



Aus 10 Rhyolite Pty Limited

ABN: 90 002 325 144



2020 Annual Review

for the

Tinda Creek Quarry



Prepared by:

R.W. CORKERY & CO. PTY. LIMITED

March 2021

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Aus 10 Rhyolite Pty Limited

ABN: 90 002 325 144

2020 Annual Review

for the

Tinda Creek Quarry

Period: 1 January 2020 to 31 December 2020

Prepared for:

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Ref No. 980/14

March 2021



R.W. CORKERY & CO. PTY. LIMITED

Table A
Title Block

Name of operation	Tinda Creek Sand Quarry
Name of operator	Aus 10 Rhyolite Pty Limited t/a Hy-Tec Concrete and Aggregates
Development consent / project approval #	SSD_4978
Name of holder of development consent / project approval	Aus 10 Rhyolite Pty Limited
Mining Lease #	No Mining Lease applicable to site under <i>Mining Act</i> (1992).
Name of holder of mining lease	N/A
Water licence #	WAL 24367 / WAL 24381 / WAL 42446
Name of holder of water licence	Aus 10 Rhyolite Pty Limited
MOP/RMP start date	N/A
MOP/RMP end date	N/A
Annual Review start date	1 January 2020
Annual Review end date	31 December 2020
<p>I, Darryl Thiedeke, certify that to the best of my knowledge this audit report is a true and accurate record of the compliance status of the Tinda Creek Quarry for the period 1 January 2020 to 31 December 2020 and that I am authorised to make this statement of behalf of Aus 10 Rhyolite Pty Limited.</p> <p><i>Note.</i></p> <p>a) <i>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.</i></p> <p>b) <i>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); Section 307A, 307B and 307C (false or misleading application/information/documents – maximum penalty 2 years imprisonment or \$22,000, or both).</i></p>	
Name of authorised reporting officer	Darryl Thiedeke
Title of authorised reporting officer	National Planning and Development Manager
Signature of authorised reporting officer	
Date	31 March 2021

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CONTENTS

	Page
LIST OF ACRONYMS	VII
1. STATEMENT OF COMPLIANCE	1
2. INTRODUCTION	3
2.1 SCOPE AND FORMAT.....	3
2.2 KEY PERSONNEL CONTACT DETAILS	5
3. APPROVALS	6
4. OPERATIONS SUMMARY	7
4.1 INTRODUCTION	7
4.2 CLOSED WATER MANAGEMENT SYSTEM	7
4.3 EXTRACTION OPERATIONS	10
4.4 HOURS OF OPERATION.....	10
4.5 TRANSPORT LEVELS	11
4.6 CONSTRUCTION ACTIVITIES	11
4.7 WASTE MANAGEMENT	11
4.8 NEXT REPORTING PERIOD	12
5. ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW	12
6. ENVIRONMENTAL PERFORMANCE	12
6.1 METEOROLOGICAL MONITORING.....	12
6.1.1 Rainfall	12
6.2 AIR QUALITY	12
6.2.1 Introduction	12
6.2.2 Air Quality Criteria	14
6.2.3 Air Quality Monitoring Results.....	14
6.2.4 Analysis of Results.....	15
6.3 OPERATIONAL NOISE	16
6.3.1 Introduction	16
6.3.2 Noise Criteria	16
6.3.3 Noise Monitoring Results	17
6.3.4 Attended Noise Measurement Compliance Assessment.....	17
6.3.5 Quarry Noise Predictions at Residences	18
6.4 ABORIGINAL HERITAGE.....	18
6.5 NON-ABORIGINAL HERITAGE	18
7. WATER MANAGEMENT	19
7.1 GROUNDWATER	19
7.1.1 Groundwater Quality Monitoring	19
7.1.2 Analysis of Groundwater Quality Results.....	20
7.1.3 Groundwater Level Monitoring.....	21
7.1.4 Analysis of Groundwater Level Results	25
7.1.5 Groundwater Usage	26



CONTENTS

	Page
7.2 SURFACE WATER	27
7.2.1 Introduction.....	27
7.2.2 Surface Water Monitoring.....	27
7.2.3 Dredge Pond Water Levels	28
7.2.4 Surface Water Quality	28
7.2.5 Drainage Lines, Diversion Drains and Water Management System.....	28
8. REHABILITATION AND LANDSCAPE MANAGEMENT	30
8.1 REHABILITATION MANAGEMENT	30
8.2 LANDSCAPE MANAGEMENT.....	31
8.2.1 Rehabilitation Monitoring.....	31
8.2.2 Long-Term Rehabilitation Monitoring	33
8.2.3 Biodiversity Offset Area Monitoring	34
8.2.4 Koala Monitoring	36
8.2.5 Aquatic Monitoring.....	36
8.2.6 Nest Box Monitoring	37
8.2.7 Threatened Fauna Species Monitoring	37
8.2.8 <i>Grevillea parviflora</i> Monitoring	37
8.2.9 Conclusion.....	38
9. COMMUNITY	39
9.1 COMMUNITY COMPLAINTS.....	39
9.2 COMMUNITY LIAISON.....	39
10. INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD	39
10.1 INTRODUCTION.....	39
10.2 INCIDENTS	40
10.3 DEVELOPMENT CONSENT SSD_4978.....	41
10.4 ENVIRONMENT PROTECTION LICENCE	41
10.5 WATER ACCESS LICENCES	42
10.6 VOLUNTARY UNDERTAKING	42
11. ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD	42
 APPENDICES	
Appendix 1 Internal Compliance Audit (SSD_4978) – 1 January 2020 to 31 December 2020	A1
Appendix 2 Return for Extractive Industries – June 2020.....	A2
Appendix 3 Noise Monitoring Report	A3
Appendix 4 Offset Vegetation, Revegetation and Koala Monitoring Report – 2020.....	A4
Appendix 5 Aquatic Monitoring Report – Spring 2020.....	A5
Appendix 6 Minutes of Tinda Creek Quarry Community Consultative Committee Meetings	A6
Appendix 7 Photographs from within the Voluntary Undertaking Area.....	A7

CONTENTS

	Page
FIGURES	
Figure 1	3
Figure 2	4
Figure 3	13
Figure 4	15
Figure 5	22
Figure 6	24
Figure 7	25
Figure 8	35
TABLES	
Table 1.1	1
Table 1.2	1
Table 3.1	6
Table 4.1	10
Table 4.2	11
Table 6.1	14
Table 6.2	14
Table 6.3	15
Table 6.4	16
Table 6.5	16
Table 6.6	17
Table 6.7	18
Table 7.1	19
Table 7.2	19
Table 7.3	20
Table 7.4	21
Table 7.5	23
Table 7.6	26
Table 7.7	27
Table 7.8	29
Table 7.9	29
Table 7.10	30
Table 8.1	32
Table 8.2	33
Table 8.3	33
Table 8.4	34
Table 8.5	38



CONTENTS

	Page
PLATES	
Plate 1	Weighbridge Office and Weighbridge – February 2021 8
Plate 2	Extraction within Domain 6 – February 2021 8
Plate 3	Dredge Pond with Pump in the Foreground and Cutter Suction Dredge in the Background – February 2021 8
Plate 4	Sand Stockpile and Loader – February 2021 8
Plate 5	View of the Raised Northern Wall of the Sediment Pond and Clean Water Diversion Drain – February 2021 9
Plate 6	View of the New 300m Safety Overflow Pipes Installed between the Sediment Pond and Dredge Pond – February 2021 9
Plate 7	View of the Depth Marker Installed in the Sediment Pond – February 2021 9
Plate 8	Rehabilitation Growth within Rehabilitation Area – February 2021 9

LIST OF ACRONYMS

AHD	Australian Height Datum
ARI	Average Recurrence Interval
CCC	Community Consultative Committee
DD	Deposited Dust
DPE	Department of Planning and Environment
DPIE	Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPA	Environment Protection Authority
EPL	Environment Protection License
MAC	Muller Acoustic Consulting Pty Ltd
PM	Particulate Matter
RCE	Riparian and Channel and Environment Inventory Assessment
RFS	Rural Fire Service
RWC	R.W. Corkery and Co. Pty Limited
SIGNAL	Stream Invertebrate Grade Number Average Level
TRH	Total Recoverable Hydrocarbon
TSP	Total Suspended Particulates
WAL	Water Access Licence



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1. STATEMENT OF COMPLIANCE

Table 1.1
Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	Yes / No
DC # SSD_4978	No
EPL # 12007	No

Table 1.2
Non-compliances

Page 1 of 2

Relevant Approval	Condition #	Condition Description (summary)	Compliance Status	Comment	Where Addressed in Annual Review
SSD_4978	2 (1)	This condition relates to specific performance criteria established under the consent and the requirement to prevent and/or minimise material harm to the environment.	Low	Two unplanned discharge events from the closed water management system occurred in March and November 2020. Incident reporting following the events confirmed that material harm to the environment had not occurred.	Section 10.2
SSD_4978	2 (2)	This condition relates to operation of the Quarry in accordance with the conditions of consent	Administrative	A total of five non-compliance issues under SSD_4978 were identified during the reporting period (four of which relate to two water discharge incidents) precluding the achievement of compliance with this condition.	Appendix 1
SSD_4978	3 (12)	This condition relates to compliance with Section 120 of the POEO Act and/or EPL an offsite discharge.	Low	Two unplanned discharge events from the closed water management system occurred in March and November 2020. Incident reporting following the events confirmed that material harm to the environment had not occurred.	Section 10.2
SSD_4978	3 (13)	This condition relates to implementation of an approved Water Management Plan.	Low	A Water Management Plan has been prepared and approved by the Secretary and is being implemented at the Quarry. Two unplanned discharge events from the closed water management system occurred in March and November 2020.	Sections 7.1 and 10.2
SSD_4978	3 (20)	This condition relates to the review and revision of the Conservation and Rehabilitation Bond following an Independent Environmental Audit	Administrative	An Independent Environment Audit was undertaken on 9 and 10 October 2019. Whilst a review of the Conservation and Rehabilitation Bond is in progress this has not yet been finalised.	Section 10.3 Appendix 1

**Table 1.2 (Cont'd)
Non-compliances**

Page 2 of 2

Relevant Approval	Condition #	Condition Description (summary)	Compliance Status	Comment	Where Addressed in Annual Review
SSD_4978	5 (7)	This condition relates to notification following a reportable incident.	Administrative	The EPA were not immediately notified of March 2020 incident. Hy-Tec management were made aware of the 4 November 2020 discharge event on 16 December 2020. EPA were notified on 17 December 2020.	Section 10.2
EPL 12007	A3.1	This condition relates to activities being carried out in accordance with the proposal contained in the licence application.	Low	Two unplanned discharge events from the closed water management system occurred in March and November 2020.	Section 10.2
EPL 12007	A3.2	This condition relates to activities being carried out in accordance with SSD_4978	Low	The non-compliances recorded under SSD_4978 preclude the achievement of compliance with this condition.	Section 10.2
EPL 12007	L1.1	This condition relates to compliance with Section 120 of the POEO Act and the EPL	Low	Two unplanned discharge events from the closed water management system occurred in March and November 2020. Incident reporting following the events confirmed that material harm to the environment had not occurred.	Section 10.2
EPL 12007	R2.2	This condition relates to notification to the EPA following a reportable incident.	Administrative	The EPA were not immediately notified of March 2020 incident. Hy-Tec management were made aware of the 4 November 2020 discharge event on 16 December 2020. EPA were notified on 17 December 2020.	Section 10.2

Compliance Status Key

Risk level	Colour code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence.
Medium	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> potential for serious environmental consequences, but is unlikely to occur; or potential for moderate environmental consequences but is likely to occur.
Low	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> potential for moderate environmental consequences, but is unlikely to occur; or potential for low environmental consequences but is likely to occur.
Administrative non-compliance	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions).

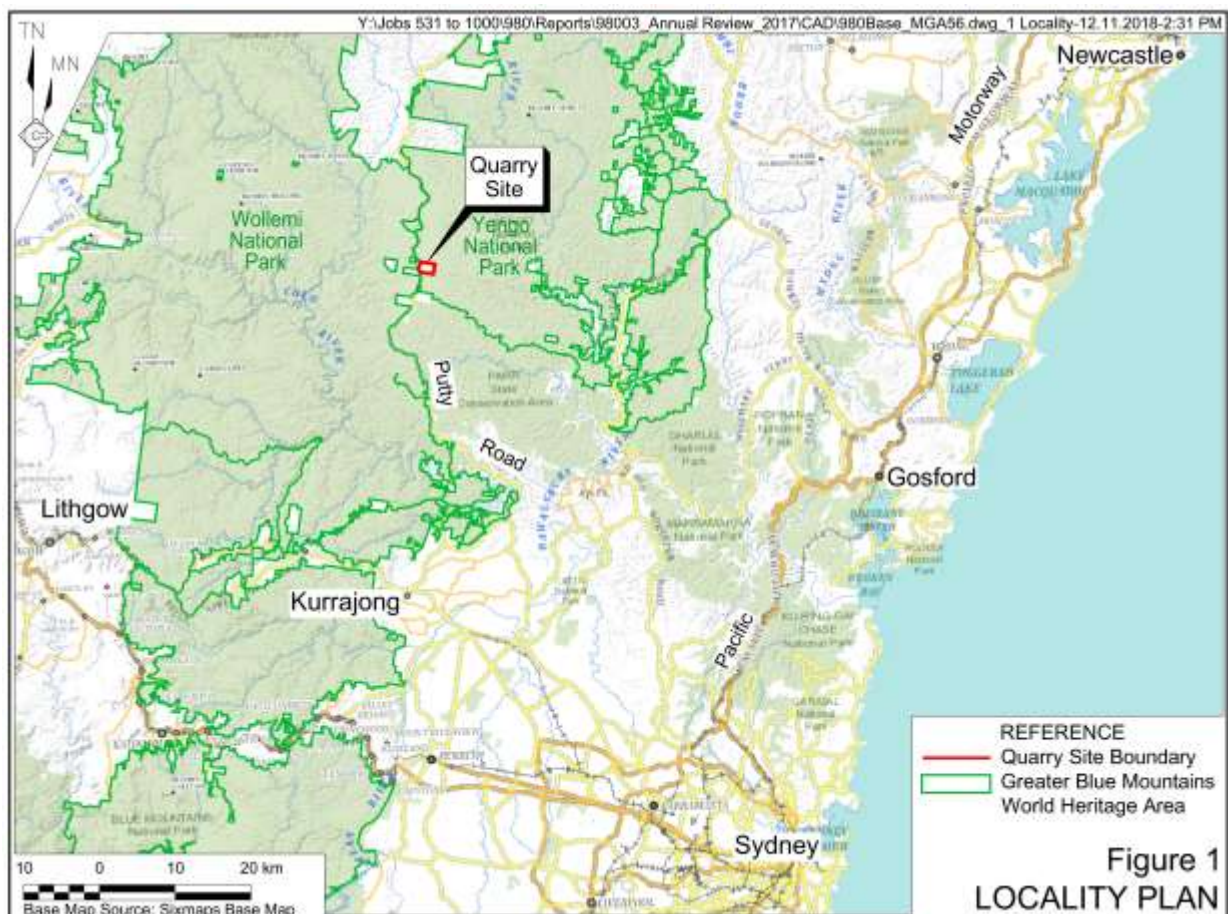
2. INTRODUCTION

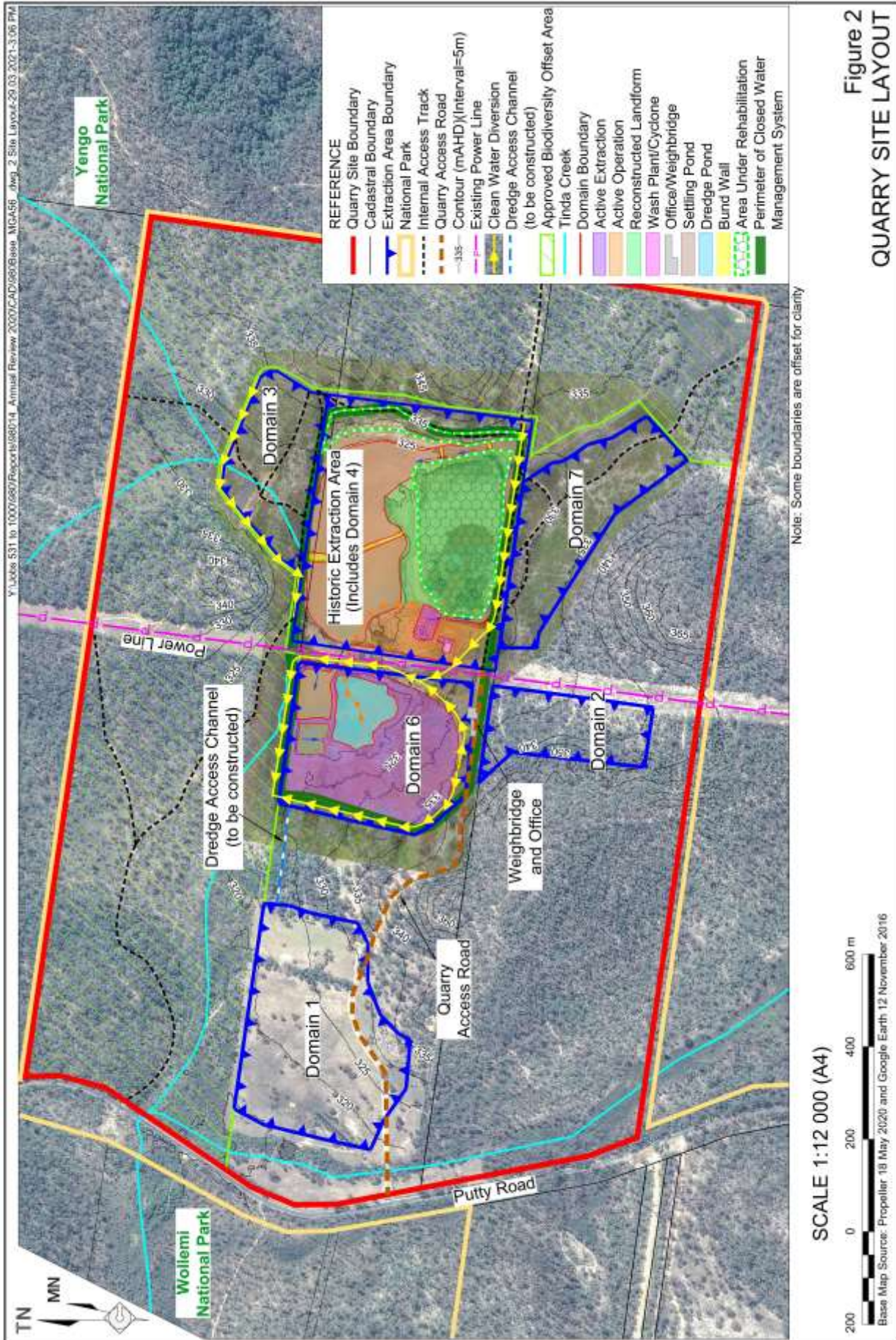
2.1 SCOPE AND FORMAT

This *Annual Review* has been compiled by R.W. Corkery & Co. Pty Limited (RWC) on behalf of Aus 10 Rhyolite Pty Limited. This report is applicable for the period 1 January 2020 to 31 December 2020 (“the reporting period”). The information presented within this *Annual Review* has been prepared based upon observations made during a site visit on 18 February 2021 and information provided by Hy-Tec.

The Tinda Creek Sand Quarry (the Quarry) is owned and operated by Aus 10 Rhyolite Pty Limited trading as Hy-Tec Concrete and Aggregates hereafter referred to as Hy-Tec. The Quarry Site is located approximately 67km north of Windsor along Putty Road, NSW (see **Figure 1**). Development Consent SSD_4978 (SSD_4978) was granted on 10 April 2015 to permit the extraction and despatch of up to 300 000 tonnes of sand from the Quarry each year for the duration of the Project. **Figure 2** displays the layout of the Quarry.

It is noted that regional environmental issues have impacted operations at the Quarry during the reporting period. The Quarry was impacted by residual impacts of the Gospers Mountain Bush Fire throughout January and February 2020 as Putty Road was closed periodically to allow service teams to clear roads of fallen trees, telephone lines and power lines. Flooding in the Hawkesbury River from 7 February 2020 to 12 February 2020 also caused bridge closures at Windsor. Approval from RMS was obtained to allow trucks travelling to and from the Quarry to use alternative routes during this period.





This *Annual Review* has been prepared in accordance with *Condition 5(4)* of Development Consent SSD_4978 to record the activities and environmental monitoring undertaken at the Quarry during the reporting period and to outline the activities and environmental monitoring planned throughout the next reporting period (1 January 2021 to 31 December 2021). *Condition 5(4)* requires the preparation of a report which must:

- a) *describe the development (including rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year (Sections 4, 8 and 11);*
- b) *include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year, which includes a comparison of these results against:*
 - *the relevant statutory requirements, limits or performance measures/criteria;*
 - *the monitoring results of previous years; and*
 - *the relevant prediction in the EIS (Sections 6, 7 and 9);*
- c) *identify any non-compliance over the last year, and describes what actions were (or are being) taken to ensure compliance (Section 10);*
- d) *identify any trends in the monitoring data over the life of the development (Section 6 and 7);*
- e) *identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies (Section 6 and 7); and*
- f) *describe what measures will be implemented over the current calendar year to improve the environmental performance of the development (Sections 6, 7 and 11).*

2.2 KEY PERSONNEL CONTACT DETAILS

The key personnel contact names, position and phone numbers are as follows.

Name	Position	24 Hour Contact
Michael Walton	Quarry Manager	0447 391 964

3. APPROVALS

Hy-Tec is required to operate the Tinda Creek Quarry in accordance with a development consent and four licenses, listed in **Table 3.1**.

Table 3.1
Tinda Creek Sand Quarry – Approvals and Licences

Consent/Lease/Licence	Issue Date	Expiry Date	Details / Comments
Development Consent SSD_4978	10/4/2015	31/12/2045	Issued by Department of Planning and Environment
Approval EPBC 2013/7028	4/10/2016	31/12/2045	Issued by the Department of the Environment and Energy
Environment Protection Licence No 12007	11/5/2005	12 May ⁺	Issued by Environment Protection Authority
Water Access License 24381 40 Units	1/9/2014	Continuing	Nominated Water Supply Works (Excavation) approval number 10WA112523 issued on 1/7/2011. Valid until 8/11/2025
Water Access License 24367 15 Units	2/2/2012	Continuing	Nominated Water Supply Works (Bore) approval number 10WA112531 amended on 11/11/2020. Valid until 13/4/2025*
Water Access License 42446 60 Units	20/06/2019	Continuing	Nominated Water Supply Works (Bore) approval number 10WA112531 amended on 11/11/2020. Valid until 13/4/2025*
⁺ Anniversary Date [*] Works Approval 10WA112531 has a conditional limit of 44ML per annum.			

No modifications or variations to the development consent or licenses outlined in **Table 3.1** were sought within the reporting period.

SSD_4978 was granted in accordance with Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) by the Minister for Planning on 10 April 2015 to extract and transport no more than 300 000 tonnes of sand products from the Quarry Site each calendar year until 31 December 2045. SSD_4978 superseded DA 134/95 to allow for the expansion of extraction beyond the previously approved extraction area boundary. Sand extraction within the new approved extraction area commenced in September 2015. DA 134/95 was formally surrendered on 10 December 2015.

Hy-Tec also operates in accordance with Approval EPBC 2013/7028. This approval relates principally to operations that may impact the threatened Koala and small flower Grevillea identified within the Quarry Site. This approval also recognises the world and natural heritage values of the nearby Greater Blue Mountains Area. A compliance review of the conditions of EPBC 2013/7028 is completed annually and placed on the Hy-Tec website. During the reporting period, Hy-Tec remained compliant with the conditions of EPBC 2013/7028.

Hy-Tec also operates the Tinda Creek Quarry in accordance with Environment Protection Licence (EPL) 12007. This licence incorporates standard conditions for extractive industries and includes limits for noise emissions from the Quarry Site.

An internal compliance review of the conditions of SSD_4978 and EPL 12007 is presented as **Appendix 1** with the outcomes discussed in Section 1 and Section 10.

Water Access Licence (WAL) 24381 (40 units) and WAL 24367 (15 units) were issued to permit extraction of water from the Sydney Basin North Groundwater Source. Water within this source is managed through the water sharing plan for the *Greater Metropolitan Region Groundwater Sources 2011*. The WALs permit extraction of groundwater in accordance with the conditions provided in the licences. Two Water Supply Works approvals were issued to Hy-Tec on 1 July 2011 by the then Department of Primary Industries (now the Department of Industry – Crown Lands and Water) to permit extraction of groundwater associated with the WALs.

WAL 24367 and the nominated works approval 10WA112531 permit the use of groundwater sourced via a production bore from the underlying aquifer. This water, when required is used to top up the dredge pond to ensure the dredge can operate efficiently. WAL 24381 and the nominated works approval 10WA112523 permit the use of water accessed from the groundwater setting through extraction activities and principally accounts for evaporation from exposed faces. Anecdotally, Quarry personnel have observed very little seepage into operating domains, however this license accounts for the possible evaporation.

Hy-Tec applied for and received an additional 60ML allocation of groundwater from within the Sydney Basin North Groundwater Source under a controlled allocation order in October 2018. Hy-Tec submitted an application to nominate the works approvals associated with the site (10WA112531) on WAL 42446. The potential impacts associated with additional take of water from the groundwater setting have been assessed by Water NSW and Water Supply Works (Bore) approval number 10WA112531 has been nominated as the relevant works approval for WAL 42446. It is noted that 10WA112531 has a conditional limit of 44ML per annum. Hy-Tec is currently investigating a suitable location for a second bore to extract the remaining 31ML groundwater allocation under existing entitlements. Any additional works would be undertaken in consultation with Water NSW and the relevant licences and approvals sought.

4. OPERATIONS SUMMARY

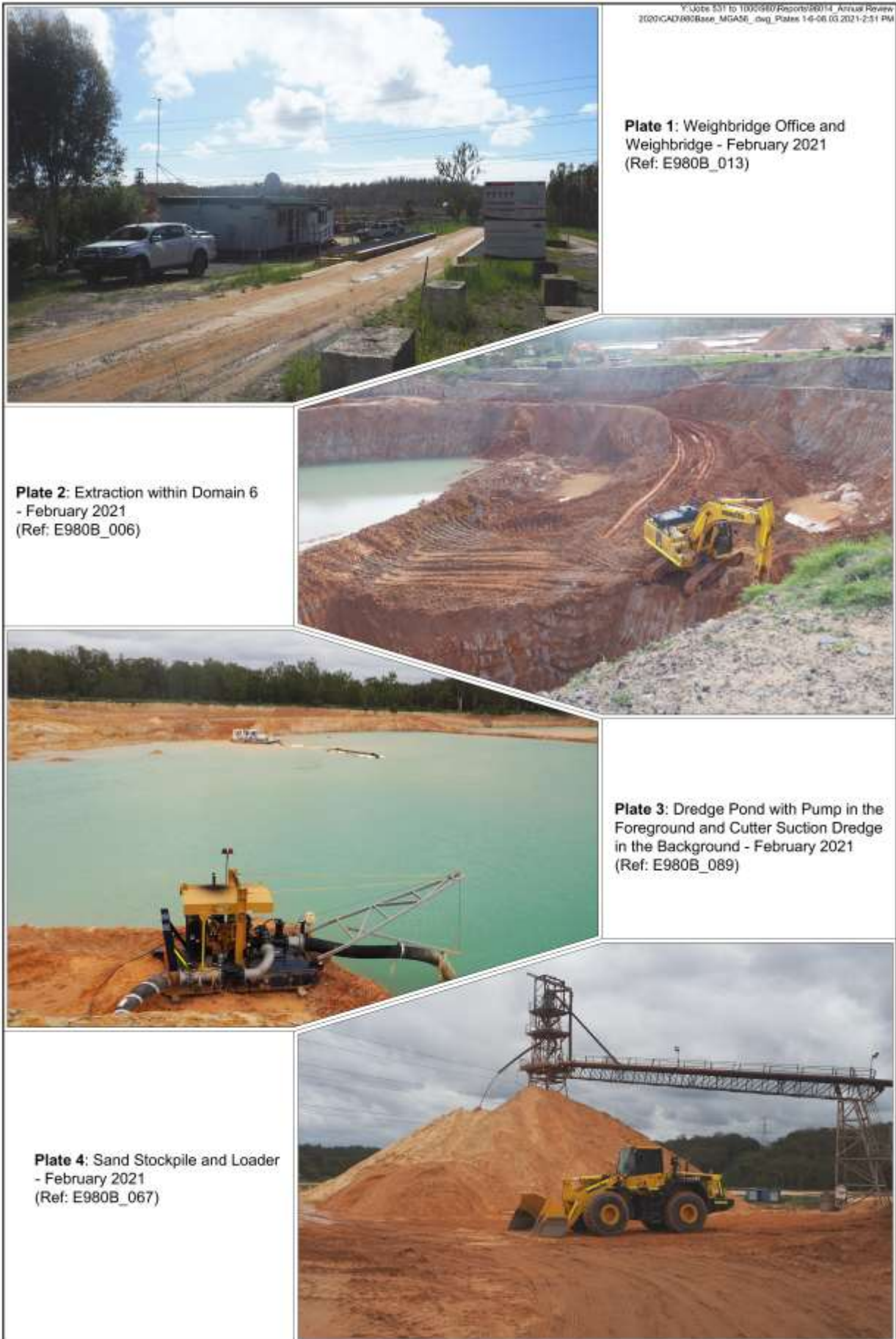
4.1 INTRODUCTION

The following subsections provide a summary of activities undertaken during the reporting period. Activities were generally consistent with those described in previous environmental management reporting. **Plates 1 to 8** display a series of photographs of the Tinda Creek Quarry taken on 18 February 2021 that are representative of existing conditions at the Quarry.

4.2 CLOSED WATER MANAGEMENT SYSTEM

Condition 12 of Schedule 3 of SSD_4978 requires that the catchment of the closed water system must not exceed 40ha at any one time. The closed water management system includes the area within the clean water diversions (**Figure 2**).

During the reporting period the closed water management system covered an area of 35.6ha and remained unchanged from the previous year.





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Plate 5: View of the Raised Northern Wall of the Sediment Pond and Clean Water Diversion Drain
- February 2021
(Ref: E980B_120)

Plate 6: View of the New 300m Safety Overflow Pipes installed between the Sediment Pond and Dredge Pond
- February 2021
(Ref: E980B_105)



Plate 7: View of the Depth Marker installed in the Sediment Pond
- February 2021
(Ref: E980B_097)

Plate 8: Rehabilitation Growth within Rehabilitation Area
- February 2021
(Ref: E980B_075)



4.3 EXTRACTION OPERATIONS

Extraction and processing during the reporting period occurred entirely within Domain 6 (see **Figure 2**). The total volume of sand extracted and processed was 93 488t which is within the limits specified in Condition 6 of Schedule 2 of SSD_4978. Sand was extracted via excavator then loaded onto a single articulated dump truck and hauled to the dredge where the material was tipped into a dump pocket in front of the dredge throughout the reporting period (refer **Plate 3**).

This process involves the removal of water, sand, silt and clay in the form of a slurry which is then pumped to the processing area and stockpiled prior to transportation (refer **Plate 4**). Sand transported from site during the reporting period and forecast for the 2021 reporting period is displayed in **Table 4.1**.

Table 4.1
Sand Transportation from Site

Material	Approved annual limit (SSD_4978)	2017 reporting period	2018 reporting period	2019 reporting period	2020 reporting period	2021 reporting period (forecast)
Sand	300 000 t	190 642t	116 865t	46 942t	93 488t	120 000t

Source: Hy-Tec

A copy of the annual return for extractive materials submitted to DRG for 2019/2020 is included within **Appendix 2**.

During the reporting period, the reported sand transported from site (93 488t) was similar to the volume of sand produced (91 424t) which is below the 300 000tpa limit approved within the development consent. Sand processing and transport increased from 2019 as production in the previous reporting period was restricted by the lack of water available for production processes and impacts from the Gaspers Mountain Bush Fire which saw fire within the Quarry Site and the closure of the Putty Road (only site access) for a lengthy period after the fire had passed.

During the reporting period (and for all historic operations) extraction operations did not exceed the limit of 15m below the natural ground surface described in *Condition 2(6)* of SSD_4978. Hy-Tec has established a site-based standard procedure for survey and confirmation of the depth of extraction. The site-based procedure is undertaken on a monthly basis.

It is expected that sand processing and transportation from site will increase in 2021.

4.4 HOURS OF OPERATION

The permissible operating hours as set out in *Condition 3(3)* of SSD_4978 were adhered to throughout the reporting period. Extended hours for major supply contracts were not required during the reporting period.

4.5 TRANSPORT LEVELS

SSD_4978 specifies that haulage activities at Tinda Creek Quarry should not exceed 34 trucks per day, averaged over a calendar month. A total of 2 444 laden loads were despatched from the Quarry during the reporting period. A summary of the vehicle movements at Tinda Creek Quarry is provided from the Hy-Tec website and are summarised in **Table 4.2**. There were no recorded exceedances of average daily vehicle movements (based on a calendar month averaging period) within the reporting period.

Table 4.2
Monthly Laden Truck Movements at Tinda Creek Quarry

Month	Laden Truck Loads	Mean Daily Laden Truck Loads ¹
January	70	2.3
February	115	4.0
March	156	5.0
April	164	5.5
May	144	4.6
June	146	4.9
July	240	7.7
August	245	7.9
September	268	8.9
October	284	9.2
November	357	11.9
December	286	9.2
Annual Total	2 475	-
Annual Daily Average	6.8	-
Note 1: Daily despatch averaged over the calendar month is presented, consistent with the requirements of Condition 7 of Schedule 2 of SSD_4978.		
Source: Hy-Tec		

4.6 CONSTRUCTION ACTIVITIES

Hy-Tec raised the bunds at the western and northern extent of the historical extraction area by approximately 40cm (see Section 10.2). In addition, two safety overflow pipes were installed between Domains 4 and 6. No other construction activities were conducted during the reporting period.

4.7 WASTE MANAGEMENT

Waste management practices continued in accordance with the provisions of the *Protection of the Environment Operations (Waste) Regulation 2014* throughout the reporting period. Hy-Tec has engaged licensed waste contractors to recycle and dispose of waste throughout the reporting period.

4.8 NEXT REPORTING PERIOD

Sand extraction and processing from Domain 6 will continue throughout the 2021 reporting period with extraction unlikely to proceed into Domains 1, 2, 3 or 7. Preparatory activities (e.g. construction of water management infrastructure) may be undertaken towards the end of the reporting period in Domain 3 in advance of vegetation clearing.

Processing activities will continue, consistent with historic processing activities. Average daily laden truck levels will remain within approved limits.

5. ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

Correspondence was received from DPIE on 17 September 2020 confirming that the 2019 Annual review was satisfactory. No actions were required as a result of the Department's review.

6. ENVIRONMENTAL PERFORMANCE

6.1 METEOROLOGICAL MONITORING

Hy-Tec installed a meteorological station in July 2016 in accordance with the requirements of *Condition 3(10)* of SSD_4978. The meteorological station complies with the requirements in the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* guideline. The location of the meteorological station is shown on **Figure 3**.

6.1.1 Rainfall

A summary of the rainfall data for the reporting period is provided in **Table 6.1**. A total of 988.2mm of rain was recorded from 1 January 2020 to 31 December 2020. Total rainfall during 2020 was significantly higher than each of the preceding four years, however, rainfall varied between individual months.

6.2 AIR QUALITY

6.2.1 Introduction

Air quality monitoring is required to be undertaken in accordance with the approved *Air Quality Management Plan*.

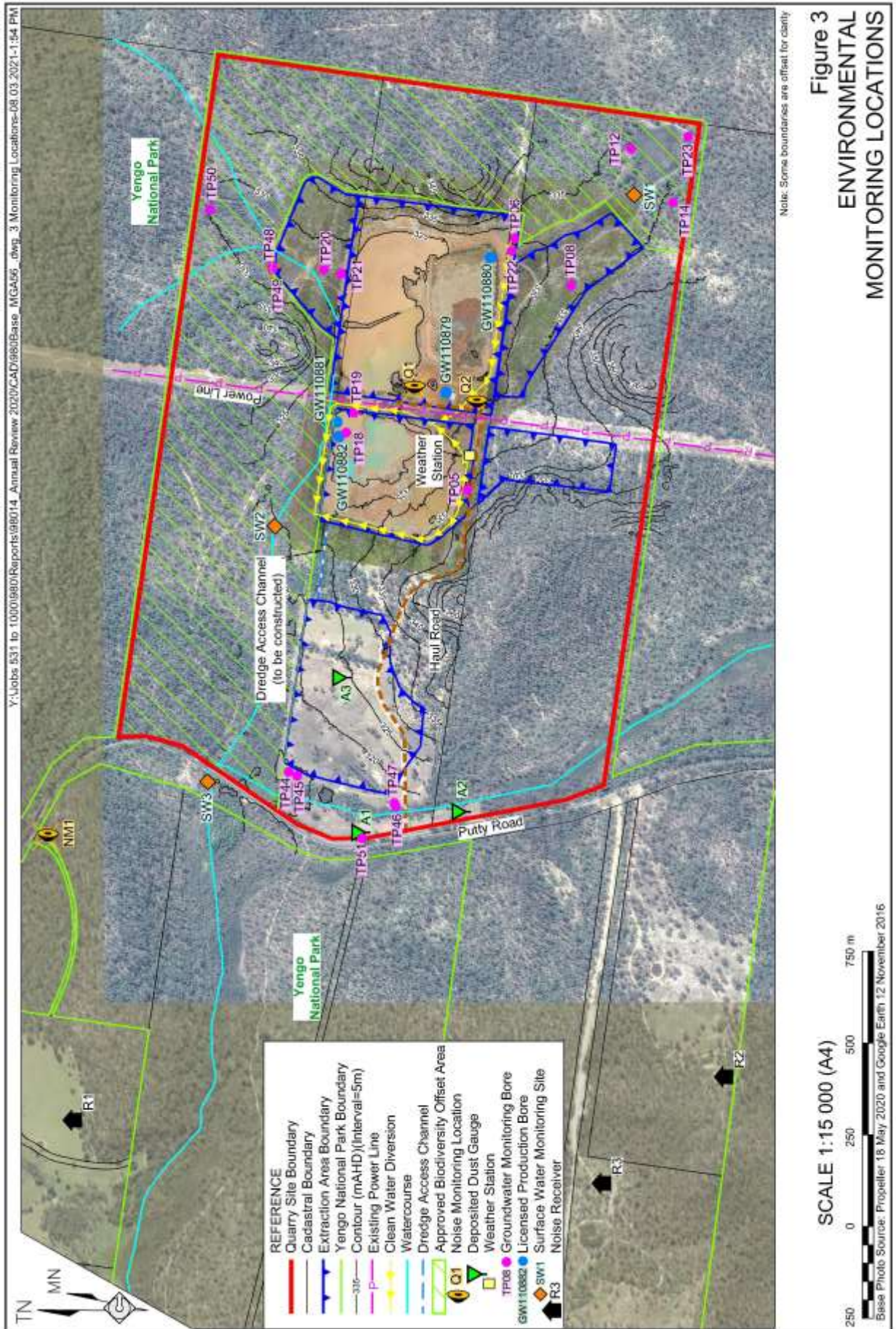


Table 6.1
Summary of Rainfall Records Since 2007

Month	Year													
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Jan	50.5	95.5	29.0	48.5	66.5	133.0	138.0	8.0	163.0	272.0	36.2*	25.6	30.0	64.8
Feb	152.0	146.5	137.5	119.5	47.0	179.0	202.0	64.0	46.5	0.0	34.2*	58.4	25.2	208.4
Mar	80.5	43.0	30.0	85.5	97.0	145.0	103.0	135.2	96.5	0.0	208.0	64.4	86.8	134.2
Apr	61.5	81.5	117.0	26.0	60.0	64.0	63.5	60.5	285.5	0.0	22.4^	13.4	12.4	57.6
May	29.0	10.5	56.5	59.5	96.0	-	31.0	0.0	56.5	0.0	16.6	6.2	4.4	20.0
Jun	210.0	94.0	39.5	43.0	85.5	29.0	84.5	29.0	20.5	126.0	54.0	33.0	22.0	12.8
Jul	13.0	24.5	17.5	38.5	25.5	27.0	18.5	13.0	34.0	55.0	2.6	5.0	12.2	114.6
Aug	107.0	40.5	4.0	13.5	90.0	4.0	11.0	74.5	26.5	36.5	11.6	10.0	26.0	51.4
Sep	18.5	58.5	21.0	18.0	69.0	27.5	31.5	29.0	26.5	45.5	0.0	20.0	51.6	37.6
Oct	22.0	93.5	85.5	85.0	65.5	17.5	26.5	48.0	34.0	40.4	61.6	88.8	19.6	66.6
Nov	157.5	75.0	31.5	127.5	159.0	70.5	106.5	16.5	141.0	72.2	35.8	13.2	24.4	34.2
Dec	76.0	71.0	103.5	120.5	72.5	18.5	27.0	150	116.0	69.0	65.0	2.8	0.0	186.0
Totals (mm)	977.5	834.0	672.5	785.0	933.5	715.0	843.0	627.7	1046.5	716.6	548.0	340.8	314.6	988.2

* Estimated from Putty Tea RMS as Quarry weather station out of service.
^ Data downloaded between 31/3/2017 – 9/4/2017 due to weather station fault

6.2.2 Air Quality Criteria

The air quality criteria for the Quarry are provided in *Condition 3(7)* of SSD_4978 and are summarised in **Table 6.2**. Deposited dust (DD) is currently the only air quality parameter that is required to be monitored as specified in the approved *Air Quality Management Plan*. The level of monitoring is considered appropriate as all extraction and processing is essentially a ‘wet’ process and generates limited dust. Deposited dust levels are used as an indicator of the overall air quality performance of operations.

