

GALES-KINGSCLIFF

PTY LTD
ABN: 75 093 540 080

Annual Review

for the

Cudgen Lakes Sand Quarry

1 July 2017 to 30 June 2018

Prepared by:



R.W. CORKERY & CO. PTY. LIMITED

August 2018

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1 July 2017 to 30 June 2018

Compiled for:

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
Ref No. 617/35

August 2018



R. W. CORKERY & CO. PTY. LIMITED

TITLE BLOCK

Name of Operation	Cudgen Lakes Sand Quarry
Name of Operator	Neumann Contractors
Development consent / project approval #	Project Approval 05_0103B
Name of holder of development consent / project approval	Gales-Kingscliff Pty Ltd
Mining Lease #	Not Applicable
Name of holder of mining lease	Not Applicable
Water licence #	WAL 40902 / 30CA321269
Name of holder of water licence	Gales-Kingscliff Pty Ltd
MOP/RMP start date	Not Applicable
MOP/RMP end date	Not Applicable
Annual Review start date	01/07/17
Annual Review end date	30/06/18
<p>I, Stephen Segal, certify that this audit report is a true and accurate record of the compliance status of the Cudgen Lakes Sand Quarry for the period 1 July 2017 to 30 June 2018 and that I am authorised to make this statement of behalf of Gales-Kingscliff Pty Ltd.</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	Stephen Segal
Title of authorised reporting officer	Managing Director
Signature of authorised reporting officer	
Date	31/08/2018

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1. STATEMENT OF COMPLIANCE

The compliance status of relevant approvals was reviewed for the reporting period and is summarised in **Table 1.1**. It was determined that there was one administrative non-compliance during the reporting period. The non-compliance recorded during the reporting period has been ranked according to the risk matrix included in **Table 1.2**.

Table 1.1
Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	Yes / No
Project Approval 05_0103B	No
Environment Protection Licence 12385	Yes
Water Supply Works and Use Approval 30CA321269	Yes

Table 1.2
Non-compliances

Relevant Approval	Condition	Condition Description (summary)	Compliance Status	Comment	Where Addressed in Annual Review
PA 05_0103	3(9)	Prepare and <u>implement</u> Air Quality Monitoring Program.	Non-compliant	Deposited dust monitoring was ceased at completion of extraction activities. Whilst not resulting in any environmental issues, the Air Quality Monitoring Program does not explicitly provide for the temporary cessation of monitoring during non-operational periods.	Sections 6.3 and 11

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 OVERVIEW OF OPERATIONS

The Cudgen Lakes Sand Quarry (the Quarry) is located at Cudgen approximately 1km south of the Tweed River and 8km south of the New South Wales/Queensland Border (see **Figure 2.1**). Project Approval 05_0103B was granted 16 June 2009 and modified 19 February 2016. The modified operations include the inclusion of an initial processing area with operations planned to remain south of the existing alignment of Altona Drive for a period of at least 5 years from commencement. The approved layout of the operations is shown in **Figure 2.2** whilst surrounding land ownership, residences and registered groundwater bores are shown in **Figure 2.3**.

Operations at the Quarry were physically commenced on 13 September 2016, site establishment activities commenced on 26 June 2017 and extraction commenced 30 October 2017. The approval for the realignment of Altona Drive (DA05/1450) was physically commenced in 2011 through the placement of sub-base material in the eastern section of the road realignment. Further details on the activities undertaken during the reporting period are provided in Section 4.

2.2 SCOPE AND FORMAT

This Annual Review for the Quarry has been compiled by R.W. Corkery & Co. Pty. Limited on behalf of Gales-Kingscliff Pty Ltd (“the Company”).

This is the ninth Annual Review submitted for the Quarry, following one Annual Environmental Management Report, and is applicable for the period 01 July 2017 to 30 June 2018 (“the reporting period”). The information presented within this Annual Review is based on information compiled by R.W. Corkery & Co. Pty. Limited and provided by Gales-Kingscliff Pty Limited, Neumann Contractors, HMC Environmental Consulting and AGE Consultants.

