require equipment to operate in dry sand conditions results in significantly higher fuel use of around 60 litres per hour as opposed to the equipment specification of 23 litres per hour.

Mackas Sand continues to investigate equipment modifications, quarrying methodology and operational procedural changes to minimise the highly inefficient fuel consumption caused by the dry sand operating conditions, and the impact that these harsh operating conditions have on the loaders and the business overall.

Clause 3 (2) of the NOW approval states that 'the approval holder must remove all machinery used in the Extractive Operations from the Land at the end of each day's operation'. Mackas Sand has approval to operate for 24 hours a day. However, all mobile machinery not anticipated to be in active use is to be removed from Lot 218 or Lot 220. Vehicle storage locations are located outside of the North Stockton Catchment Area.

3.3 Storage of Contaminants

During the report period, no hydrocarbon materials or other potential contaminants were stored on either Lot 218 or Lot 220, within the North Stockton Catchment Area.

3.4 Refuelling

Refuelling of vehicles occurs at the Macka's Sand and Soil administration and maintenance facility, or at the vehicle storage area at the Alternate Access Route.

Mackas Sand uses sieves and/or stackers at Lot 220 and Lot 218 that have limited mobility and are not considered to be vehicles. This relocatable plant is moved once or twice a year as the sand extraction face advances. Offsite refuelling of plant with limited mobility is not considered feasible.

As noted within Section 4.2.1 of the Operations Management Procedure, refuelling of plant with limited mobility occurs within the extraction areas via the use of mobile refuelling equipment.

To minimise the risk of fuel spills, and the impact of spills should they occur, refuelling equipment consists of a fuel tank, spill catch tray and spill kit. An additional mobile spill kit is located within the extraction area to enable prompt clean up in the event of an accidental spill during refuelling activities.

4.0 Operations Management Procedure

The Operations Management Procedure outlines the standard methods and practices of utilisation of plant and equipment at the site. Works at the site were undertaken in accordance with the Operations Management Procedure during 2021.

Hydrocarbon Spill Procedure

No spills were recorded during 2021 and works at the site were undertaken in accordance with the Hydrocarbon Spill Procedure during 2021.

Any spills, should they occur, will be managed in accordance with Section 4.3.3 of the Operational Management Procedure to prevent fuel from contaminating the North Stockton groundwater source.

Any contaminated material will be disposed of in accordance with relevant waste management requirements.

5.0 Rehabilitation

Rehabilitation at Lot 220 is being undertaken progressively as sand extraction and operating space on the active quarry floor permits.

Approximately 2.5 ha of land in the South section of Lot 220 commenced rehabilitation during 2021.

Prior to seeding, land undergoing preparation for rehabilitation are required to be surveyed to ensure they comply with final landform heights as noted within the Macka's Sand Landscape Management Plan, in accordance with Part 2 Clause 6 of the Hunter Water Regulations approval.

6.0 Non-compliance Summary

No non-compliances against the NOW Approval were identified within the 2021 Operations Report period.

Mackas Sand Pty Ltd

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