Table 6.2
Air Quality Criteria

Pollutant	Criterion	Averaging Period
Total suspended particulates (TSP)	90µg/m ³	Annual mean
Particulate matter <10µm (PM ₁₀) <10µm (PM ₁₀)	30µg/m ³	Annual mean
Particulate matter <10µm (PM ₁₀)	50µg/m ³	24-hour average
Deposited dust	4 g/m ² /month*	Annual mean

* or 2g/m²/month above the annual background level

6.2.3 Air Quality Monitoring Results

Monthly deposited dust monitoring was undertaken throughout the reporting period. The location of dust monitoring gauges DG1, DG2 and DG3 are shown on **Figure 3**. **Figure 4** and **Table 6.3** present the results of the deposited dust monitoring program over the reporting period. It is noted that the approved Air Quality Management Plan requires deposited dust monitoring at location DG1 only. Monitoring at locations DG2 and DG3 is undertaken on a voluntary basis and therefore is not subject to compliance under SSD 4978.

Figure 4 Deposited Dust Levels 2017 to 2020

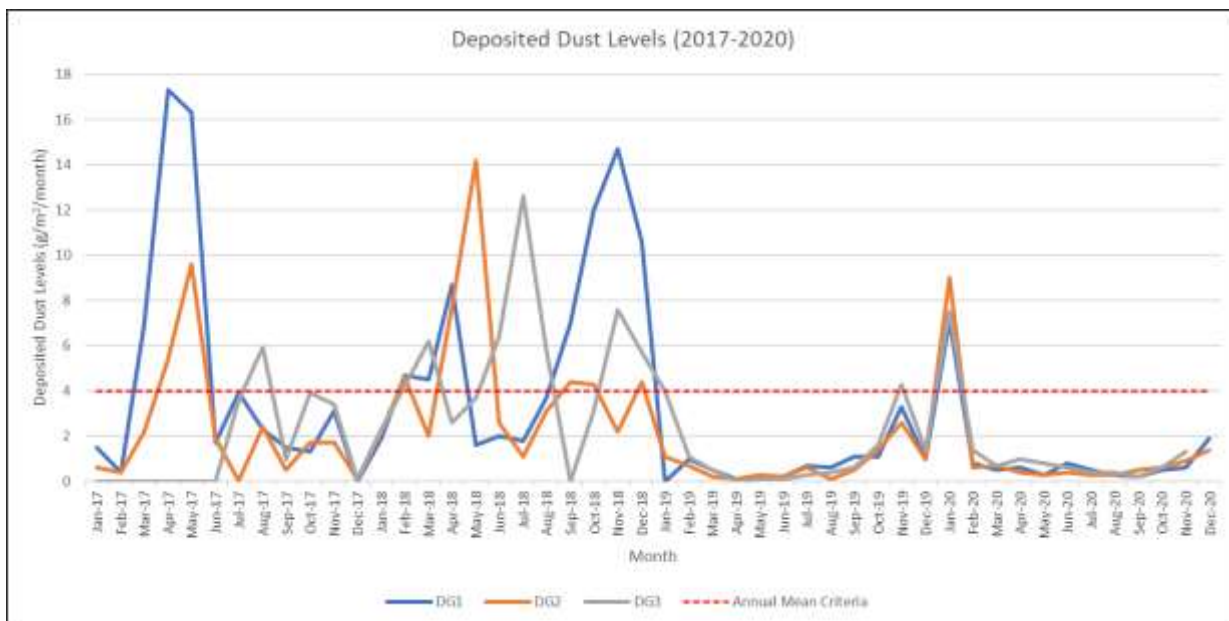


Table 6.3
Measured Performance – Deposited Dust

Date	Deposited Dust Level ¹			Criterion
	DG1	DG2	DG3	
January	7.1	9.0	7.5	-
February	0.8	0.6	1.4	-
March	0.5	0.7	0.7	-
April	0.6	0.4	1.0	-
May	0.3	0.3	0.8	-
June	0.8	0.4	0.6	-
July	0.5	0.3	0.4	-
August	0.3	0.3	0.4	-
September	0.2	0.5	0.2	-
October	0.5	0.6	0.6	-
November ²	0.6	0.9	1.3	-
December	1.9	1.4	NR	-
Annual Average	1.1	1.3	1.4	4

Note 1: Units – g/m²/month Red text indicates elevated results
 Note 2: Result influenced by the NSW Bush Fires

6.2.4 Analysis of Results

Deposited dust levels were all well below the trigger value at each dust gauge throughout the reporting period, with the exception of readings at DG1, DG2 and DG3 in January 2020. Deposited dust levels in January were significantly higher than the rest of the year due to the

Gospers Mountain bush fire with operations restricted to five days in this month. It is noted that samples were unable to be taken at DG3 during December 2020 due to the wet conditions with access determined to be unsafe by vehicle or foot.

Deposited dust levels remained lower than 2017 and 2018 due to the installation of bird deterrence collars on 4 January 2019, which prevented the entry of insects, organic matter, and bird droppings in samples. As a result of the low records, the annual average level is well below the criteria level for the reporting period.

It is noted that the EIS does not include a quantitative assessment of potential air quality impacts as the operation is essentially a ‘wet’ process and significant air quality impacts were not anticipated.

6.3 OPERATIONAL NOISE

6.3.1 Introduction

Noise monitoring is required to be undertaken in accordance with the conditions listed in the development consent, EPL and approved *Noise Management Plan*. The following subsections provide a brief summary of noise criteria that apply at the Quarry, the results of noise monitoring activities and a discussion of the results recorded during the reporting period.

Following discussions with the then DPE in January 2017, it was agreed that additional monitoring would be undertaken to provide an estimate of the contribution of the Quarry to noise levels at residential locations. The results of this monitoring for 2020 are presented in Section 6.3.5 and in **Appendix 3**.

6.3.2 Noise Criteria

Condition 3(4) of SSD_4978 is relevant to noise compliance assessment and sets the criteria for noise generated by the development at any residence on privately-owned land as outlined in **Table 6.4**.

Table 6.4
Noise Monitoring Criteria SSD_4978 (dB(A))

Receiver	Day / Evening	Night	
	LAeq (15 min)	LAeq (15min)	LA1 (max)
All receivers	35	35	45

Condition L3 of EPL 12007 is relevant to the noise compliance assessment and stipulates the noise criteria at any monitoring point established under the EPL as outlined in **Table 6.5**.

Table 6.5
Noise Monitoring Criteria EPL 12007 (dB(A))

Time Period	Measurement Parameter	Noise level dB(A)
All hours	LAeq (15 minute)	35
All receivers	Lmax OR LA1, 1min	45

6.3.3 Noise Monitoring Results

Attended noise monitoring was undertaken by Muller Acoustic Consulting Pty Ltd (MAC) on 16 April 2020 in accordance with the approved *Noise Management Plan*. A report prepared by MAC is included as **Appendix 3**.

A summary of the attended noise monitoring results at NM1 is provided in **Table 6.6**. In all instances the Quarry contribution to noise levels was <35 dB_{LAeq} (15 minute).

Table 6.6
Summary of Attended Noise Monitoring at Receiver NM1

Time (hrs)	Measure (dBA re 20µPa)			Descriptor and Noise Contribution (dBA)
	L _{Amax}	L _{Aeq}	L _{A90}	
Morning Shoulder (6:00am)	63	43	28	Traffic 30-63 Birds 25-54 Wind 22-35 Quarry Hum <25
Morning Shoulder (6:15am)	64	42	28	Traffic 30-64 Quarry 26-59 Birds 23-37 Quarry Hum <25
Morning Shoulder (6:30am)	66	48	34	Traffic 30-66 Birds 28-50 Wind 28-41 Quarry Hum <25
Morning Shoulder (6:45am)	73	52	34	Traffic 30-73 Birds 27-53 Wind 28-41 Quarry Hum <25
Day (7:30am)	72	49	29	Traffic 30-72 Birds 23-57 Wind 23-37 Quarry Hum <25
Day (7:45am)	74	50	31	Traffic 30-74 Birds 24-53 Wind 23-39 Quarry Hum <25
Day (8:00am)	72	48	30	Traffic 30-72 Birds 24-55 Wind 24-42 Quarry Hum <25
Day (8:15am)	71	47	30	Traffic 30-71 Birds 24-56 Wind 24-44 Quarry Hum <25

6.3.4 Attended Noise Measurement Compliance Assessment

The compliance assessment summary for R1 (see **Figure 3**) is presented in **Table 6.7** for day and morning shoulder assessment periods and compares operational contributions against the relevant criteria.

Table 6.7
Day and Morning Shoulder Noise Compliance Assessment at R1

Period	Quarry Noise Contribution L _{Aeq} (15min)	Quarry Noise Criteria L _{Aeq} (15min)	Compliant
Day	<30	35	Yes
Morning Shoulder	<30	35	Yes

The overall contribution of the Quarry to ambient noise was found to be less than 30dB(A) at the time of the monitoring which is within the limits set by both SSD_4978 and EPL 12007. These results indicate that the Quarry is complying with all relevant noise assessment criteria.

The results of the noise monitoring program are also comparable with historic noise monitoring data from Tinda Creek Quarry. Attended noise monitoring conducted in 2016, 2017, 2018 and 2019 estimated Quarry noise contribution to be less than 25dB(A) in 2016, less than 20dB(A) in 2017 and 2018 and less than 35dB(A) in 2019. This indicates that current noise mitigation measures are effective in restricting noise to an acceptable level.

6.3.5 Quarry Noise Predictions at Residences

On 20 January 2017, the then DPE requested that Hy-Tec undertake additional noise monitoring to record existing noise levels (sound power levels) that were being produced at the Quarry and undertake an assessment to predict the noise impact of the Quarry at nearby privately-owned residences. The request was only made for the year 2017, however Hy-Tec has taken on the initiative to continue to assess the noise levels at surrounding residences that could potentially be impacted by noise generated from Quarry operations.

Sound power levels were measured at locations Q1 and Q2 (see **Figure 3**) with the results of this assessment presented in **Appendix 3**. In summary, it was concluded that Quarry noise at R1, R2, and R3 after taking into consideration the attenuation caused from distance and topography is 21dB(A), 20dB(A), and 21dB(A) at the respective residences. These results all fall well below the criteria nominated by both the SSD_4978 and the EPL12007 of 35dB(A). It is noted that the noise levels are also well below the predicted noise levels modelled during the preparation of the EIS which ranged from <30dB(A) to 35dB(A) at the nearest receivers.

6.4 ABORIGINAL HERITAGE

No actions or impacts related to Aboriginal heritage occurred during the reporting period.

6.5 NON-ABORIGINAL HERITAGE

No actions or impacts related to non-Aboriginal heritage occurred during the reporting period.

7. WATER MANAGEMENT

7.1 GROUNDWATER

7.1.1 Groundwater Quality Monitoring

Groundwater quality monitoring was conducted by Hy-Tec generally in accordance with the approved *Water Management Plan*. Groundwater quality monitoring was undertaken at six-month intervals over the reporting period at the locations shown on **Figure 3**. The groundwater quality assessment trigger values recorded in the approved *Water Management Plan* are presented in **Table 7.1**.

Table 7.1
Groundwater Quality Trigger Criteria

Analyte	Lower Trigger Value	Upper Trigger Value
pH	<4.5	>7.0
Conductivity ($\mu\text{S}/\text{cm}$)	N/A	900
Nitrate (mg/L)	N/A	7.5
Ammonia (mg/L)	N/A	0.2
TRH (C6-C9) (mg/L)	N/A	5.0
TRH (C10-C14) (mg/L)	N/A	5.0
TRH (C15-C28) (mg/L)	N/A	5.0
TRH (C29-C36) (mg/L)	N/A	5.0

Source: Water Management Plan (RWC, 2019) – Table 18

The results of the groundwater quality monitoring data are outlined in **Tables 7.2** and **7.3**. All results for Total Recoverable Hydrocarbon (TRH) were below the limit of recording and it is assumed there was none present. TRH is not discussed further in this review.

Table 7.2
Water Monitoring Results – 23 April 2020

Bore Hole	pH	EC ($\mu\text{S}/\text{cm}$)	Nitrate (mg/L)	Ammonia (mg/L)
TP05	5.6	145	<0.1	0.1
TP06	5.5	110	<0.1	<0.1
TP08	5.4	95	<0.1	<0.1
TP12	5.5	75	3.3	0.3
TP14	5.7	55	<0.1	<0.1
TP20	5.6	60	<0.1	<0.1
TP21	5.7	55	0.35	<0.1
TP23	5.2	55	1.2	<0.1
TP44	6.2	230	0.35	<0.1
TP45	6.0	220	6.1	<0.1
TP46	6.0	95	2.2	<0.1
TP47	4.1	170	37.0	0.7
TP48	6.0	220	0.18	0.2
TP49	5.2	250	0.27	<0.1
TP50	5.2	380	0.27	<0.1
TP51	6.1	95	1.3	<0.1

Table 7.3
Water Monitoring Results – 28 August 2020

Bore Hole	pH	EC (µS/cm)	Nitrate (mg/L)	Ammonia (mg/L)
TP05	5.2	135	<0.1	0.3
TP06	5.6	80	<0.1	<0.1
TP08	5.6	140	<0.1	<0.1
TP12	5.5	60	2.4	0.1
TP14	5.5	50	<0.1	<0.1
TP20	5.5	70	0.22	<0.1
TP21	5.7	60	2.3	<0.1
TP23	5.2	55	1.0	<0.1
TP44	5.7	230	<0.1	<0.1
TP45	5.6	220	<0.1	<0.1
TP46	5.9	95	<0.1	<0.1
TP47	4.5	130	24.0	0.2
TP48	6.1	200	<0.1	<0.1
TP49	5.3	270	<0.1	<0.1
TP50	5.2	360	<0.1	<0.1
TP51	6.2	95	<0.1	<0.1

7.1.2 Analysis of Groundwater Quality Results

General observations from the groundwater quality monitoring data are as follows.

- TP47 returned samples with elevated nitrate and ammonia on 23 April 2020 and 28 August 2020. TP47 is located on the western boundary of the Quarry approximately 750m from the closest point of disturbance. This is consistent with records from 2019 at this location indicating a local influence that is separate to Quarry operations. It is possible that the elevated nitrate is a result of past agricultural practices (fertiliser application) and elevated ammonia the result of decaying plant matter.

Elevated ammonia levels were also returned for TP12 on 23 April 2020 and TP05 on 28 August 2020. However, these results are consistent with historical levels and are considered to be isolated outcomes unlikely to be indicative of a change to the groundwater setting.

- The slightly acidic pH is consistent with historic data and likely to represent the breakdown of plant material. Exceedances of the lower trigger value for pH were recorded at TP47 on 23 April 2020 and 28 August 2020 which also indicates a local influence on groundwater in this area.
- The outcomes for EC are also consistent with historic data and within the assumed trigger levels.

- It is highly unlikely that quarrying activities are impacting groundwater quality.
- pH, conductivity, nitrate and ammonia results are consistent with groundwater monitoring data obtained during previous monitoring campaigns. No distinct temporal trends are evident within the measured parameters.

The EIS noted that the groundwater tended to be slightly acidic due to the generation of organic acid from the breakdown of plant material (min pH = 4.6, max pH = 6.7). The EIS further noted that conductivity was generally very low (min $\mu\text{S}/\text{cm}$ = 45, max $\mu\text{S}/\text{cm}$ = 1 320). The groundwater quality results are generally consistent with those presented in the EIS and it is unlikely that extractive operations are impacting on the quality of the groundwater.

It is noted that bores TP18 and TP19 had been removed as a part of the development of Domain 6. Additional monitoring bores TP44, 45, 46, 47, 48, 49, 50 and 51 were installed in 2017. Samples were not taken at bore TP22 due to damage to the standpipe. It is considered that bore TP06 provides a suitable substitute for bore TP22 due to the close proximity of these bores.

7.1.3 Groundwater Level Monitoring

Groundwater levels at the monitoring bores were monitored monthly in accordance with the approved *Water Management Plan*.

Groundwater levels in the monitoring bores are used to assess the impacts of Quarry operations on the surrounding aquifers. This analysis involves assessing the risk of Quarry operations impacting on the Greater Blue Mountains Heritage Area. No significant impacts were anticipated to groundwater flow as a result of quarrying activities.

Table 7.4 presents the drilled depth and groundwater investigation trigger level for each bore within the groundwater monitoring network.

Table 7.4
Groundwater Investigation Trigger Levels

Page 1 of 2

Bore	Drilled Depth (m)	Trigger Level mBGL
TP22	12	4.43
TP06	18	5.91
TP12	15	6.67
TP23	15	6.77
TP14	20	9.08
TP08	18	6.76
TP05	15	8.75
TP18*	18	3.30
TP19*	12	4.79
TP20	12	5.84
TP21	12	5.84
TP44	18.5	3.11
TP45	9	3.36

Table 7.4 (Cont'd)
Groundwater Investigation Trigger Levels

Page 2 of 2

Bore	Drilled Depth (m)	Trigger Level mBGL
TP46	20	1.71
TP47	12	0.69
TP48	18	5.85
TP49	10	5.80
TP50	20	7.67
TP51	16	2.49

* Bore no longer accessible
Source: Water Management Plan (RWC 2019) - Table 17

Groundwater level monitoring has been undertaken at 11 groundwater bores since October 2010 (bores TP05, TP06, TP08, TP12, TP14, TP18, TP19, TP20, TP21, TP22, TP23). In March 2018, monitoring also commenced at a further five bores located to the west of the Quarry (TP44, TP45, TP46, TP47, and TP51) and three bores in the vicinity of Domain 3 (TP49, TP48 and TP50). The locations of the monitoring bores are shown on **Figure 3**.

The results of the 2020 groundwater levels monitoring are outlined in **Table 7.5** and displayed in **Figure 5**. The historical groundwater levels are presented in **Figure 6** and **Figure 7**. Monitoring results are displayed for both the original monitoring bores and the newly constructed bores.

Figure 5 2020 Groundwater Level Monitoring Results

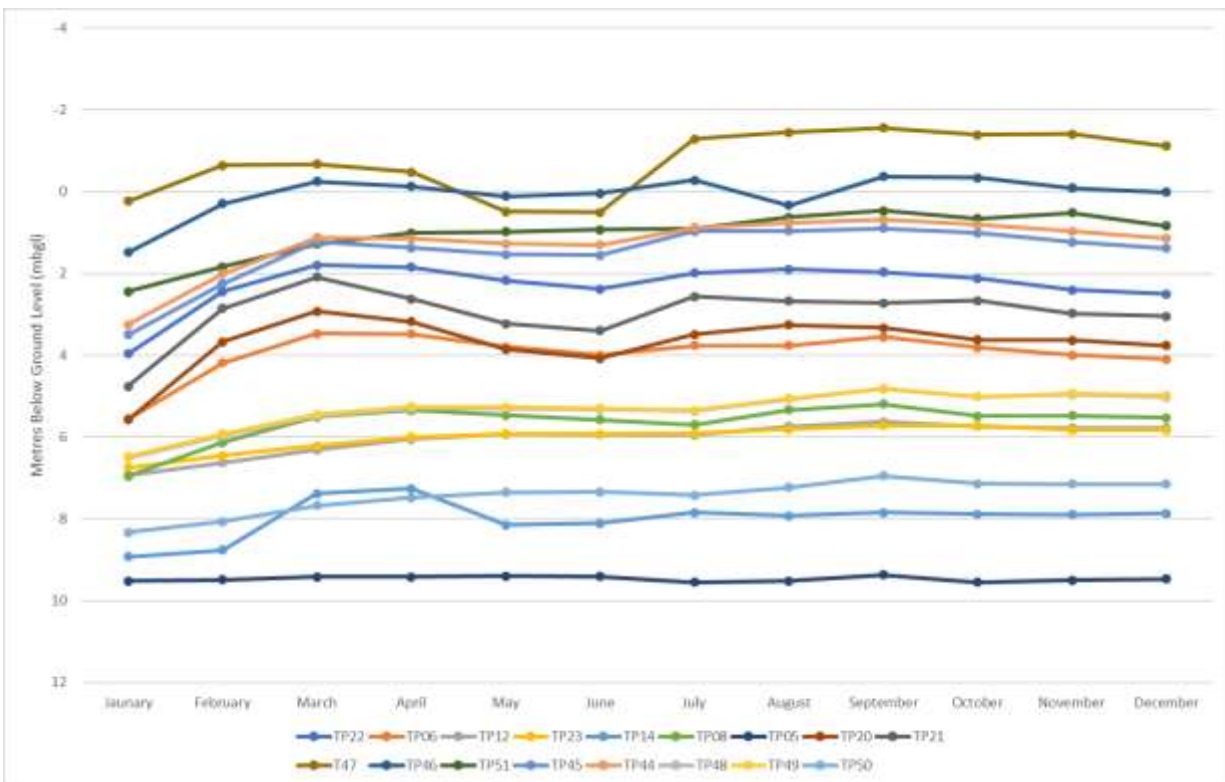


Table 7.5
Results of 2020 Groundwater Levels Monitoring Program

Bore Hole	Trigger	Month											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		Depth to water (mbgs)											
TP22	4.43	3.96	2.44	1.80	1.85	2.17	2.38	1.99	1.90	1.97	2.12	2.40	2.50
TP06	5.91	5.56	4.19	3.47	3.48	3.79	3.99	3.76	3.76	3.55	3.81	3.99	4.09
TP12	6.67	6.93	6.62	6.31	6.05	5.93	5.94	5.95	5.74	5.63	5.74	5.78	5.78
TP23	6.77	6.75	6.45	6.21	6.00	5.92	5.93	5.91	5.81	5.72	5.73	5.83	5.83
TP14	9.08	8.92	8.76	7.38	7.26	8.15	8.11	7.84	7.93	7.84	7.88	7.90	7.86
TP08	6.76	6.96	6.13	5.51	5.34	5.47	5.58	5.7	5.33	5.19	5.49	5.48	5.53
TP05	8.75	9.52	9.49	9.42	9.42	9.40	9.41	9.55	9.52	9.37	9.55	9.50	9.47
TP20	5.84	5.58	3.67	2.93	3.18	3.85	4.07	3.49	3.26	3.33	3.62	3.63	3.76
TP21	5.84	4.76	2.85	2.09	2.62	3.23	3.40	2.56	2.67	2.72	2.66	2.98	3.05
TP47	0.69	0.23	0.64	0.67	-0.48	0.49	0.51	-1.29	-1.45	-1.56	-1.39	-1.41	-1.12
TP46	1.71	1.48	0.29	0.25	-0.13	0.11	0.04	-0.28	0.33	-0.37	-0.34	-0.09	0.01
TP51	2.49	2.44	1.84	1.28	1.01	0.98	0.93	0.90	0.63	0.47	0.66	0.52	0.84
TP45	3.36	3.50	2.25	1.23	1.37	1.53	1.55	0.97	0.96	0.90	1.01	1.23	1.38
TP44	3.11	3.25	2.01	1.12	1.15	1.27	1.30	0.88	0.76	0.69	0.81	0.97	1.14
TP48	5.85	6.50	5.97	5.48	5.29	5.29	5.32	5.36	5.07	4.82	5.01	4.96	5.02
TP49	5.80	6.47	5.92	5.45	5.25	5.26	5.29	5.34	5.05	4.81	5.01	4.94	4.98
TP50	7.67	8.33	8.07	7.67	7.48	7.35	7.34	7.42	7.23	6.95	7.14	7.15	7.15

Figure 6 Hydrography for Site Bores with Monthly Rainfall (Historic Bores)

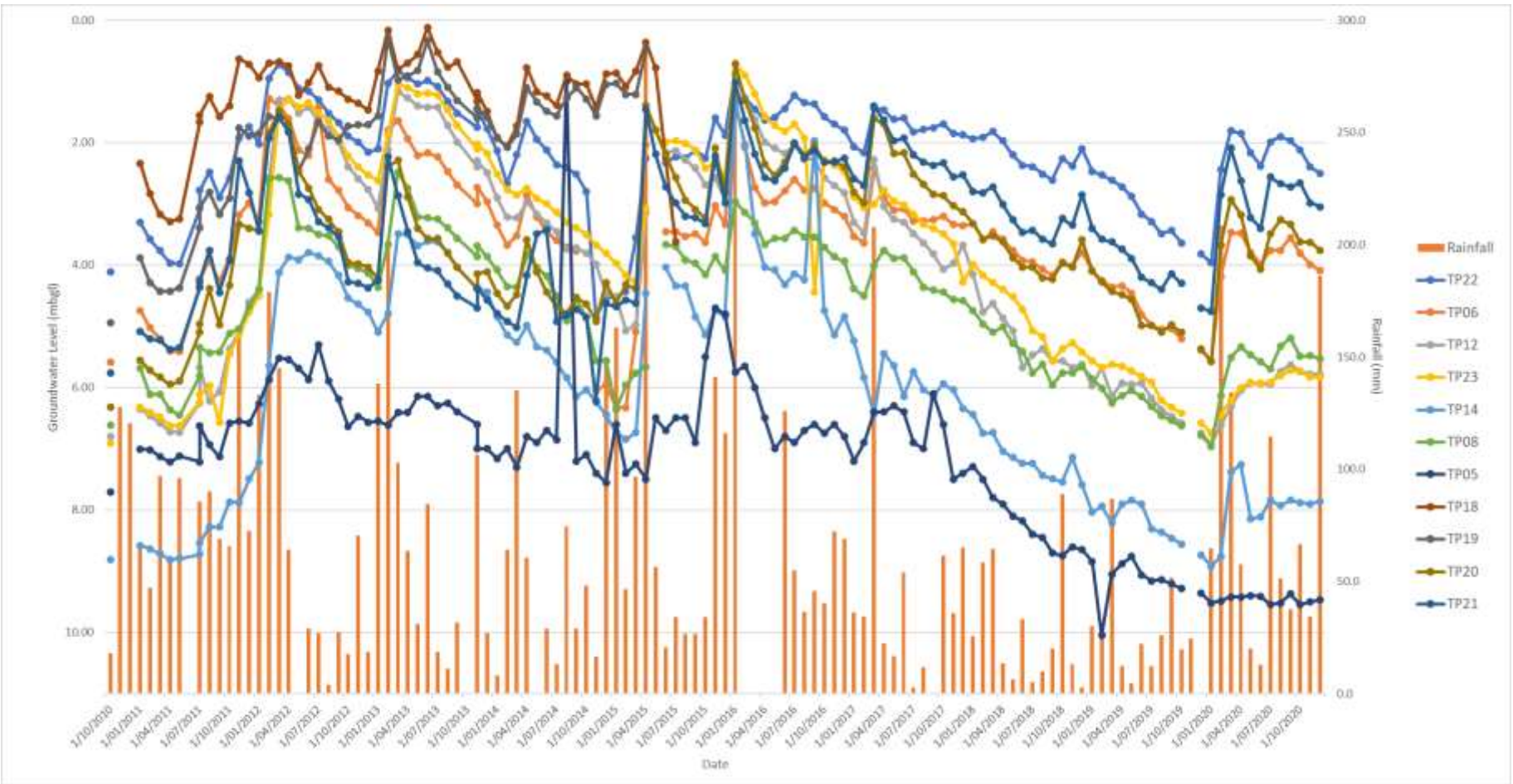
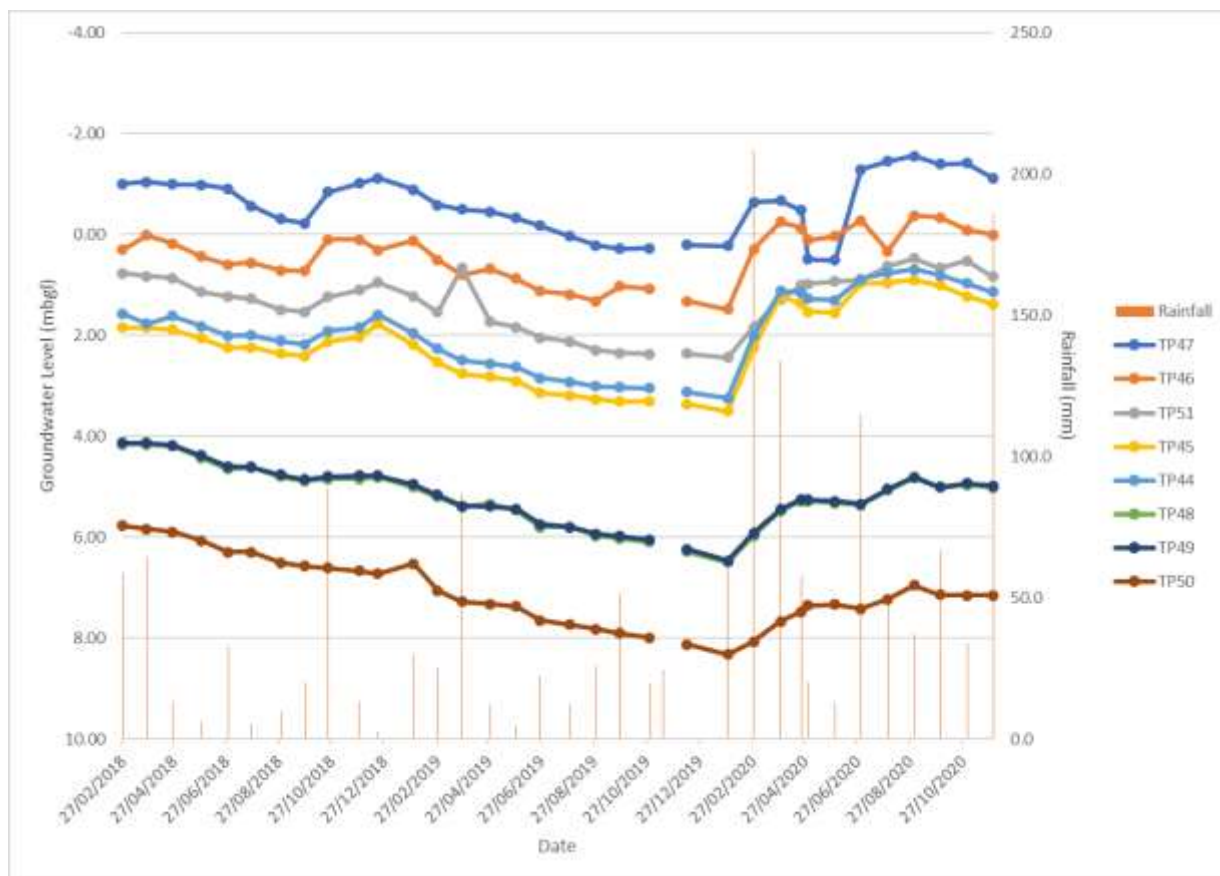


Figure 7 Hydrography for Site Bores with Monthly Rainfall (New Bores)



7.1.4 Analysis of Groundwater Level Results

Figure 5, Figure 6 and Figure 7 clearly display the declining trend in groundwater levels evident across all monitoring bores within the monitoring program prior to the reporting period with the rainfall events in January, February and July 2020 resulting in a groundwater level rise or stabilisation of groundwater decline across all bores.

Groundwater levels in monitoring bore TP05 were below the investigation trigger levels for the entire reporting period. Groundwater levels at this bore were also below the investigation trigger level throughout the 2019 reporting period, indicating that this trigger level may no longer be appropriate for this bore. Groundwater levels at TP5 increased only slightly following rainfall events and it is expected that only minor changes to water levels in this bore would occur following prolonged dry or wet weather periods. It is noted that TP5 is expected to be removed during the 2021 reporting period as it is within the approved extraction area. It is envisaged that a replacement bore would be located parallel with TP5 on the opposite side of the Quarry Access Road. The final location of the bore would be presented in an updated Water Management Plan.

Groundwater levels below the investigation trigger level have also been recorded for bores TP12, TP08, TP48, TP45, TP44, TP48, TP49 and TP50 between January and February 2020. These results are considered to have been the result of local drought conditions prior to January 2020 and groundwater levels in all these bores remained above trigger levels following the rainfall events in January and February 2020.

7.1.5 Groundwater Usage

Hy-Tec have the capacity to extract 55 million litres (ML) of water per year under its water access licences and water supply works approvals (see Section 3 and **Table 3.1**). Following a successful application for additional 60ML of water allocation, it is expected that this allocation will commence upon issuance of the appropriate documentation. Water extracted from the deeper aquifers was primarily used to fill the dredge pond and for use in dust suppression during extended dry periods.

The approved *Water Management Plan* requires that the quantity of water obtained from production bores is monitored on a monthly basis. **Table 7.6** presents a summary of the groundwater usage from January 2020 until December 2020.

Table 7.6
Groundwater Usage – Meter Reading and Monthly Usage

Date	Meter Reading (KL)	Usage (ML)
January	48476	0.043
February	48477	0.001
March	48479	0.002
April	48480	0.001
May	48489	0.009
June	48490	0.001
July	50270	1.780
August	50300	0.030
September	50427	0.127
October	51737	1.310
November	52339	0.602
December	53811	1.472
Total	-	5.378

A total of 5.4ML of groundwater was utilised over the reporting period which represents a decrease of 11.7ML compared to 2019. This is largely due to the higher-than-average rainfall experienced throughout the reporting period. WAL 24367 permits extraction of 15ML of water per annum (based on a water year (July to June)). It is noted that between July 2019 to June 2020 a total of 16.44ML of water was used. However, this period included the Gaspers Mountain bush fire event for which water was extracted for firefighting purposes.

During October and November 2019 water was drawn from the groundwater production bore for firefighting purposes. It is conservatively estimated that towards the end of October and in November 2019 5.0ML of water was used by the Rural Fire Service (RFS) and National Parks and Wildlife Services for continual helicopter passes. The water was taken in bulk using helicopter buckets. To ensure a sufficient volume of water was available for the RFS, Hy-Tec continually pumped groundwater from the production bore during this time. Water use in October and November was approximately 6.1ML, during a time when production was curtailed. Minor volumes of water were also taken from a small dam adjacent to the Putty Road by fire tankers.

7.2 SURFACE WATER

7.2.1 Introduction

The Tinda Creek Quarry is situated near the top of the Tinda Creek catchment. Tinda Creek itself typically experiences intermittent, short duration flows immediately following heavy rainfall events. Previous monitoring, conducted in 2008 and 2015, indicates that quarrying activities have not impacted negatively on the Tinda Creek system and the downstream portions of the creek remain consistent with other creek systems in the vicinity of the Quarry.

The Quarry utilises a closed water management system in order to minimise any potential impacts on downstream water quality, flow regimes and habitats. This system has been successfully implemented for the past 30 years and involves a number of pump lines and catch drains.

Clean water diversion drains have been constructed within the Quarry Site in order to prevent clean runoff entering the operations area (refer **Plate 5**). The diversion drain system shown on **Figure 3** comprises the following components.

- Southern Diversion
- Southern Diversion Extension
- Existing Diversion.

Clean water diversion for operations in Domain 6 were constructed in 2017. No further changes were required during the reporting period.

During the reporting period the closed water management system covered an area of 35.6ha and remained within the limit of 40ha at any one time, as described in *Condition 3(12)* of SSD_4978.

7.2.2 Surface Water Monitoring

Surface water monitoring was conducted generally in accordance with the approved *Water Management Plan* over the reporting period. A summary of the required surface water monitoring is provided in **Table 7.7**.

Table 7.7
Surface Water Monitoring Regime

Monitoring Type	Location	Parameters Monitored	Frequency of Monitoring	Monitoring Method
Dredge Pond Level	Dredge Pond	Level (depth below ground)	Monthly	Observation or dip
Surface Water Quality	Upstream and downstream of Quarry	pH, EC, turbidity	Monthly if water is flowing in Tinda Creek. Samples will also be taken after more than 50mm of rain in 24 hours if water is flowing.	Grab Sample
Drainage Lines and Diversion Drains	Upstream and downstream of quarry	Stability, erosion, and sediment build up	Monthly and event based	Observation and photography
Closed Water Management System	Quarry	Stability, erosion, and sediment build up	Monthly and event based	Observation and photograph

7.2.3 Dredge Pond Water Levels

The *Water Management Plan* requires that dredge pond water levels are assessed on a monthly basis. The depth to water in any operating dredge pond from the adjoining ground surface is to remain less than 10m to avoid triggering further investigations. Documented monthly monitoring of dredge pond levels was undertaken by Hy-Tec from January to December 2020. Water levels were recorded as between 7mbgs and 8mbgs during each survey. On the basis of these results no further investigations were required.

7.2.4 Surface Water Quality

Insufficient water was available to sample upstream and downstream of the Quarry throughout the reporting period.

7.2.5 Drainage Lines, Diversion Drains and Water Management System

Hy-Tec have implemented a range of measures to ensure sediment movement within the Quarry (in clean water diversion drains) is limited. These measures include the following.

- Construction and maintenance of spoon drains.
- Lining of drains with geofabric and rock armouring.
- Installation of a gabion mattress at the end of drain in the vicinity of Domain 6 to capture sediment and slow the flow of water.
- Installation of rows of hay bales and silt fencing.
- Re-seeding of the drain to establish a suitable ground cover.

Condition M2.1 of the EPL 12007 requires that the licensee undertake monthly inspections of the surface water system at the premises. The monthly inspection must:

- be undertaken immediately upstream and downstream of the Quarry disturbance area;
- include visual inspection for litter, oil and grease and sediment within the surface water system, including diversion channels;
- include visual inspection of the physical integrity of the surface water system, including any signs of erosion; and
- include visual inspection of the water level/flow in Tinda Creek.

A summary of the monitoring data as required by EPL 12007 is presented in **Table 7.8**.

Built up sediment was noted within the clean water diversion drain near the weighbridge during the monthly inspections undertaken in March, May and November 2020. Minor erosion within the clean water diversion drain was noted in April 2020, however, the sediment did not enter the Tinda Creek system. Maintenance activities within the diversion drains were undertaken promptly following identification of issues.

Table 7.8
Results of Surface Water Monitoring - 2020

Observation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Litter	No	No	No	No	No	No	No	No	No	No	No	No
Oil/Grease	No	No	No	No	No	No	No	No	No	No	No	No
Sediment	No	No	Yes	No	Yes	No	No	No	No	No	Yes	No
Erosion	No	No	No	Yes	No	No	No	No	No	No	No	No
Water Level/Flow	No	No	No	No	No	No	No	No	No	No	No	No

Two incidents relating to the Water Management System occurred during the reporting period. An unexpected storm event on 24 –25 March 2020 resulted in small volumes of overflow from the settling ponds to the natural environment. Once discovered, water was quickly diverted from the settling ponds to the dredge pond to manage water levels. On 4 November 2020, water overtopped the northern wall of the closed water management system and discharged into the site’s northern clean water diversion drain. The discharge event was caused by a delay in opening the controlled discharge pipes between the sediment pond and the dredge pond. It is estimated that the discharge event occurred over a maximum period of 1.5 hours.

Hy-Tec considers that the discharge events did not result in material harm to the environment as observations of the receiving environment after the event indicated that sediment fences remained in place and there were no signs of sedimentation in surrounding vegetation. **Table 7.9** presents the results of water monitoring taken after the March incident with no discernible impact recorded.

Table 7.9
Summary of Surface Water Monitoring Results - March Discharge Event

Event	Monitoring Location	Parameter		
		pH (pH Unit)	Turbidity (NTU)	EC (µS/cm)
March	SW1 (Upstream)	6.71	104.0	38
	Discharge Point	5.81	47.3	62
	SW2 (Downstream)	5.99	62.8	59
	SW3 (Downstream)	6.25	58.6	70

Table 7.10 presents the results of water monitoring taken immediately after the incident by Niche Environment and Heritage during routine aquatic ecology monitoring and following up monitoring undertaken by Hy-Tec after the incident. Elevated turbidity and decreased pH were recorded downstream at Site 4 following the November incident, however, downstream records indicate minimal disturbance when compared to upstream tributary records and records downstream were consistent with historical records. Hy-Tec’s response to the incidents and measures implemented since they occurred are discussed in Section 10.2.

Table 7.10
Summary of Surface Water Monitoring Results - November Discharge Event

Date	Monitoring Location	Parameter		
		pH (pH Unit)	Turbidity (NTU)	EC (µS/cm)
4/11/2020*	Site 4 (Downstream)	4.37	540.0	NR
	Site 5 (Tributary)	7.30	47.5	NR
	Site 6 (Downstream)	5.98	64.5	NR
	Site 8 (Tributary)	5.99	179.8	NR
21/12/2020	Site 4 (Downstream)	7.38	776.0	48
	Small dam downstream of Site 4	5.89	104.0	78
	Downstream at Putty Road crossing	6.47	16.4	174
07/01/2021	Site 4 (Downstream)	6.34	94.6	87
	Small dam downstream of Site 4	6.25	109.0	78
	Downstream at Putty Road crossing	6.35	37.5	140
	Site 8 (Tributary)	6.43	36.4	84

* Routine monitoring for aquatic ecology monitoring campaign.

8. REHABILITATION AND LANDSCAPE MANAGEMENT

8.1 REHABILITATION MANAGEMENT

Rehabilitation objectives for the Quarry are described in Schedule 3, Condition 17 of SSD_4978 and reiterated in the approved *Landscape Management Plan* for the Quarry. The objectives for progressive and final rehabilitation of the Quarry include the following.

- The Quarry Site is safe, stable and non-polluting.
- Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of local native species and habitat, including at least 0.35ha of Mellong Sandmass Sedgeland.
- Surface infrastructure is to be decommissioned and removed (unless the Secretary agrees otherwise).
- Minimise the size, depth, batter slope and the drainage catchment of the final void.
- Ensure that the volume of VENM and ENM detailed in the EIS is imported for rehabilitation of the site.
- Ensure that the surface area of the final voids is no greater than 16ha in total.

- Ensure that final voids are separated from the surface water drainage system, unless the Secretary agrees otherwise.
- Restore alignment and hydraulic function of watercourses, as far as practical.
- Ensure public safety.

Rehabilitation works continued in the 2ha domain in the southeastern quadrant of the Quarry Site and the north eastern corner of the historic extraction area of Domain 4 as shown on **Figure 2**. Rehabilitation works comprised primarily backfilling the area with overburden, silt and clay material. Backfilled areas were then allowed to dry prior to being covered with topsoil, mulch and timber to create a growth medium and habitat areas (refer **Plate 8**). This activity was consistent with the methods and timing presented in the *Landscape Management Plan*.

Hy-Tec considers that the potential for successful rehabilitation of the Quarry Site remains positive following the Gospers Mountain Bush Fire. During the life of the Quarry, natural regeneration following bush fire has demonstrated the natural resilience of the vegetation. The resilience of the vegetation is evident and the speed of regeneration (following rainfall) evident. This is consistent with the response to fires that occurred in October 2013, with Quarry personnel reporting that within a matter of months the vegetation was re-establishing and within one year there was almost no evidence of the fire.