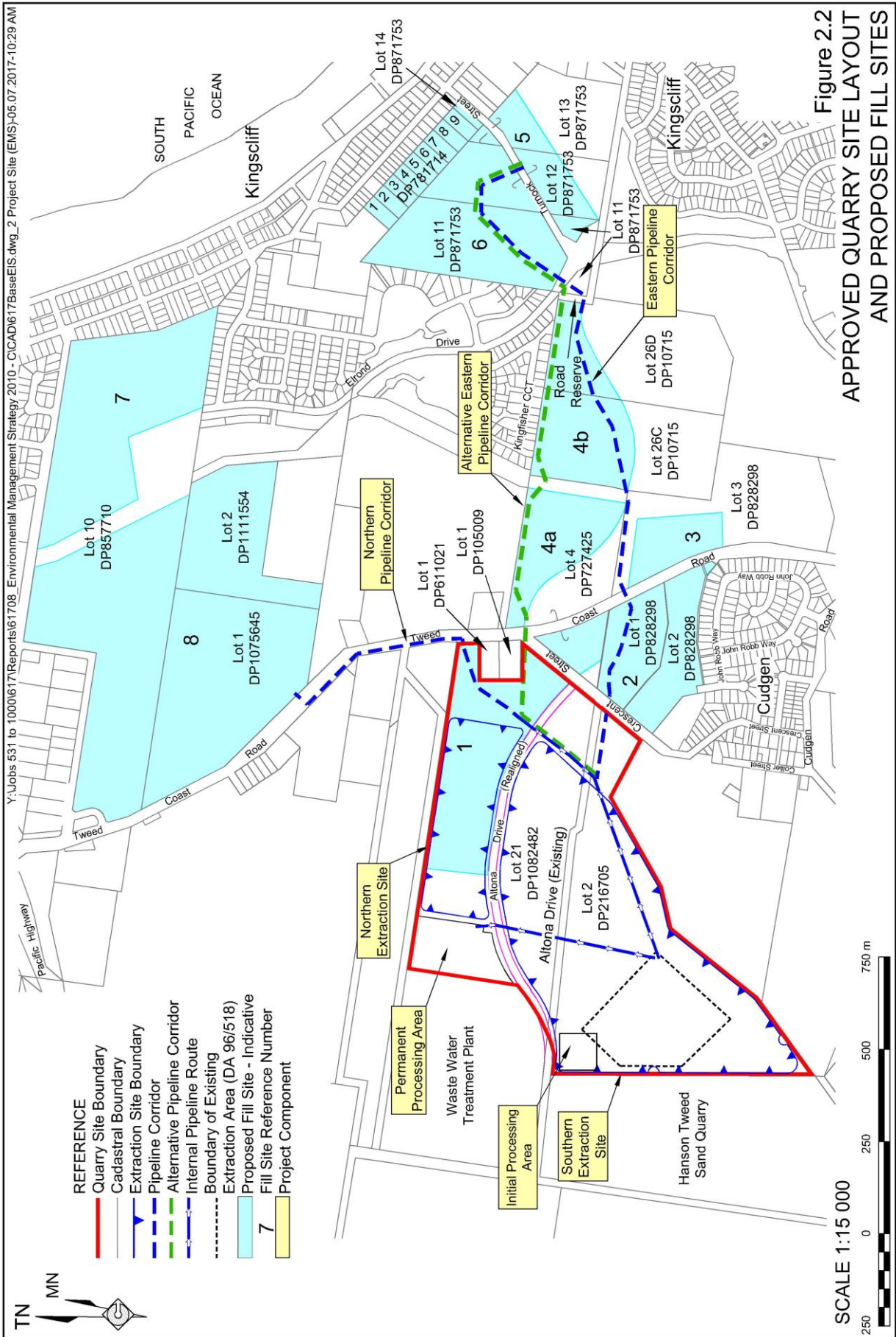
The report generally follows the format and content requirements identified in the *Annual Review Guideline* dated October 2015 and the approval and licencing requirements, as applicable for the reporting period.