8.2 LANDSCAPE MANAGEMENT

Landscape management was undertaken generally in accordance with the approved *Landscape Management Plan* which was prepared in accordance with *Condition 3(19)* of SSD_4978. Activities involved predominantly weed management, maintenance of clean water diversions and some vegetation maintenance.

Local Land Services initiated a 1080 Wild Dog and Fox Baiting Program within the Hawkesbury and Blue Mountains region in May and November 2020. This included the Quarry Site. A total of two meat baits were taken by wild dogs during these programs. A total of seven wild deer were also shot by Local Land Services officers within the Quarry Site during the reporting period.

The approved *Landscape Management Plan* includes a range of monitoring activities to be undertaken by Hy-Tec to demonstrate compliance with the objectives and performance criteria for landscape and rehabilitation management. A summary of these activities is provided in **Table 8.1**.

8.2.1 Rehabilitation Monitoring

Visual inspections of the areas under active rehabilitation were undertaken monthly during the reporting period (rather than six-monthly) and cross-over with requirements for monitoring of erosion and sediment controls and surface water quality in accordance with the *Water Management Plan*. A summary of the outcomes of monitoring during the reporting period is provided in **Table 8.2**. Visual inspections of the Quarry Site were supplemented by monitoring undertaken by EnviroKey in December 2020 (EnviroKey, 2021) with the outcomes of this monitoring presented in **Appendix 4**.

Table 8.1
Ecological Monitoring Requirements at Tinda Creek Quarry

Type of Monitoring	Location	Parameters Monitored	Frequency	Monitoring Method	Responsibility
Rehabilitation	Rehabilitation Areas	Inspections of drainage lines, water management systems and rehabilitation areas	Monthly	Visual Inspection	Quarry Manager
Long-term rehabilitation	Rehabilitation Areas	Soil conditions, erosion, environmental controls	Six Monthly	Field Survey	Quarry Manager
Habitat Assessment	Biodiversity Offset Areas	Erosion, general health of vegetation, floristic structure and diversity, occurrence of weeds, signs of disturbance by stock or humans, evidence of feral animal, evidence of fire, seedling recruitment, characteristic of ground cover, nectar and fruit resources, water resources, fauna usage	Annually unless otherwise agreed	Field Survey	Quarry Manager
Koala	Biodiversity Offset Areas	Targeted Spot Assessment Technique, Call playback surveys, Spotlight surveys	Annually unless otherwise agreed	Field Survey	Quarry Manager
Aquatic Monitoring	Drainage lines upstream and downstream of site.	Stream width and edge habitat, stream features including substrate, vegetation and organic material, site observation including catchment description and local land use practises, and riparian characteristics	Annually	Field Survey and Photography	Quarry Manager
Nest Boxes	Biodiversity Offset Areas	Condition assessment	Annually for first 5 years	Field inspection and LED camera.	Quarry Manager
Threatened Fauna Species Monitoring		Koala, eastern pygmy possum, squirrel glider, forest owls, threatened micro-bat species, diurnal reptiles/amphibians, introduced species	After first 5 years of operation	Diurnal bird area searches, diurnal reptile/amphibian area searches, nocturnal call playback surveys, remote camera surveys, nocturnal Anabat surveys	Quarry Manager
<i>Grevillea parviflora</i>	Biodiversity Offset Areas	Surveys during known flowering period (July to December), stem counts in permanent plots, photo monitoring, habitat quality	Annually for first 5 years	Field Survey	Quarry Manager

Table 8.2
Rehabilitation Inspections

Rehabilitation Monitoring Aspect	Comment
<p>Monitoring is to include:</p> <ul style="list-style-type: none"> • soil conditions and erosion (i.e. stability); • drainage and sediment control structures; • runoff water quality; • germination rates; • plant health; • natural regeneration; and • weed infestation. 	<p>Visual inspections were undertaken monthly by the Quarry Manager with photographic evidence of drain conditions and stability recorded. Only minor structural issues were identified in clean water diversion structures during the reporting period. Nonetheless, it is considered that existing erosion and sediment controls were functioning appropriately (see Plate 5 and Section 7.2.5) with the exception of the two overtopping events within the historical extraction area in March and November 2020.</p> <p>There was insufficient water in the clean water diversions to permit water quality testing.</p> <p>Drainage structures are stabilised with vegetation, with some of the monitored areas amongst sedge vegetation containing original vegetation. Areas on the northern wall of the sediment pond remain unvegetated following recent maintenance activities despite hydromulch being applied.</p> <p>Weeds identified during site inspections were typically sprayed and removed or manually removed.</p>

8.2.2 Long-Term Rehabilitation Monitoring

Long-term rehabilitation monitoring was undertaken by EnviroKey in December 2020 (EnviroKey, 2021). The outcomes of this monitoring are described in detail in the monitoring report presented as **Appendix 4** of this report. **Table 8.3** presents an overview of key monitoring aspects and outcomes.

Table 8.3
Long-Term Rehabilitation Monitoring

Page 1 of 2

Rehabilitation Monitoring Aspect	Comment
<p>Monitoring is to:</p> <ul style="list-style-type: none"> • compare results against rehabilitation objectives and targets • identify possible trends and continuous improvement • link to records of rehabilitation to determine causes and explain results • assess effectiveness of environmental controls implemented • where required, identify modifications required for the monitoring program, rehabilitation practices or areas requiring research • compare flora species present against original seed mix and/or analogue sites • assess vegetation health • assess vegetation structure (e.g. upper, mid. 	<p>The majority of the rehabilitation objectives do not yet apply, however progressive rehabilitation and management of the rehabilitating landscape remains consistent with these objectives (described in Section 8.1). It is noted that impacts from the Gospers Mountain bush fire have significantly impacted previously rehabilitated areas.</p> <p>EnviroKey (2021) confirmed that all vegetation within the rehabilitation area was burnt during the Gospers Mountain bush fire. Post-bush fire, exotic flora have become well established.</p> <p>Weed species are present in both the regeneration and adjacent remnant areas. However, cover and abundance is substantially greater within the rehabilitation area, influenced mostly by African Lovegrass which is likely to have had a negative influence on native species and has since increased in cover since the 2019 monitoring survey. Weed control will be required as the African Lovegrass density will</p>

Table 8.3 (Cont'd)
Long-Term Rehabilitation Monitoring

Page 2 of 2

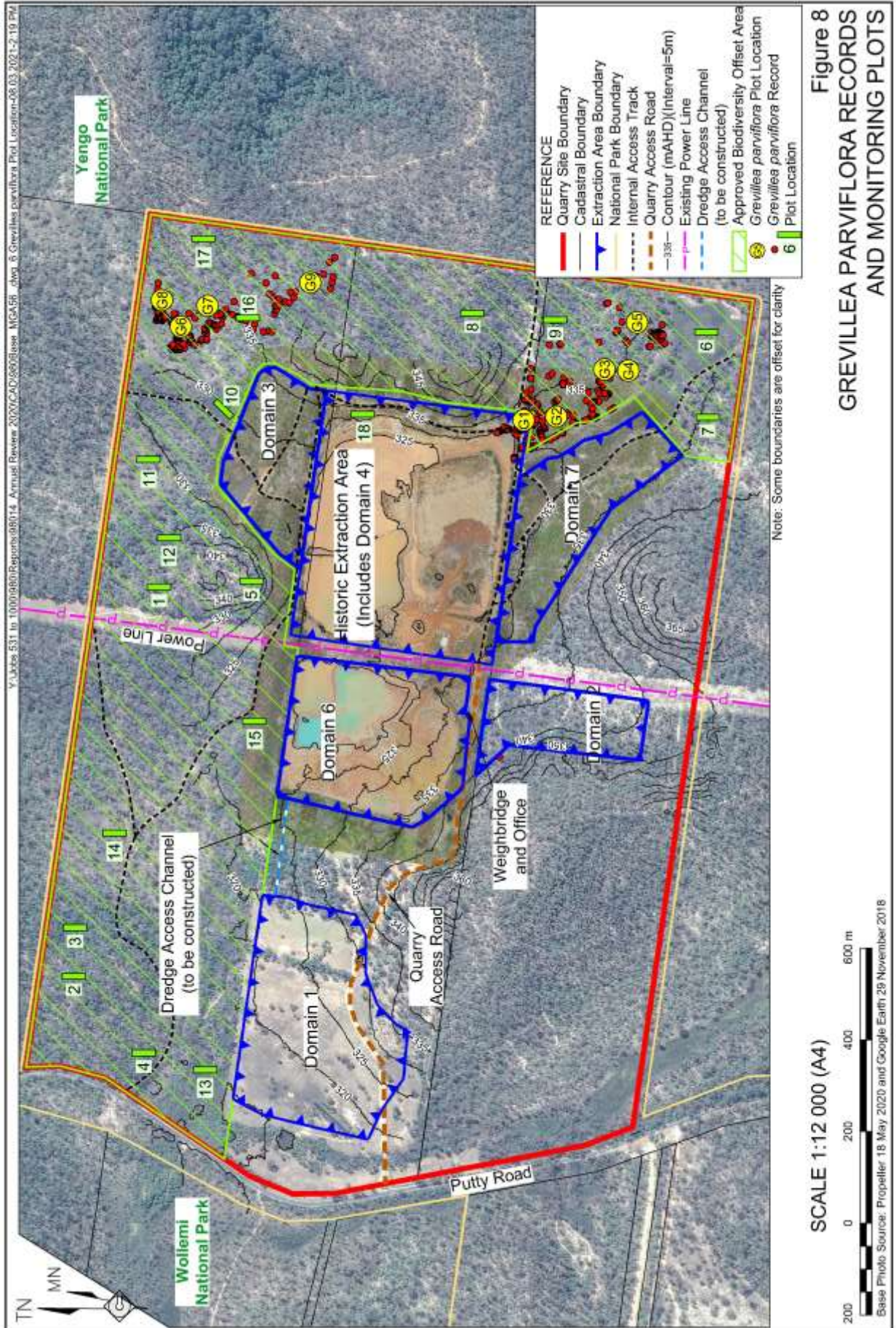
Rehabilitation Monitoring Aspect	Comment
and lower storey) • the presence and abundance of any weed species • assessment of natural regeneration/recruitment of new species where applicable, assess native fauna species diversity and the effectiveness of habitat creation for target fauna species	negatively affect native plant species germination and growth post-fire. Pest species including deer, feral cat and wild dogs occur throughout Wollemi and Yengo National Parks directly adjacent to the Quarry Site. Control will therefore be impossible given that these species will continue to move from the national parks into unoccupied habitat within the Quarry Site.

8.2.3 Biodiversity Offset Area Monitoring

Monitoring within the Biodiversity Offset Area was undertaken by EnviroKey in December 2020 in accordance with the *Landscape Management Plan*. A total of 18 monitoring plots were re-visited for monitoring with the approximate locations presented in **Figure 8**. However, the Gospers Mountain bush fire destroyed many of the timber marker pegs making the exact location of some plots difficult to determine. As such, it was not possible to make a direct comparison between the 2020 monitoring data and previous years. **Table 8.4** presents the monitoring aspects and general conclusions of the monitoring campaign. A more detailed review of the monitoring outcomes and the data collected from monitoring plots is provided in **Appendix 4**.

Table 8.4
Biodiversity Offset Area Monitoring

Biodiversity Offset Area Monitoring Aspect	Comment
Monitoring is to include: • general vegetation health • evidence of natural seedling recruitment • occurrence and abundance of weed species • structure and floristics of vegetation cover • signs of disturbance (by stock, people or feral animals) • nature and extent of erosion • evidence of fire • characteristic of ground cover (e.g. leaf litter, rocks, logs and soil) • nectar or fruit resources and perch sites • water resources • secondary evidence of fauna use such as scats, tree scratches or diggings.	EnviroKey (2021) noted no obvious adverse effects from the Quarry on vegetation communities within the Biodiversity Offset Area. The area was significantly impacted by the Gospers Mountain bush fire. Extensive regenerating is occurring post-fire since significant rain events. A number of threatened species occur within the Biodiversity Offset Area, including a population of <i>Grevillea parviflora</i> . A reduction in the <i>Grevillea</i> population was noted as a direct result of the Gospers Mountain bush fire. A slight increase in Koala evidence was collected compared to the 2019 monitoring survey. Weeds occur along some of the access tracks within the Biodiversity Offset Area, however, their extent was not considered significant. Native flora species dominate the offset area. No weed species recorded are listed as 'Weeds of National Significance'.



8.2.4 Koala Monitoring

EnviroKey undertook Koala population monitoring surveys in December 2020 (EnviroKey, 2021) in areas of potential koala habitat. No Koala were identified during the surveys, however potential Koala scats and scratches were identified in six of the 17 permanent monitoring plots within the Biodiversity Offset Area. The results were confounded by the presence of Common Brushtail Possum scats and the scratches may have also been caused by Lace Monitor. However, EnviroKey (2021) concluded that the presence of both scats and scratches were likely indicative of Koala. This was later confirmed by Quarry personnel who provided a motion-activated camera photograph showing a Koala within the Quarry Site.

The approved *Landscape Management Plan* for the Quarry contains a Koala Plan of Management (Appendix 1 of the plan) that specifies performance criteria for Koala management. These include the following:

- No koalas will be harmed as a result of any tree-clearing practices that take place as a result of this Project.
- Potential quarry-induced impacts will not result in the alteration to the floristics, structure or condition of non-cleared areas of potential koala habitat.

No vegetation clearing was required during the reporting period and Quarry personnel have reported no incidents involving Koala vehicle strikes. There is no evidence that there are Quarry-related impacts occurring to Koala habitat.

8.2.5 Aquatic Monitoring

On 4 November 2020, Niche (2020) undertook aquatic monitoring to monitor the river health of Tinda Creek and its tributaries and to assess any potential impacts from Quarry development. A report detailing the methods, outcomes and conclusions of the aquatic monitoring program is provided as **Appendix 5**. The monitoring program is consistent with the previous monitoring presented as Appendix 2 of the *Landscape Management Plan* (Umwelt, 2016).

The monitoring program in 2019 included the following.

- Assessment of stream condition using Riparian and Channel and Environment inventory assessment (RCE).
- Assessment of habitat condition using AUSRIVAS proforma.
- Assessment of water quality against default ANZECC trigger values.
- Assessment of the macroinvertebrate community condition using Stream Invertebrate Grade Number Average Level (SIGNAL).

In comparison to 2019, the sites monitored had significantly more water which resulted in more sites being able to be sampled. Aquatic environments downstream of Tinda Creek Quarry infrastructure were found to have a good level of riparian regrowth after the Gaspers Mountain bush fire, as well as stable channel morphology and only minor areas of erosion. The macroinvertebrate community had poor AUSRIVAS and low-moderate SIGNAL2 scores indicative of poor stream health, however this is thought to be a result of the prolonged dry conditions followed by major bush fire and flooding events.

Based on the evidence available, there appears to be no obvious disturbance resulting from the Tinda Creek Quarry operations at downstream sites. However, unplanned water discharge from the settling pond that occurred immediately prior to sampling may have contributed to elevated turbidity (suspended sediment levels) recorded at Monitoring Site 4 immediately prior to the survey (see Section 10.2). This did not appear to be reaching downstream Sites 6 or 7 at the time of the survey and is considered a one-off, short-term event.

8.2.6 Nest Box Monitoring

No nesting boxes have been installed at the Quarry and therefore no monitoring has been required to date.

8.2.7 Threatened Fauna Species Monitoring

Threatened fauna monitoring was undertaken by EnviroKey in December 2020, predominantly focused on the Biodiversity Offset Area (EnviroKey, 2020). The outcomes of these surveys are presented in **Appendix 4**.

Four threatened fauna species were identified during the monitoring including the following.

- Koala
- Dusky Woodswallow
- Rosenberg's Goanna
- Little Lorikeet

There is no indication of Quarry impact to threatened fauna presence within the Biodiversity Offset Area.

8.2.8 *Grevillea parviflora* Monitoring

Monitoring of the condition and persistence of the small flower *Grevillea parviflora* subsp. *parviflora* was undertaken in December 2020 and is considered to provide an indication of the condition of this species for the reporting period. A series of nine 10m x 10m plots were revisited (where they could be identified) within the approved Biodiversity Offset Area to facilitate annual stem counts of the species. The locations of these plots can be seen on **Figure 6**. The goal of this monitoring program is to assess the ongoing viability and health of the species and to ensure the habitat is maintained or improved over the life of the operations. The monitoring results are included in **Table 8.5**.

Despite inherent inaccuracies in *Grevillea parviflora* subsp. *parviflora* monitoring plot boundary locations (and difficulty in separating resprouting / clonal plants from new seedlings), the results of the survey plot counts provide a general indication of population condition. A total of 80 plants were recorded within the nine plots during the survey. While this is less than the previous year (125 plants recorded), this result is not surprising given widespread fire that is likely to have killed some of the plants. The current results indicate that the local population continues to proliferate.

Table 8.5
Ecological Monitoring Requirements at Tinda Creek Quarry

Plot Number	2019 Count	2020 Count	2019 No. in flower	2020 No. in flower	2019 No. in fruit	2020 No. in fruit
G1	38	0	15	0	0	0
G2	7	0	4	0	0	0
G3	25	18	5	0	0	0
G4	1	10	0	0	0	0
G5	19	35	9	0	0	0
G6	35	16	11	0	0	0
G7	0	0	0	0	0	0
G8	0	0	0	0	0	0
G9	0	1	0	0	0	0
Total	125	80	44	0	0	0

Source: EnviroKey (2021) – Table 3

8.2.9 Conclusion

Consistent with previous years, Hy-Tec has continued to operate the Tinda Creek Quarry with minimal evident impact to the surrounding landscape within the Quarry Site, the Biodiversity Offset Area and in aquatic environments downstream of the Quarry. High sediment levels were recorded at aquatic Monitoring Site 4 and were caused by overflow of sediment-laden water from the Quarry Site into Tinda Creek. This incident was short term and is not considered indicative of any trends in aquatic ecology impact. Rehabilitation progress has been hampered by the Gaspers Mountain Bush Fire, however following substantial rainfall in 2020, regeneration is evident within the Quarry Site.

EnviroKey (2021) included the following key recommendations.

- The monitoring program should be scaled back in the Biodiversity Offset Area (currently 17 plots) and increased in the rehabilitation areas (currently one plot). This is due to the lack of any evident impact from Quarry operations in the Biodiversity Offset Area and the need to monitor and improve conditions in areas that are subject to rehabilitation.
- Koala monitoring should cease due to the severe nature of the Gaspers Mountain Bush Fire and the relatively low abundance of Koala in the landscape.
- Monitoring of *Grevillea parviflora* subsp. *parviflora* should be reduced to a small number of plots given that the extent of the population remains unchanged as the Quarry operations do not impact this area and all monitoring plots occur within the Biodiversity Offset Area.
- With regards to the rehabilitation areas, it has been recommended that weeding campaigns should focus on the population of African Lovegrass that has established with weeding undertaken every 3 months for at least months. Direct seeding of eucalypts was recommended to develop an overstorey in rehabilitating areas.

- Recommendations for ongoing management of the Biodiversity Offset Area focused on weed management along edge habitat such as access tracks and consideration of closure of tracks that are no longer in use.

Hy-Tec will consider these recommendations in a future update to the Landscape Management Plan.

9. COMMUNITY

9.1 COMMUNITY COMPLAINTS

One community complaint was recorded on 1 December 2020. The complaint related to a truck crossing double white lines approximately 45km from the Quarry Site. The incident was investigated, however, the truck and driver were unable to be identified.

Complaints will continue to be logged within the complaints register and investigated fully when they are received. The complaints register will continue to be kept in the weighbridge office and updated on the Hy-Tec website on a monthly basis.

9.2 COMMUNITY LIAISON

A total of two Tinda Creek Quarry Community Consultative Committee (CCC) meetings were conducted remotely via email during the reporting period due to the COVID-19 pandemic. Presentations were emailed to all CCC members on the scheduled meeting date of 4 May 2020 and 12 October 2020. Members were requested to review the documents and provide any questions/comments within 7 days. After this time, this information was collated and forwarded through to the company for its response. Minutes of the meetings are provided in **Appendix 6**.

There were no issues raised during the CCC meetings that were considered to be complaints or required investigation by Hy-Tec.

Given the remote location of the Quarry, no further community engagement activities occurred within the reporting period.

10. INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

10.1 INTRODUCTION

The following subsections outline incidents and non-compliances that occurred during the reporting period. An internal review of compliance with the conditions of SSD_4978 was undertaken by Hy-Tec and RWC and is included as **Appendix 1**. The operation remained generally compliant with development conditions throughout the reporting period with the exception of the non-compliances listed below.

10.2 INCIDENTS

Two incidents requiring notification to DPIE and the Environment Protection Authority (EPA) occurred during the reporting period due to non-compliance with Condition 12 of Schedule 3 of SSD_4978.

Incident 1 – March 2020

A total of approximately 20 000L to 30 000L was discharged from the closed water management system following an un-forecasted late evening / early morning storm event on the evening of 25 March and into the early morning on 26 March 2020. Upon discovery of the discharge, water was diverted back to the dredge pond ensuring that only a small amount of water was discharged to the external environment.

Surface water was sampled at the location of the discharge and at SW1, SW2 and SW3 on 25 March 2020 and it was confirmed that the quality of the discharge water was generally better than the water sampled both upstream and downstream of the Quarry operation. As such, Hy-Tec considers that this discharge event did not result in any material harm to the environment.

DPIE was notified of the non-compliance in an email dated 26 March 2020 with the results of the water monitoring provided to DPIE on 3 April 2020. Given the short-term and limited impact of this incident and the fact that it was caused by unexpected heavy rainfall, it was not considered necessary to notify the EPA at the time. However, Hy-Tec has since consulted with the EPA on the matter and accepts that this and all future potential or actual pollution incidents must be notified to the EPA. This incident was reported as a non-compliance in the Annual Return to the EPA

Incident 2 – November 2020

On 4 November 2020, water overtopped the northern wall of the closed water management system and discharged into the site's northern clean water diversion drain. The discharge event was caused by a delay in opening the controlled discharge pipes between the sediment pond and the dredge pond. It is estimated that the discharge event occurred over a maximum period of 1.5 hours, however, the volume of water that was discharged was not able to be accurately calculated. The water that was discharged was sediment-laden water produced from wash plant operations that was pumped into the sediment pond and left to settle and would have had elevated turbidity and possibly low pH.

Hy-Tec considers that the discharge event did not result in material harm to the environment as observations of the receiving environment after the event indicated that sediment fences remained in place and there were no signs of sedimentation in surrounding vegetation.

Due to the short-term nature of the event, Hy-Tec management was not aware it had occurred until 16 December 2020 when a draft aquatic monitoring report undertaken on the day of the incident was provided to Hy-Tec and included water monitoring results (as presented in Table 7.10). Upon review of the report, it was apparent that an incident may have occurred. The EPA and DPIE were notified on 17 December 2020, with a follow up report sent on 18 January 2021.

It is noted that Quarry management had been progressively implementing controls to manage risks associated with sediment pond overflows prior to the incident in November 2020.

Following the incident, the following works (planned prior to the incident) were also undertaken.

- The northern and western walls of the sediment pond were raised by approximately 40cm.
- Two 300mm gravity fed safety overflow pipes were installed between the sediment pond and the dredge pond to ensure that any potential overflow is directed to the dredge pond which is within the close water management system.

Hy-Tec also implemented new operating procedures for assessing and managing water levels within the sediment and dredge ponds which include the following.

- Installation of a new depth marker in the sediment pond.
- Daily checks of the sediment pond water level against the depth marker to determine the level of available freeboard and inform the time at which the controlled drainage pipes need to be opened.
- Daily discussion and documentation of sediment pond levels and controlled drainage pipe opening times at morning toolbox meetings.
- Daily maintenance checks of drainage pipe infrastructure to ensure it is functioning effectively.

Hy-Tec considers that the above measures have adequately addressed the risks associated with overtopping from the sediment pond, however, adaptive management techniques will continue to be implemented to ensure that controls remain effective.

10.3 DEVELOPMENT CONSENT SSD_4978

Hy-Tec was not compliant with Conditions 2(1), 2(2), 3(12) and 3(13) of SSD_4978 due to the two unplanned discharge events described in Section 10.2. Hy-Tec considers that neither event resulted in material harm to the environment, however, for conservatism both incidents have been recorded as non-compliant against relevant conditions.

Hy-Tec was also not compliant with Condition 3(20) of SSD_4978 which stipulates that a review of the Conservation and Rehabilitation Bond must be undertaken within 3 months of an Independent Audit. An independent Environmental Audit was undertaken on 9 and 10 October 2019, however, whilst a review of the bond amount is in progress, this has not yet been finalised.

10.4 ENVIRONMENT PROTECTION LICENCE

Hy-Tec was non-compliant with Conditions A3.1, A3.2, L1.1 and R2.2 of EPL 12007. These non-compliances resulted directly from the two unplanned discharge events described in Section 10.2.

10.5 WATER ACCESS LICENCES

WAL 24367 permits extraction of 15ML of water per annum based on a water year (i.e. July to June). A total of 16.44ML of water was used between July 2019 to June 2020. As described in Section 7.1.5, it is conservatively estimated that towards the end of October and in November 2019, 5.0ML of water was used by the Rural Fire Service (RFS) and National Parks and Wildlife Services to fight bush fires in the region. This is not considered a non-compliance for the purpose of this report but is recorded here for transparency.

10.6 VOLUNTARY UNDERTAKING

During a site inspection and audit by officers of DPE on 6 June 2017, it was identified that equipment and other materials historically stored within the southeast corner of the Quarry Site constituted a breach of *Condition 3(30)* of SSD_4978 in relation to waste management at the Quarry. The material was subsequently removed by Hy-Tec and the Company entered into a voluntary undertaking regarding revegetation in this area. The requirements of the voluntary undertaking were completed in February 2020 after DPIE requested additional evidence of vegetation regeneration. Photos taken within the rehabilitated area between September 2017 and February 2021 are presented in **Appendix 7**. It is noted that this area was significantly impacted by the Gaspers Mountain Bush Fire and much of the regrowth vegetation was burnt.

11. ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

The following operational activities are planned throughout the 2020 reporting period.

- Extraction will continue within Domain 6.
- The production forecast for 2021 is to extract, process and transport approximately 120 000t of sand product.
- Ongoing monitoring and maintenance of erosion and sediment controls and diversion drains. Preparatory activities, such as the construction of bunds, diversion channel and other water management infrastructure, will commence in Domain 3.
- Continuation of progressive rehabilitation as practicable. This will primarily continue within southeastern rehabilitation area.
- Continue landscape management in accordance with the Landscape Management Plan including monitoring campaign and participation in local feral animal control programs, where possible.
- Finalise arrangements to secure the Biodiversity Offset Area.
- Replacement of approximately 1.5km of fence along Putty Road and powerline corridors which were destroyed in the Gaspers Bush Fire.
- Continuation of water management and dust control measures.

- Continue to monitor deposited dust and confirm the success of bird control measures through review of results against historic trends.
- Waste will continue to be collected by licensed contractors and volumes and dates recorded.
- Continuation of annual LiDAR Survey or other aerial imagery capture of the Quarry Site.
- Continued implementation of all requirements and conditions prescribed under Development Consent SSD_4978, EPL 12007 and approved management plans.

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Appendices

(Total No. of pages including blank pages = 192)

- Appendix 1 Internal Compliance Audit (SSD_4978) –
1 January 2020 to 31 December 2020 (30 pages)
- Appendix 2 Return for Extractive Industries – June 2020 (4 pages)
- Appendix 3 Noise Monitoring Report (24 pages)
- Appendix 4 Offset Vegetation, Revegetation and Koala
Monitoring Report – 2020 (56 pages)
- Appendix 5 Aquatic Monitoring Report – Spring 2020 (38 pages)
- Appendix 6 Minutes of Tinda Creek Quarry Community
Consultative Committee Meetings (12 pages)
- Appendix 7 Photographs from within the Voluntary
Undertaking Area (26 pages)



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Appendix 1

Internal Compliance Audit (SSD_4978) – 1 January 2020 to 31 December 2020

(Total No. of pages including blank pages = 30)



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Table A1
Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Page 1 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 2: ADMINISTRATION CONDITIONS				
Obligation to Minimise Harm to the Environment				
1.	In addition to meeting the specific performance criteria established under this consent, the Applicant shall implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, or rehabilitation of the development.	N	Two unplanned discharge events occurred in March and November 2020. Whilst it is contended that no material harm occurred because of these events, it is acknowledged that further planned action, if completed earlier could have avoided the risk of overtopping from the sediment pond. It is noted that Hy-Tec have now completed the additional works, which included raising the northern and western walls of the sediment pond, installing non-controlled safety drainage pipes and initiating new operating procedures in relation to checks of sediment pond levels.	O/D
TERMS OF CONSENT				
2.	The Applicant shall carry out the development generally in accordance with the: (a) EIS; (b) Statement of Commitments; and (c) conditions of this consent.	N	A total of five non-compliance issues under SSD_4978 were identified during the reporting period as detailed in this table.	O/D
3.	If there is any inconsistency between the above documents, the most recent document shall prevail to the extent of the inconsistency. However, the conditions of this consent shall prevail to the extent of any inconsistency.	Noted		
4.	The Applicant shall comply with any reasonable requirement/s of the Secretary arising from the Department's assessment of: (a) any strategies, plans, programs, reviews, audits, reports or correspondence that are submitted in accordance with this consent; (b) any reports, reviews or audits commissioned by the Department regarding compliance with this consent; or (c) the implementation of any actions or measures contained in these documents.	Y	No requests were received from DPIE during the reporting period.	D
Yes = Complied with during 2020 No = Not complied with during 2020 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed				



Table A1 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Page 2 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 2: ADMINISTRATION CONDITIONS (Cont'd)				
LIMITS ON CONSENT				
Extraction Operations				
5.	The Applicant may undertake extraction operations on the site until 31 December 2045.	Noted		
Production Limits				
6.	The Applicant shall not: (a) extract or process more than 300,000 tonnes of sand in any calendar year; or (b) undertake extraction operations beyond 15 m below the natural ground surface.	Y	Approximately 91 424 tonnes of sand were extracted and processed and depth restrictions were not exceeded during the reporting period.	D
Transportation Limits				
7.	The Applicant shall not: (a) transport more than 300,000 tonnes of sand from the site in a calendar year; and (b) dispatch more than 34 trucks per day or receive more than 34 trucks per day, averaged over a calendar month.	Y	Product despatch was limited to 93 488 tonnes and truck level limits were not exceeded during the reporting period.	D
SURRENDER OF EXISTING DEVELOPMENT CONSENT				
8.	Within 6 months of the date of this consent, unless the Secretary agrees otherwise, the Applicant shall surrender the development consent (DA 0134/95) for the existing operations on the site in accordance with Section 104A of the EP&A Act. Prior to the surrender of development consent DA 0134/95, the conditions of this consent shall prevail to the extent of any inconsistency with the conditions of that consent.	Y	DA 1034/95 was surrendered on 10 December 2015.	D
STRUCTURAL ADEQUACY				
9.	The Applicant shall ensure that any new buildings and structures, and any alterations, or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.	Noted	No new buildings and structures were constructed during the reporting period.	O
DEMOLITION				
10.	The Applicant shall ensure that all demolition work on site is carried out in accordance with Australian Standard AS 2601-2001: The Demolition of Structures, or its latest version.	Noted	No demolition occurred during the reporting period.	O
11.	The Applicant shall: (a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the development; and	Noted	There was no damage or necessary relocation of public infrastructure during the reporting period.	O
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Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Page 3 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 2: ADMINISTRATION CONDITIONS (Cont'd)				
PROTECTION OF PUBLIC INFRASTRUCTURE				
	(b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the development. <i>Note: This condition does not apply to any damage to roads caused as a result of general road usage.</i>			
OPERATION OF PLANT AND EQUIPMENT				
12.	The Applicant shall ensure that all plant and equipment used on site is: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner.	Y	All equipment was maintained and operated in an acceptable manner during the reporting period.	D
UPDATING & STAGING STRATEGIES, PLANS OR PROGRAMS				
13.	With the approval of the Secretary, the Applicant may submit any strategies, plans or programs required by this consent on a progressive basis. To ensure the strategies, plans or programs under the conditions of this consent are updated on a regular basis, the Applicant may at any time submit revised strategies, plans or programs to the Secretary for approval. With the agreement of the Secretary, the Applicant may prepare any revised strategy, plan or program without undertaking consultation with all parties under the applicable condition of this consent.	Noted	Not required during the reporting period.	D
14.	Until they are replaced by an equivalent strategy, plan or program approved under this consent, the Applicant shall implement the existing strategies, plans or programs for the site that have been approved under DA 0134/95.	Noted	All management strategies, plans and programs have been updated and approved.	D
PRODUCTION DATA				
15.	The Applicant shall: (a) provide annual quarry production data to DRE using the standard form for that purpose; and (b) include a copy of this data in the Annual Review (see condition 4 of schedule 5).	Y	See Appendix 2.	
DEVELOPER CONTRIBUTIONS				
16.	The Applicant shall pay Council road maintenance contributions consistent with Council's Section 94 Contributions Plan, or its latest version.	Y	Road maintenance contributions are paid monthly.	D
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Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*															
SCHEDULE 3: ENVIRONMENTAL PERFORMANCE CONDITIONS																			
IDENTIFICATION OF APPROVED LIMITS OF EXTRACTION																			
1.	Prior to undertaking extraction operations under this consent, the Applicant shall: (a) engage a registered surveyor to mark out the boundaries of the approved limits of extraction within the site; and (b) submit a survey plan of these boundaries with applicable GPS coordinates to the Secretary.	Y	All relevant boundaries have been surveyed and marked to comply with this condition.																
2.	While extraction operations are being carried out, the Applicant shall ensure that these boundaries are clearly marked at all times.	Noted	All boundaries were clearly marked during the reporting period.																
HOURS OF OPERATION																			
3.	The Applicant shall comply with the operating hours set out in Table 1. Table 1: Operation Hours	Y	Hy-Tec complied with all approved operating hours during the reporting period.	D															
<table border="1"> <thead> <tr> <th>Activity</th> <th>Operating Hours</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Extraction operations and deliveries</td> <td>7 am to 6 pm, Monday to Friday</td> </tr> <tr> <td>7 am to 3 pm, Saturday</td> </tr> <tr> <td>No activities on Sundays or Public Holidays</td> </tr> <tr> <td rowspan="2">Dispatch</td> <td>5 am to 10 pm, Monday to Friday</td> </tr> <tr> <td>6 am to 3 pm, Saturday</td> </tr> <tr> <td rowspan="3">Construction activities</td> <td>7 am to 6 pm, Monday to Friday</td> </tr> <tr> <td>8 am to 1 pm, Saturday</td> </tr> <tr> <td>No construction to be undertaken on Sundays or Public Holidays</td> </tr> <tr> <td>Maintenance activities</td> <td>24 hours a day, 7 days per week, providing maintenance activities are inaudible at any privately-owned residence</td> </tr> </tbody> </table>		Activity	Operating Hours	Extraction operations and deliveries	7 am to 6 pm, Monday to Friday	7 am to 3 pm, Saturday	No activities on Sundays or Public Holidays	Dispatch	5 am to 10 pm, Monday to Friday	6 am to 3 pm, Saturday	Construction activities	7 am to 6 pm, Monday to Friday	8 am to 1 pm, Saturday	No construction to be undertaken on Sundays or Public Holidays	Maintenance activities	24 hours a day, 7 days per week, providing maintenance activities are inaudible at any privately-owned residence			
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Construction activities	7 am to 6 pm, Monday to Friday																		
	8 am to 1 pm, Saturday																		
	No construction to be undertaken on Sundays or Public Holidays																		
Maintenance activities	24 hours a day, 7 days per week, providing maintenance activities are inaudible at any privately-owned residence																		
NOISE																			
Noise Criteria																			
4.	The Applicant shall ensure that the noise generated by the development does not exceed the criteria in Table 2 at any residence on privately-owned land. Table 2: Noise criteria dB(A)	Y	Noise monitoring undertaken during the reporting period demonstrates that Hy-Tec complied with this criteria. There were no noise complaints during the reporting period.	D															
<table border="1"> <thead> <tr> <th rowspan="2">Receiver</th> <th>Day/Evening</th> <th colspan="2">Night</th> </tr> <tr> <th>L_{Aeq}(15 min)</th> <th>L_{Aeq}(15 min)</th> <th>L_{A1}(max)</th> </tr> </thead> <tbody> <tr> <td>All receivers</td> <td align="center">35</td> <td align="center">35</td> <td align="center">45</td> </tr> </tbody> </table>		Receiver	Day/Evening	Night		L _{Aeq} (15 min)	L _{Aeq} (15 min)	L _{A1} (max)	All receivers	35	35	45							
Receiver	Day/Evening		Night																
	L _{Aeq} (15 min)	L _{Aeq} (15 min)	L _{A1} (max)																
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<p>Yes = Complied with during 2020 No = Not complied with during 2020 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed</p>																			