2.3 KEY PERSONNEL CONTACT DETAILS

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

Name	Company	Position	24 Hour Contact
Gareth Brown	Neumann Contractors	Contracts Manager	0409 346 555
Stephen Segal	Gales-Kingscliff	Managing Director	0414 322 455
Jeff Holloway	-	Site Caretaker	0402 427 938







3. APPROVALS

The Quarry operates in accordance with the approvals listed in **Table 3.1**.

Table 3.1
Cudgen Lakes Sand Quarry – Consents, Leases and Licences

Consent/Lease/Licence	Issue Date	Expiry Date	Details / Comments
Project Approval 05_0103B	16/06/2009 MOD1 - 19/02/2016	01/07/2029	Issued by the (then) Department of Planning.
Environment Protection Licence 12385	18/11/2005 (licence version date 20 July 2017)	Not Applicable	Issued by NSW Environment Protection Authority (EPA). Renewed annually. Variation pending.
Water Access Licence 40902	09/11/2016	Not Applicable	Issued by Water NSW. Includes 700ML water allocation. Nominated works 30CA321269.
Water Supply Works and Use Approval 30CA321269	01/07/2016	28/02/2021	Issued by Water NSW at commencement of <i>Water Sharing Plan for the North Coast Coastal Sands Groundwater Sources 2016</i> .
DA 05/1450	18/08/2006	Not Applicable	Issued by Tweed Shire Council for the realignment of Altona Drive.

During the reporting period Environment Protection Licence 12385 was varied on 20 July 2017. The variation occurred as a result of consultation with EPA who required that, whilst filling operations were being undertaken, the Cudgen Heights fill site be incorporated into the licence. As filling operations at Cudgen Heights were completed during the reporting period, a licence variation was submitted 3 July 2018 for the removal of Cudgen Heights from the licence. Future fill sites will be added to the licence as appropriate and prior to commencement of filling at those sites.

During the reporting period modification applications were also submitted for PA 05_0103B on 11 January 2018 (MOD2) and 9 March 2018 (MOD3). These applications remain in the response to submissions and assessment stages and have not yet been determined. These modifications aim to further rationalise the extraction and processing operations, including proposed changes to the final lake batters, removal of the northern extraction area and increase in size of the southern extraction area, subsequent modification to the alignment of Altona Road and update of road upgrade requirements.

The compliance review included in **Appendix 1** reflects the conditions relevant as at the end of this reporting period.

4. OPERATIONS SUMMARY

4.1 EXTRACTION OPERATIONS

The first extraction campaign for the Cudgen Lakes Sand Quarry commenced on 30 October 2017 and concluded on 8 February 2018 with up to 352 195m³ of sand hydraulically transferred to the Cudgen Heights fill site. Hydrographic survey on 13 February 2018 confirms a total 'cut' volume of 376 887m³ of which at least 24 692m³ is silt that was returned to the pond resulting in a net removal of up to 352 195m³ of sand. It is noted that, at the time of survey, silts were still settling and, as such, the volume of silt returned to the pond is expected to be slightly greater than measured. Further hydrographic survey is planned during the next reporting period, prior to recommence of extraction, to confirm the final volume of silt returned. A corrected sand and silt value will be reported as part of the next Annual Return. This information will also provide the basis for estimating the future ratio of sand to silt.

No sand was processed or transported by road and no Virgin Excavated Natural Material (VENM) was imported onto the Quarry Site during the reporting period. **Table 4.1** provides the production summary.