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Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Page 5 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*									
SCHEDULE 3: ENVIRONMENTAL PERFORMANCE CONDITIONS (Cont'd)													
NOISE (Cont'd)													
Operating Conditions													
5.	The Applicant shall: (a) implement all reasonable and feasible mitigation measures to minimise the construction, operational and road noise of the development; (b) regularly assess noise monitoring data and relocate, modify and/or stop operations on site to ensure compliance with the noise criteria in this consent; (c) minimise the noise impacts of the development during meteorological conditions under which the noise criteria in this consent do not apply (see Appendix 6); and (d) carry out regular noise monitoring to determine whether the development is complying with the relevant conditions of this consent, to the satisfaction of the Secretary.	Y	See previous response. Hy-Tec has not been required to modify operations due to noise-related concerns during the reporting period.										
Noise Management Plan													
6.	The Applicant shall prepare and implement a Noise Management Plan for the development to the satisfaction of the Secretary.	Y	A Noise Management Plan has been approved by the Secretary and is implemented at the Quarry. The Noise Management Plan is available from the Hy-Tec website.										
AIR QUALITY													
Air Quality Criteria													
7.	The Applicant shall implement all reasonable and feasible avoidance and mitigation measures so that particulate matter emissions generated by the development do not exceed the criteria in Tables 3 to 5 at any residence on privately-owned land. Table 3: Long-Term Criteria for Particulate Matter <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>^d Criterion</th> </tr> </thead> <tbody> <tr> <td>Total suspended particulates (TSP)</td> <td>Annual</td> <td>^a 90 µg/m³</td> </tr> <tr> <td>Particulate matter < 10µm (PM₁₀)</td> <td>Annual</td> <td>^a 30 µg/m³</td> </tr> </tbody> </table>	Pollutant	Averaging period	^d Criterion	Total suspended particulates (TSP)	Annual	^a 90 µg/m ³	Particulate matter < 10µm (PM ₁₀)	Annual	^a 30 µg/m ³	Y	Dust monitoring undertaken during the reporting period indicates that the operation complied with the criteria in this condition. The introduction of bird deterrence on deposited dust gauges in January 2019 has reduced deposited dust levels significantly. This indicates that previously elevated deposited dust levels are not attributable to Quarry operations.	D
Pollutant	Averaging period	^d Criterion											
Total suspended particulates (TSP)	Annual	^a 90 µg/m ³											
Particulate matter < 10µm (PM ₁₀)	Annual	^a 30 µg/m ³											
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Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
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Page 6 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*								
SCHEDULE 3: ENVIRONMENTAL PERFORMANCE CONDITIONS (Cont'd)												
AIR QUALITY (Cont'd)												
Air Quality Criteria (Cont'd)												
	Table 4: Short-Term Criteria for Particulate Matter <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>^d Criterion</th> </tr> </thead> <tbody> <tr> <td>Particulate matter < 10µm (PM₁₀)</td> <td>24 hour</td> <td>^a 50 µg/m³</td> </tr> </tbody> </table>		Pollutant	Averaging period	^d Criterion	Particulate matter < 10µm (PM ₁₀)	24 hour	^a 50 µg/m ³				
Pollutant	Averaging period	^d Criterion										
Particulate matter < 10µm (PM ₁₀)	24 hour	^a 50 µg/m ³										
	Table 5: Long-Term Criteria for Deposited Dust <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>Maximum increase in deposited dust level</th> <th>Maximum total deposited dust level</th> </tr> </thead> <tbody> <tr> <td>^c Deposited dust</td> <td>Annual</td> <td>^b 2g/m²/month</td> <td>^a 4g/m²/month</td> </tr> </tbody> </table>		Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level	^c Deposited dust	Annual	^b 2g/m ² /month	^a 4g/m ² /month		
Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level									
^c Deposited dust	Annual	^b 2g/m ² /month	^a 4g/m ² /month									
Operating Conditions												
8.	The Applicant shall: (a) implement all reasonable and feasible measures to minimise the dust emissions of the development; (b) minimise surface disturbance of the site; and (c) monitor and report on compliance with the relevant air quality criteria in this consent; to the satisfaction of the Secretary.	Y	Dust impacts were effectively managed during the reporting period.	D								
Air Quality Management Plan												
9.	The Applicant shall prepare and implement an Air Quality Management Plan for the development to the satisfaction of the Secretary.	Y	An Air Quality Management Plan has been approved by the Secretary and is implemented at the Quarry. The Air Quality Management Plan is available from the Hy-Tec website. Monitoring not undertaken at DG3 in December as personnel became bogged when attempting to access the gauge, however, it is noted that monthly dust monitoring is only required at DG1.	D								
METEOROLOGICAL MONITORING												
10.	For the life of the development, the Applicant shall ensure that there is a suitable meteorological station operating in the vicinity of the site that complies with the requirements in the Approved Methods for Sampling of Air Pollutants in New South Wales guideline.	Y	A meteorological station was installed in July 2016.	D								
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Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Page 7 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 3: ENVIRONMENTAL PERFORMANCE CONDITIONS (Cont'd)				
SOIL AND WATER				
Water Supply				
11.	The Applicant shall ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of operations under the consent to match its available water supply to the satisfaction of the Secretary.	Noted	WAL 24367 permits extraction of 15ML of water per annum (based on a water year (July to June)). A total of 16.44ML was used between July 2019 to June 2020 although it is estimated that 5.0ML was used by the RFS to fight bush fires during October and November 2019.	D
Operating Conditions				
12.	The Applicant shall: (a) comply with Section 120 of the POEO Act, unless an EPL authorises otherwise; (b) ensure that the catchment of the water management system is not larger than 40 ha, unless the Secretary agrees otherwise; (c) maintain the dredge and silt ponds to capture a 1 in 100 ARI storm event plus adequate freeboard to ensure no offsite discharge; and (d) ensure that the loss of groundwater and surface water to Tinda Creek is no greater than predicted in the EIS.	N	Two unplanned discharge events occurred in March and November 2020. Whilst it is contended that no material harm occurred because of these events, it is acknowledged that further planned action, if completed earlier could have avoided the risk of overtopping from the sediment pond. It is noted that Hy-Tec have now completed the additional works, which included raising the northern and western walls of the sediment pond, installing non-controlled safety drainage pipes and initiating new operating procedures in relation to checks of sediment pond levels.	D
Water Management Plan				
13.	The Applicant shall prepare and implement a Water Management Plan for the development to the satisfaction of the Secretary.	N	A Water Management Plan has been prepared and approved by the Secretary and is being implemented at the Quarry. Groundwater level monitoring was undertaken throughout the reporting period with levels below trigger thresholds investigated. Two unplanned discharge events from the closed water management system occurred in March and November 2020.	D
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Page 8 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*						
SCHEDULE 3: ENVIRONMENTAL PERFORMANCE CONDITIONS (Cont'd)										
HERITAGE										
Heritage Management Plan										
14.	The Applicant shall prepare and implement a Heritage Management Plan for the development to the satisfaction of the Secretary.	Y	A Heritage Management Plan has been approved by the Secretary and is implemented at the Quarry. The Heritage Management Plan is available from the Hy-Tec website							
LANDSCAPE AND REHABILITATION										
Biodiversity Offset Strategy										
15.	The Applicant shall implement the biodiversity offset strategy described in the EIS, as summarised and revised in Table 6, and shown conceptually in Appendix 5, to the satisfaction of the Secretary. Table 6: Biodiversity Offset Strategy (ha)	NYA	Hy-Tec has been in discussions with NPWS and DPIE regularly regarding the actions necessary to implement the biodiversity offset strategy.							
	<table border="1"> <thead> <tr> <th>Area</th> <th>Offset Type</th> <th>Minimum Size (ha)</th> </tr> </thead> <tbody> <tr> <td>On-site Offset Area</td> <td>Existing vegetation to be enhanced</td> <td>106.6</td> </tr> </tbody> </table>	Area	Offset Type	Minimum Size (ha)	On-site Offset Area	Existing vegetation to be enhanced	106.6			
Area	Offset Type	Minimum Size (ha)								
On-site Offset Area	Existing vegetation to be enhanced	106.6								
Security of Offsets										
16.	Within 2 years of this consent, unless otherwise agreed with the Secretary, the Applicant shall make suitable arrangements to provide appropriate long-term security for the offset area, to the satisfaction of the Secretary.	NYA	Hy-Tec is currently consulting with DPIE and NPWS on an appropriate mechanism to secure the offset area. It is noted that the area is not being disturbed and environmental management is implemented in accordance with an approved Landscape Management Plan.							
Rehabilitation Objectives										
17.	The Applicant shall rehabilitate the site to the satisfaction of the Secretary. The final landform must: (a) be generally consistent with the proposed rehabilitation strategy in the EIS, and the final landform shown conceptually in Appendices 4 and 5. and	Y	Progressive rehabilitation is consistent with the EIS. The final landform is yet to be developed.	O						
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Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*												
SCHEDULE 3: ENVIRONMENTAL PERFORMANCE CONDITIONS (Cont'd)																
LANDSCAPE AND REHABILITATION (Cont'd)																
Rehabilitation Objectives (Cont'd)																
	(b) comply with the objectives in Table 7. Table 7: Rehabilitation Objectives	Y	Progressive rehabilitation complied with these objectives during the reporting period.	O												
	<table border="1"> <thead> <tr> <th>Feature</th> <th>Objective</th> </tr> </thead> <tbody> <tr> <td>Site (as a whole)</td> <td> <ul style="list-style-type: none"> Safe, stable and non-polluting Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of local native species and habitat, including at least 0.35 ha of Mellong Sandmass Sedgeland </td> </tr> <tr> <td>Surface Infrastructure</td> <td> <ul style="list-style-type: none"> To be decommissioned and removed (unless the Secretary agrees otherwise) </td> </tr> <tr> <td>Final Voids</td> <td> <ul style="list-style-type: none"> Minimise the size, depth, batter slope and the drainage catchment of the final void Ensure that the volume of VENM and ENM detailed in the EIS is imported for rehabilitation of the site Ensure that the surface area of the final voids is no greater than 16 ha in total Separated from the surface water drainage system, unless the Secretary agrees otherwise </td> </tr> <tr> <td>Watercourses</td> <td> <ul style="list-style-type: none"> Restore alignment and hydraulic function, as far as practical </td> </tr> <tr> <td>Community</td> <td> <ul style="list-style-type: none"> Ensure public safety </td> </tr> </tbody> </table>	Feature	Objective	Site (as a whole)	<ul style="list-style-type: none"> Safe, stable and non-polluting Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of local native species and habitat, including at least 0.35 ha of Mellong Sandmass Sedgeland 	Surface Infrastructure	<ul style="list-style-type: none"> To be decommissioned and removed (unless the Secretary agrees otherwise) 	Final Voids	<ul style="list-style-type: none"> Minimise the size, depth, batter slope and the drainage catchment of the final void Ensure that the volume of VENM and ENM detailed in the EIS is imported for rehabilitation of the site Ensure that the surface area of the final voids is no greater than 16 ha in total Separated from the surface water drainage system, unless the Secretary agrees otherwise 	Watercourses	<ul style="list-style-type: none"> Restore alignment and hydraulic function, as far as practical 	Community	<ul style="list-style-type: none"> Ensure public safety 			
Feature	Objective															
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Watercourses	<ul style="list-style-type: none"> Restore alignment and hydraulic function, as far as practical 															
Community	<ul style="list-style-type: none"> Ensure public safety 															
Progressive Rehabilitation																
18.	The Applicant shall rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. Interim stabilisation measures must be implemented where reasonable and feasible to control erosion (both wind and water) in disturbed areas that are not active and which are not ready for final rehabilitation.	Y	Rehabilitation continued in Domain 4 during the reporting period with this landform progressively being stabilised prior to revegetation.	O												
Landscape Management Plan																
19.	The Applicant shall prepare and implement a Landscape Management Plan for the development to the satisfaction of the Secretary.	Y	A Landscape Management Plan has been approved by the Secretary and is being implemented at the Quarry. The Landscape Management Plan is available from the Hy-Tec website. An updated Landscape Management Plan is currently in preparation to revise ongoing management and monitoring measures.	D												
<p>Yes = Complied with during 2020 No = Not complied with during 2020 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed</p>																



Table A1 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Page 10 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 3: ENVIRONMENTAL PERFORMANCE CONDITIONS (Cont'd)				
LANDSCAPE AND REHABILITATION (Cont'd)				
Conservation and Rehabilitation Bond				
20.	<p>Within 6 months of the approval of the Landscape Management Plan, the Applicant shall lodge a Conservation and Rehabilitation Bond with the Department to ensure that the biodiversity offset strategy and rehabilitation of the site are implemented in accordance with the performance and completion criteria set out in the plan and relevant conditions of this consent. The sum of the bond shall be determined by:</p> <p>(a) calculating the cost of implementing the biodiversity offset strategy over the next 3 years;</p> <p>(b) calculating the cost of rehabilitating the site, taking into account the likely surface disturbance over the next 3 years of extraction operations; and</p> <p>(c) employing a suitably qualified quantity surveyor or other expert to verify the calculated costs, to the satisfaction of the Secretary.</p>	Y	A conservation and rehabilitation bond was lodged with DPE on 11 December 2017.	D
	<p>Within 3 months of each Independent Environmental Audit (see condition 9 of schedule 5), the Applicant shall review, and if necessary revise, the sum of the Conservation and Rehabilitation Bond to the satisfaction of the Secretary.</p>	N	<p>An Independent Environment Audit was undertaken on 9 and 10 October 2019.</p> <p>An updated Landscape Management Plan is currently in preparation and will be submitted to DPIE in Q2 2021. The conservation and rehabilitation bond will be updated for the Quarry following approval of this plan.</p>	
TRANSPORT				
Monitoring of Product Transport				
22.	The Applicant shall keep accurate records of all laden truck movements to and from the site (hourly, daily, weekly, monthly and annually) and publish these records on its website every 6 months.	Y	See Section 4.2.2 of the Annual Review. Truck movement records are also available from the Hy-Tec website.	D
<p>Yes = Complied with during 2020 No = Not complied with during 2020 ND = Not Determined</p> <p>NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance</p> <p>* = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit</p> <p>Yes# / No# = Complied / not complied with and compliance no longer required to be assessed</p>				

Table A1 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Page 11 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 3: ENVIRONMENTAL PERFORMANCE CONDITIONS (Cont'd)				
TRANSPORT (Cont'd)				
Operating Conditions				
23.	The Applicant shall ensure that: (a) all laden vehicles have appropriate signage, including a contact phone number, so they be easily identified by road users; (b) all laden vehicles entering or exiting the site have their loads covered; (c) all laden vehicles exiting the site are cleaned of sand and other material that may fall on the road, before leaving the site; and (d) no trucks queue at the entrance to the site before 6am.	Y	All laden vehicles complied with these requirements during the reporting period.	D
Access Road and Intersection Construction				
24.	Within 12 months from the date of this consent, unless the Secretary agrees otherwise, the Applicant shall upgrade the site access road and its intersection with Putty Road in accordance with applicable AUSTRROADS standards, and to the satisfaction of RMS.	Y	Intersection upgrade completed in November 2015.	D
Transport Management Plan				
25.	The Applicant shall prepare and implement a Transport Management Plan for the development to the satisfaction of the Secretary.	Y	A Transport Management Plan has been approved by the Secretary and is implemented at the Quarry. The Transport Management Plan is available from the Hy-Tec website	D
VISUAL				
26.	The Applicant shall: (a) implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the development on local residences and road users; and (b) ensure that all external lighting associated with the development complies with the relevant Australian Standards.... to the satisfaction of the Secretary.	Y	Visual amenity was managed effectively during the reporting period. No complaints were received during the reporting period regarding visual impacts.	
BUSHFIRE MANAGEMENT				
27.	The Applicant shall ensure that the development is suitably equipped to respond to any fires on site; and assist the Rural Fire Service, emergency services and National Parks and Wildlife Service as much as practicable if there is a fire in the surrounding area.	Y	Firefighting equipment is readily available at the Quarry.	D
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Table A1 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Page 12 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 3: ENVIRONMENTAL PERFORMANCE CONDITIONS (Cont'd)				
WASTE				
28.	The Applicant shall ensure that only certified VENM and ENM is imported to the site to aid in the minimisation of final voids.	Y	No material was imported during the reporting period.	D
29.	The Applicant shall manage on-site sewage treatment and disposal in accordance with the requirements of its EPL, and to the satisfaction of the EPA and Council.	Y	There were no compliance issues with regards to sewerage management during the reporting period.	D
30.	The Applicant shall: (a) minimise the waste generated by the development; (b) ensure that the waste generated by the development is appropriately stored, handled, and disposed of; and (c) report on waste management and minimisation in the Annual Review, to the satisfaction of the Secretary.	Y	Historically stored waste located on the premises was identified as part of site visit by DPE representatives in June 2017. The items were disposed of in September 2017, and the area is being revegetated, in liaison with the DPE and EPA.	D
SCHEDULE 4: ADDITIONAL PROCEDURES				
NOTIFICATION OF LANDOWNERS				
1.	As soon as practicable after obtaining monitoring results showing an exceedance of any relevant criteria in schedule 3, the Applicant shall notify affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the development is again complying with the relevant criteria.	Y	Hy-Tec did not receive monitoring results that indicated impacts at a nearby residence.	D
INDEPENDENT REVIEW				
2.	If an owner of privately-owned land considers the development to be exceeding the relevant criteria in schedule 3, then he/she may ask the Secretary in writing for an independent review of the impacts of the development on his/her land. If the Secretary is satisfied that an independent review is warranted, then within 2 months of the Secretary's decision the Applicant shall:	NYA	No requests for an independent review of impacts of the Quarry were received during the reporting period.	
SCHEDULE 5: ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING				
ENVIRONMENTAL MANAGEMENT				
Environmental Management Strategy				
1.	The Applicant shall prepare and implement an Environmental Management Strategy for the development to the satisfaction of the Secretary.	Y	An Environmental Management Strategy has been approved by the Secretary and is implemented at the Quarry. The Environmental Management Strategy Plan is available from the Hy-Tec website.	D
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Table A1 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 5: ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING (Cont'd)				
ENVIRONMENTAL MANAGEMENT (Cont'd)				
Adaptive Management				
2.	<p>The Applicant shall assess and manage development-related risks to ensure that there are no exceedances of the criteria and/or performance measures in schedule 3. Any exceedance of these criteria and/or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation.</p> <p>Where any exceedance of these criteria and/or performance measures has occurred, the Applicant shall, at the earliest opportunity:</p> <p>(a) take all reasonable and feasible measures to ensure that the exceedance ceases and does not recur;</p> <p>(b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and</p> <p>(c) implement remediation measures as directed by the Secretary;</p> <p>to the satisfaction of the Secretary.</p>	Y	<p>Groundwater level (Section 7.1) exceedances were recorded in early 2020 but are considered to be due to the drought conditions experienced during 2019.</p> <p>Hy-Tec has implemented additional management and mitigation measures in response to the overtopping incidents in March and November (see Section 10.2).</p>	D
Management Plan Requirements				
3.	<p>The Applicant shall ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:</p> <p>(a) detailed baseline data;</p> <p>(b) a description of:</p> <ul style="list-style-type: none"> • the relevant statutory requirements (including any relevant approval, licence or lease conditions); • any relevant limits or performance measures/criteria; and • the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures; <p>(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;</p>	Y	All management plans and strategies have been approved by the Secretary.	D
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Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Page 14 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 5: ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING (Cont'd)				
ENVIRONMENTAL MANAGEMENT (Cont'd)				
Management Plan Requirements (Cont'd)				
	(d) a program to monitor and report on the: <ul style="list-style-type: none"> • impacts and environmental performance of the development; and • effectiveness of any management measures (see (c) above); (e) a contingency plan to manage any unpredicted impacts and their consequences;			
	(f) a program to investigate and implement ways to improve the environmental performance of the development over time;			
	(g) a protocol for managing and reporting any: <ul style="list-style-type: none"> • incidents; • complaints; • non-compliances with statutory requirements; and • exceedances of the impact assessment criteria and/or performance criteria; and (h) a protocol for periodic review of the plan.			
Annual Review				
4.	By the end of December each year, or other timing as may be agreed by the Secretary, the Applicant shall review the environmental performance of the development to the satisfaction of the Secretary.	Y	This document.	D
Revision of Strategies, Plans and Programs				
5.	Within 3 months of a modification to this consent or following the submission of an: <ul style="list-style-type: none"> (a) annual review under condition 4 above; (b) incident report under condition 7 below; or (c) audit report under condition 9 below, the Applicant shall review, and if necessary revise, the strategies, plans, and programs required under this consent to the satisfaction of the Secretary. <i>Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.</i>	Y	Hy-Tec have advised that a review has been carried out accordingly An updated Landscape Management Plan is currently in preparation to revise ongoing management and monitoring measures.	D
Yes = Complied with during 2020 No = Not complied with during 2020 NYA = Not Yet Applicable * = Basis for assessment of compliance Yes# / No# = Complied / not complied with and compliance no longer required to be assessed		No = Not complied with during 2020 HNC = Historical Non-Compliance D = Documentation/Discussion		ND = Not Determined ANC = Administrative Non-Compliance O = Observation during audit

Table A1 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Page 15 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 5: ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING (Cont'd)				
ENVIRONMENTAL MANAGEMENT (Cont'd)				
Community Consultative Committee				
6.	The Applicant shall establish and operate a Community Consultative Committee (CCC) for the development to the satisfaction of the Secretary. This CCC must be operated in general accordance with the Guidelines for Establishing and Operating Community Consultative Committees for Mining Developments (Department of Planning, 2007, or its latest version), and be operating within 6 months of the date of this consent.	Y	Virtual CCC Meetings were held on 4 May 2020 and 12 October 2020.	D
REPORTING				
Incident Reporting				
7.	The Applicant shall immediately notify the Secretary and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the Development, the Applicant shall notify the Secretary. Within 7 days of the date of the incident, the Applicant shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.	N	DPIE and EPA were notified of the unplanned discharge event from the sediment pond in November 2020. DPIE was also notified of the incident in March 2020, however, EPA notification was not considered relevant as no material harm to the environment occurred, Following consultation with the EPA, Hy-Tec accepted this as a non-compliance for the EPA 2019 / 2020 Annual Return period.	D
Regular Reporting				
8.	The Applicant shall provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent.	Y	All relevant documents and monitoring results are available from the Hy-Tec website.	O
INDEPENDENT ENVIRONMENTAL AUDIT				
9.	Within a year of the date of this consent, and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development.	Y	An Independent Environment Audit was undertaken on 9 and 10 October 2019.	D
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Table A1 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Page 16 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 5: ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING (Cont'd)				
INDEPENDENT ENVIRONMENTAL AUDIT (Cont'd)				
10.	Within 6 weeks of the completion of this audit, unless the Secretary agrees otherwise, the Applicant shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report, including a timetable for the implementation of any measures proposed to address the recommendations in the audit report. If the Applicant intends to defer the implementation of a recommendation, reasons must be documented.	Y	The audit report and response from Hy-tec were provided to DPIE on 21 November 2019	D
11.	<p>Within 6 months of the date of this consent, the Applicant shall:</p> <p>(a) make copies of the following publicly available on its website:</p> <ul style="list-style-type: none"> • the EIS; • current statutory approvals for the development; • approved strategies, plans and programs required under the conditions of this consent; • a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs; • a complaints register, which is to be updated monthly; • minutes of CCC meetings; • the annual reviews of the development (for the last 5 years); • any independent environmental audit of the development, and the Applicant's response to the recommendations in any audit; • any other matter required by the Secretary; and <p>(b) keep this information up-to-date, to the satisfaction of the Secretary.</p>	Y	All relevant documents and monitoring results are available from the Hy-Tec website.	D
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Table A2
Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Page 1 of 11

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*
1. Administrative Conditions				
What the licence authorises and regulates				
A1.1	This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation. Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition.	Yes	Scheduled Activity Fee Based Activity Scale > 100 000 – 500 000m ³ annual extractive capacity	D
	Scheduled Activity	Fee Based Activity	Scale	
	Extractive activities	Water-based extractive activity	>100000 – 500000m ³ annual extractive capacity	
A1.2	Notwithstanding condition A1.1, the scale of the water-based extractive activity authorised under this licence must not exceed more than 300,000 tonnes of sand extracted or processed in any calendar year, being the amount equivalent to the annual extraction limit approved by the development consent granted under the Environmental Planning and Assessment Act 1979 for the premises specified in A2.	Yes	Water-based extractive activity did not exceed more than 300 000 tonnes of sand extracted or processed during the reporting period.	D
Premises or plant to which this licence applies				
A2.1	The licence applies to the following premises: TINDA CREEK QUARRY 6102 PUTTY ROAD MELLONG NSW 2756 LOT 1 DP 628806, LOT 2 DP 628806, LOT 3 DP 628806 AS DEPICTED IN THE MAP OF THE APPROVED PROJECT AREA FOR SSD 4978 IN CONDITION A2.2	N/A		
A2.2	The premises location is shown on the map below	N/A		
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Table A2 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Page 2 of 11

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*						
1. Administrative Conditions (Cont'd)										
Information supplied to the EPA										
A3.1	Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence. In this condition the reference to "the licence application" includes a reference to: a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.	N	Two unplanned discharge events occurred in March and November 2020. Whilst it is contended that no material harm occurred because of these events, it is acknowledged that further planned action, if completed earlier could have avoided the risk of overtopping from the sediment pond. It is noted that Hy-Tec have now completed the additional works, which included raising the northern and western walls of the sediment pond, installing non-controlled safety drainage pipes and initiating new operating procedures in relation to checks of sediment pond levels.	D						
A3.2	Works and activities must be carried out in accordance with the Development Consent for State Significant Development 4978 approved by the Department of Planning and Environment on 10 April 2015.	N	Two unplanned discharge events occurred in March and November 2020. Whilst it is contended that no material harm occurred because of these events it is acknowledged that further action could have been taken to avoid the risk of overtopping from the sediment pond. It is noted that Hy-Tec have since undertaken considerable work to minimise risks including raising the northern and western walls of the sediment pond, installing non-controlled drainage pipes and initiating new operating procedures in relation to checks of sediment pond levels.	D						
2. Discharges to Air and Water and Applications to Land										
P1 Location of monitoring/discharge points and areas										
P1.1	The following points referred to in the table below are identified in this licence for the purposes of weather and/or noise monitoring and/or setting limits for the emission of noise from the premises.	Yes	A Noise Management Plan has been approved by the Secretary and is implemented at the Quarry. The Noise Management Plan is available from the Hy-Tec website and identifies monitoring locations.	D						
	<table border="1"> <thead> <tr> <th>EPA ID No.</th> <th>Type of monitoring point</th> <th>Location Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Noise monitoring</td> <td>The boundary of "Receiver 1" as detailed in Figure 6.1 of the document titled "Tinda Creek Sand Quarry Noise Management Plan Final October 2015", submitted to the EPA on 18 November 2015</td> </tr> </tbody> </table>	EPA ID No.	Type of monitoring point	Location Description	1	Noise monitoring	The boundary of "Receiver 1" as detailed in Figure 6.1 of the document titled "Tinda Creek Sand Quarry Noise Management Plan Final October 2015", submitted to the EPA on 18 November 2015			
EPA ID No.	Type of monitoring point	Location Description								
1	Noise monitoring	The boundary of "Receiver 1" as detailed in Figure 6.1 of the document titled "Tinda Creek Sand Quarry Noise Management Plan Final October 2015", submitted to the EPA on 18 November 2015								
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Table A2 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*																
3. Limit Conditions																				
L1 Pollution of waters																				
L1.1	Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.	N	Two unplanned discharge events occurred in March and November 2020. Whilst it is contended that no material harm occurred because of these events, it is acknowledged that further planned action, if completed earlier could have avoided the risk of overtopping from the sediment pond. It is noted that Hy-Tec have now completed the additional works, which included raising the northern and western walls of the sediment pond, installing non-controlled safety drainage pipes and initiating new operating procedures in relation to checks of sediment pond levels	D																
L2 Waste																				
L2.1	The licensee must not cause, permit or allow any waste generated outside the premises to be received at the premises for storage, treatment, processing, reprocessing or disposal or any waste generated at the premises to be disposed of at the premises, except as expressly permitted by the licence.	Yes	No waste material was received on site during the reporting period.	D																
L2.2	This condition only applies to the storage, treatment, processing, reprocessing or disposal of waste at the premises if those activities require an environment protection licence.	Yes	No waste material was received on site during the reporting period.	D																
L3 Noise Limits																				
L3.1	Noise generated at the premises that is measured at each noise monitoring point established under this licence must not exceed the noise levels specified in Column 4 of the table below for that point during the corresponding time periods specified in Column 1 when measured using the corresponding measurement parameters listed in Column 2.	Yes	Noise monitoring undertaken during the reporting period demonstrates that Hy-Tec complied with the criteria. There were no noise complaints during the reporting period.	D																
<table border="1"> <thead> <tr> <th colspan="4">POINT 1</th> </tr> <tr> <th>Time period</th> <th>Measurement parameter</th> <th>Measurement frequency</th> <th>Noise level dB(A)</th> </tr> </thead> <tbody> <tr> <td>All hours</td> <td>LAeq (15 minute)</td> <td>-</td> <td>35</td> </tr> <tr> <td>Night</td> <td>Lmax OR LA1,1min</td> <td>-</td> <td>45</td> </tr> </tbody> </table>		POINT 1				Time period	Measurement parameter	Measurement frequency	Noise level dB(A)	All hours	LAeq (15 minute)	-	35	Night	Lmax OR LA1,1min	-	45			
POINT 1																				
Time period	Measurement parameter	Measurement frequency	Noise level dB(A)																	
All hours	LAeq (15 minute)	-	35																	
Night	Lmax OR LA1,1min	-	45																	
L3.2	For the purposes of the table under Condition L3.1 "Night" has the same meaning as in the NSW Industrial Noise Policy (EPA, 2000).	Noted																		
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Table A2 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Page 4 of 11

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*
3. Limit Conditions (Cont'd)				
L4 Hours of Operation				
L4.1	Unless permitted by another condition of this licence, activities at the premises must: a) only be undertaken between 7:00 am and 6:00 pm Monday to Friday; b) only be undertaken between 7:00 am and 3:00 pm Saturday; and c) not be undertaken on Sundays or public holidays.	Yes	Hy-Tec reports that all hours of operation were complied with during the reporting period.	D
L4.2	In addition to the limitations imposed by Condition L4.1, construction activities must not be undertaken: a) between 7:00 am and 8:00 am Saturdays; and b) between 1:00 pm and 3:00 pm Saturdays.	Yes	No construction activities were undertaken in the reporting period with the exception of raising the northern and western walls of the sediment pond. Hy-Tec reports that hours of operation were adhered to.	D
L4.3	In addition to the hours of operation specified in Condition L4.1, dispatch activities may be undertaken: a) between 5:00 am and 10:00 pm Monday to Friday; and b) between 6:00 am and 3:00 pm Saturdays	Yes	Hy-Tec reports that dispatch occurred during the approved hours throughout the reporting period.	D
L4.4	Maintenance activities may be undertaken at any time if those activities are inaudible at all residential premises.	Yes	Hy-Tec has confirmed that all maintenance activities were inaudible at residential premises. No noise complaints were received through the reporting period.	D
4. Operating Conditions				
O1 Activities must be carried out in a competent manner				
O1.1	Licensed activities must be carried out in a competent manner. This includes: a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.	Yes	Hy-Tec reports that all activities were carried out in a competent manner during the reporting period. This includes the management of materials and substances used to carry out the operation such as diesel and other hazardous substances. All waste generated by the operation was managed in accordance with the Environmental Management Strategy.	D
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Table A2 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Page 5 of 11

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*
4. Operating Conditions (Cont'd)				
O2 Maintenance of plant and equipment				
O2.1	All plant and equipment installed at the premises or used in connection with the licensed activity: a) must be maintained in a proper and efficient condition; and b) must be operated in a proper and efficient manner.	Yes	Hy-Tec reports that all plant and equipment was maintained and operated in a proper and efficient manner.	D
O3 Dust				
O3.1	The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.	Yes	Hy-Tec reports that quarry-generated dust was minimal throughout the reporting period. No complaints relating to dust impacts were received.	D
O3.2	The licensee must ensure that all laden vehicles exiting the site have their loads covered.	Yes	Hy-Tec reports that all loads were covered during the reporting period.	D
5. Monitoring and Recording Conditions				
M1 Monitoring Records				
M1.1	The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.	Yes	All monitoring was conducted and retained in accordance with M1 of EPL 12007	D
M1.2	All records required to be kept by this licence must be: a) in a legible form, or in a form that can readily be reduced to a legible form; b) kept for at least 4 years after the monitoring or event to which they relate took place; and c) produced in a legible form to any authorised officer of the EPA who asks to see them.	Yes	All records have been kept in accordance with condition M1 of EPL 12007.	D
M1.3	The following records must be kept in respect of any samples required to be collected for the purposes of this licence: a) the date(s) on which the sample was taken; b) the time(s) at which the sample was collected; c) the point at which the sample was taken; and d) the name of the person who collected the sample.	Yes	Hy-Tec confirms that all relevant details have been recorded for monitoring activities.	D
Yes = Complied with during 2020 No = Not complied with during 2020 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed				

Table A2 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*
5. Monitoring and Recording Conditions (Cont'd)				
M2 Environmental Monitoring				
M2.1	a) The licensee must undertake monthly inspections of the surface water management system at the premises. b) The monthly inspections must: (i) be undertaken immediately upstream and downstream of the quarry disturbance area; (ii) include visual inspection of litter, oil and grease and sediment levels within the surface water system, including diversion channels; (iii) include visual inspection of the physical integrity of the surface water management system, including any signs of erosion; and (iv) include visual inspection of the water level and flow in Tinda Creek.	Yes	Monthly inspections of the surface water management system were undertaken throughout the reporting period in accordance with condition M2 of EPL 12007.	D
M3 Recording of pollution complaints				
M3.1	The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.	Yes	A complaints register is maintained, however, no complaints were received during the reporting period.	D
M3 Recording of pollution complaints (Cont'd)				
M3.2	The 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.	Yes	A complaints register is maintained, however, no complaints were received during the reporting period.	D
M3.3	The record of a complaint must be kept for at least 4 years after the complaint was made.	Yes	A complaints register is maintained, however, no complaints were received during the reporting period.	D
M3.4	The record must be produced to any authorised officer of the EPA who asks to see them.	NYA	No requests were provided during the reporting period.	D
M4 Telephone complaints line				
M4.1	The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.	Yes	A telephone complaints line was maintained, however, no complaints were received during the reporting period.	D
Yes = Complied with during 2020 No = Not complied with during 2020 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed				

Table A2 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Page 7 of 11

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*												
5. Monitoring and Recording Conditions (Cont'd)																
M4 Telephone complaints line (Cont'd)																
M4.2	The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.	Yes	The telephone complaints number is displayed on a sign at the front gate of the Quarry.	D												
M4.3	The preceding two conditions do not apply until 3 months after: the date of the issue of this licence.	Noted														
M5 Noise Monitoring																
M5.1	To assess compliance with the noise limits specified within this licence, the licensee must undertake operator attended noise monitoring at each specified noise monitoring point in accordance with the table below.	Yes	Noise monitoring was undertaken by Muller Acoustic Consultants in April 2020 in accordance with the approved Noise Management Plan.	D												
<table border="1"> <thead> <tr> <th colspan="4">POINT 1</th> </tr> <tr> <th>Assessment period</th> <th>Minimum frequency in a reporting period</th> <th>Minimum duration within assessment period</th> <th>Minimum number of assessment period</th> </tr> </thead> <tbody> <tr> <td>All hours when in use</td> <td>Yearly</td> <td>1 hour</td> <td>1 operation day</td> </tr> </tbody> </table>		POINT 1				Assessment period	Minimum frequency in a reporting period	Minimum duration within assessment period	Minimum number of assessment period	All hours when in use	Yearly	1 hour	1 operation day			
POINT 1																
Assessment period	Minimum frequency in a reporting period	Minimum duration within assessment period	Minimum number of assessment period													
All hours when in use	Yearly	1 hour	1 operation day													
M5.2	The licensee must undertake noise monitoring as directed by an authorised officer of the EPA.	NYA	No request was made for additional noise monitoring during the reporting period.	D												
M5.3	All noise monitoring required by this licence must be undertaken in accordance with Australian Standard AS 2659.1 - 1998: Guide to the use of sound measuring equipment - Portable sound level meters, or any revisions of that standard that may be made by Standards Australia, and the compliance monitoring guidance provided in the NSW Industrial Noise Policy.	Yes	Noise monitoring was undertaken in accordance with Australian Standard AS 2659.1 – 1998.	D												
6. Reporting Conditions																
R1 Annual Return Documents																
R1.1	The licensee must complete and supply to the EPA an Annual Return in the approved form comprising: 1. a Statement of Compliance, 2. a Monitoring and Complaints Summary, 3. a Statement of Compliance - Licence Conditions, 4. a Statement of Compliance - Load based Fee, 5. a Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan, 6. a Statement of Compliance - Requirement to Publish Pollution Monitoring Data; and 7. a Statement of Compliance - Environmental Management Systems and Practices. At the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.	Yes	Annual Return submitted to EPA on 12/07/2020.	D												
Yes = Complied with during 2020		No = Not complied with during 2020		ND = Not Determined												
NYA = Not Yet Applicable		HNC = Historical Non-Compliance		ANC = Administrative Non-Compliance												
* = Basis for assessment of compliance		D = Documentation/Discussion		O = Observation during audit												
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Table A2 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Page 8 of 11

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*
6. Reporting Conditions (Cont'd)				
R1 Annual Return Documents (Cont'd)				
R1.2	An Annual Return must be prepared in respect of each reporting period, except as provided below.	Noted		
R1.3	Where this licence is transferred from the licensee to a new licensee: a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.	Noted		
R1.4	Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on: a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.	Noted		
R1.5	The Annual Return for the reporting period must be supplied to the EPA via eConnect EPA or by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').	Yes	Annual Return submitted to EPA 12/07/2020.	D
R1.6	The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.	Noted		
R1.7	Within the Annual Return, the Statements of Compliance must be certified and the Monitoring and Complaints Summary must be signed by: a) the licence holder; or b) by a person approved in writing by the EPA to sign on behalf of the licence holder.	Yes	Compliance declaration was signed by a Director and Company Secretary.	D
R2 Notification of environmental harm				
R2.1	Notifications must be made by telephoning the Environment Line service on 131 555.	Noted	Notifications during the reporting period were not made using this number but to the relevant EPA Officer. In all instances the Officer acknowledged receipt of the information.	
Yes = Complied with during 2020 No = Not complied with during 2020 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed				

Table A2 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Page 9 of 11

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*
6. Reporting Conditions (Cont'd)				
R2 Notification of environmental harm (Cont'd)				
R2.2	The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.	N	The EPA were not immediately notified of March 2020 incident. Hy-Tec management were made aware of the 4 November 2020 discharge event on 16 December 2020. EPA were notified on 17 December 2020.	D
R3 Written Report				
R3.1	Where an authorised officer of the EPA suspects on reasonable grounds that: a) where this licence applies to premises, an event has occurred at the premises; or b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence, and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.	Y	An R3 Written Report was provided by Hy-Tec to the EPA on 18 January 2021 in response to a request made by EPA on 18 December 2020	D
R3.2	The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.	Y	An R3 Written Report was provided by Hy-Tec to the EPA on 18 January 2021 in response to a request made by EPA on 18 December 2020.	D
R3.3	The request may require a report which includes any or all of the following information: a) the cause, time and duration of the event; b) the type, volume and concentration of every pollutant discharged as a result of the event; c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event; d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort; e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants; f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and g) any other relevant matters.	Y	An R3 Written Report was provided by Hy-Tec to the EPA on 18 January 2021 in response to a request made by EPA on 18 December 2020.	D
<p>Yes = Complied with during 2020 No = Not complied with during 2020 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed</p>				



Table A2 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*
6. Reporting Conditions (Cont'd)				
R3 Written Report (Cont'd)				
R3.4	The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.	Noted	No feedback has been received by EPA in relation to the R3 written Report.	D
R4 Other reporting conditions				
Noise Monitoring Results				
R4.1	<p>a) The licensee must submit the results of any noise monitoring undertaken in accordance with the requirements of Condition M5.1 or Condition M5.2 to the EPA within three weeks of the noise monitoring being undertaken.</p> <p>b) The noise monitoring results submitted to the EPA must include:</p> <p>(i) a map of each noise monitoring location in relation to the noise source, including relevant distances;</p> <p>(ii) an analysis of the noise monitoring results;</p> <p>(iii) any detected exceedance of the noise limits specified in Condition L4.1;</p> <p>(iv) details of any remedial action taken or proposed to be taken in relation to any exceedance of the noise limits specified in Condition L4.1;</p> <p>(v) details of the prevailing meteorological conditions during the period when the noise monitoring was undertaken; and</p> <p>(vi) confirmation that noise monitoring was/was not undertaken in accordance with Condition M5.3.</p>	Yes	A copy of the Noise Monitoring Assessment is available on the Hy-Tec website and was provided to the EPA within the allocated timeframe. No exceedances were recorded during the reporting period.	D
Surface Water Management System reporting				
R4.2	In accordance with section 5.3 of the approved Water Management Plan for the premises, the licensee must notify the EPA when surface water triggers are exceeded and provide a written report to the EPA.	NYA	No surface water triggers were exceeded during the reporting period.	D
R4.3	<p>The report to the EPA must include:</p> <p>a) the results of surface water management system inspections required in condition M2.1 for the month related to the exceedance, including photographs; and</p> <p>b) appropriate mitigation and contingency measures to be implemented within one month of the exceedance being detected.</p>	NYA	No surface water triggers were exceeded during the reporting period.	D
<p>Yes = Complied with during 2020 No = Not complied with during 2020 ND = Not Determined</p> <p>NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance</p> <p>* = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit</p> <p align="center">Yes# / No# = Complied / not complied with and compliance no longer required to be assessed</p>				

Table A2 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 1 January 2020 to 31 December 2020

Page 11 of 11

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*
6. Reporting Conditions (Cont'd)				
R4 Other reporting conditions (Cont'd)				
R4.4	The report must be submitted to the EPA within one month of surface water triggers being detected and be directed to the Manager, Sydney Industry Section by email to metro.regulation@epa.nsw.gov.au	NYA	No surface water triggers were exceeded during the reporting period.	D
7. General Conditions				
G1 Copy of licence kept at the premises or plant				
G1.1	A copy of this licence must be kept at the premises to which the licence applies.	Yes	A copy of the licence is available at the Quarry.	D
G1.2	The licence must be produced to any authorised officer of the EPA who asks to see it.	Noted		
G1.3	The licence must be available for inspection by any employee or agent of the licensee working at the premises.	Noted		
Yes = Complied with during 2020 No = Not complied with during 2020 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed				



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Appendix 2

Return for Extractive Industries – June 2020

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Extractive Materials Return

2019-2020



Regional
NSW

Form S1 – Period Ending 30 June 2020

Quote RIMS ID in all correspondence

Quarry Id: Rims ID: 401060	Inquiries please telephone: (02) 4063 6713 Completed or Nil Returns Email – mineral.royalty@planning.nsw.gov.au Postal Address (see below)
Operators Name: Aus-10 Rhyolite T/A Hy-Tec Industries Address: PO Box 6770 Silverwater, NSW, 1811	Please amend name, postal address and location of mine or quarry if incorrect or incomplete.
Email: darryl.thiedeke@hy-tec.com.au Quarry Name: Tinda Creek Quarry Quarry Address: 6102 Putty Rd, Mellong, NSW, 2756	

The return should be completed and forwarded to **Senior Advisory Officer, RESOURCE ECONOMICS, RESOURCE PLANNING & PROJECTS, DEPARTMENT OF REGIONAL NSW, PO BOX 344 HUNTER REGION MAIL CENTRE NSW 2310** on or before **31 October 2020**. If completion of the return is unavoidably delayed, an application for extension of time should be requested **before** the due date. If no work was done during the year, a **NIL** return must be forwarded.

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

Director, Resource Planning & Projects

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

Typical Geology: Friable Sandstone / Lacustrine

Nearest Town to Quarry: Wilberforce

Local Council Name: Hawkesbury Shire Council

Deposited Plan and Lot Number/s of Quarry: Lots 1 to 3 DP628806

Email Address of Operator: As above

Name of Owner or Licensee: As above

Postal Address of Licensee: As above

Licence/Lease Number/s (if any)

From Mining, Exploration & Geoscience (NSW Mineral Resources): N/A

From Crown Lands or other NSW Department: N/A

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

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

- SIGNATURE of PROPRIETOR or MANAGER  DATE 28.10.2020
- CONTACT PERSON for this return: Darryl Thiedeke
- NAME (Block letters) DARRYL THIEDEKE Telephone 02 96472866

Extractive Materials Return

2019-2020



Regional
NSW

Form S1 – Period Ending 30 June 2020

Sales During 2019-2020

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

Product	Description	Quantity Tonnes
Virgin Materials		
Crushed Coarse Aggregates		
Over 75mm		0
Over 30mm to 75mm		0
5mm to 30mm		0
Under 5mm		0
Natural Sand	Washed fine sand	45,400
Manufactured Sand		0
Prepared Road Base & Sub Base		0
Other Unprocessed Materials		0
Recycled Materials		
Crushed Coarse Aggregates		
Over 75mm		0
Over 30mm to 75mm		0
5mm to 30mm		0
Under 5mm		0
Natural Sand		0
Manufactured Sand		0
Prepared Road Base & Sub Base		0
Other Unprocessed Materials		0
River Gravel		
Over 30mm		0
5mm to 30mm		0
Under 5mm		0
Construction Sand	Excluding Industrial	
Industrial Sand		
Foundry, Moulding		0
Glass		0
Other (Specify)		0
Dimension Stone	Building, Ornamental, Monumental	
Quarried in Blocks		0
Quarried in Slabs		0
Decorative Aggregate	Including Terrazzo	0
Loam	Soil for Topdressing, Garden soil, Horticultural purposes)	0
TOTAL SITE PRODUCTION		45,400
Gross Value (\$) of all Sales		\$1.21M
Type of Material	Washed sand - Friable Sandstone / Lacustrine	
Number of Full-Time Equivalent (FTE) Employees	Employees 6	Contractors 0

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

Appendix 3

Noise Monitoring Report

Prepared by Muller Acoustic
Consulting Pty Ltd

(Total No. of pages including blank pages = 24)



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Noise Monitoring Assessment

Tinda Creek Quarry
Tinda Creek, NSW

April 2020



Document Information

Noise Monitoring Assessment

Tinda Creek Quarry, Tinda Creek, NSW

April 2020

Prepared for: RW Corkery & Co Pty Ltd

Level 1, 12 Dangar Road

Brooklyn NSW 2083

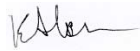

Prepared by: Muller Acoustic Consulting Pty Ltd

PO Box 262, Newcastle NSW 2300

ABN: 36 602 225 132

P: +61 2 4920 1833

www.mulleracoustic.com

Document ID	Status	Date	Prepared By	Signed	Reviewed By	Signed
MAC180647RP3	Final	1 May 2020	Kristian Allen		Oliver Muller	

DISCLAIMER

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CONTENTS

1 INTRODUCTION5

2 NOISE CRITERIA7

 2.1 ATTENDED NOISE COMPLIANCE7

3 METHODOLOGY9

 3.1 LOCALITY9

 3.2 NOISE MONITORING LOCATIONS9

 3.3 ASSESSMENT METHODOLOGY 10

 3.4 OPERATIONAL LOG 10

4 RESULTS 13

 4.1 MORNING SHOULDER RESULTS 13

 4.2 DAY ASSESSMENT RESULTS 14

5 NOISE COMPLIANCE ASSESSMENT 15

 5.1 ATTENDED NOISE MEASUREMENT COMPLIANCE ASSESSMENT 15

 5.2 CALCULATED DPE ASSESSMENT METHODOLOGY 15

6 CONCLUSION 17

APPENDIX A – GLOSSARY OF TERMS

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by RW Corkery & Co Pty Limited (RWC) on behalf of Hy-Tec Industries Pty Ltd (Hy-Tec) to complete a Noise Monitoring Assessment (NMA) for the Tinda Creek Quarry, Tinda Creek, NSW (the 'project').

The monitoring has been conducted in accordance with the approved Tinda Creek Quarry Noise Management Plan and in general accordance with Conditions L3.1 and M5 of EPL#12007 (EPL).

The assessment was conducted in accordance with the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- Environment Protection Licence EPL#12007;
- Umwelt Pty Ltd, Tinda Creek Quarry Noise Management Plan (NMP); and
- Australian Standard AS 1055:2018 - Acoustics - Description and measurement of environmental noise.

The assessment was undertaken on Thursday 16 April 2020 and forms part of the noise monitoring program to address conditions of EPL#12007, and the Noise Management Plan.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

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2 Noise Criteria

2.1 Attended Noise Compliance

Section L3.1 of the Tinda Creek EPL, approved on 3 March 2017, outlines the applicable noise criteria for all privately owned residential receivers surrounding the project. The operating criteria specified in the EPL at all receivers is 35dB LAeq(15min) for all periods and 45dB LAmax during the night time period. **Table 1** presents the criteria for privately owned residential receivers surrounding the project, as outlined in the EPL.

Table 1 Noise Criteria		
Receiver	All Hours	Night (10pm to 7am)
	dB(A) LAeq(15min)	dB(A) LAmax
All privately owned residences	35	45

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3 Methodology

3.1 Locality

The project is located on Putty Road, Tinda Creek, NSW approximately 67km north of Windsor, NSW. Receivers in the locality surrounding the project are primarily rural/residential. Putty Road is situated to the west of the site with the Yengo National park bordering the site in all other directions.

3.2 Noise Monitoring Locations

Section M5.1 of the EPL specifies that noise monitoring is to be conducted for a minimum duration of one hour at the boundary of R1, (6255 Putty Road, Mellong) as detailed in Figure 6.1 of the Tinda Creek Noise Management Plan.

It should be noted that access to the property was not possible during the time of the noise measurements. Therefore, attended measurements were conducted at the boundary gate (NM1) of the property, as shown in **Figure 1**.

Following a request from the Department of Environment and Planning (DPE) on 20 January 2017, two additional near-field monitoring locations were selected to quantify project noise levels and limiting noise influence from Putty Road. The locations include a position adjacent to the dam and a second location adjacent to the main plant. The noise levels monitored at these locations were used to quantify the overall sound power of the onsite operations, which was then used to calculate the noise contribution at surrounding noise sensitive receivers (ie R2 and R3).

The three monitoring locations, their MGA 56 coordinates and duration of measurement period are outlined in **Table 2** and are presented visually in the locality plan shown in **Figure 1**.

Table 2 Receiver Locations					
Receiver ID	Receiver Location	MGA56 Coordinates		Duration	Periods Monitored
R1	6255 Putty Road	284801	6329055	1 Hour	Morning Shoulder, Day
Q1	Dam Plant	286026	6328048	15 mins	Morning Shoulder, Day
Q2	Main Plant	285987	6327885	15 mins	Morning Shoulder, Day

3.3 Assessment Methodology

All noise surveys were conducted in general accordance with the procedures described in Australian Standard AS 1055:2018, "Acoustics - Description and Measurement of Environmental Noise" and the EPL. The acoustic instrumentation used carries current NATA calibration and complies with AS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed $\pm 0.5\text{dBA}$.

Attended noise measurements were carried out using a Svantek Type 1, 971 noise analyser on Thursday 16 April 2020. Four noise measurements of 15 minutes in duration were conducted at NM1 (R1) monitoring location during the day and morning shoulder monitoring periods. Where possible, throughout each survey, the operator quantified the contribution of each significant noise source.

Additionally, unattended noise monitoring was conducted at nearfield locations for a period of one hour during the day and morning shoulder monitoring periods to quantify the noise emissions from the quarry. These measurements were carried out using Svantek Type 1, 977 and Svantek Type 1, 958 noise analysers.




3.4 Operational Log

Transportation activities commenced at 5:30am and work shifts including operation of processing equipment commenced at 7am on the day of the survey. Morning shoulder measurements were conducted from 6am to 7am to capture the onsite loading and transportation operations. Daytime operations commenced at approximately 7am with the daytime monitoring conducted from 7:30am to 8:30am.

FIGURE 1
LOCALITY PLAN
REF: MAC180647



KEY

-  RECEIVER LOCATION
-  NOISE MONITORING LOCATION
-  PROJECT BOUNDARY



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4 Results

4.1 Morning Shoulder Results

Four attended noise measurements of 15-minutes in duration were completed during the morning shoulder assessment period at NM1 on Thursday 16 April 2020. **Table 3** presents the monitored noise level contributions and observed meteorological conditions for each measurement.

Table 3 Operator-Attended Noise Survey Results – Morning Shoulder Period, Location NM1

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
16/04/2020	06:00	63	43	28	WD: NE WS: 0.5m/s Rain: Nil	Traffic 30-63 Birds 25-54 Wind 22-35 Site Hum/Site Vehicles <25
16/04/2020	06:15	64	42	28	WD: NE WS: 0.5m/s Rain: Nil	Traffic 30-64 Birds 26-59 Wind 23-36 Site Hum/Site Vehicles <25
16/04/2020	06:30	66	48	34	WD: NE WS: 1.0m/s Rain: Nil	Traffic 30-66 Birds 28-50 Wind 28-41 Site Hum/Site Vehicles <25
16/04/2020	06:45	73	52	34	WD: NE WS: 1.0m/s Rain: Nil	Traffic 30-73 Birds 27-53 Wind 27-41 Site Hum/Site Vehicles <25
Tinda Creek Quarry L _{Aeq} (15min) Contribution						<30

Unattended noise monitoring was completed during the morning shoulder assessment period at Q1 and Q2 on Thursday 16 April 2020. **Table 4** presents the monitored 15-minute noise levels, observed on-site activities (from audio recordings) and meteorological conditions at the time of measurements.

Table 4 Unattended Noise Survey Results – Morning Shoulder Period, Location Q1 and Q2

Location	Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Onsite Activities
			L _{Amax}	L _{Aeq}	L _{A90}		
Q1	16/04/2020	06:30	88	53	44	WD: NE WS: 0.5-1.0m/s	Vehicle Loading 35-88
Q2	16/04/2020	06:25	53	42	41	Rain: Nil	

4.2 Day Assessment Results

Four attended noise measurements of 15-minutes in duration were completed during the daytime assessment period at NM1 on Thursday 16 April 2020. **Table 5** presents the monitored noise level contributions and observed meteorological conditions for each measurement.

Table 5 Operator-Attended Noise Survey Results – Day Period, Location NM1

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
16/04/2020	07:30	72	49	29	WD: NE WS: 1.0m/s Rain: Nil	Traffic 30-72 Birds 23-57 Wind 23-37 Site Hum/Site Vehicles <25
16/04/2020	07:45	74	50	31	WD: NE WS: 0.5m/s Rain: Nil	Traffic 30-74 Birds 24-53 Wind 23-39 Site Hum/Site Vehicles <25
16/04/2020	08:00	72	48	30	WD: NE WS: 0.5m/s Rain: Nil	Traffic 30-72 Birds 24-55 Wind 24-42 Site Hum/Site Vehicles <25
16/04/2020	08:15	71	47	30	WD: N WS: 1.0m/s Rain: Nil	Traffic 30-71 Birds 24-56 Wind 24-44 Site Hum/Site Vehicles <25
Tinda Creek Quarry L _{Aeq} (15min) Contribution						<30

Unattended noise monitoring was completed during the daytime assessment period at Q1 and Q2 on Thursday 16 April 2020. **Table 6** presents the monitored 15-minute noise levels, observed on-site activities (from audio recordings) and meteorological conditions at the time of measurements.

Table 6 Unattended Noise Survey Results – Day Period, Location Q1 and Q2

Location	Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
			L _{Amax}	L _{Aeq}	L _{A90}		
Q1	16/04/2020	8:00	72	66	61	WD: NE WS: 0.5-1.0m/s	Sand Processing Vehicle Loading
Q2	16/04/2020	8:10	77	63	57	Rain: Nil	Generator 54-77

5 Noise Compliance Assessment

5.1 Attended Noise Measurement Compliance Assessment

The compliance assessment summary results for R1 are presented in **Table 7** for day and morning shoulder assessment periods and compares project contributions against relevant criteria.

Table 7 Day and Morning Shoulder Noise Compliance Assessment

Period	Quarry Noise Contribution	Quarrying Noise Criteria	Compliant
	dB LAeq(15min)	dB LAeq(15min)	
Day	<30	35	✓
Morning Shoulder	<30	35	✓

5.2 Calculated DPE Assessment Methodology

From the noise measurements at monitoring location Q1 and Q2 the LAeq(15min) sound power of the quarry was calculated to be 107dBA. The contribution at each of the receivers R1 to R3 has been calculated taking into account loss due to distance and topography. This noise level was propagated to the surrounding noise sensitive receivers, with the calculated received noise level presented in **Table 8**. Results of the calculations generally align with the measured noise contributions from the project and therefore validate compliance.

Table 8 Calculated DPE Compliance Assessment

Receiver	Quarry Sound Power dB	Distance to Receiver m	Distance attenuation dB	Attenuation due to Topography dB	Calculated Quarry Contribution dB LAeq(15min)
R1	107	2050	74	12	21
R2	107	2210	75	12	20
R3	107	2030	74	12	21

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6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment for RW Corkery & Co Pty Limited on behalf of Hy-Tec Industries Pty Ltd for the Tinda Creek Quarry, Tinda Creek, NSW. The assessment was completed to assess the quarry's compliance with the relevant criteria outlined in EPL#12007 for the nominated residential receiver surrounding the quarry.

Operator attended noise monitoring was undertaken on Thursday 16 April 2020 at the nominated monitoring locations with quarry noise contributions compared against the relevant criteria.

The assessment has identified that noise emissions generated by Tinda Creek Quarry comply with relevant noise criteria specified in EPL#12007 at the assessed receiver location for both the morning shoulder and daytime monitoring periods.

Furthermore, the calculated noise contribution at two nearfield reference locations demonstrate that project noise contributions satisfy relevant criteria at R1, R2 and R3.

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Appendix A – Glossary of Terms

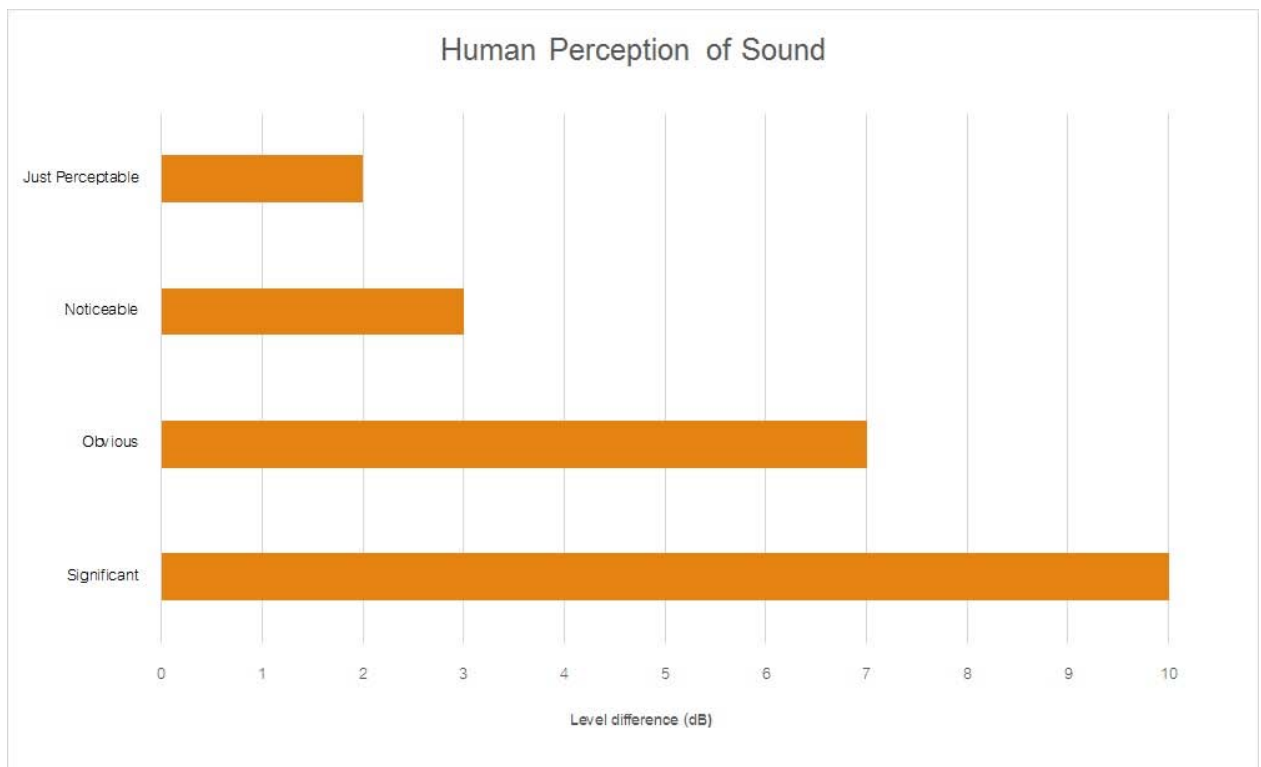
Table A1 provides a number of technical terms have been used in this report.

Table A1 Glossary of Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured LA90 statistical noise levels.
Ambient Noise	The noise associated with a given environment. Typically a composite of sounds from many sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Linear or decibels Z-weighted.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.
LA90	Commonly referred to as the background noise, this is the level exceeded 90 % of the time.
LAeq	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period.
LAm _{ax}	The maximum root mean squared (rms) sound pressure level received at the microphone during a measuring interval.
RBL	The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
Sound power level (LW)	This is a measure of the total power radiated by a source. The sound power of a source is a fundamental location of the source and is independent of the surrounding environment. Or a measure of the energy emitted from a source as sound and is given by: $= 10 \cdot \log_{10} (W/W_0)$ <p>Where: W is the sound power in watts and W₀ is the sound reference power at 10-12 watts.</p>

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA	
Source	Typical Sound Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound



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Appendix 4

Offset Vegetation, Revegetation and Koala Monitoring Report 2020

Prepared by EnviroKey Pty Ltd

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Offset vegetation, revegetation and Koala monitoring report 2020

Tinda Creek Quarry



**A report prepared for R.W. Corkery and Co. Pty Ltd on
behalf of Hy-Tec Concrete and Aggregates (Hy-Tec)**

MARCH 2021

Report No. 21.EM-004

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Draft	08.01.2021	SS, MH	LS	Steve Sass (CEnvP)

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Front Cover Image

Taken by Steven John Sass, Principal Ecologist, EnviroKey, CASA Remote Piloted Aircraft Operator Accreditation ARN 1097112

Table of Contents

1	INTRODUCTION	1
1.1	BACKGROUND	1
1.2	THE PROJECT	1
1.3	PURPOSE AND OBJECTIVES.....	1
2	METHODOLOGY	5
2.1	QUALIFICATIONS AND EXPERIENCE OF PERSONNEL	5
2.2	VEGETATION MONITORING.....	5
2.3	LOCATION OF PLOTS.....	6
2.4	PHOTO REFERENCE POINTS.....	6
2.5	MONITORING OF GREVILLEA PARVIFLORA SUBSP. PARVIFLORA ABUNDANCE PLOTS	6
2.6	KOALA POPULATION MONITORING.....	8
2.7	LIMITATIONS.....	8
3	RESULTS.....	9
3.1	VEGETATION MONITORING RESULTS	9
3.1.1	Species diversity and richness.....	9
3.1.2	Occurrence and abundance of weeds	11
3.1.3	Threatened species and habitat.....	12
3.1.4	Composition, structure and function.....	13
3.1.5	Overstorey species composition in relation to Koala habitat.....	15
3.2	KOALA SURVEYS	15
3.2.1	Koala distribution and abundance.....	15
4	DISCUSSION	19
4.1	VEGETATION MONITORING.....	19
4.2	VEGETATION COMPOSITION, STRUCTURE AND FUNCTION	19
4.3	WEEDS.....	19
4.4	KOALA MONITORING.....	20
4.5	LANDSCAPE MANAGEMENT PERFORMANCE CRITERIA.....	22
5	RECOMMENDATIONS	24
5.1	MONITORING PROGRAM	24
5.2	SPECIFIC ACTIONS IN THE REHABILITATION AREA	25
5.3	SPECIFIC ACTIONS IN THE BIODIVERSITY OFFSET AREA.....	25

6	CONCLUSION	27
7	REFERENCES	28
8	APPENDICES	I
	APPENDIX 1 – QUALIFICATIONS AND EXPERIENCE OF PERSONNEL.....	II
	APPENDIX 2 – VEGETATION MONITORING RESULTS	I
	APPENDIX 3 – PHOTO POINT MONITORING	XV

Figures, Maps & Tables

Table 1:	6-point modified Braun-Blanquette cover-abundance score used in this study. ...	5
Table 2:	Average species richness per vegetation community in 2019 and 2020, for the three subplots examining: ground cover (4 m ²), shrubs (100 m ²) and all species (400 m ²)	9
Table 3:	Results from 2020 Grevillea parviflora plot monitoring including 2019 results for general comparison	12
Table 4:	BBAM structure, function and condition data from the 20x50m plot-transects (2020). (The overstorey regeneration value of 1 means that all overstorey species are regenerating, as assessed over the wider vegetation zone, not just with in the 20x50m plot).....	14
Table 5:	Landscape Management Performance Criteria	22
Table 6:	Flora species and cover/abundance score, sites 1-9. (* = exotic species)	i
Table 7:	Flora species and cover/abundance score, sites 10-19. (* = exotic species).....	viii
Map 1:	Regional location of the study area	3
Map 2:	Identification of the Study Area and Biodiversity Offset Area	4
Map 3:	Location of the BBAM Plots and Grevillea Plots.....	7
Map 4:	Threatened species recorded during the 2020 monitoring survey	18
Map 5:	Recommended weed monitoring and control locations.....	21
Figure 1:	Comparison of average species richness per vegetation community between years.	10
Figure 2:	The regeneration area has a heavy African Lovegrass infestation, increasing from 46% from 38% at the last monitoring survey.	11
Figure 3:	African Lovegrass is scattered along tracks within biodiversity offset area, including at this junction in the west of the site.....	11
Figure 4:	Scratch trees and scats are evidence of Koala presence.	16
Figure 5:	Motion-activated image of Koala within the study area (Provided by Hy-Tec) ..	17

1 INTRODUCTION

1.1 BACKGROUND

EnviroKey were engaged by R. W. Corkery and Co. Pty Ltd (RWC) on behalf of Hy-Tec Concrete and Aggregates (Hy-Tec), to carry out the third year of annual vegetation and Koala monitoring as part of the monitoring conditioned in the Tinda Creek Quarry Landscape Management Plan (LMP) (Umwelt, 2016).

Tinda Creek is a sand quarry located 23 kilometres north of Colo Heights in the Hawkesbury City local government area (LGA). The quarry is situated between Wollemi National Park (NPWS, 2001) to the west and Yengo National Park to the east (NPWS, 2019). The regional location is identified within **Map 1**.

The first monitoring survey was undertaken by Niche Environment and Heritage (Niche) in December, 2018 (Niche, 2019). Methodology used by Niche to undertake Koala and vegetation monitoring was based on the monitoring framework provided in the LMP, with the objective of long-term conservation and enhancement of ecological values of the project area and offset areas. The outcomes of that monitoring is used as a baseline against which the monitoring results of the current surveys are compared. The second year monitoring survey was carried out by EnviroKey which confirmed that the BOA and Rehabilitation Area is largely achieving the conservation objectives outlined in the LMP (EnviroKey, 2020).

1.2 THE PROJECT

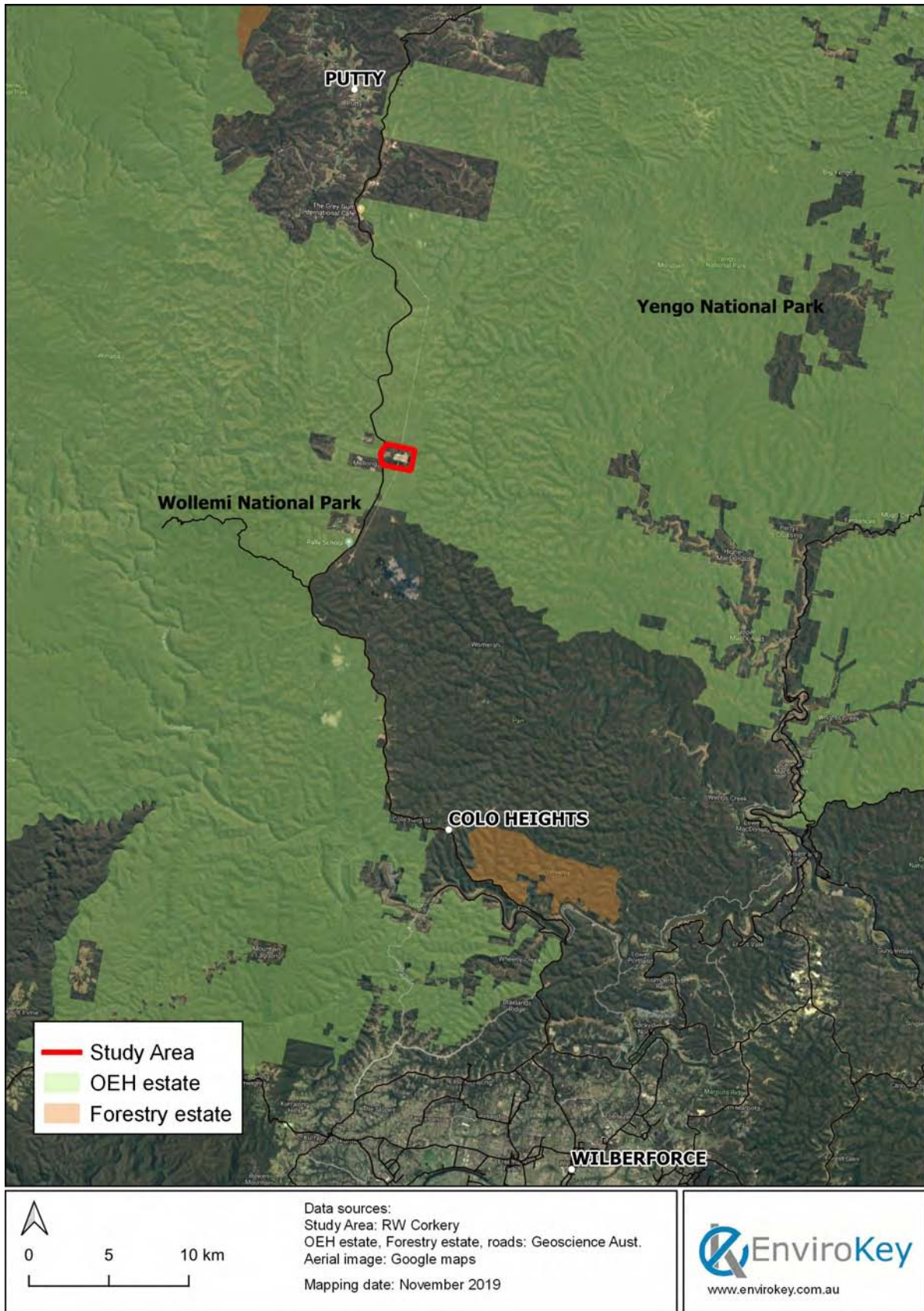
The Tinda Creek Quarry is currently a 300,000 tpa sand resource, approved for extraction from five domains. Throughout the project planning process, Hy-Tec have sought to avoid and minimise potential impacts on the ecological values of the project area which has included the avoidance and minimisation of disturbance to key vegetation communities, fauna habitats and threatened flora locations. About 108 hectares of adjacent land has been set aside for offsetting of the proposed disturbance area and will be managed for conservation in perpetuity with likely transfer into Yengo National Park. This is now referred to as the BOA. The study area, which includes the BOA is show on **Map 2**.

1.3 PURPOSE AND OBJECTIVES

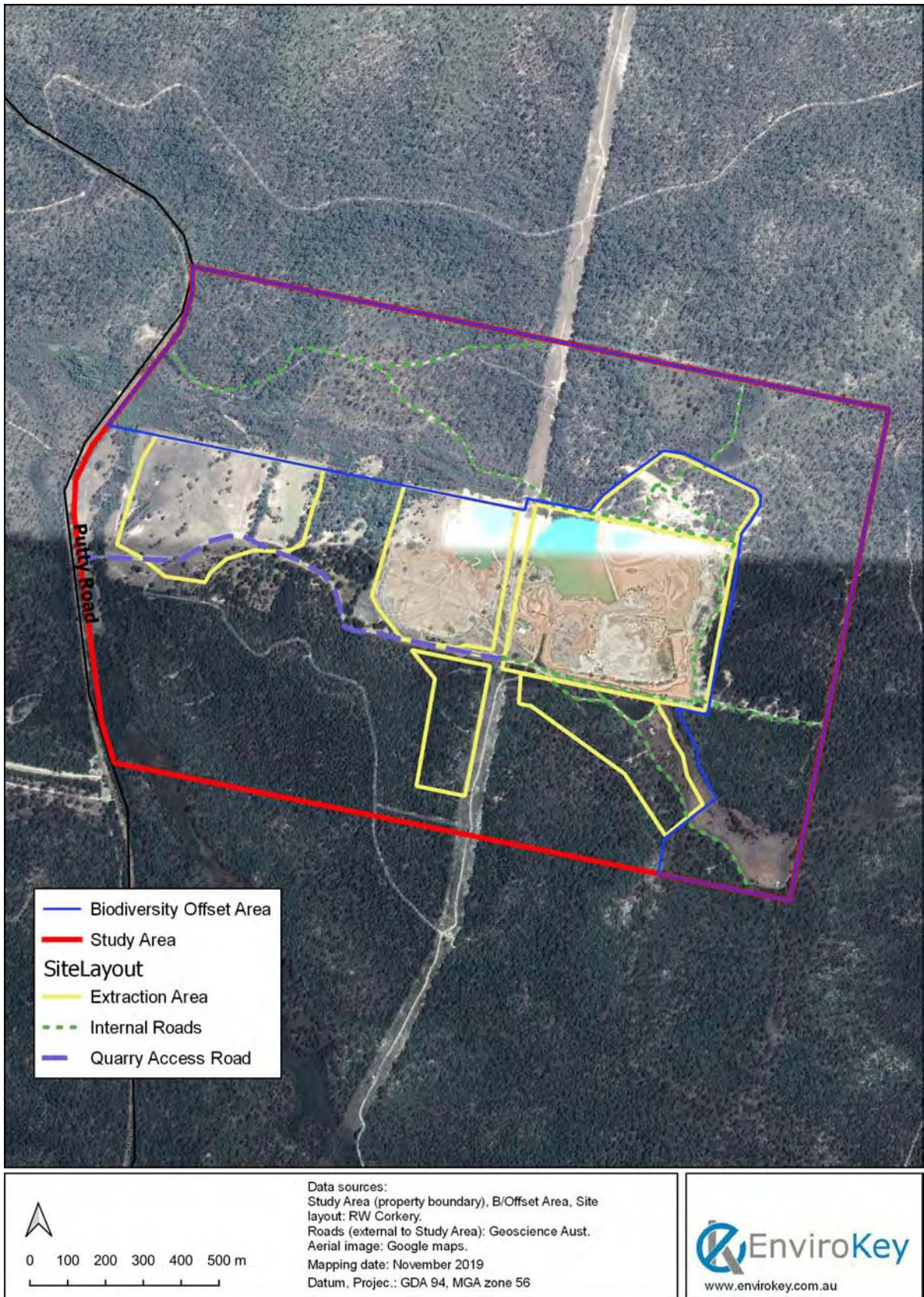
The LMP identifies the Tinda Creek Quarry project area as containing the following key ecological values:

- High conservation native vegetation communities and fauna habitats
- The presence of groundwater dependent ecosystems
- Threatened species habitat, including core habitat for the Koala (as described in the (now repealed) SEPP 44).

This monitoring report aims to demonstrate compliance with performance targets and will contribute to on-going general management for the progressive rehabilitation of the quarry pit and ongoing management of the BOA.



Map 1: Regional location of the study area



Map 2: Identification of the Study Area and Biodiversity Offset Area

2 METHODOLOGY

2.1 QUALIFICATIONS AND EXPERIENCE OF PERSONNEL

This report was prepared by suitably qualified and experienced personnel under the authority of a Scientific License (SL100110) issued under Clause 22 of the *National Parks and Wildlife Regulation 2002* and section 122C of the *National Parks and Wildlife Act 1974* by the NSW OEH and an Animal Research Authority (09/2596) approved by, and in accordance with, the Animal Care and Ethics Committee (ACEC) of the Director-General of Industry and Investment NSW. Steve Sass is an Accredited Assessor under the NSW *Biodiversity Conservation Act 2016* (BAAS17047).

Details of the qualifications and experience of these personnel are provided (**Appendix 1**).

2.2 VEGETATION MONITORING

The monitoring design and methodology follows the methods specified in the LMP (Umwelt, 2016). Field sampling was conducted between 7-9 December 2020 by Principal Ecologist Steve Sass, Senior Ecologist Linda Sass, Senior Botanist Mark Harris, and Assistant Ecologist Alexandra Metcalfe.

All 18 of the vegetation monitoring plots, established during the initial 2018 monitoring survey, were attempted to be resampled in accordance with the methods described in Section 2.1 of the 2018 monitoring report (Niche, 2019). However, the Gospers Mountain Wildfire of 2019 made finding many of the plots impossible as timber marker pegs had disappeared (presumably burnt). However, in summary, these plots comprised the 50x20m plot-transect 'Biometric' method as used in the BioBanking Assessment Methodology (BBAM) (OEH, 2014), with a number of extra parameters also recorded (see Section 2.1. of Niche, 2019).

The 6-point modified Braun-Blanquette cover-abundance score assigned to all species found in the 20mx20m survey plots is identified within **Table 1**.

Table 1: 6-point modified Braun-Blanquette cover-abundance score used in this study.

Score	Cover-abundance
1	Rare, few individuals present (three or less) and cover <5%
2	Common and cover <5%
3	Very abundant and cover nearing 5% OR Cover from 5% to <25%
4	Cover 25% to <50%
5	Cover 50% to <75%
6	Cover 75% or more

2.3 LOCATION OF PLOTS

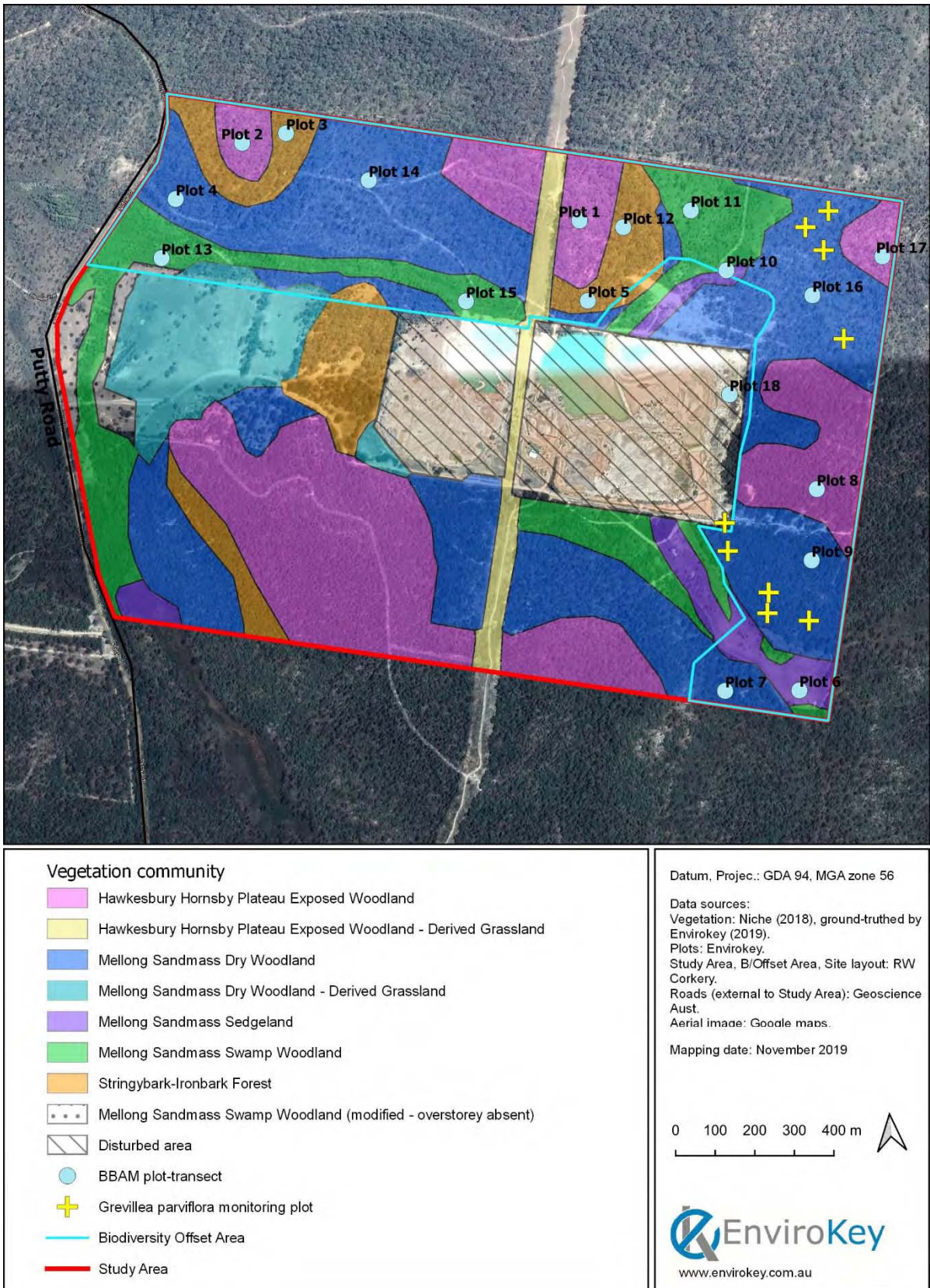
All previously surveyed plot locations (18 plots) had been permanently marked and mapped and the number of plots stratified based on the quantified vegetation type across the Biodiversity Offset Area and the Rehabilitation Area (Niche, 2019). **Map 3** identifies the plot locations within the study area, while the GPS coordinates of each plot can be found in Appendix 1 of Niche (2019). However, the Gospers Mountain Wildfire of 2019 made finding some of the plots impossible to locate as timber marker pegs had disappeared (presumably burnt). The survey team relied on GPS points, which have an accuracy of around 5 metres. This makes direct comparison with previous years data impossible as we are uncertain if sampling was in the same exact location. Photo points could not be relied upon to assist in this process given the dramatic change to vegetation since the Gospers Mountain Wildlife.

2.4 PHOTO REFERENCE POINTS

At the beginning of each transect (southern end for most) a photo reference was taken to allow for visualisation for the changes in vegetation and habitat type over time. The images taken presented in the 2018 field survey report also helped identify the exact plot orientation (Niche, 2019). Photo reference points from the 2019 monitoring survey are presented in **Appendix 3**.

2.5 MONITORING OF GREVILLEA PARVIFLORA SUBSP. PARVIFLORA ABUNDANCE PLOTS

All nine of the 10mx10m *Grevillea parviflora* subsp. *parviflora* monitoring plots, established during the initial 2018 monitoring survey, were resampled, but noting they are unlikely to be in the exact same location as previous year/s, as no information was available to ascertain exactly where each plot occurred in relation to the previously installed single peg at each site. Additionally, photo points could not be relied upon to assist in this process given the dramatic change to vegetation since the Gospers Mountain Wildlife. Therefore, this year's data cannot be compared directly to 2018 or 2019 data. Grevillea plots are identified on **Map 3**.



Map 3: Location of the BBAM Plots and Grevillea Plots.

2.6 KOALA POPULATION MONITORING

Koala (listed as Vulnerable under the BC Act and EPBC Act) has been historically recorded in the Tinda Creek region and during the 2018 monitoring survey (Niche, 2019). Koala monitoring followed the methodology established by Niche (2019).

Every mature eucalyptus tree within each of the assumed vegetation plots was carefully inspected by ecologists familiar with Koala signs. These inspections included scat searches across the entirety of the plot and observing for scratches on the trees. The tree canopy was also thoroughly searched for Koala individuals.

Additionally, motion-activated camera images from monitoring by Local Land Services (LLS) as part of their Wild Dog Monitoring, was also reviewed for evidence of Koala occupation.

2.7 LIMITATIONS

By far the most significant change to the vegetation communities within the study area was the Gospers Mountain Wildfire of 2019. This occurred after the Year 2 monitoring in 2019. Vegetation has changed significantly within the plot areas, and across the study area, with all existing plots burnt during that Wildfire. Additionally, the wildfire also resulted in the permanent monitoring plot marker pegs originally installed at Year 1, to be lost as they were timber pegs. The end result of this is that the exact location of virtually all plots could not be accurately determined as the GPS locations are only accurate to about 5 metres, and that photo points could not be relied upon due to significant changes in the appearance of vegetation.

Many species of fauna are highly mobile, so false absences plague short-term monitoring surveys. This is a major limitation of any ecological study.

3 RESULTS

3.1 VEGETATION MONITORING RESULTS

3.1.1 *Species diversity and richness*

The current survey found a total of 149 flora species during the plot-transect surveys, comprising 144 native and 6 exotic species (**Appendix 2**). As shown in **Table 2** and **Figure 1**, below, this slight increase since the last survey can be attributed to an increase in the number of groundcover species this year (graph C). This increase was slightly offset by a small drop in shrub species richness.

Table 2: Average species richness per vegetation community in 2019 and 2020, for the three subplots examining: ground cover (4 m²), shrubs (100 m²) and all species (400 m²)

Vegetation Community	400m ² (all species)		100m ² (Shrubs)		4m ² (Groundcovers)	
	2019	2020	2019	2020	2019	2020
Hawkesbury Hornsby Plateau Exposed Woodland	30.5	32.0	4.0	1.8	5.3	12.0
Mellong Sandmass Dry Woodland	30.4	29.6	5.0	3.4	8.2	8.8
Mellong Sandmass Sedgeland	12.5	12.0	0.5	1.5	3.5	5.0
Mellong Sandmass Swamp Woodland	21.0	21.3	3.7	3.7	4.3	4.0
Stringybark – Ironbark Forest	23.7	31.0	3.7	2.3	4.7	6.7
Regenerating Mellong Sandmass Woodland	27.0	18.0	4.0	4.0	4.0	1.0

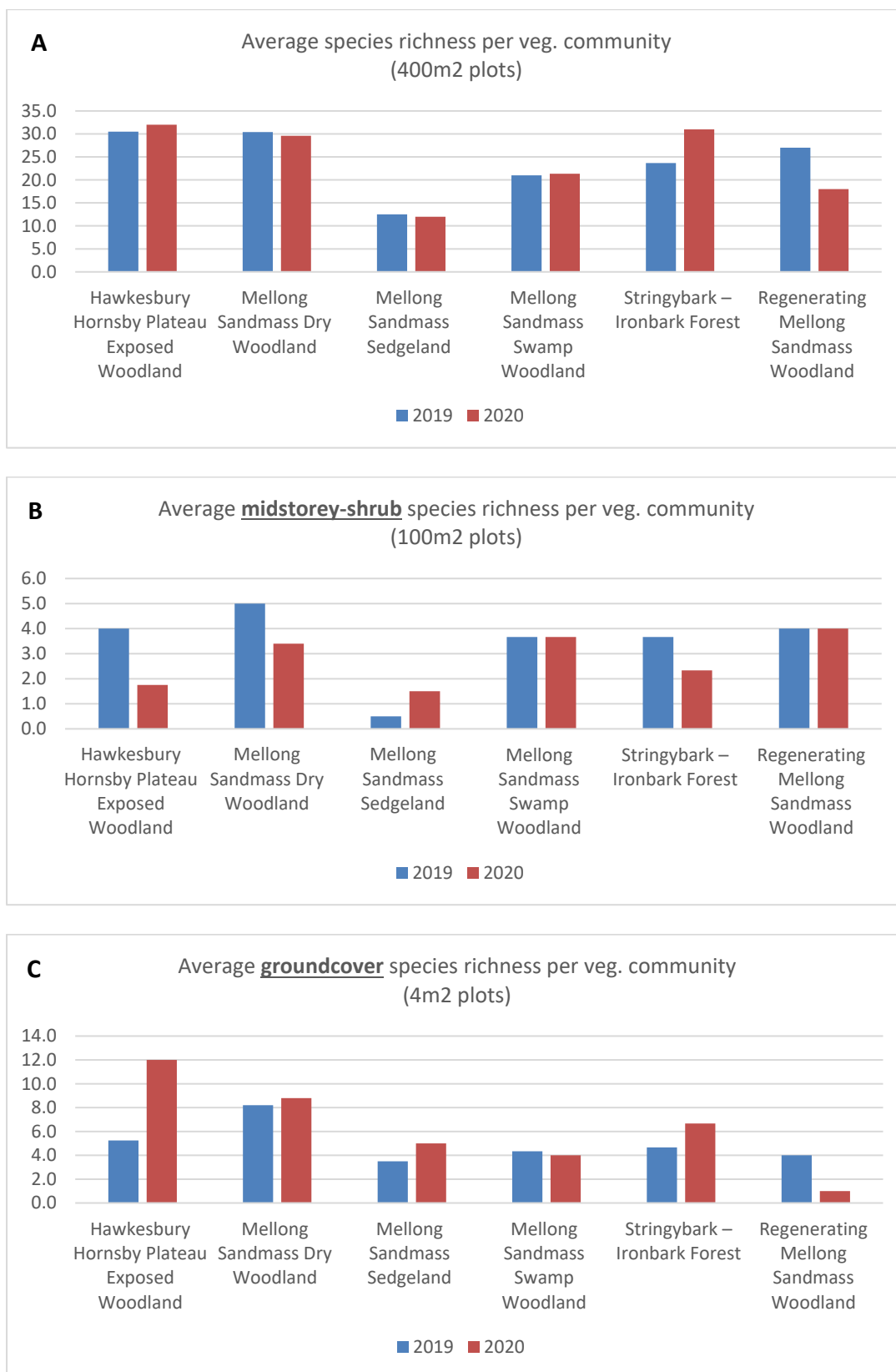


Figure 1: Comparison of average species richness per vegetation community between years.