Table 4.1
Production Summary

Material	Approved limit (specify source)	Previous reporting period (actual)	This reporting period (actual)	Next reporting period (forecast)
Waste Rock / Overburden ¹	NA	0	0	0
ROM ¹	NA	0	0	0
Coarse Reject ²	NA	0	0	0
Fine Reject ²	NA	0	0	0
Saleable Product ³ (transported by road)	300,000t [PA 05_0103B Condition 2(7)]	0	0	0
Total Extraction	650,000m ³ [PA 05_0103B Condition 2(6)]	0	352,195m ³ #	50,000m ³
Imported VENM	45,000t [PA 05_0103B Condition 2(8)]	0	0	0

Notes: 1. The Quarry does not generate waste rock / overburden or 'Run of Mine' material.
2. Whilst some coarse materials and fines will be generated through sand washing and returned to the extraction ponds, there are no approval limits applicable to these materials.
3. 300 000t is equivalent to approximately 200 000m³.
This is a maximum volume. A more precise volume will be reported as part of the next Annual Review following further hydrographic survey to confirm the final volume of returned silts.

4.2 OTHER OPERATIONS DURING THE REPORTING PERIOD

Site Establishment and Construction Activities

Site establishment and construction activities commenced on 26 June 2017 (i.e. just prior to this reporting period) with the following activities completed during this reporting period.

- Site access improvement works, including extension of the culvert and widening of the access point onto Altona Drive (in accordance with S138 Road Permit DWY_16/0349).

- Installation of piped culverts beneath Crescent Street for passage of the hydraulic fill pipelines (in accordance with S138 Permit DWY_16_0366).
- Construction of the Initial Processing Area pad and bunding.
- Construction of water management bunding around the initial extraction area and completion of initial topsoil stripping.
- Installation of spear points (in accordance with Water Supply Works and Use Approval 30CA321269) within the Southern Extraction Area for 'internal' transfer of water during dredging.
- Construction of an internal access road and dredge launch area to the initial extraction area.
- Assembly and launch of the dredge and assembly of hydraulic pipelines.

Figure 4.1 presents the activity locations whilst **Plates 4.1 to 4.4** provide a snapshot of these activities.

Monitoring

Environmental monitoring continued throughout the reporting period including air, noise and water quality monitoring. Results of this monitoring is summarised in Sections 6 and 7.

Other Activities

As discussed in Section 3, modification applications were submitted for PA 05_0103B on 11 January 2018 (MOD2) and 9 March 2018 (MOD3) with supporting documentation. These applications remain in the response to submissions and assessment stages and have not yet been determined.

No works associated with the realignment of Altona Drive were undertaken during the reporting period.