3.1.2 Occurrence and abundance of weeds

Weed occurrence and abundance appears to be similar to that described in the 2019 monitoring report with the exception of the regeneration area where weed cover has increased from 38% to 46%. The regeneration area is infested with *Eragrostis curvula* (African Lovegrass) along with other less prominent weeds such as *Andropogon virginicus* (Whisky Grass) and *Stenotaphrum secundatum* (Buffalo Grass) (site shown in **Figure 2**).

Within the biodiversity offset area, minor areas of concern are scattered along the vehicular tracks, the electricity easement and other small areas previously subject to disturbance (**Map 5**). A similar pattern occurs around the fringes of the offset area (e.g. the works site, front paddock and Putty Road), where weeds encroach into bushland for up to 1 or 2 metres in intermittent locations (**Map 5** and site photos below in **Figure 1**).



Figure 2: The regeneration area has a heavy African Lovegrass infestation, increasing from 38% to 46% from the last monitoring survey.



Figure 3: African Lovegrass is scattered along tracks within biodiversity offset area, including at this junction in the west of the site

Other weeds found in the offset area (and the works site), all in low to moderate abundance were similar to previous surveys. These were *Hypochaeris radicata* (Catsear), *Andropogon virginicus* (Whisky Grass) and *Conyza bonariensis* (Flaxleaf Fleabane).

3.1.3 Threatened species and habitat

Grevillea parviflora subsp. *parviflora* was recorded at Plot 16, as it was in 2018 and 2019. Random meanders in the wider vicinity found this species to be growing across a similar distribution to that previously mapped. No assessments of density/abundance were made in the random meanders, however counts within the permanent monitoring plots showed no plants were in flower or fruit (last survey roughly 40% were in flower). The great majority of all plants were considered to be juveniles, based on their small stature and that most of the site had been burnt since the last survey in 2019.

The widespread presence of the species during the current survey confirms that it can regenerate readily following fire (this was also confirmed last survey base on the presence of remnant fire scars at that time).

Despite inherent inaccuracies in *Grevillea parviflora* monitoring plot boundary locations (and difficulty in separating resprouting/clonal plants from new seedlings), the results of the survey plot counts are sufficient to provide general indication of population condition. A total of 80 plants were recorded within the nine plots this survey. While this is less than the previous year (125 plants recorded), this result is not surprising given widespread fire likely to have killed some of the plants. Nevertheless, the current result indicates that the local population continues to proliferate.

Table 3: Results from 2020 *Grevillea parviflora* plot monitoring including 2019 results for general comparison

Site	2019 Count	2020 Count	2019 No. in flower	2020 No. in flower	2019 No. in fruit	2020 No. in fruit
1	38	0	15	0	0	0
2	7	0	4	0	0	0
3	25	18	5	0	0	0
4	1	10	0	0	0	0
5	19	35	9	0	0	0
6	35	16	11	0	0	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	1	0	0	0	0
Total	125	80	44	0	0	0

No new records of *Grevillea parviflora* subsp. *parviflora* were noted outside of its known distribution in the study area during the current monitoring survey. No other threatened flora species were recorded during the monitoring surveys.

Four threatened fauna species were also detected within the study area during the 2020 monitoring surveys. These being:

- Koala (vulnerable, BC Act and EPBC Act)
- Rosenberg's Goanna (vulnerable, BC Act)
- Dusky Woodswallow (vulnerable, BC Act)
- Little Lorikeet (vulnerable, BC Act)

The locations of these are provided on **Map 4**.

3.1.4 **Composition, structure and function**

The BBAM provides a transparent, and rapid method for determining the composition, structure and function of native vegetation. **Table 4** provides the results of the 2020 monitoring surveys for each plot.

Table 4: BBAM structure, function and condition data from the 20x50m plot-transects (2020). (The overstorey regeneration value of 1 means that all overstorey species are regenerating, as assessed over the wider vegetation zone, not just with in the 20x50m plot).

Plot No.	Vegetation community	Native Plant Species	Native Overstorey Species Cover	Native Midstorey Species Cover	Native ground cover grasses	Native ground cover shrubs	Native ground cover other	Exotic Plant Cover	Number trees with hollows	Overstorey Regen.	Fallen Logs (m)
1	Hawkesbury Exposed Woodland	31	39	6	12	2	16	0	0	1	11
2	Hawkesbury Exposed Woodland	32	20	3	16	20	16	0	0	1	37
3	Stringybark Ironbark	31	45	4	60	14	22	0	0	1	18
4	Dry Woodland	34	20	5	70	2	6	0	1	1	22
5	Stringybark Ironbark	29	25	10	12	2	32	0	1	1	15
6	Sedge swamp	13	0	0	0	12	66	0	0	1	0
7	Dry Woodland	30	17	9	10	36	34	0	2	1	28
8	Hawkesbury Exposed Woodland	39	8	2	12	18	28	0	2	1	45
9	Dry Woodland	28	6	4	2	11	14	0	0	1	48
10	Sedge Swamp	12	0	0	0	2	64	0	0	1	0
11	Swamp Woodland	30	7	10	2	54	60	0	3	1	0
12	Stringybark Ironbark	36	41	7	66	0	40	0	0	1	52
13	Swamp Woodland	17	10	8	0	42	24	0	0	1	0
14	Dry Woodland	31	12	8	26	26	34	0	2	1	2
15	Swamp Woodland	17	12	2	2	2	72	0	0	1	1
16	Dry Woodland	25	12	4	10	26	38	0	0	1	12
17	Hawkesbury Exposed Woodland	29	48	10	16	6	26	0	1	1	52
18	Revegetation site	18	0	2	0	24	0	46	0	1	0

3.1.5 *Overstorey species composition in relation to Koala habitat*

Overstorey species composition within the 50 m x 20 m plots was unable to be compared with previous Koala survey data given that the exact plot locations were unable to be located (due to the plot pegs being destroyed by the 2019 Gospers Mountain Wildfire). Given this significant natural disturbance that had occurred across the study area, it is assumed that significant impacts to Koala habitat occurred. Regardless, the study area contains three preferred feed tree species for the Koala, *Eucalyptus punctata* (Grey Gum), *E. sclerophylla* (Scribbly Gum) and *E. parramattensis* (Parramatta Red Gum). During the current survey, signs of Koala (scats or tree scratches) were found in six of the 17 offset area vegetation plots, namely plots 1, 3, 4, 5, 8, and 13. The 2018 monitoring survey found signs of Koala in plots 11 and 13, while the 2019 monitoring survey found signs in plots 1, 4, 7 and 11.

3.2 KOALA SURVEYS

3.2.1 *Koala distribution and abundance*

Koala signs was detected during the 2020 monitoring survey. While no individual Koala were recorded, Koala scats and signs were detected. This was also the same method of detectability in the 2018 and 2019 monitoring survey.

As suggested in the 2018 monitoring by Niche (2019), potential scats and scratch trees are consistent but not definitive evidence of Koala presence. Scratch trees were recorded at a number of sites. The age and density of scratches was also noted as being either a high, moderate or low use tree. An abundance of Possum and Lace Monitor could be responsible for many of the marks left on the trees, however in some instances, both scats and scratch marks consistent with Koala make their presence considerably likely (**Figure 4**). During the current survey, signs of Koala (scats or tree scratches) were found in six of the 17 offset area vegetation plots, namely plots 1, 3, 4, 5, 8, and 13. The 2018 monitoring survey found signs of Koala in plots 11 and 13, while the 2019 monitoring survey found signs in plots 1, 4, 7 and 11.

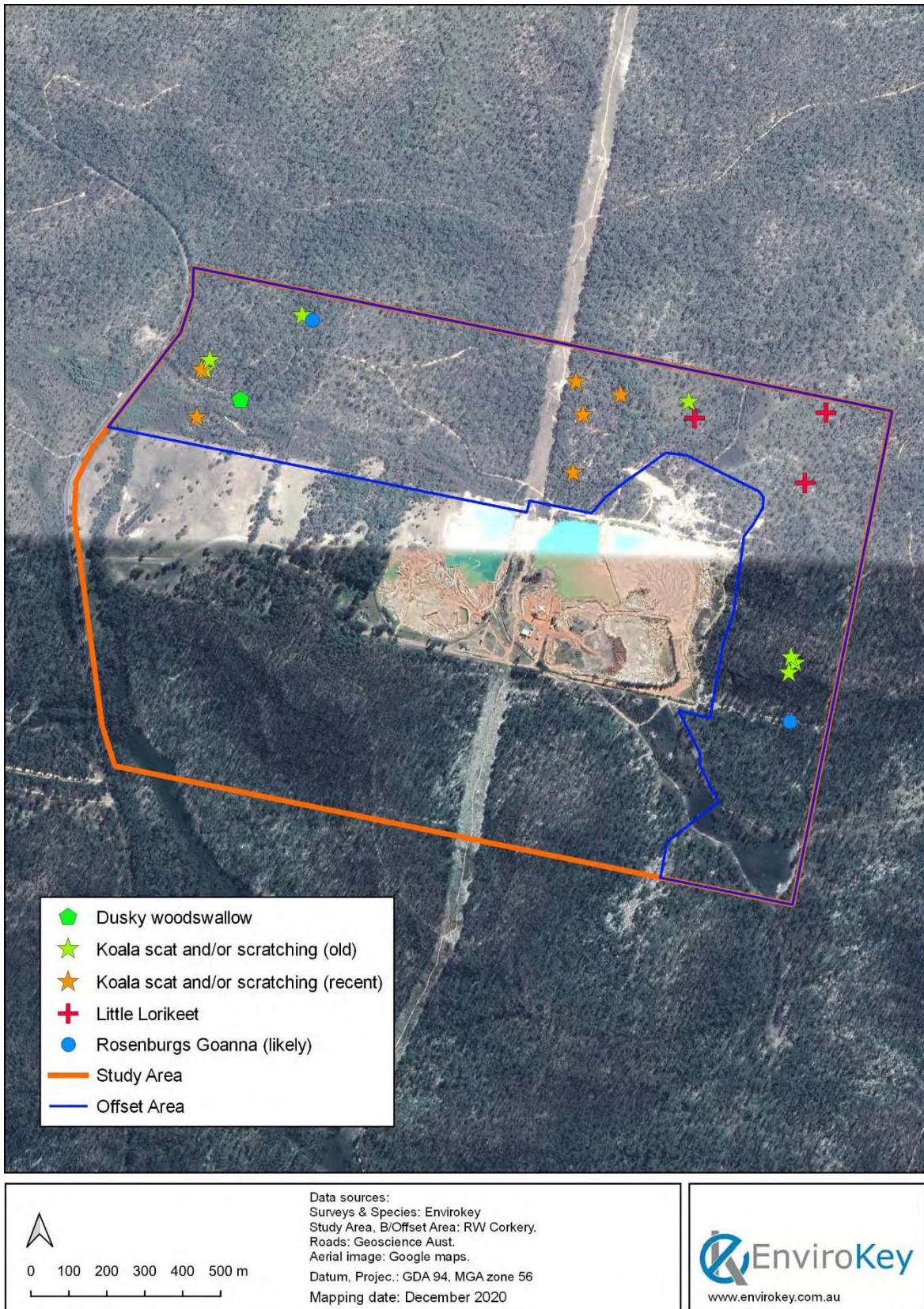
However, what is definitive is an image from a motion-activated camera showing a Koala within the study area provided by Hy-Tec (**Figure 5**).



Figure 4: Scratch trees and scats are evidence of Koala presence.



Figure 5: Motion-activated image of Koala within the study area (Provided by Hy-Tec)



Map 4: Threatened species recorded during the 2020 monitoring survey

4 DISCUSSION

4.1 VEGETATION MONITORING

The results of the 2020 monitoring survey are broadly comparable to the 2018 monitoring survey. However, the current survey produced a slight increase in plant species richness compared to 2019, along with the recording of a number of species not recorded on site previously. These results coincide with both the breaking of extended drought, enabling a number of sensitive herbs to germinate and/or the occurrence of wildfire across the study area, which has fostered fire-ephemeral species.

4.2 VEGETATION COMPOSITION, STRUCTURE AND FUNCTION

At the time of the current field surveys (December 2020), the study area had been subjected to significant disturbance as a direct result of the Gaspers Mountain Wildfire. Of note is the current condition of the Site 18 (within the rehabilitation area) compared to the others that are generally in good condition. For example, Site 18, despite containing a similar number of native species to many of the offset area sites, has no overstorey cover, no native grass cover, no fallen log habitat and has a dense cover of exotic species which has increased since the 2019 monitoring survey.

At the time of the 2020 monitoring survey, scattered weeds were present along most tracks. They were also scattered at the fringes of the extraction area, the cleared electricity easement, the cleared front paddock and to a lesser extent the Putty Road edge. Physical disturbance to native vegetation/habitat was a minor issue, with a few areas having been disturbed, e.g. where a vehicle may turn around near hydrology monitoring sites.

During monitoring of the threatened flora species *Grevillea parviflora*, it was noted that dense regrowth of dominant and fire-tolerant species such as *Angophora bakeri* and *Banksia* sp., was providing heavy competition to the *Grevillea* seedlings/resprouts.

4.3 WEEDS

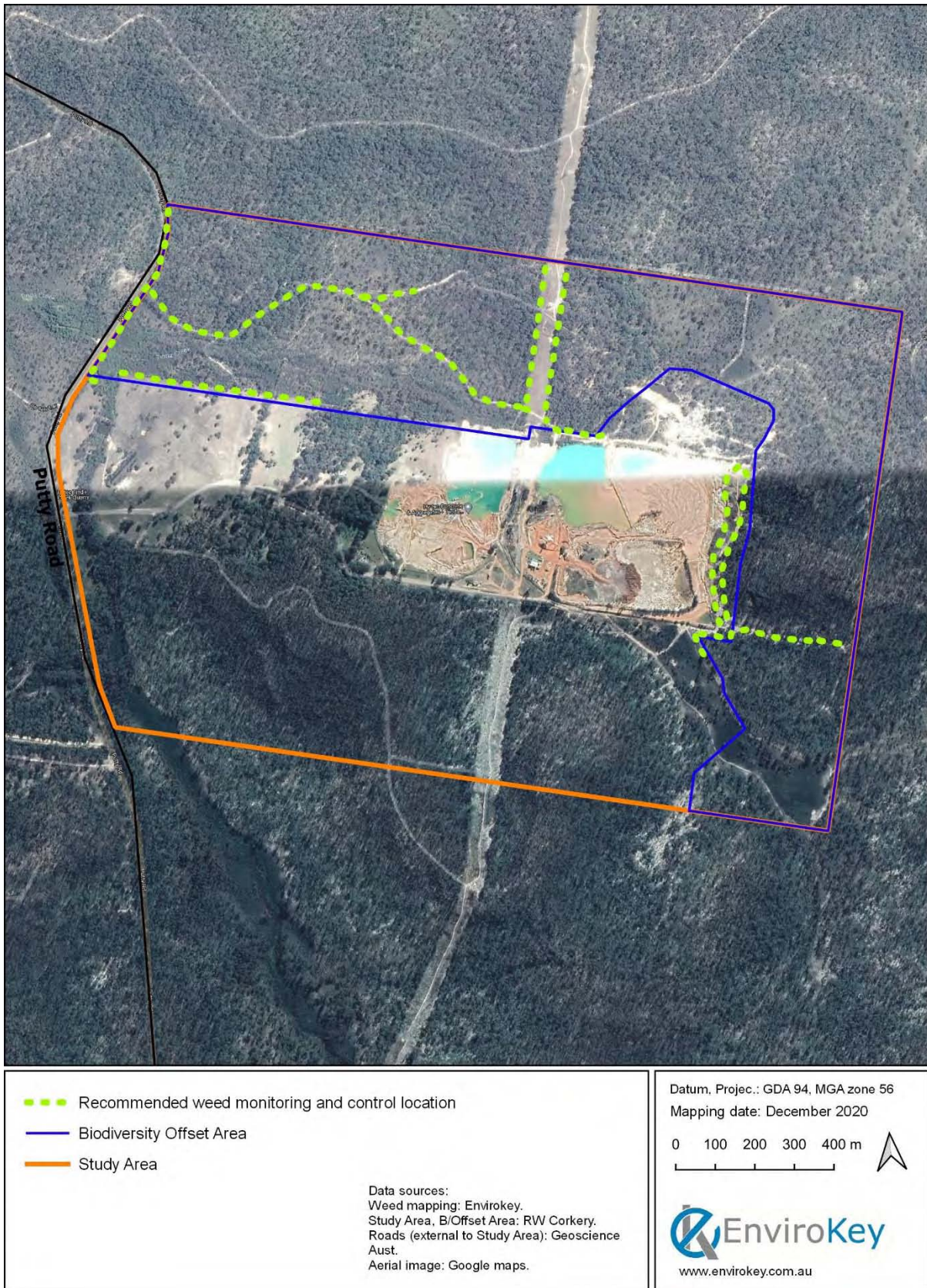
The transmission line that traverses the study area and the regeneration area, as well as Putty Road to a lesser extent, are likely to be source populations for weeds in the study area. With disturbances around the study area, weeds then become established. **Map 5** identifies the locations of key weed invasions into native vegetation and we recommend these are key monitoring and control locations.

As stated in the 2nd year monitoring report, there continues to be an opportunity to close irrelevant vehicle tracks with the biodiversity offset area, and allow them to naturally regenerate. Some weed species continue to be within the track itself, or within 1 metre of it. By allowing the vegetation to regenerate over the track, weed invasion into adjoining native vegetation would be greatly minimised.

4.4 KOALA MONITORING

The presence of a Koala population using the study area was confirmed during the 2019 monitoring surveys despite the Gospers Mountain Wildlife. While the November 2019 wild fire is likely to have had a significant negative impact on the Koala population given that they are typically in low numbers across Hawksbury sandstone geology, evidence of Koalas remain within the study area. As reported in the 2019 monitoring report, one individual Koala has been sighted by Tinda Quarry personnel within the site post-fire. No significant injuries including burns were noted on the individual. The animal was observed walking along the ground and continued to walk through the site and into the adjacent Yengo National Park.

Signs of habitat use by Koala increased from the 2019 monitoring survey. During the current survey, signs of Koala (scats or tree scratches) were found in six of the 17 offset area vegetation plots, namely plots 1, 3, 4, 5, 8, and 13. The 2018 monitoring survey found signs of Koala in plots 11 and 13, while the 2019 monitoring survey found signs in plots 1, 4, 7 and 11. The photographic capture of one Koala also confirms their continued presence in the study area despite the Gospers Mountain Wildfire and continued operations of the quarry.



Map 5: Recommended weed monitoring and control locations.

4.5 LANDSCAPE MANAGEMENT PERFORMANCE CRITERIA

The approved LMP contains a set of performance criteria for both the rehabilitation and the Biodiversity offset area. **Table 5** provides commentary of the matters reviewed during the monitoring survey and a response.

Table 5: Landscape Management Performance Criteria

Aspect	Performance Criteria	Comments
Rehabilitation Area		
Native vegetation	Revegetation area contains flora species characteristic of the native vegetation communities of the study area	The flora assemblage present during the 2020 monitoring survey contained some species that are characteristic of the Mellong Sand-mass vegetation communities. This would be considered to be an acceptable level of regeneration given the current dry conditions. However, post-wildfire, all vegetation was substantially burnt and now exotic flora are becoming well established. Control of African Lovegrass should be a priority.
	Second generation tree seedlings are present, or likely to be (ie, evidence of fruiting of native species observed)	Few tree species remain in the rehabilitation area as a direct result of the Gaspers Mountain Wildfire.
	More than 75 per cent of trees are healthy and growing (i.e. have achieved sustained growth and development) as indicated by Long Term Monitoring and reference to Analogue Sites 1 to 3.	The trees within the rehabilitation area were growing albeit slowly. However, all vegetation was substantially burnt during the November 2019 wildfire.
Weeds	There is no weed infestation in excess of that observed at analogue sites in extant native vegetation.	Weed species are present in both the regeneration and adjacent remnant areas. However, cover and abundance is substantially greater within the regeneration area, influenced mostly by African Lovegrass (which is likely to have had a negative influence on native species and has increased in cover since the 2019 monitoring survey). Weed control will be required as the African Lovegrass density will negatively affect native plant species germination and growth post-fire.
Pest Species	There is no increase in evidence of pest species at the time of the inspection above baseline conditions	Pest species including deer, feral cat and wild dogs are present within the study area, as they occur throughout Wollemi and Yengo National Parks directly adjacent to the study area. Control within the study area will be all but impossible given that these species will continue to move from the national park into unoccupied habitat within the study area.

Aspect	Performance Criteria	Comments
Biodiversity Offset Area		
Vegetation communities and Fauna habitat	No adverse affect of quarrying on vegetation community/fauna habitat extent or condition	There is no obvious adverse effects of quarrying on the vegetation communities of the Biodiversity offset area. The entire study area and indeed locality, was significantly impacted by the Gospers Mountain Wildfire. Extensive regenerating is occurring post-fire since significant rain events.
	Persistence of threatened species and their habitat within the biodiversity offset area	A number of threatened species occur within the biodiversity offset area, including a population of <i>Grevillea parviflora</i> . A reduction in the Grevillea population was noted as a direct result of the Gospers Mountain Wildfire. A slight increase in Koala evidence was collected above the 2019 monitoring survey. The November 2019 wildfire had burnt all known individuals of the Grevillea population. 12 months post-fire, some regeneration was observed in the Grevillea parviflora and a Koala population remains.
Weeds	There is no weed infestation greater than 25m ² in area	No. Weeds occur along some of the access tracks within the Biodiversity offset area, but their extent is not considered significant. Native flora species dominate the offset area.
	There are no Weeds of National Significance in the Biodiversity Offset Area	No weed species recorded are listed as 'Weeds of National Significance'.
Pest Species	No significant populations of pest fauna species are present	Pest animal species including foxes, feral cats, deer, goats and pigs are known from within or near the study area. The adjacent national parks are likely to provide habitat over large areas. No pest species was recorded in high abundance. The presence of pest species in the Biodiversity offset areas is not likely to have been influenced (positively or negatively) by the presence at Quarry operations.

5 RECOMMENDATIONS

Based on the results of our field survey, **EnviroKey** make the following recommendations with regard to the rehabilitation, the monitoring program and the offset area.

5.1 MONITORING PROGRAM

EnviroKey recommends a review of the monitoring program. The monitoring program in its current form provides no real benefit to monitoring the effects of the quarry operations on the BOA as those operations are excluded from that area. The key points we wish to make include:

1. There are a substantial number of BBAM plots in the BOA, all of which take considerable effort to monitor, with no real value in the data being collected given that the quarry operates outside of the BOA, so it is unlikely that impacts would occur there.

We recommend the removal of most BBAM plots. We recommend an adaptive approach by reassigning a smaller number of plots to be within future domains and within the Regeneration Area. These plots should be established to determine the success (or failure) of the Regeneration Area. Monitoring in the BOA should mainly be done as an reference site for comparison with the Regeneration Area.

2. Monitoring Koala is problematic given their relatively low abundance in the landscape and in some instances, they are highly mobile. Monitoring over three years indicates no impact (positive or negative) to koala from Quarry operations. The BOA was found to be significantly altered by the Gospers Mountain Wildfire yet threatened species including Koala were still detected. Further, any changes to the vegetation within the BOA were not the result of quarry operations. Further, the use of threatened fauna species as surrogates to determine vegetation or habitat changes is unreliable given the above factors and their absence during monitoring does not indicate their permanent absence from the study area or as a result of quarry operations.

We recommend that Koala Monitoring cease given the intense nature of the November 2019 wildfire and the resulting severe reduction in native vegetation within the study area including the BOA. Threatened species remain within the study area post-fire.

3. Ecological monitoring over three consecutive years indicates that Quarry operations have not impacted the presence or condition of the population of *Grevillea parviflora* subsp. *parviflora*. It is clear that the Gospers Mountain Wildfire has had some impact on the population of *Grevillea parviflora* subsp. *parviflora*. However, the extent of the population remains unchanged and it is generally accepted that this species requires wildfire as part of its normal ecological function. Although it will be important to monitor future operational impacts, especially once extraction reaches Domain 7, continued monitoring of all 9 *Grevillea* plots is unjustified given that all occur within the BOA.

We recommend that monitoring of the *Grevillea parviflora* subsp. *parviflora* population be reduced to a small number of plots within the south-east corner closest to Domain 7 (G1-5).

5.2 SPECIFIC ACTIONS IN THE REHABILITATION AREA

EnviroKey recommend the following actions be undertaken in the rehabilitation area:

1. The rehabilitation area is dominated by the exotic plant, African Lovegrass. The cover of this species has substantially increased since the 2019 monitoring survey and recommendations made in that report appear not to have been implemented.
2. Weed control should occur on a three-monthly basis for at least 12 months. This should target the priority weed African Lovegrass given the extensive cover of this species within the area.
3. Direct tree (and shrub) seeding: The current survey found parts of the rehabilitation area were devoid of eucalypts (which includes the genera *Angophora* and *Corymbia*, not just *Eucalyptus*) which was also the case prior to the Gospers Mountain Wildfire. While they would normally be expected to regenerate naturally over the longer term, the heavy cover of African Lovegrass may hinder this. Therefore, the planting of eucalypt seedlings is recommended to increase species diversity and compete with weeds for light, water and other resources (including the creation of leaf litter/soil conditions unfavourable to the exotic grasses). The previous and current monitoring found that some native shrubs have regenerated naturally however, this has been hindered by the wildfire.

Seeds should be sourced from the native tree and shrub seed bank indicated in the 2018 monitoring report. If this is not available, they should be sourced from local provenance only.

5.3 SPECIFIC ACTIONS IN THE BIODIVERSITY OFFSET AREA

EnviroKey recommend the following actions be undertaken in the Biodiversity Offset Area:

1. Minimise driving and physical disturbance (e.g. grading, slashing) on and adjacent to the access tracks and within the electricity easement to curb the spread of weed seed. It is recommended to close surplus tracks for them to naturally regenerate should they not be required for monitoring plots (as per section 5.1).
2. Do not use slashing as a weed control method, as it can cause weeds to proliferate. Given the sparse cover of weeds along the tracks, it is recommended to spot spray weed on foot and by hand only, to minimise weed seed being spread by vehicles and avoid herbicide overspray killing native plants nearby. It is important that adjacent native plants remain alive to maintain competition against weeds.
3. Monitor weeds visually at least every three months and spray as necessary to prevent seed-set. Always assess the efficacy of the control method over time (e.g. if native

plants are inadvertently killed and weed cover is not decreasing, cease weed control and reassess methods).

4. Given that the study area was subject to an intense wild fire in November 2019, no recommendations are made with regard to fire management.

6 CONCLUSION

This report details the results of the third year of monitoring at the Tinda Creek Quarry. The data contained within demonstrates that the management of the BOA and Rehabilitation Area is largely achieving the conservation objectives outlined in the LMP.

Overall, the BOA remains secure despite the significant impacts of the 2019 Gospers Mountain Wildfire. The Rehabilitation Area was also significantly altered by the Wildfire and of concern is the ongoing presence of the priority weed African Lovegrass in the Rehabilitation Area that has increased in cover from 38 to 46% since the 2019 monitoring survey. The quarry operations do not appear to be having an adverse impact on the Biodiversity Offset Area.

EnviroKey recommend a review of the monitoring program. The monitoring program in its current form provides little value to monitor potential impacts of the quarry given that there are no quarry operations within the BOA. Monitoring should be redirected to the Rehabilitation Area and future Domains. It is clear that the Gospers Mountain Wildfire has had some impact on the population of *Grevillea parviflora subsp. parviflora*. However, the extent of the population remains unchanged and given that it generally conceded that this species requires wildfire as part of its normal ecological function, continued monitoring of all 9 Grevillea plots is unjustified given that all occur within the BOA. The presence of a Koala population using the study area was confirmed during the 2019 monitoring surveys despite the Gospers Mountain Wildlife. While the wildfire is likely to have had a significant negative impact on the Koala population given that they are typically in low numbers across Hawksbury sandstone geology, the 2020 monitoring survey confirmed that Koalas remain within the study area.



Mr. Steve Sass

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Certified Environmental Practitioner, Environment Institute of Australia & New Zealand

Practicing Member, Ecological Consultants Association of NSW

7 REFERENCES

- ENVIROKEY 2020. Tinda Creek Quarry Offset vegetation, revegetation and Koala monitoring report 2019. *A report prepared for RW Corkery & Co Pty Ltd on behalf of Hy-Tec Concrete and Aggregates.*
- NICHE 2019. Tinda Creek Quarry Offset vegetation, revegetation and Koala monitoring report 2018. *A report prepared for RW Corkery & Co Pty Ltd on behalf of Hy-Tec Concrete and Aggregates (Hy-Tec).*
- NPWS 2001. WOLLEMI NATIONAL PARK PLAN OF MANAGEMENT.
- NPWS 2019. YENGO NATIONAL PARK, PARR STATE CONSERVATION AREA AND FINCHLEY ABORIGINAL AREA PLAN OF MANAGEMENT
- OEH 2014. Biobanking Assessment Methodology (version 2). *NSW Office of Environment & Heritage.*
- UMWELT 2016. Tinda Creek Quarry Landscape Management Plan. *A report prepared by Umwelt for Aus-10 Ryloite Pty Ltd.*

8 APPENDICES

APPENDIX 1 – QUALIFICATIONS AND EXPERIENCE OF PERSONNEL

Name and Qualifications	Experience
<p>Steve Sass B.App.Sci (Env.Sci) (Hons), GradCert.CaptVertMngt (CSU)</p> <p>Director / Principal Ecologist</p> <p>NSW Biodiversity Accredited Assessor (BAAS17047) Certified Environmental Practitioner, EIANZ Member, Ecological Consultants Association of NSW</p>	<p>Steve is a highly experienced Ecologist having undertaken hundreds of terrestrial and aquatic ecological surveys and assessments across Australia since 1992. He has an in-depth working knowledge of environmental and biodiversity legislation across all states and territories which allows him to provide detailed and accurate assessments and formulate practical solutions to clients and specific projects on a case-by-case basis. He is a current NSW Biodiversity Accredited Assessor (BAAS17047) by the DPIE. Steve is a past Councillor of the Ecological Consultants Association of NSW. Steve was appointed 'Expert' status for a number of threatened fauna species listed under the <i>Biodiversity Conservation Act 2016</i>.</p> <p>Previous and current research holds Steve in high regard within both the scientific and ecological consultants' community. To date, Steve has published, submitted or has in preparation, thirty-six manuscripts within scientific journals, many of which are related to threatened species survey, monitoring or management.</p> <p>Steve has extensive experience in NSW. Over the past 16 years, he has completed or provided specialist biodiversity advice to more than 1,300 environmental assessments for projects such as residential and industrial developments, highway upgrades and telecommunications, water, sewerage, energy, mining and electricity network infrastructure projects.</p> <p>For this study, Steve was the Project Manager, primary author of this report, and led the field surveys, including the Koala surveys.</p>
<p>Linda Sass Assoc.Deg.Gen.Stu (Science), B.A, Dip.Ed</p> <p>Director / Senior Ecologist</p>	<p>Linda is an experienced ecologist having carried out hundreds of flora and fauna surveys across NSW for the past 12 years. Her recent projects include a Species Impact Statement for the Potato Point Fire Buffer Construction within Eurobodalla National Park as well as a number of highway upgrades in the Blue Mountains and Central Tablelands.</p> <p>For this project, Linda carried out the field surveys for the plot data.</p>
<p>Mark Harris Senior Botanist/Specialist GIS</p>	<p>Mark is a highly experienced Botanist having undertaken flora surveys across eastern and central Australia. He has more than 12 years' experience in Biodiversity Assessment and Planning which includes the Sydney Basin. Mark has extensive experience with the flora and vegetation communities of the region confirmed by his two-year tenure with the State-wide Native Vegetation Mapping Project. This includes the 3-year landscape monitoring of the Liverpool Military Area (c. 25,000 hectares).</p> <p>For this project, Mark assisted with the floristic plot surveys and prepared the maps for this report.</p>
<p>Alex Metcalfe Field Assistant (Ecology)</p>	<p>Alex has worked as a field assistant with the NSW National Parks and Wildlife Service in Kosciuszko National Park for the past three years. Here, she was mainly involved with weed monitoring and threatened species surveys. In her short time at EnviroKey, Alex works under the direct supervision of the Principal Ecologist and Senior Ecologist, and provides</p>

Name and Qualifications	Experience
	<p>valuable field assistance to the ecology team. Her most recent projects include the Downies Bridge MWREF, Batemans Bay Bridge Marine Offset Project and a BDAR for the Howlong Sand and Gravel Quarry Expansion.</p> <p>For this project, Alex assisted with the plot surveys as well as Koala surveys.</p>

APPENDIX 2 – VEGETATION MONITORING RESULTS

Table 6: Flora species and cover/abundance score, sites 1-9. (* = exotic species)

Family	Species	Common Name	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9
Acanthaceae	<i>Brunoniella australis</i>	Blue Trumpet			1						
Adiantaceae	<i>Cheilanthes sieberi</i>	Rock Fern			2						
Anthericaceae	<i>Arthropodium milleflorum</i>	Pale Vanilla-lily	2		1	2				2	
Anthericaceae	<i>Thysanotus</i> sp.	A Fringe Lily	2							1	
Apiaceae	<i>Hydrocotyle laxiflora</i>	Stinking Pennywort			2	1				1	
Apiaceae	<i>Platysace ericoides</i>			2	2	2				2	
Apiaceae	<i>Xanthosia atkinsoniana</i>		1						2	1	2
Asteraceae	<i>Asteraceae</i> sp.	A daisy (forb)									
Asteraceae	<i>Conyza bonariensis</i> *	Flaxleaf Fleabane*				1					
Asteraceae	<i>Coronidium waddelliae</i>	Waddel Everlasting	1								
Asteraceae	<i>Euchiton sphaericus</i>	Cudweed				2					
Asteraceae	<i>Hypochaeris radicata</i> *	Flatweed*								1	
Asteraceae	<i>Lagenifera stipitata</i>	Blue Bottle-daisy			1		1			1	
Asteraceae	<i>Sigesbeckia orientalis</i> subsp. <i>Orientalis</i>	Indian Weed									
Bignoniaceae	<i>Pandorea pandorana</i>										
Campanulaceae	<i>Wahlenbergia gracilis</i>	Sprawling Bluebell				1					
Campanulaceae	<i>Wahlenbergia stricta</i>	Tall Bluebell		1		1	2				
Casuarinaceae	<i>Allocasuarina littoralis</i>	Black She-Oak									

Family	Species	Common Name	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9
Convolvulaceae	<i>Dichondra repens</i>	Kidney Weed			2						
Cyperaceae	<i>Carex inversa</i>	Knob Sedge			1						2
Cyperaceae	<i>Chorizandra cymbaria</i>							5			
Cyperaceae	<i>Cyathochaeta diandra</i>					3			3		2
Cyperaceae	<i>Lepidosperma laterale</i>	Variable Sword-sedge						2			
Cyperaceae	<i>Ptilothrix deusta</i>	A Sedge									
Cyperaceae	<i>Schoenus brevifolius</i>										
Dennstaedtiaceae	<i>Pteridium esculentum</i>	Bracken	2		2	2	2		2		3
Dilleniaceae	<i>Hibbertia obtusifolia</i>	Hoary Guinea Flower	2						2		
Dilleniaceae	<i>Hibbertia riparia</i>					1					
Dilleniaceae	<i>Hibbertia serpyllifolia</i>	Hairy Guinea Flower									
Ericaceae	<i>Brachyloma daphnoides</i>	Daphne Heath							2	2	3
Ericaceae	<i>Melichrus procumbens</i>	Jam Tarts							1	1	
Fabaceae (Faboideae)	<i>Bossiaea heterophylla</i>	Variable Bossiaea	1				2		2		3
Fabaceae (Faboideae)	<i>Bossiaea scolopendria</i>								1		1
Fabaceae (Faboideae)	<i>Daviesia genistifolia</i>	Broom Bitter Pea							2	2	
Fabaceae (Faboideae)	<i>Daviesia ulicifolia</i>	Gorse Bitter Pea					2				
Fabaceae (Faboideae)	<i>Dillwynia retorta</i>										
Fabaceae (Faboideae)	<i>Dillwynia sieberi</i>										
Fabaceae (Faboideae)	<i>Glycine clandestina</i>	Twining glycine			2	2					
Fabaceae (Faboideae)	<i>Glycine tabacina</i>	Variable glycine			2	2					
Fabaceae (Faboideae)	<i>Gompholobium grandiflorum</i>	Large Wedge Pea	1	1							
Fabaceae (Faboideae)	<i>Gompholobium minus</i>	Dwarf Wedge Pea	2								
Fabaceae (Faboideae)	<i>Hardenbergia violacea</i>	2 Sarsaparilla		2		2	2			2	

Family	Species	Common Name	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9
Fabaceae (Faboideae)	<i>Hovea linearis</i>									1	
Fabaceae (Faboideae)	<i>Mirbelia speciosa</i>	A Pea		1							
Fabaceae (Faboideae)	<i>Podolobium ilicifolium</i>	Prickly Shaggy Pea	2	3			2			2	
Fabaceae (Faboideae)	<i>Pultenaea divaricata</i>		2								
Fabaceae (Faboideae)	<i>Pultenaea scabra</i>		2	2		2					
Fabaceae (Mimosoideae)	<i>Acacia brownii</i>	Heath wattle									2
Fabaceae (Mimosoideae)	<i>Acacia parvipinnula</i>	Silver-stemmed Wattle			2	2				1	
Fabaceae (Mimosoideae)	<i>Acacia penninervis</i> var. <i>penninervis</i>	Mountain Hickory		1						1	
Fabaceae (Mimosoideae)	<i>Acacia terminalis</i>	Sunshine Wattle								1	
Fabaceae (Mimosoideae)	<i>Acacia ulicifolia</i>	Prickly Moses		1							
Gentianaceae	<i>Centaurium tenuiflorum</i> *	Branched Centaury*				1					
Geraniaceae	<i>Pelargonium inodorum</i>										
Goodeniaceae	<i>Cooperhooia barbata</i>	Purple Goodenia									
Goodeniaceae	<i>Dampiera stricta</i>								2		2
Goodeniaceae	<i>Goodenia heterophylla</i>		1	2						2	
Goodeniaceae	<i>Goodenia paniculata</i>							2			
Goodeniaceae	<i>Scaevola ramosissima</i>	Purple Fan-flower		1					2		2
Haemodoraceae	<i>Haemodorum planifolium</i>	Bloodroot					1		2	1	2
Haloragaceae	<i>Gonocarpus micranthus</i> subsp. <i>ramosissimus</i>							2			
Haloragaceae	<i>Gonocarpus tetragynus</i>	Poverty Raspwort				1					
Iridaceae	<i>Patersonia longifolia</i>	Purple-Flag									

Family	Species	Common Name	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9
Iridaceae	<i>Patersonia sericea</i>	Silky Purple-Flag					1		2		
Juncaceae	<i>Juncus</i> sp.	A Rush						1			
Lindsaeaceae	<i>Lindsaea linearis</i>	Screw Fern									2
Lobeliaceae	<i>Pratia purpurascens</i>	Whiteroot				1					
Lomandraceae	<i>Lomandra cylindrica</i>		1				2		2	2	
Lomandraceae	<i>Lomandra filiformis</i>	Wattle Matt-rush									
Lomandraceae	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>		1	1	1						
Lomandraceae	<i>Lomandra glauca</i>	Pale Mat-rush									2
Lomandraceae	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush	2	2	1	2	2			2	
Lomandraceae	<i>Lomandra obliqua</i>		3	2		2	3		2	2	
Menyanthaceae	<i>Liparophyllum exaltatum</i>							1			
Myrtaceae	<i>Angophora bakeri</i>	Narrow-leaved Apple				1			3		3
Myrtaceae	<i>Angophora costata</i>	Sydney Red Gum	3	2			2				
Myrtaceae	<i>Angophora floribunda</i>	Rough-barked Apple			3	2	3				
Myrtaceae	<i>Callistemon citrinus</i>	Crimson Bottlebrush						2			
Myrtaceae	<i>Callistemon linearis</i>	Narrow-leaved Bottlebrush									
Myrtaceae	<i>Corymbia eximia</i>	Yellow Bloodwood									
Myrtaceae	<i>Corymbia gummifera</i>	Red Bloodwood	3	1						2	
Myrtaceae	<i>Eucalyptus fibrosa</i>	Red Ironbark			1						
Myrtaceae	<i>Eucalyptus parramattensis</i> subsp. <i>parramattensis</i>	Parramatta Red Gum						1			1
Myrtaceae	<i>Eucalyptus piperita</i>	Sydney Peppermint	3				2				
Myrtaceae	<i>Eucalyptus punctata</i>	Grey Gum	2	2		1				1	
Myrtaceae	<i>Eucalyptus sclerophylla</i>	Hard-leaved Scribbly Gum				3			3		

Family	Species	Common Name	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9
Myrtaceae	<i>Eucalyptus sparsifolia</i>	Narrow-leaved Stringybark	2	3	4					1	
Myrtaceae	<i>Leptospermum juniperinum</i>	Prickly Tea-tree						1			
Myrtaceae	<i>Leptospermum polygalifolium</i>	Tantoon									
Myrtaceae	<i>Leptospermum trinervium</i>	Slender Tea-tree				2					3
Myrtaceae	<i>Melaleuca thymifolia</i>	Thyme Honey-myrtle									
Myrtaceae	<i>Micromyrtus ciliata</i>	Fringed Heath-myrtle							1		
Orchidaceae	<i>Caleana major</i>	Large Duck Orchid		1							
Orchidaceae	<i>Dipodium sp.</i>										
Oxalidaceae	<i>Oxalis perennans</i>	Oxalis			1						
Phormiaceae	<i>Dianella longifolia</i>	Blueberry Lily		2	1		1		3	2	
Phyllanthaceae	<i>Phyllanthus hirtellus</i>	Thyme Spurge					2			1	
Phyllanthaceae	<i>Poranthera microphylla</i>		2								
Phytolaccaceae	<i>Phytolacca octandra</i>	Inkweed			2						
Pittosporaceae	<i>Billardiera scandens</i>	Hairy Apple Berry			1						
Pittosporaceae	<i>Bursaria spinosa</i>	Native Blackthorn		1							
Plantaginaceae	<i>Veronica plebeia</i>	Trailing Speedwell			2						
Poaceae	<i>Anisopogon avenaceus</i>	Oat Speargrass									2
Poaceae	<i>Aristida ramosa</i>	Purple Wiregrass									
Poaceae	<i>Aristida vagans</i>	Threeawn Speargrass		2	1					2	
Poaceae	<i>Austrostipa pubescens</i>	A Speargrass							2	1	
Poaceae	<i>Dichelachne micrantha</i>	Shorthair Plumegrass					1				
Poaceae	<i>Digitaria sanguinalis</i>	Summer Grass				2					
Poaceae	<i>Echinopogon caespitosus</i>	Bushy Hedgehog Grass			2	2					
Poaceae	<i>Entolasia stricta</i>	Wiry Panic	2	2	3	2	3	2	1	2	2

Family	Species	Common Name	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9
Poaceae	<i>Eragrostis brownii</i>	Brown's Lovegrass									
Poaceae	<i>Eragrostis curvula</i> *	African Lovegrass*									
Poaceae	<i>Eragrostis leptostachya</i>	Paddock Lovegrass			2						
Poaceae	<i>Imperata cylindrica</i>	Blady Grass				2				2	2
Poaceae	<i>Microlaena stipoides</i>	Weeping Grass		2	4	2				2	
Poaceae	<i>Panicum simile</i>	Two-colour Panic				1					
Poaceae	<i>Poa sieberiana</i>	Snowgrass					1				
Poaceae	<i>Rytidosperma pallidum</i>	Redanther Wallaby Grass	3	2		2	3				
Poaceae	<i>Rytidosperma</i> sp.				1	2					
Poaceae	<i>Stenotaphrum secundatum</i> *	Buffalo Grass*									
Poaceae	<i>Themeda triandra</i>	Kangaroo Grass	2			2				2	
Proteaceae	<i>Banksia serrata</i>	Old-man Banksia							2		2
Proteaceae	<i>Banksia spinulosa</i>	Hairpin Banksia				2			2		1
Proteaceae	<i>Conospermum ericifolium</i>										
Proteaceae	<i>Conospermum longifolium</i> subsp. <i>mediale</i>										
Proteaceae	<i>Grevillea mucronulata</i>			1						3	
Proteaceae	<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Small-flower Grevillea									
Proteaceae	<i>Hakea dactyloides</i>	Finger Hakea				1	1		2		2
Proteaceae	<i>Isopogon anemonifolius</i>	Broad-leaf Drumsticks							2		2
Proteaceae	<i>Lomatia silaifolia</i>	Crinkle Bush	2				2		2		2
Proteaceae	<i>Persoonia levis</i>	Broad-leaved Geebung		1						1	2
Proteaceae	<i>Persoonia linearis</i>	Narrow-leaved Geebung	3	1	1	2	2		2		2
Proteaceae	<i>Persoonia oblongata</i>								1		

Family	Species	Common Name	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9
Proteaceae	<i>Xylomelum pyriforme</i>	Woody Pear	2								
Ranunculaceae	<i>Clematis aristata</i>	Old Man's Beard									
Restionaceae	<i>Leptocarpus tenax</i>							2			
Restionaceae	<i>Lepyrodia scariosa</i>							2			
Rubiaceae	<i>Galium gaudichaudii</i>										
Rubiaceae	<i>Opercularia diphylla</i>	Stinkweed					1			2	
Rubiaceae	<i>Pomax umbellata</i>	Pomax		3			2			3	2
Santalaceae	<i>Exocarpos strictus</i>	Dwarf Cherry					1				2
Schizaeaceae	<i>Schizaea bifida</i>	Forked Comb Fern									
Solanaceae	<i>Solanum prinophyllum</i>	Forest Nightshade			2					2	
Solanaceae	<i>Solanum nigrum*</i>	Blackberry nightshade*			1						
Stylidiaceae	<i>Stylidium graminifolium</i>	Grass Triggerplant		1							
Thymelaeaceae	<i>Pimelea linifolia</i>	Slender Rice Flower							1		
Violaceae	<i>Hybanthus monopetalus</i>	Slender Violet-bush		2							
Xanthorrhoeaceae	<i>Xanthorrhoea sp.</i>	A Grass-tree	1								
Zamiaceae	<i>Macrozamia spiralis</i>		1	1			2				

Table 7: Flora species and cover/abundance score, sites 10-19. (* = exotic species)

Family	Species	Common Name	Plot 10	Plot 11	Plot 12	Plot 13	Plot 14	Plot 15	Plot 16	Plot 17	Plot 18
Acanthaceae	<i>Brunoniella australis</i>	Blue Trumpet									
Adiantaceae	<i>Cheilanthes sieberi</i>	Rock Fern			2						
Anthericaceae	<i>Arthropodium milleflorum</i>	Pale Vanilla-lily		1			2		2	2	
Anthericaceae	<i>Thysanotus sp.</i>	A Fringe Lily		1							
Apiaceae	<i>Hydrocotyle laxiflora</i>	Stinking Pennywort			3			1			
Apiaceae	<i>Platysace ericoides</i>			2			2			2	1
Apiaceae	<i>Xanthosia atkinsoniana</i>										2
Asteraceae	<i>Asteraceae sp.</i>	A daisy (forb)			1						
Asteraceae	<i>Conyza bonariensis*</i>	Flaxleaf Fleabane*									
Asteraceae	<i>Coronidium waddelliae</i>	Waddel Everlasting									
Asteraceae	<i>Euchiton sphaericus</i>	Cudweed			1						
Asteraceae	<i>Hypochaeris radicata*</i>	Flatweed*									
Asteraceae	<i>Lagenifera stipitata</i>	Blue Bottle-daisy									
Asteraceae	<i>Sigesbeckia orientalis subsp. Orientalis</i>	Indian Weed			2						
Bignoniaceae	<i>Pandorea pandorana</i>				1						
Campanulaceae	<i>Wahlenbergia gracilis</i>	Sprawling Bluebell			2						
Campanulaceae	<i>Wahlenbergia stricta</i>	Tall Bluebell									
Casuarinaceae	<i>Allocasuarina littoralis</i>	Black She-Oak		1	3						
Convolvulaceae	<i>Dichondra repens</i>	Kidney Weed			2			1			
Cyperaceae	<i>Carex inversa</i>	Knob Sedge									
Cyperaceae	<i>Chorizandra cymbaria</i>										

Cyperaceae	<i>Cyathochaeta diandra</i>		1	3		1	3		2		
Cyperaceae	<i>Lepidosperma laterale</i>	Variable Sword-sedge				3					
Cyperaceae	<i>Ptilothrix deusta</i>	A Sedge					2		2		
Cyperaceae	<i>Schoenus brevifolius</i>		3	2		3		3			
Dennstaedtiaceae	<i>Pteridium esculentum</i>	Bracken			3	2			2		
Dilleniaceae	<i>Hibbertia obtusifolia</i>	Hoary Guinea Flower									
Dilleniaceae	<i>Hibbertia riparia</i>										
Dilleniaceae	<i>Hibbertia serpyllifolia</i>	Hairy Guinea Flower						1			
Ericaceae	<i>Brachyloma daphnoides</i>	Daphne Heath		1							
Ericaceae	<i>Melichrus procumbens</i>	Jam Tarts							1		
Fabaceae (Faboideae)	<i>Bossiaea heterophylla</i>	Variable Bossiaea									1
Fabaceae (Faboideae)	<i>Bossiaea scolopendria</i>										
Fabaceae (Faboideae)	<i>Daviesia genistifolia</i>	Broom Bitter Pea		3					1		
Fabaceae (Faboideae)	<i>Daviesia ulicifolia</i>	Gorse Bitter Pea									
Fabaceae (Faboideae)	<i>Dillwynia retorta</i>							2			
Fabaceae (Faboideae)	<i>Dillwynia sieberi</i>						2		1		
Fabaceae (Faboideae)	<i>Glycine clandestina</i>	Twining glycine			2						
Fabaceae (Faboideae)	<i>Glycine tabacina</i>	Variable glycine			1						
Fabaceae (Faboideae)	<i>Gompholobium grandiflorum</i>	Large Wedge Pea							1		
Fabaceae (Faboideae)	<i>Gompholobium minus</i>	Dwarf Wedge Pea					2				
Fabaceae (Faboideae)	<i>Hardenbergia violacea</i>	2 Sarsaparilla								1	
Fabaceae (Faboideae)	<i>Hovea linearis</i>										
Fabaceae (Faboideae)	<i>Mirbelia speciosa</i>	A Pea									
Fabaceae (Faboideae)	<i>Podolobium ilicifolium</i>	Prickly Shaggy Pea								2	
Fabaceae (Faboideae)	<i>Pultenaea divaricata</i>										

<i>Fabaceae (Faboideae)</i>	<i>Pultenaea scabra</i>									2	
<i>Fabaceae (Mimosoideae)</i>	<i>Acacia brownii</i>	Heath wattle									2
<i>Fabaceae (Mimosoideae)</i>	<i>Acacia parvipinnula</i>	Silver-stemmed Wattle			4			1		1	1
<i>Fabaceae (Mimosoideae)</i>	<i>Acacia penninervis var. penninervis</i>	Mountain Hickory									
<i>Fabaceae (Mimosoideae)</i>	<i>Acacia terminalis</i>	Sunshine Wattle									1
<i>Fabaceae (Mimosoideae)</i>	<i>Acacia ulicifolia</i>	Prickly Moses								3	
<i>Gentianaceae</i>	<i>Centaurium tenuiflorum*</i>	Branched Centaury*									
<i>Geraniaceae</i>	<i>Pelargonium inodorum</i>				1						
<i>Goodeniaceae</i>	<i>Cooperhooia barbata</i>	Purple Goodenia								1	
<i>Goodeniaceae</i>	<i>Dampiera stricta</i>		1	2			2	2			
<i>Goodeniaceae</i>	<i>Goodenia heterophylla</i>									1	
<i>Goodeniaceae</i>	<i>Goodenia paniculata</i>					2		1			
<i>Goodeniaceae</i>	<i>Scaevola ramosissima</i>	Purple Fan-flower								1	1
<i>Haemodoraceae</i>	<i>Haemodorum planifolium</i>	Bloodroot					2			2	
<i>Haloragaceae</i>	<i>Gonocarpus micranthus subsp. ramosissimus</i>		1			2	2	3	2		
<i>Haloragaceae</i>	<i>Gonocarpus tetragynus</i>	Poverty Raspwort		1			1				
<i>Iridaceae</i>	<i>Patersonia longifolia</i>	Purple-Flag					1				
<i>Iridaceae</i>	<i>Patersonia sericea</i>	Silky Purple-Flag									
<i>Juncaceae</i>	<i>Juncus sp.</i>	A Rush									
<i>Lindsaeaceae</i>	<i>Lindsaea linearis</i>	Screw Fern					2				
<i>Lobeliaceae</i>	<i>Pratia purpurascens</i>	Whiteroot			1						
<i>Lomandraceae</i>	<i>Lomandra cylindrica</i>			1							

Lomandraceae	<i>Lomandra filiformis</i>	Wattle Matt-rush								3	
Lomandraceae	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>										
Lomandraceae	<i>Lomandra glauca</i>	Pale Mat-rush					2			2	
Lomandraceae	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush		1					2		
Lomandraceae	<i>Lomandra obliqua</i>									3	
Menyanthaceae	<i>Liparophyllum exaltatum</i>										
Myrtaceae	<i>Angophora bakeri</i>	Narrow-leaved Apple		2					3	1	
Myrtaceae	<i>Angophora costata</i>	Sydney Red Gum								2	
Myrtaceae	<i>Angophora floribunda</i>	Rough-barked Apple				3		1			
Myrtaceae	<i>Callistemon citrinus</i>	Crimson Bottlebrush					4				
Myrtaceae	<i>Callistemon linearis</i>	Narrow-leaved Bottlebrush							1		
Myrtaceae	<i>Corymbia eximia</i>	Yellow Bloodwood								1	
Myrtaceae	<i>Corymbia gummifera</i>	Red Bloodwood									
Myrtaceae	<i>Eucalyptus fibrosa</i>	Red Ironbark				3				1	
Myrtaceae	<i>Eucalyptus parramattensis</i> subsp. <i>parramattensis</i>	Parramatta Red Gum		2		3			3	1	
Myrtaceae	<i>Eucalyptus piperita</i>	Sydney Peppermint									
Myrtaceae	<i>Eucalyptus punctata</i>	Grey Gum									
Myrtaceae	<i>Eucalyptus sclerophylla</i>	Hard-leaved Scribbly Gum	1	1					3	3	
Myrtaceae	<i>Eucalyptus sparsifolia</i>	Narrow-leaved Stringybark									3
Myrtaceae	<i>Leptospermum juniperinum</i>	Prickly Tea-tree		1		4		1		1	
Myrtaceae	<i>Leptospermum polygalifolium</i>	Tantoon				4					2
Myrtaceae	<i>Leptospermum trinervium</i>	Slender Tea-tree	2						1		2
Myrtaceae	<i>Melaleuca thymifolia</i>	Thyme Honey-myrtle	1	2		2		2	2		
Myrtaceae	<i>Micromyrtus ciliata</i>	Fringed Heath-myrtle	2	3						3	

Orchidaceae	<i>Caleana major</i>	Large Duck Orchid									
Orchidaceae	<i>Dipodium sp.</i>									1	
Oxalidaceae	<i>Oxalis perennans</i>	Oxalis			2						
Phormiaceae	<i>Dianella longifolia</i>	Blueberry Lily				1	2		3	3	
Phyllanthaceae	<i>Phyllanthus hirtellus</i>	Thyme Spurge								3	
Phyllanthaceae	<i>Poranthera microphylla</i>				2						
Phytolaccaceae	<i>Phytolacca octandra</i>	Inkweed									
Pittosporaceae	<i>Billardiera scandens</i>	Hairy Apple Berry									
Pittosporaceae	<i>Bursaria spinosa</i>	Native Blackthorn			2						2
Plantaginaceae	<i>Veronica plebeia</i>	Trailing Speedwell			1						
Poaceae	<i>Anisopogon avenaceus</i>	Oat Speargrass									
Poaceae	<i>Aristida ramosa</i>	Purple Wiregrass					1				
Poaceae	<i>Aristida vagans</i>	Threeawn Speargrass			1				1		1
Poaceae	<i>Austrostipa pubescens</i>	A Speargrass		1	1						
Poaceae	<i>Dichelachne micrantha</i>	Shorthair Plumegrass						2			
Poaceae	<i>Digitaria sanguinalis</i>	Summer Grass			1						
Poaceae	<i>Echinopogon caespitosus</i>	Bushy Hedgehog Grass			2						
Poaceae	<i>Entolasia stricta</i>	Wiry Panic			4	3	3			2	
Poaceae	<i>Eragrostis brownii</i>	Brown's Lovegrass			3		2				
Poaceae	<i>Eragrostis curvula*</i>	African Lovegrass*									6
Poaceae	<i>Eragrostis leptostachya</i>	Paddock Lovegrass					1				
Poaceae	<i>Imperata cylindrica</i>	Blady Grass			4			1	2		
Poaceae	<i>Microlaena stipoides</i>	Weeping Grass			4		2				
Poaceae	<i>Panicum simile</i>	Two-colour Panic		2	1	1	2				
Poaceae	<i>Poa sieberiana</i>	Snowgrass									

Poaceae	<i>Rytidosperma pallidum</i>	Redanther Wallaby Grass								3	
Poaceae	<i>Rytidosperma sp.</i>										
Poaceae	<i>Stenotaphrum secundatum*</i>	Buffalo Grass*									2
Poaceae	<i>Themeda triandra</i>	Kangaroo Grass		1			2		2		1
Proteaceae	<i>Banksia serrata</i>	Old-man Banksia							2		
Proteaceae	<i>Banksia spinulosa</i>	Hairpin Banksia		3		2	2	1	3		
Proteaceae	<i>Conospermum ericifolium</i>		2	2							1
Proteaceae	<i>Conospermum longifolium subsp. mediale</i>										1
Proteaceae	<i>Grevillea mucronulata</i>									1	2
Proteaceae	<i>Grevillea parviflora subsp. parviflora</i>	Small-flower Grevillea							2		
Proteaceae	<i>Hakea dactyloides</i>	Finger Hakea		3			2		1		
Proteaceae	<i>Isopogon anemonifolius</i>	Broad-leaf Drumsticks	1	3			2				
Proteaceae	<i>Lomatia silaifolia</i>	Crinkle Bush									
Proteaceae	<i>Persoonia levis</i>	Broad-leaved Geebung					1		1		
Proteaceae	<i>Persoonia linearis</i>	Narrow-leaved Geebung		1	1		1		2	2	
Proteaceae	<i>Persoonia oblongata</i>			1							2
Proteaceae	<i>Xylomelum pyriforme</i>	Woody Pear									
Ranunculaceae	<i>Clematis aristata</i>	Old Man's Beard				1					
Restionaceae	<i>Leptocarpus tenax</i>		5	3							
Restionaceae	<i>Lepyrodia scariosa</i>					4	2				
Rubiaceae	<i>Galium gaudichaudii</i>				2						
Rubiaceae	<i>Opercularia diphyllo</i>	Stinkweed									
Rubiaceae	<i>Pomax umbellata</i>	Pomax			1					1	1
Santalaceae	<i>Exocarpos strictus</i>	Dwarf Cherry		1							

<i>Schizaeaceae</i>	<i>Schizaea bifida</i>	Forked Comb Fern	1								
<i>Solanaceae</i>	<i>Solanum prinophyllum</i>	Forest Nightshade			2						
<i>Solanaceae</i>	<i>Solanum nigrum*</i>	Blackberry nightshade*									
<i>Stylidiaceae</i>	<i>Stylidium graminifolium</i>	Grass Triggerplant		1		2	2				
<i>Thymelaeaceae</i>	<i>Pimelea linifolia</i>	Slender Rice Flower									1
<i>Violaceae</i>	<i>Hybanthus monopetalus</i>	Slender Violet-bush								1	
<i>Xanthorrhoeaceae</i>	<i>Xanthorrhoea sp.</i>	A Grass-tree									
<i>Zamiaceae</i>	<i>Macrozamia spiralis</i>										

APPENDIX 3 – PHOTO POINT MONITORING



BBAM 1



BBAM 2



BBAM 3



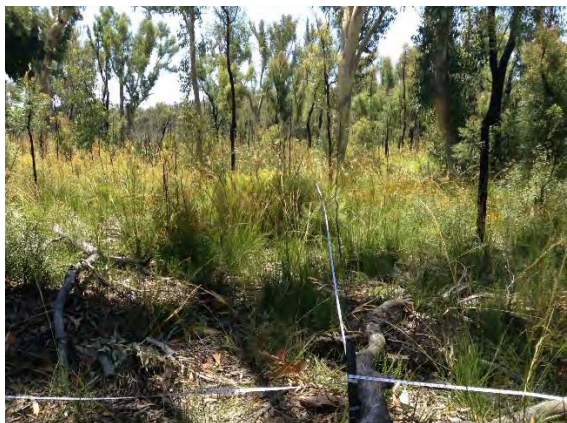
BBAM 4



BBAM 5



BBAM 6



BBAM 7



BBAM 8



BBAM 9



BBAM 10



BBAM 11



BBAM 12



BBAM 13



BBAM 14

No photo available

BBAM 15



BBAM 16



BBAM 17



BBAM 18

Appendix 5

Aquatic Monitoring Report Spring 2020

Prepared by Niche Environment
and Heritage Pty Ltd

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Aquatic Monitoring Report

Spring 2020

Prepared for Tinda Creek Quarry Pty Ltd | 25 March 2021



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Executive summary

An aquatic monitoring program was established as a requirement of the Landscape Management Plan (LMP) for the Tinda Creek Quarry. The program involves survey and analytical methods for measuring macroinvertebrates, stream health, water quality and catchment-riparian conditions.

The aim of the monitoring program is to monitor the river health of Tinda Creek and its tributaries. The monitoring includes:

- Assessment of stream condition using Riparian and Channel and Environment inventory assessment (RCE)
- Assessment of habitat condition using AUSRIVAS proforma
- Assessment of water quality against default ANZECC trigger values
- Assessment of the macroinvertebrate community condition using Stream Invertebrate Grade Number Average Level (SIGNAL) and AUSRIVAS.

In comparison to 2019, the sites had significantly more water which resulted in more available aquatic habitat and more sites able to be sampled from. Aquatic environments downstream of Tinda Creek Quarry infrastructure were found to have a good level of riparian regrowth after the 2019-2020 bushfire events, as well as stable channel morphology with only some areas indicating channel erosion which is likely due to the heavy rainfall post bushfires. The macroinvertebrate communities had low SIGNAL2 scores indicative of poor stream health, however this is potentially a result of the prolonged dry conditions followed by the major bushfire event and post flooding events having an impact on available stable aquatic habitats, and as such the streams are likely being influenced by natural stress associated with intermittent/ephemeral streams of the region.

Table of Contents

Executive summary	i
Table of Contents	ii
Glossary and abbreviations	5
1. Introduction	6
1.1 Background.....	6
1.2 Catchment characteristics	6
1.3 Aim.....	6
2. Methods	8
2.1 Location of monitoring sites	8
2.2 Field methods	11
2.3 Data analysis.....	13
3. Results	15
3.1 Weather conditions	15
3.2 Aquatic habitat/condition	15
3.3 Water quality	24
3.4 Macroinvertebrates	25
3.5 Other fauna.....	26
4. Discussion	27
4.1 RCE scores.....	27
4.2 SIGNALs scores and macroinvertebrate communities	27
4.3 Water quality	27
5. Conclusion and recommendations	28
5.1 Conclusions.....	28
6. References	29
Annex 1. Macroinvertebrate survey results	31

List of Figures

Figure 1: Location of monitoring sites.....	10
Figure 2: Rainfall data for January-November 2020.....	15
Figure 3. Overflow from Tinda Creek Quarry tailing pond, flowing upstream of Site 4.....	24
Figure 4. SIGNAL2 Bi-plot.....	26

List of Plates

Plate 1: Sampling method	12
Plate 2: Site 1	16
Plate 3: Site 2	17
Plate 4: Site 3	18
Plate 5: Site 4	19
Plate 6: Site 5	20
Plate 7: Site 6	21
Plate 8: Site 7	22
Plate 9: Site 8	23

List of Tables

Table 1: Location of monitoring sites	8
Table 2: Summary of methods at each site	11
Table 3: SIGNAL Grade and the Level of Pollution Tolerance	13
Table 4: Guide to interpreting the SIGNAL2 scores.....	14
Table 5: RCE inventory scores (2020)	15
Table 6: Site 1 habitat results	16
Table 7: Site 2 habitat results	17
Table 8: Site 3 habitat results	18
Table 9: Site 4 habitat results	19
Table 10: Site 5 habitat results	20
Table 11: Site 6 habitat results	21
Table 12: Site 7 habitat results	22
Table 13: Site 8 habitat results	23
Table 14: Water quality results	24
Table 15. Macroinvertebrate results.....	25
Table 16. Weighted SIGNAL2 scores (2015, 2018, 2019 and 2020)	26

Glossary and abbreviations

ANZECC	Australian and New Zealand Environment and Conservation Council
Anthropogenic	Caused or produced by humans
Aquatic macroinvertebrates	Animals that have no backbone, are visible with the naked eye and spend all or part of their life in water
AUSRIVAS	Australian Rivers Assessment System
CMA	Catchment Management Area
Drainage	Natural or artificial means for the interception and removal of surface or subsurface water.
Ecology	The study of the relationship between living things and the environment.
Ephemeral	Existing for a short amount of time.
Habitat	The place where a species, population or ecological community lives (whether permanently, periodically or occasionally).
LMP	Landscape Management Plan
RCE inventory	Riparian and Channel and Environment inventory assessment.
Riparian	Relating to the banks of a natural waterway.
SIGNAL	Stream Invertebrate Grade Number Average Level. SIGNAL2 scores are indicative only and pollution does not refer to just anthropogenic sources. Environmental stress may result in poor water quality occurring naturally in waterways such as those conditions found in ephemeral streams. Low family richness and the occurrence of pollution tolerant invertebrates can give a low SIGNAL score even though they are a natural condition
Stress	Response to a stressor such as an environmental condition or a stimulus.

1. Introduction

1.1 Background

As part of the Tinda Creek Quarry Landscape Management Plan (LMP), a macroinvertebrate monitoring program within the Tinda Creek system and its tributaries was established to monitor changes to the system over time and assess possible influence from Quarry operations. The program includes methods for assessing stream health through the monitoring of macroinvertebrates, water quality and catchment-riparian conditions.

A baseline survey and assessment of eight sites was conducted in August 2007 shortly after a period of heavy rainfall and runoff. Following the 2015 approval for expansion of the Quarry, another survey was conducted in November 2015 to update the baseline records. Aus-10 Rhyolite (Hy-Tec) has committed to annual monitoring under the approved Landscape Management Plan. Niche were engaged to conduct aquatic monitoring in spring 2018, 2019 and 2020.

1.2 Catchment characteristics

The aquatic habitats surrounding the Tinda Creek Quarry include:

- Tinda Creek, a tributary of Wollemi Creek which joins the Colo River approximately 16km to the west of the project area
- Ephemeral drainage lines that flow to Tinda Creek
- Artificially created diversion channels
- Farm dam sites.

Tinda Creek is an ephemeral/intermittent stream which flows to the west away from the Quarry grounds. It has been diverted around the eastern and northern boundaries of the current operation zone via small earth drainage channels.

Tinda Creek is met by ephemeral second order drainage lines on the northern boundary of the Quarry. These lines do not hold water due to the substrate having a high concentration of sand and silt, and as such, are usually dry due to the sandy substrate having such a high permeability.

Two small former farm dams are located within the property to the north of the Quarry. These dams have been overgrown with vegetation in recent monitoring periods, however, have been cleared to some extent due to the recent bushfires and are currently regenerating.

1.3 Aim

The aim of the aquatic monitoring program is to assess the health of Tinda Creek and its tributaries to ensure that the expanded quarry operations do not result in adverse impacts to the health of the downstream creek system. Specifically, in regard to aquatic environment and aquatic habitat health of the Greater Blue Mountains World Heritage Area. The monitoring includes:

- Assessment of stream condition using RCE
- Assessment of habitat condition using AUSRIVAS
- Assessment of water quality against default ANZECC trigger values

- Assessment of the macroinvertebrate community condition using SIGNAL and AUSRIVAS.

2. Methods

2.1 Location of monitoring sites

A total of eight sites were surveyed along the Tinda Creek system and its tributaries (Figure 1, Table 1) consistent with the baseline monitoring conducted in 2015 and monitoring in 2018/2019. This included sites upstream and sites downstream of operations of the Quarry and therefore provides both reference and test sites for monitoring.

Table 1: Location of monitoring sites

Site	Stream	Location	Easting	Northing
Site 1	Tinda Creek	Tinda Creek Upstream of Quarry	286599	6327354
Site 2	Tinda Creek	Tinda Creek Upstream of Quarry	286400	6328390
Site 3	Tinda Creek Diversion Channel	Tinda Creek Diversion channel within Quarry	286405	6327957
Site 4	Tinda Creek	Tinda Creek Downstream of Quarry	285711	6328427
Site 5	Tributary of Tinda Creek	Tinda Creek Tributary	284913	6328247
Site 6	Tinda Creek	Tinda Creek downstream of Quarry	284048	6328633
Site 7	Tinda Creek	Tinda Creek downstream of Quarry	282998	6328847
Site 8	Tributary of Tinda Creek	Tinda Creek tributary (Outside of Quarry influence)	284476	6329656

2.1.1 Site 1 – Tinda Creek, Upstream of Quarry

Site 1 is situated on the upper reaches of Tinda Creek, upstream and to the southeast of Quarry activities. In this location, Tinda Creek lacks a defined drainage channel, being characterised by an open, sandy floodplain. As Site 1 is located upstream of the quarry, it will be monitored as a reference site.

2.1.2 Site 2 – Tinda Creek, Upstream of Quarry

Site 2 is located upstream and to the north of the Quarry and is downstream of a former farm dam. Site 2 is located on a section of an upper tributary of Tinda Creek formed as a constructed drainage channel with an open floodplain. As Site 2 is located upstream of the Quarry, it will be monitored as a reference site.

2.1.3 Site 3 – Tinda Creek Quarry – Clean Water Diversion

Site 3 is situated along a clean water diversion channel that was constructed to divert overland flows around the eastern edge of the Quarry and to the north towards Tinda Creek. The diversion channel is generally less than 2m in width. Site 3 comprises a test site.

2.1.4 Site 4 – Downstream of the Quarry

Site 4 is located downstream of the Quarry along a section of Tinda Creek that occurs just upstream of a small former farm dam. Tinda Creek at Site 4 comprises a defined drainage channel which supports a number of small, isolated pools. As Site 4 is situated downstream of the Quarry, it will be monitored as a test site.

2.1.5 Site 5 – Tinda Creek Tributary

Site 5 comprises a tributary of Tinda Creek that runs generally parallel to the eastern side of Putty Road and joins Tinda Creek just upstream of the road culvert. The tributary at this site comprises a series of wide pools interspersed with narrower sections. Site 5 will be monitored as a reference site.

2.1.6 Site 6 – Tinda Creek, West of Putty Road

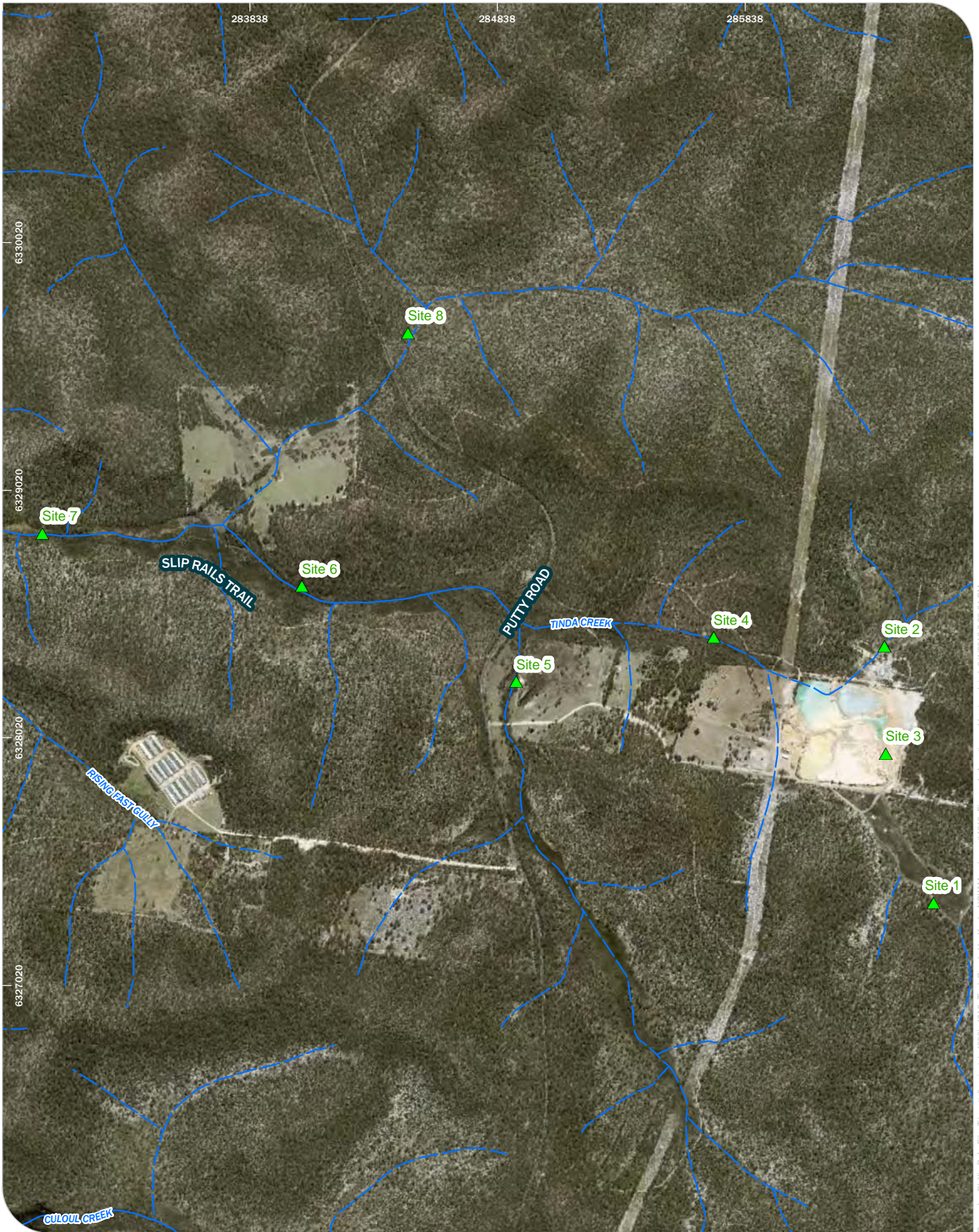
Site 6 is situated on Tinda Creek, approximately 0.75km downstream of Putty Road. Site 6 comprises a shallow channel with broad floodplain. As Site 6 is downstream of the quarry, it will be monitored as a test site.

2.1.7 Site 7 – Tinda Creek, Far West of Putty Road

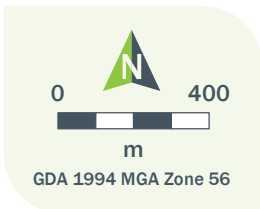
Site 7 is positioned along Tinda Creek, approximately 2km downstream of Putty Road. Site 7 comprises a broad, open channel. As Site 7 is downstream of the Quarry, it will be monitored as a test site.

2.1.8 Site 8 – Tinda Creek, northern territory

Site 8 is located upstream of Putty Road within a tributary of Tinda Creek to the north of the Quarry that is not influenced by Quarry operations. The site is directly above the culvert under Putty Road and comprises a broad open channel. Given that Site 8 occurs in a tributary that could not be affected by the quarry operations it is monitored as a reference site.



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Niche PM: Matthew Russell
 Niche Proj. #: 4216
 Client: Hy-Tech

Subject Area
 Tinda Creek Aquatic Monitoring

Figure 1

2.2 Field methods

The field survey was undertaken on the 4 November 2020. Field methods were consistent with standardised techniques for field sampling as prescribed by AUSRIVAS (Turak *et al.* 2000). The AUSRIVAS methods of sampling both pools and riffles has been modified for this program, as no suitable in-stream riffle features were present. A summary of the survey methods used at each of the eight sites is provided in Table 2.

Application of some methods were limited at some of the sites as the sites were dry at the time of the survey.

Table 2: Summary of methods at each site

Site	Macroinvertebrate sampling	AusRivAS habitat assessment	RCE assessment	Photo monitoring
Site 1			X	X
Site 2			X	X
Site 3			X	X
Site 4	X	X	X	X
Site 5	X	X	X	X
Site 6	X	X	X	X
Site 7		X	X	X
Site 8	X	X	X	X

2.2.1 Aquatic habitat and stream condition

Riparian, Channel and Environment inventory assessment (RCE)

The RCE Inventory (Chessman *et al.* 1997) provides a comparative measure of stream condition by assessing both the stream and its riparian environment in terms of habitat diversity, habitat condition and the degree of human-induced disturbance. Thirteen categories each receive a score between one and four based on their condition, resulting in an accumulated score of between 13 and 52. The maximum score (52) indicates a stream with little or no obvious physical disruption and the lowest score (13) indicates a heavily channelled stream without any riparian vegetation. This assessment provided an assessment of the general condition of the stream and must be interpreted accordingly.

Habitat description

A description of aquatic habitat was also produced using the AUSRIVAS proforma. The survey is a rapid visual assessment used to describe the habitat based on the following parameters:

- Geomorphology
- Channel diversity
- Bank stability
- Riparian vegetation and adjacent land use
- Water quality
- Macrophytes
- Local impacts and land use practices.

Macro-invertebrate sampling

Macro-invertebrate sampling was to be undertaken at sites 4-8 in accordance with AusRivAS protocol (Turak et al., 2004), where possible. This is due to the fact that sites 1-3 do not typically hold sufficient water to allow for sampling. The lack of sufficient water in these sites is a result of the ephemeral nature of the streams in the project area and the sandy substrate.

2.2.2 Water quality

Surface water quality was measured *in situ* using a Yeokal 611 water quality probe at each site. The following variables were recorded:

- Temperature (°C)
- Conductivity ($\mu\text{S}/\text{cm}$)
- pH
- Dissolved oxygen (DO)(% saturation and mg/L)
- Turbidity (NTU).

Alkalinity ($\text{mg CaCO}_3/\text{L}$) was measured with a standard titration kit. Water quality data were compared with the ANZECC (2000) default guideline values to physical and chemical stressors for protection of slightly upland aquatic ecosystems in South-Eastern Australia.

2.2.3 Macroinvertebrates

Samples of macroinvertebrates were collected from pool edges for a length of 10 metres, either as a continuous line or in disconnected segments. Sampling in segments was often undertaken to ensure the sampling of sub-habitats such as macrophyte beds, bank overhangs, submerged branches and root mats. Segmented sampling was also employed where pool length was short and it was logistically difficult to sample in a continuous line (e.g. in-stream logs). A 250 μm dip net was drawn through the water with short sweeps towards the bank to dislodge benthic fauna while scraping submerged rocks and debris, sides of the stream bank and the bed substrate (Plate 1). Further sweeps in the water column targeted the suspended fauna.



Plate 1: Sampling method

Each sample was rinsed from the net onto a white sorting tray from which animals were picked using forceps, pipettes and or paint brushes. Each tray was picked for a minimum period of 40 minutes, after which they were picked at 10 minute intervals for either a total of one hour or until no new specimens had been found. Care was taken to collect cryptic and fast moving animals, in addition to those that were conspicuous or slow. The animals collected at each site were placed into a labelled jar containing 70% ethanol.

Laboratory methods-invertebrate identification

Macroinvertebrate samples were identified to family level with the exception of Oligochaeta (to class), Polychaeta (to class), Ostracoda (to subclass), Nematoda (to phylum), Nemertea (to phylum), Acarina (to order) and Chironomidae (to subfamily). Keys used to identify taxa included:

- Centre for Freshwater Ecosystems (n.d.) – Identification Key and Ecology of Australian Freshwater Invertebrates. <http://www.mdfrc.org.au/bugguide/>.
- Dean, J., Rosalind, M., St Clair, M., and Cartwright, D. (2004) Identification keys to Australian families and genera of caddis-fly larvae (Trichoptera) Cooperative Research Centre for Freshwater Ecology.
- Gooderham, J. and Tsyrlin, E. (2002) The Waterbug Book: A guide to the Freshwater Macroinvertebrates of Temperate Australia, CSIRO Publishing.
- Hawking and Theischinger (1999) A guide to the identification of larvae of Australian families and to the identification of ecology of larvae from NSW.
- Madden, C. (2010) Key to genera of Australian Chironomidae. Museum Victoria Science Reports 12, 1-31.
- Madden, C. (2011) Draft identification key to families of Diptera larvae of Australian inland waters La Trobe University.
- Smith, B. (1996) Identification keys to the families and genera of bivalve and gastropod molluscs found in Australian inland waters Murray Darling Freshwater Research Centre.

2.3 Data analysis

2.3.1 SIGNAL: (Stream Invertebrate Grade Number Average Level) scores

The revised SIGNAL2 biotic index developed by Chessman (2003a and 2003b) was used to determine the “environmental quality” of sites. This method assigns grade numbers to each macroinvertebrate family or taxa found, based largely on their response to a range of environmental conditions (Table 3). The sum of all grade numbers for that habitat is then divided by the total number of families recorded in each habitat to calculate the SIGNAL2 index. A weighted SIGNAL2 score was also calculated (see Chessman 2003b). The SIGNAL2 index therefore uses the average sensitivity of macroinvertebrate families to present a snapshot of biotic integrity at a site.

Table 4 provides a broad guide for interpreting the health of the site according to the SIGNAL2 score of the site.

Table 3: SIGNAL Grade and the Level of Pollution Tolerance

SIGNAL Grade	Pollution Tolerance
10-8	Indicates a greater sensitivity to pollution
7-5	Indicates a sensitivity to pollution
4-3	Indicates a tolerance to pollution
2-1	Indicates a greater tolerance to pollution

Table 4: Guide to interpreting the SIGNAL2 scores

SIGNAL2 Score	Habitat quality
Greater than 6	Healthy habitat
Between 5 and 6	Mild pollution
Between 4 and 5	Moderate pollution
Less than 4	Severe pollution

(Source: Gooderham and Tsyrlin 2002)

*Note that SIGNAL2 scores are indicative only and that pollution does not refer to just anthropogenic pollution. Environmental stress may result in poor water quality occurring naturally in waterways. Low family richness and the occurrence of pollution tolerant invertebrates can give a low SIGNAL score even when they are in natural condition.

2.3.2 Opportunistic observations

Opportunistic visual observations of aquatic fauna were recorded during the surveys at each site.

3. Results

3.1 Weather conditions

The survey was conducted on 4 November 2020. The weather was hot (approximately 30°C) with light/moderate winds. There was low rainfall in early November leading up to the survey date (Figure 2). However, in late October there was 165mm of rainfall 10 days prior to the sampling period. This contributed to sites 4, 5 6 and-8 having moderate/high water levels and flow in comparison to previous monitoring periods.

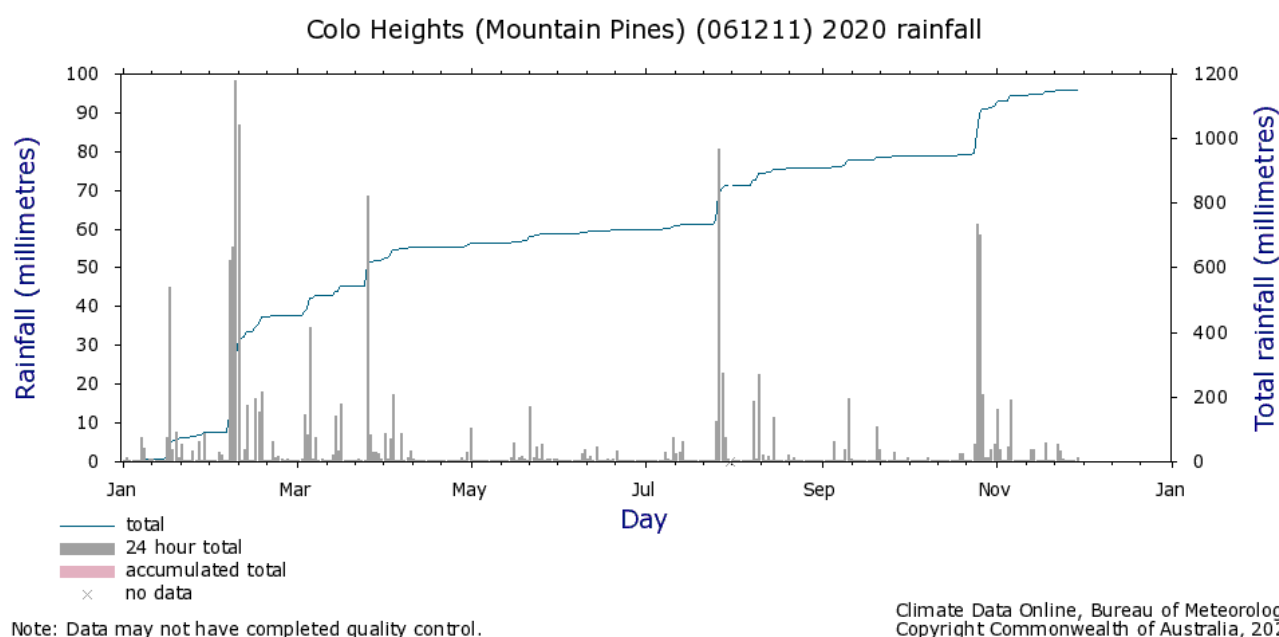


Figure 2: Rainfall data for January-November 2020

3.2 Aquatic habitat/condition

The aquatic habitat of the study area comprised of pools habitat only with no active riffles. All except two sites had good riparian and channel health (RCE score 40 or above) (Table 5). Most sites exhibited stable banks and regenerating native riparian cover.

Table 5: RCE inventory scores (2020)

Site	Spring 2018
Site 1	41
Site 2	31 (Constructed diversion channel)
Site 3	26 (Constructed diversion channel)
Site 4	42
Site 5	41
Site 6	45
Site 7	45
Site 8	45

An RCE score greater than 40 indicates a stream considered to be in good condition with potential for higher biodiversity values. RCE Scores of 20-40 indicate a stream is in moderate condition and below 20 indicates that the stream is in very poor condition

3.2.1 Site 1 Tinda Creek upstream of the quarry

The aquatic habitat at Site 1 (Plate 2) at the time of the spring 2020 monitoring surveys is detailed in Table 6.



Site 1 Downstream



Site 1 Upstream

Plate 2: Site 1

Table 6: Site 1 habitat results

	Attribute	Site 1
	Photograph	Plate 2
Riparian	RCE score	41
	Vegetation	Canopy absent. Scattered Parramatta red gum (<i>Eucalyptus parramattensis</i>) regenerating within this location. Mid-story absent. Groundcover dominated by sedge, low shrub, herb and grasses. (<i>Leptocarpus tenax</i> ; <i>Juncus</i> sp.; <i>lepyrodia scariosa</i> ; <i>Schoenus brevifolius</i> ; <i>Entolasia stricta</i> ; <i>Gonocarpus micranthus</i> ; <i>Melaleuca thymifolia</i> ; <i>Micromyrtus ciliata</i> and <i>Dampiera stricta</i>).
	Stream shading	Low <5%
	Exotic vegetation	-
Stream characteristics	Modal width (m)	<1m
	Substrate	Majority sand and silt
	Flow/depth	No flow
	Macrophytes/algae	Absent
	Water quality observations	Dry
Comments		Very narrow channel, <1m. Open sandy floodplain.

3.2.2 Site 2 Tinda Creek upstream of the quarry

The aquatic habitat at Site 2 (Plate 3) at the time of the spring 2020 monitoring surveys is detailed in Table 7.



Site 2 Downstream



Site 2 Upstream

Plate 3: Site 2

Table 7: Site 2 habitat results

	Attribute	Site 2
	Photograph	Plate 3
Riparian	RCE score	31 (Constructed drainage channel)
	Vegetation	Canopy consisted of sparse Scribbly Gums (<i>Eucalyptus haemastoma</i>), with a scattered grass/shrub land dominated by <i>Chorizandra spaerocephala</i> .
	Stream shading	Low/Moderate
	Exotic vegetation	-
Stream characteristics	Modal width (m)	<1m
	Substrate	Sand 80%, Silt 20%
	Flow/depth	No flow
	Macrophytes/algae	Absent-
	Water quality observations	Dry
Comments		Constructed channel to drain farm dam

3.2.3 Site 3 Tinda Creek Diversion channel within Quarry

The aquatic habitat at Site 3 (Plate 4) at the time of the spring 2020 monitoring surveys is detailed in Table 8.



Site 3 Downstream



Site 3 Upstream

Plate 4: Site 3

Table 8: Site 3 habitat results

	Attribute	Site 3
	Photograph	Plate 4
Riparian	RCE score	26 (Constructed channel)
	Vegetation	Canopy absent. Mid-story absent. Groundcover dominated by <i>Chorizandra spaerocephala</i> .
	Stream shading	Low/none
	Exotic vegetation	-
Stream characteristics	Modal width (m)	<2m
	Substrate	Sand 70%, silt 30%
	Flow/depth	No flow
	Macrophytes/algae	Absent
	Water quality observations	Dry
Comments		Dry. Very loose and unstable banks.

3.2.4 Site 4 Tinda Creek Downstream of Quarry

The aquatic habitat at Site 4 (Plate 5) at the time of the spring 2020 monitoring surveys is detailed in Table 9.



Site 4 Downstream



Site 4 Upstream

Plate 5: Site 4

Table 9: Site 4 habitat results

	Attribute	Site 4
	Photograph	Plate 5
Riparian	RCE score	42
	Vegetation	Canopy composed of <i>Eucalyptus haemastoma</i> (<5%). Mid-story dominated by small trees and tall shrubs. Ground cover was sparse with signs of slight post fire regrowth and dominated by <i>Chorizandra spaerocephala</i> .
	Stream shading	Low
	Exotic vegetation	-
Stream characteristics	Modal width (m)	<2m
	Substrate	80% silt, 20% sand
	Flow/depth	Heavy flow/<1m depth.
	Macrophytes/algae	Absent
	Water quality observations	Very turbid, high flow
Comments		Turbid water from overflow of tailings pond upstream of creek. (Figure 4)

3.2.5 Site 5 Tinda Creek Tributary

The aquatic habitat at Site 5 (Plate 6) at the time of the spring 2020 monitoring surveys is detailed in Table 10.



Site 5 Downstream



Site 5 Upstream

Plate 6: Site 5

Table 10: Site 5 habitat results

	Attribute	Site 5
	Photograph	Plate 6
Riparian	RCE score	41
	Vegetation	Canopy present and comprised of <i>Eucalyptus haemastoma</i> , Mid-story supporting dense cover of small trees and tall shrubs (<i>Acacia spp</i> and <i>Cassurina spp</i>). There were signs of regrowth of ground covering including regenerative Cat-tailed bulrush (<i>Typha</i>) and Round headed bristle sedge (<i>Chorizandra spaeocephala</i>).
	Stream shading	Low-Moderate
	Exotic vegetation	-
Stream characteristics	Modal width (m)	<4m
	Substrate	Silt 90%, sand 10%
	Flow/depth	No flow/deep >1m
	Macrophytes/algae	Present (<i>Typha</i>)
	Water quality observations	Dam and creek were at bank full with relatively clear water.
Comments		Riparian and macrophyte vegetation present, European carp (<i>Cyprinus carpio</i>) was present in dam

3.2.6 Site 6 Tinda Creek downstream of Quarry

The aquatic habitat at Site 6 (Plate 7) at the time of the spring 2020 monitoring surveys is detailed in Table 11.



Site 6 Downstream



Site 6 Upstream

Plate 7: Site 6

Table 11: Site 6 habitat results

	Attribute	Site 6
	Photograph	Plate 7
Riparian characteristics	RCE score	45
	Vegetation	Forest Red Gum (<i>Eucalyptus tereticornis</i>), White Stringybark (<i>E. globoidea</i>) dominated the canopy vegetation. The mid-storey was dominated by small trees and tall shrubs. The ground cover consisted of regenerating native grasses, herbs and ferns.
	Stream shading	Low/Moderate
	Exotic vegetation	-
Stream characteristics	Modal width (m)	<3m
	Substrate	Sand 20%, silt 80%
	Flow/depth	No flow/ >1m deep
	Macrophytes/algae	Green algae present
	Water quality observations	Turbid water. The creek was bank full.
Comments		Good level of post bushfire regrowth, water level elevated from heavy rainfall..

3.2.7 Site 7 Tinda Creek downstream of Quarry

The aquatic habitat at Site 7 (Plate 8) at the time of the spring 2020 monitoring surveys is detailed in Table 12.



Site 7 Downstream



Site 7 Upstream

Plate 8: Site 7

Table 12: Site 7 habitat results

	Attribute	Site 7
	Photograph	Plate 8
Riparian characteristics	RCE score	45
	Vegetation	Canopy vegetation included Grey Gums (<i>Eucalyptus punctata</i>) and Scribbly Gums (<i>Eucalyptus haemastoma</i>). The ground cover consisted of by native grasses, herbs and ferns, as well as macrophytes.
	Stream shading	Low/moderate
	Exotic vegetation	-
	Stream characteristics	Modal width (m)
	Substrate	Silt 100%
	Flow/depth	No flow, <10cm deep
	Macrophytes/algae	Cat tail Bulrush (<i>Typha</i>), Saw sedge (<i>Gahnia</i> sp.)
	Water quality observations	Very damp. Shallow water
Comments		Shallow surface water. Overgrown creek bed. Evidence of large mammal activity

3.2.8 Site 8 Tinda Creek tributary (Outside of Quarry influence)

The aquatic habitat at Site 8 (Plate 9) at the time of the spring 2020 monitoring surveys is detailed in Table 13.



Site 8 Downstream



Site 8 Upstream

Plate 9: Site 8

Table 13: Site 8 habitat results

	Attribute	Site 8
	Photograph	Plate 9
Riparian characteristics	RCE score	45
	Vegetation	Canopy vegetation included Grey Gums (<i>Eucalyptus punctata</i>) and Scribbly Gums (<i>Eucalyptus haemastoma</i>). The mid-storey was heavily damaged due to bushfires. The ground cover consisted of by native grasses, herbs and ferns along with Eucalyptus and Casuarina regeneration post fires.
	Stream shading	Low/Moderate
	Exotic vegetation	-
	Stream characteristics	Modal width (m)
	Substrate	Pebble 30%, sand 20%, silt50%
	Flow/depth	Low flow/<1m
	Macrophytes/algae	Absent-
	Water quality observations	Turbid/low flow at bank-full max
Comments		Animal activity at water edge. High water level form recent rainfall

3.3 Water quality

Water samples were only possible at four of the eight sites. These were taken after heavy rainfall preceding the survey.

The results show that temperature ranged between 14.76 – 27.11 °C; the highest being Site 4 (

Table 14). Conductivity ranged between 63-273 $\mu\text{S}/\text{cm}$; the highest recorded in Site 6. All sites were within the ANZECC trigger values for conductivity (30-350 $\mu\text{S}/\text{cm}$). Turbidity ranged 47.5-540 NTU with the highest recorded in Site 4. Dissolved Oxygen (DO) values were moderate/high to very low (between 10.5 and 97.3 % sat) with only Site 6 being below ANZECC trigger values (80-110%). All Sites except for Site 5 had pH levels below ANZECC trigger values (6.5 – 8), the lowest being 4.37 pH at Site 4. Alkalinity was low recording 20 CaCO_3/L for all Sites.



Figure 3. Overflow from Tinda Creek Quarry tailing pond, flowing upstream of Site 4.

Table 14: Water quality results

Site acronym	Temp (C°)	Conductivity ($\mu\text{S}/\text{cm}$)	Turbidity (NTU)	Dissolved Oxygen (% sat)	pH*	Alkalinity (mg CaCa_3/L)
Site 1	-	-	-	-	-	-
Site 2	-	-	-	-	-	-
Site 3	-	-	-	-	-	-
Site 4	27.11	71	540	96.6	4.37	20
Site 5	20.08	159	47.5	97.3	7.3	20

Site 6	14.76	273	64.5	10.5	5.98	20
Site 7	-	-	-	-	-	-
Site 8	17.05	63	179.8	86	5.99	20

ANZECC trigger values for upland streams: Electrical conductivity (30-350 $\mu\text{S}/\text{cm}$), Turbidity (6-50 NTU), pH (6.5-8), Dissolved Oxygen (80-110%). Text in bold indicate those variables that exceed the default trigger values.

Note: For some waterways, default ANZECC trigger values do not reflect typical background water quality and chemistry. Therefore an assessment of water quality monitoring data against default values can suggest the condition of the waterway is outside the normal range, or polluted, when in fact it is 'clean', or vice versa.

3.4 Macroinvertebrates

AUSRIVAS and SIGNAL2 results for the two sampled sites are provided in Table 15. Raw data is provided in Annex 1.

Table 15. Macroinvertebrate results

Site acronym	Number of Taxa	SIGNAL2 weighted score	AUSRIVAS score
Site 1	-	-	-
Site 2	-	-	-
Site 3	-	-	-
Site 4	10	2.83	B
Site 5	19	2.86	B
Site 6	14	2.73	C
Site 7	-	-	-
Site 8	15	3.71	B

The number of taxa at the four sites ranged from 10 to 19, with the most taxa observed at Site 5. The least taxa observed were at Site 4, a tributary of Tinda Creek to the north of the quarry. AUSRIVAS scores showed that the stream could be impaired as they are dissimilar to modelled reference macroinvertebrate communities with three of the four sites scoring in Band B and one site scoring lower in Band C. The low SIGNAL2 scores indicate that the streams may have a dominance of pollution-tolerant taxa (Table 4). Pollution-sensitive taxa mayfly Leptophlebiidae (SIGNAL 8) were observed at Site 8 and Site 6 and caddisfly Leptoceridae (SIGNAL 6) were observed at Site 5. Other pollution sensitive taxa (SIGNAL 6) Scirtidae, were located at Site 4. The SIGNAL biplot (Figure), indicates that no sites have favourable aquatic habitat and all locations are exhibiting some form of pollution or natural stress. However, this appears typical for streams in the area as Site 8 (an upstream site) is similarly present in this quadrant (Figure).

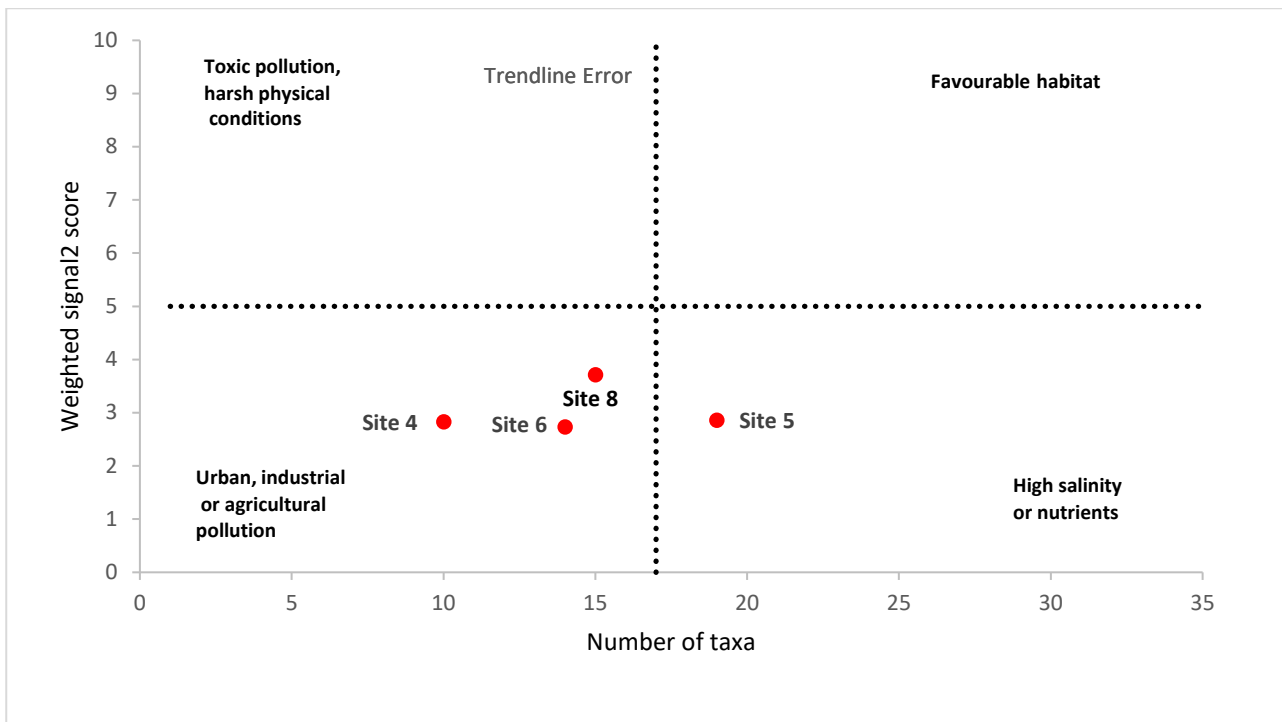


Figure 4. SIGNAL2 Bi-plot

There appears to be no general trend in SIGNAL2 scores in comparison to previous results however, Site 8 did increase in SIGNAL score over four surveys (Table 16). More sites were able to be sampled in 2020 due to the higher water levels. Sites 4 and 6 which were dry during the 2019 period were able to be sampled in 2020. There was a decrease in SIGNAL2 score at Site 5 while Site 8 increased slightly. Site 7 was not sampled in 2020 due to insufficient surface water. AUSRIVAS scores in general has improved over time as increased rainfall has provided more and better condition aquatic habitat (Table 17).

Table 16. Weighted SIGNAL2 scores (2015, 2018, 2019 and 2020)

Site	SIGNAL2 weighted Spring 2015	SIGNAL2 weighted Spring 2018	SIGNAL2 weighted Spring 2019	SIGNAL2 weighted Spring 2020
Site 4	2.25	DRY	DRY	2.83
Site 5	2	3.54	3.35	2.86
Site 6	3.5	2.6	DRY	2.73
Site 7	4.66	DRY	DRY	Low water level – not sampled.
Site 8	2.5	3	3.19	3.71

Table 17. AUSRIVAS (2018 - 2020)

Site	AUSRIVAS 2018	AUSRIVAS 2019	AUSRIVAS 2020
Site 4	DRY	DRY	B
Site 5	D	B	B
Site 6	C	DRY	C
Site 7	DRY	DRY	Low water level – not sampled.
Site 8	C	B	B

3.5 Other fauna

European Carp (*Cyprinus carpio*) was present at Site 5 in the dam.

4. Discussion

4.1 RCE scores

While there is remaining evidence of the bushfire that occurred in January 2020, the catchment was intact and had a significant amount of regeneration of native vegetation. As such results from spring 2020 monitoring are relatively similar to the results from previous assessment (Niche 2019) and showing moderate to good channel and riparian health at most sites. RCE scores were approximately 40 or above indicating good or near good condition, with the exception of two sites (Sites 2 and 3). The low scores are due to the nature of these sites as they have been modified by human activity.

4.2 SIGNALs scores and macroinvertebrate communities

Four sites were sampled during this monitoring period. These included Sites 4 and 6 (test sites), along with reference sites, Site 5 and Site 8. Despite poor AUSRIVAS and low-moderate SIGNAL2 scores, the streams appear to be in reasonable health particularly considering the 2019-2020 bushfire event. The site exhibited, macroinvertebrate fauna, and stream condition that are typical of intermittent streams which are under natural ephemeral stress. The monitoring shows a slight decrease in stream health at site 5 and an increase in stream health at Site 8 when compared with the 2019 monitoring (Niche 2019), which indicate natural variability in the catchment. There appears to be no obvious disturbance resulting from the Tinda Creek Quarry operations at downstream sites, however Site 4 did have elevated turbidity due to water overflowing the tailings pond from heavy rainfall prior to the survey. This did not appear to be reaching downstream sites 6 and 7 at the time of the survey.

The results in general are consistent with macroinvertebrate community's representative of low flow/intermittent streams, the fauna of which consist of generally pollution-tolerant organisms resulting in the streams having low SIGNAL2 and AUSRIVAS scores. Low SIGNAL 2 scores were similarly observed in 2019, 2018 and 2015 and AUSRIVAS score were similar or higher than previous surveys.

4.3 Water quality

Field parameters measured during this monitoring period were within the expected range of typical disturbances found within intermittent streams. All sites had elevated turbidity (Except for Site 5) with Site 4 having the highest. The site 4 result is likely due to elevated suspended sediment from the overflow of the tailings pond upstream from the monitoring point. The other sites also had elevated turbidity which is likely the result of recent rainfall and the suspended sediment exacerbated by 2020 bushfires and this may also be contributing to site 4. The pH at site 4 was low which could be the influence of the overflowing sediment ponds, however reference site 8 was also below guideline values which may indicate potential bushfire related impact to water quality or other natural influence.

5. Conclusion and recommendations

5.1 Conclusions

The general health of the vegetation and waterways of the eight sites was found to be in moderate to good health with a good level of post bushfire recovery of native vegetation. All sites but two had RCE scores above 40. Four out of the 8 total sites (two Test Sites; Sites 4 and 6, and two Reference sites; Sites 5 and 8) were sampled using AUSRIVAS method including water quality.

Sites downstream of Tinda Creek Quarry operations continue to exhibit good riparian and channel morphology with the native riparian vegetation showing regeneration, although some of the ground cover is yet to re-establish. The macroinvertebrate community at test and reference sites is in reasonable health despite some poor AUSRIVAS and low to moderate SIGNAL2 scores. Water quality was consistent with what would be expected for ephemeral/intermittent streams. However, is likely to be exhibiting impacts of recent fire events and rainfall events. Site 4 was receiving overflow from tailings dam overflow. While the impact to receiving environment was minimal, it is recommended that this northern side of the dam is investigated and repaired, reinforced or elevated to manage future high rainfall events. Following the inspection of the 4th of November, we have been advised that the following pre-planned activities have taken place; During the period 5 – 7 November 2020, Aus-10 undertook works including:

- a) raising the northern wall of the sediment pond; and
- b) installing two 300mm non-controlled, gravity feed drainage pipes to ensure that any potential overflow from the sediment pond is directed to the dredge pond.

6. References

- Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) (2000) National water quality management strategy and assessment guidelines: Australian and New Zealand guidelines for fresh and marine water quality ANZECC/ARMCANZ.
- Chessman B. C., Growns J.E and Kotlash A.R. (1997) Objective derivation of macroinvertebrate family sensitivity grade numbers for the SIGNAL biotic index: allocation to the Hunter River system, NewSouth Wales. *Marine and Freshwater Research*. **48**, 159-172.
- Chessman B. (2003a) New sensitivity grades for Australian macroinvertebrates. *Marine and Freshwater Research* 54 95-1032.
- Chessman B. (2003b) SIGNAL 2 – A Scoring System for Macro-invertebrate ('Water Bugs') in Australian Rivers, Monitoring River Heath Initiative Technical Report no 31, Commonwealth of Australia, Canberra DWR, 199.
- Dean, J., Rosalind, M., St Clair, M., and Cartwright, D. (2004) Identification keys to Australian families and genera of caddis-fly larvae (Trichoptera) Cooperative Research Centre for Freshwater Ecology.
- Gooderham, J. and Tsyrlin, E. (2002). *The Waterbug Book: A guide to the Freshwater Macroinvertebrates of Temperate Australia*, CSIRO Publishing.
- Hawking and Theischinger (1999) A guide to the identification of larvae of Australian families and to the identification of ecology of larvae from NSW.
- Madden, C. (2010) Key to genera of Australian Chironomidae. *Museum Victoria Science Reports* **12**, 1-31.
- Madden, C. (2011) Draft identification key to families of Diptera larvae of Australian inland waters La Trobe University.
- Niche, EH (2018) Aquatic monitoring report – Tinda Creek Sand Quarry. Prepared for Hy-Tech Tinda Creek Quarry Pty Ltd.
- Niche, EH (2019) Aquatic monitoring report – Tinda Creek Sand Quarry. Prepared for Hy-Tech Tinda Creek Quarry Pty Ltd.
- Smith, B. (1996) Identification keys to the families and genera of bivalve and gastropod molluscs found in Australian inland waters Murray Darling Freshwater Research Centre.
- Turak E., Waddell N., and Johnstone G. (2000) NSW AUSRIVAS Sampling and Processing Manual. Department of Environment and Conservation.
- Umwelt. (2015) Aquatic sampling and condition assessment – Tinda Creek Sand Quarry. Prepared for AUS-10 Rhyolite Pty Ltd.
- Umwelt. (2016). Tinda Creek Quarry. Landscaper Management Plan. Prepared for Prepared for AUS-10 Rhyolite Pty Ltd.

Websites

<http://ausrivas.ewater.com.au/>

<http://www.mdfrc.org.au/bugguide/>

Annex 1. Macroinvertebrate survey results

Site	Site 4	Site 5	Site 6	Site 8
Lymnaeidae				1
Oligochaeta			6	2
Atyidae		1		
Parastacidae				
Dytiscidae	3	1	14	15
Hydrophilidae	1	2		
Hydraenidae	2			
Scirtidae	1			
Hydrochidae	4		1	
Culicidae	1			
Ceratopogonidae	1	5		2
Tanypodinae		20	6	12
Orthoclaadiinae				1
Chironominae	1	17		15
Baetidae		6		
Leptophlebiidae			9	54
Veliidae		1		2
Corixidae		13	28	4
Notonectidae	1	34	8	2
Coenagrionidae		6		2
Lestidae		3	24	1
Hemicorduliidae		3	7	15
Libellulidae		2	1	
Leptoceridae		2		

Site	Site 4	Site 5	Site 6	Site 8
curculionidae	1			
Micronectidae		13		
Tricladida		5		
notonemouridae		2		
hydrometridae		1		
choarbidae				1
Planorbidae			12	
Physidae			2	
ceinidae			1	
synthmestidae			1	

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Sydney
Illawarra
Central Coast
Newcastle
Mudgee
Port Macquarie
Brisbane
Cairns



Our services

Ecology and biodiversity

Terrestrial
Freshwater
Marine and coastal
Research and monitoring
Wildlife Schools and training

Heritage management

Aboriginal heritage
Historical heritage
Conservation management
Community consultation
Archaeological, built and landscape values

Environmental management and approvals

Impact assessments
Development and activity approvals
Rehabilitation
Stakeholder consultation and facilitation
Project management

Environmental offsetting

Offset strategy and assessment (NSW, QLD, Commonwealth)
Accredited BAM assessors (NSW)
Biodiversity Stewardship Site Agreements (NSW)
Offset site establishment and management
Offset brokerage
Advanced Offset establishment (QLD)

Appendix 6

Minutes of Tinda Creek Quarry Community Consultative Committee Meetings

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**TINDA CREEK SAND PROJECT
COMMUNITY CONSULTATIVE COMMITTEE
MINUTES OF MEETING HELD “VIRTUALLY” VIA EMAIL
MONDAY 4TH MAY 2020**

	NAME	ORGANISATION
PRESENT	Lisa Andrews (LA)	Independent Chairperson
	Darryl Thiedeke (DT)	Hy-Tec – National Planning & Development Manager
	Michael Walton (MW)	Hy-Tec – Quarry Manager
	Jane Robinson (JR)	Putty Community Association delegate
	Brigitte Lewis (BL)	Community Representative
	Ray Campbell (RC)	Community Representative
	David Cilento (DC)	Hy-Tec – NSW General Manager
	Greg Burnett (GB)	Hy-Tec – Operations Manager NSW
	Mitchell Noble (MN)	Hy-Tec – Health, Safety & Environment Manager
	Bruce Mansell (BM)	Community Representative
APOLOGIES	Nil	

**Due to the COVID-19 pandemic, this meeting was conducted remotely via email. The presentation was emailed to all CCC members on the scheduled meeting date of 4 May 2020. Members were requested to review the document and provide any questions/comments within 7 days. After this time, this information was collated by LA and forwarded through to the company for its response.*

The answers were incorporated into these minutes as a record of the outcome of the engagement process.

The subject presentation forms as an attachment to these minutes.

WELCOME & INTRODUCTIONS	The chair opened the meeting when the presentation was sent on Monday 4 th May 2020 at 11.54am.		
APOLOGIES	As above.		
DECLARATION OF INTEREST	LA advised that she is an approved Independent Chairperson with the Department of Planning and Environment, appointed by the Secretary to chair this CCC and engaged by Hy-Tec.		No changes to members' previous declarations
BUSINESS ARISING	In accordance with the guidelines, the minutes from the previous meeting held on 14 th October 2019 were finalised on 25 th October 2019 and emailed to members. Action Items:		
	ITEM	ISSUE	RESPONSIBILITY
	1	Contact AQUAS and advise of CCC's feedback for inclusion in the Independent Environmental Audit.	LA (Complete 15/10/19)

	2	Summary of groundwater monitoring data presentation to be provided at the next CCC.	MW (Heldover to next meeting to enable maps to be shown to members)	
CORRESPONDENCE	<ul style="list-style-type: none"> • 16/10/19 – Email to CCC members with the draft minutes from 14/10/19 for review • 25/10/19 - Email to CCC members with the finalised minutes • 25/10/19 – Email to Ray Campbell with the same information • 17/4/20 – Email to members advising that the proposed meeting for 4/5/20 will be held remotely via email due to COVID-19 restrictions. Feedback received back from members. • 17/4/19 – Letter to Ray Campbell with the same information. • 4/5/20 – Email to members with the project presentation and directions on how to participate in the ‘virtual meeting’. Presentation hand delivered to Ray Campbell by MW. 			
REPORT/PROJECT UPDATE <i>(See attached presentation)</i>	<p>Slides 1 & 2 - Review of Operations – October 2019 to April 2020</p> <p>2019 year less than 40% of budget volume dispatched from site. Production output has remained low for the following reasons:</p> <ul style="list-style-type: none"> • Low rainfall – lack of process water • Gospers Mountain Bushfires 2019 • Flooding in early 2020 (Windsor and Nth Richmond bridges) • Corona Covid 19 • Low Rainfall experienced across 2017-2019– This led to a lack of Process water to wash sand and recycle water in our closed water circuit • 2019 only 315mm rainfall • 2020 YTD : 455.8mm rainfall <p>Slide 3 - Gospers Mountain Bushfire Impacts on Tinda Creek Quarry:</p> <ul style="list-style-type: none"> • Fire impacted Nov. 12 at site – employees x 3 and RFS defended site • Putty Road Closed for most of Nov. & parts of Dec. • Direct losses of 14.5km fencing • Poly Pipe :minor \$ • Electricals :minor \$ • Loss of production and sales across Nov. & Dec. <p><i>Comment from JR - What a terrible fire season it was. So pleased the site's impact was minimal - still very scary.</i></p>			

Slide 4 - High Rainfall January to April 2020

- Impacts on site:
- Windsor and North Richmond Bridges flooded
- Restricted transport to & from site
- Employee access to site
- Positive -refilled site water ponds
- Windsor Bridge – restricted to light vehicles only for an extended period.
- Low production rates due to wet and muddy conditions onsite.

JR enquired whether the new Windsor Bridge will assist Hy-Tec with its transportation.

Hy-Tec advised that:

- The new Windsor bridge and indeed any road upgrade along Putty Road are welcome and will offer improved safety for all motorists, pedestrians and cyclists.
- The new bridge will also offer a more reliable route with its increase in height for access when compared to the present low-level bridge crossing.
- Improved traffic flow from a bridge that allows two-way heavy vehicle traffic and shoulders for vehicle breakdowns should it occur, thus reducing delays for all motorists.

Slide 5 - Corona (COVID-19) Impacts 2020

Stringent controls put in place onsite for employees, contractors and visitors.

Uncertainty in the construction industry

Expected impacts on the building industry potentially to flow through as slow or delayed sales of sand for concrete.

JR asked; on top of a 40% short fall in Budget production in 2019 – what is the plan for ongoing operation of the site?

Hy-Tec advised that:

- With the rainfall received to date and having adequate process water currently available, the current mine plan for the immediate future will continue at production levels relevant to the market demand, which is currently increasing, up to the approved limit of 300Kt per annum.

Slide 6 - Environment & Site Rehabilitation

- The 2019 site environmental audit undertaken by Aquas returned no major items in site requirements
- Nil complaints regarding trucks or other
- Site rehabilitation has continued with capping and topsoiling of formerly quarried areas
- Area under rehabilitation 4Ha
- Due to drought, then fire, rehab has been slow

	<ul style="list-style-type: none"> • With rain, germination and growth has accelerated. • The NSW Govt. Local Land Services are continuing with the feral pest eradication program across 2020 in the area for wild dogs fox & deer etc. <p><i>JR commented that nil complaints about the trucks was excellent news.</i></p> <p>Slide 7 - Site Safety Hy-Tec through its parent company Adelaide Brighton Ltd has introduced the Work Safe Home Safe Program with excellent results for all employees and contractors Across Oct-April period Nil Lost Time injury or accidents sustained onsite.</p> <p><i>JR commented that this was a great result - year on year – and congratulated the company.</i></p> <p>Slide 8 - Community Assistance During the 2019 Gospers Mtn bushfires Hy-Tec have assisted the local community by supporting :</p> <ul style="list-style-type: none"> • Colo Heights RFS by supplying road base for their carpark • Local Community care programs for wildlife • Assisted the NPWS during and post the fires • Quarry area utilised as a RFS/NPWS staging post. <p><i>JR thanked Hy-Tec for its community assistance in relation to the Gospers Mountain Fires and expressed her appreciation from the residents of Putty during a very stressful time for the whole community.</i></p> <p>Slide 9 - Ongoing Investment</p> <p>Hy-Tec have continued to invest in the business even though 2019 was impacted by many issues highlighted.</p> <ul style="list-style-type: none"> • New Hy-Tec branded trucks • At Tinda Creek a new 40t Komatsu haul truck • New high volume water-pump • Local employment <p><i>JR thanked Hy-Tec for advertising your latest position locally.</i></p>	
GENERAL BUSINESS	Nil.	
NEXT MEETING	The next meeting is scheduled for Monday 12th October 2020, commencing at 9am on site. It is hoped that the government's restrictions will be lifted by then, allowing the meeting to occur face to face; however, LA will confirm closer to the date, based on current directives.	

The meeting was technically closed by the chair, following responses from CCC members and the company, compiled into the draft minutes and emailed on 15 May 2020.

ACTION ITEMS

ITEM	ISSUE	RESPONSIBILITY
1	Summary of groundwater monitoring data presentation to be provided at the next CCC.	MW – next CCC

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**TINDA CREEK SAND PROJECT
COMMUNITY CONSULTATIVE COMMITTEE
MINUTES OF MEETING HELD “VIRTUALLY” VIA EMAIL
MONDAY 12TH OCTOBER 2020**

	NAME	ORGANISATION
PRESENT	Lisa Andrews (LA)	Independent Chairperson
	Darryl Thiedeke (DT)	Hy-Tec – National Planning & Development Manager
	Michael Walton (MW)	Hy-Tec – Quarry Manager
	Jane Robinson (JR)	Putty Community Association delegate
	Brigitte Lewis (BL)	Community Representative
	Ray Campbell (RC)	Community Representative
	David Cilento (DC)	Hy-Tec – NSW General Manager
	Bruce Mansell (BM)	Community Representative
APOLOGIES	Nil	

**Due to the COVID-19 pandemic, this meeting was conducted remotely via email. The presentation was emailed to all CCC members on the scheduled meeting date of 12 October 2020. Members were requested to review the document and provide any questions/comments within 7 days for incorporation into the minutes.*

The subject presentation forms as an attachment to these minutes.

WELCOME & INTRODUCTIONS	The chair opened the meeting when the presentation was sent on Monday 12 th October 2020 at 9.11am.							
APOLOGIES	As above.							
DECLARATION OF INTEREST	LA advised that she is an approved Independent Chairperson with the Department of Planning and Environment, appointed by the Secretary to chair this CCC and engaged by Hy-Tec.	No changes to members' previous declarations						
BUSINESS ARISING	In accordance with the guidelines, the minutes from the previous meeting held on 4 th May 2020 were finalised on 25 th May 2020 and emailed to members. Action Items:							
	<table border="1"> <thead> <tr> <th></th> <th>ISSUE</th> <th>RESPONSIBILITY</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Summary of groundwater monitoring data presentation to be provided at the next CCC.</td> <td>MW (Held over to next meeting to enable maps to be shown to members)</td> </tr> </tbody> </table>		ISSUE	RESPONSIBILITY	1	Summary of groundwater monitoring data presentation to be provided at the next CCC.	MW (Held over to next meeting to enable maps to be shown to members)	
	ISSUE	RESPONSIBILITY						
1	Summary of groundwater monitoring data presentation to be provided at the next CCC.	MW (Held over to next meeting to enable maps to be shown to members)						
CORRESPONDENCE	<ul style="list-style-type: none"> • 15/5/20 – Email to CCC members with the draft minutes for review • 25/5/20 - Email to CCC members with the finalised minutes • 25/5/20 – Letter to Ray Campbell with the same information • 1/6/20 – Email to CCC members with the CEO's Bushfire Update. 							

	<ul style="list-style-type: none"> • 11/6/20 – Letter to Ray Campbell with the CEO’s Bushfire Update. • 29/9/20 – Email to CCC members advising that CCC will be held “virtually”. • 29/9/20 – Letter to Ray Campbell with the same information. • 3/10/20 - 12/10/20 – Letter to Ray Campbell with the CCC presentation for review and comment. • 12/10/20 – Email to CCC members with presentation & instructions on how to participate in the engagement process. 	
<p>REPORT/PROJECT UPDATE <i>(See attached presentation)</i></p>	<p>Slides 1 & 2 - Review of Operations –April 2020 to October 2020</p> <ul style="list-style-type: none"> • 2020 has been a year of recovery across the site after 3 years of drought, the Gospers Mountain Bushfire, flooding of access routes across the Hawkesbury River in early 2020 and COVID-19. • 2020 year to date budgeted sales volumes of sand increasing across site but remain low. • Nil complaints received by site regarding truck movements or site operating issues in this reporting period. • Higher rainfall experienced during 2020 year to date. • This had led to adequate process water to wash sand and recycle water in the closed water circuit • 2019 only 315mm rainfall • 2020 YTD : 701.8mm rainfall <p>Slide 3 - Gospers Mountain Bushfire & the Environment</p> <ul style="list-style-type: none"> • The site has recovered well following the devastating 2019 bushfires. • Infrastructure damaged or lost in the fires has now largely been replaced. • The surrounding native bushland has regenerated well and now in full bloom with spring flowers and blossoms. • During September 2020 two inspectors from the EPA conducted a site inspection with nil issues raised. <p>Slide 4 - Native Wildlife Protection</p> <p>In order to protect the vulnerable wildlife Hy-Tec continue to work with the NSW Local Land Services and National Parks and Wildlife to manage the surrounding bushland and to control introduced species to the area.</p> <p>Slide 5 - Corona (COVID-19) Impact 2020</p> <ul style="list-style-type: none"> • Stringent controls put in place onsite for employees, contractors and visitors • Government. initiatives to boost recovery in the construction industry 	<p>Graphs & photographs included in Slide 2</p> <p>See photos on Slide 4 of recent animals captured by LLS in the surrounding National Parks.</p>

	<ul style="list-style-type: none"> Some delayed impacts on the building industry now flowing through as slow or delayed sales of sand for concrete <p>Slide 6 - Site Health & Safety</p> <ul style="list-style-type: none"> Throughout the May to October 2020 period there was Nil Lost Time injury or accidents were sustained onsite at the Tinda Creek Quarry. Hy-Tec, through its parent company Adbri Ltd has introduced and continue to build upon the Work Safe Home Safe Program with excellent results for all employees and contractors <p>Wellbeing</p> <ul style="list-style-type: none"> Adbri continually look for ways to improve the health and wellbeing of its people. Investing in employee assistance programs that support its people in areas such as mental and physical health, financial planning, relationship support and parenting. <p>Slide 7 – Ongoing Investment</p> <ul style="list-style-type: none"> Hy-Tec have continued to invest in the business even though the 2019/2020 period has been a challenging period. At Tinda Creek this new investment included: <ul style="list-style-type: none"> Komatsu 40t capacity haul truck Komatsu WA480 Wheel Loader Local employment Ongoing training for employees 1 x new employee Continue to purchase from local suppliers and utilise local contractors <p>Slide 8 - Helping rebuild fire affected communities</p> <ul style="list-style-type: none"> Adbri is supporting fire affected communities for the long-term through its Adbri Community Rebuild Fund. The fund has committed up to \$250,000 of Adbri Masonry products to help rebuild local community assets. Should community representatives know of a community asset that could benefit from a helping hand, please let them know. 	
GENERAL BUSINESS	Nil.	
MEETING SCHEDULE FOR 2021	It is proposed that the CCC continue to meet bi-annually, in line with the previous schedule. Accordingly, the following meeting dates are proposed: Monday 3 May 2021 commencing at 9am on site and Monday 11th October 2021.	

All members were satisfied with the content and information provided in the project presentation with no questions or general business received.

The meeting was technically closed by the chair on 7 November 2020 when the finalised minutes were emailed to CCC members.

ACTION ITEMS

ITEM	ISSUE	RESPONSIBILITY
1	Summary of groundwater monitoring data presentation to be provided in person at the next CCC. Held over.	MW – next CCC

Appendix 7

Photographs from within the Voluntary Undertaking Area

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Voluntary Undertaking Photo Series

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FEBRUARY 2021









FEBRUARY 2021









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