4.3 NEXT REPORTING PERIOD

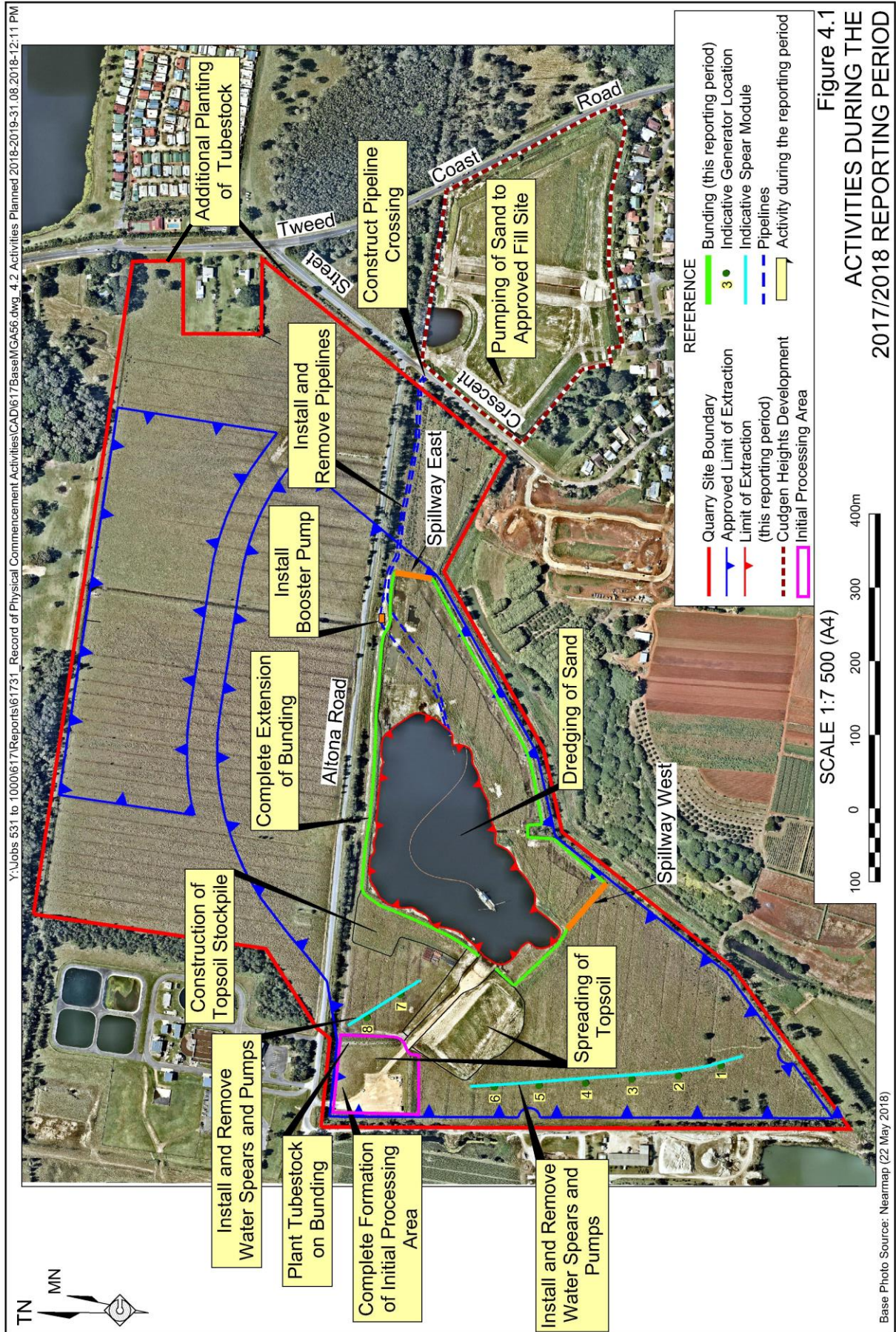
Site Establishment and Construction

Site establishment and construction activities during the next reporting period may include the establishment of processing equipment within the initial processing area and completion of any road upgrades necessary to enable commencement of road transportation.

Extraction, Processing and Transportation

Extraction may continue during the next reporting period, either by dredge or excavator and haul truck for the production of saleable products within the initial processing area. These products would be transported via road. The volume of products will be dependent upon customer demand but has nominally been estimated at 75 000t (approximately 50 000m³)¹. Based on the predicted volumes, extraction would remain within the bunded area created during the previous reporting period.

¹ It is estimated that 1m³ of in situ sand will yield 1.5t of product, however, this conversion factor will be confirmed utilising production records once road transportation commences.



**Plate 4.1 Widened Site Access to
Altona Road**

(Photo: E617G_083)



Plate 4.2 Spears and Pump System

(Photo Source: Neumann Contractors)

Plate 4.3 Soil Stripping Operations

(Photo Source: Neumann Contractors)



**Plate 4.4 Launch of Cutter/Section
Dredge**

(Photo Source: Neumann Contractors)

Further dredging and hydraulic transfer of sand to fill sites is currently not considered likely during the next reporting period and is dependent upon finalisation of approvals and development plans for those fill sites.

No importation of VENM is expected during the next reporting period given that terminal extraction faces will not yet be available for VENM placement.

Monitoring

Surface water, groundwater, air, and noise monitoring will continue to be undertaken as applicable and in accordance with the conditional requirements of Project Approval 05_0103B and the approved management plans.

Other Activities

Based on the information collected during the initial dredging campaign, it is planned to undertake a review and update of the various management plans. In particular, a range of updates to the Soil and Water Management Plan are planned to be undertaken in light of the water monitoring and acid sulfate soil testing results. Proposed updates to the management plans will be submitted to the Department of Planning and Environment and other relevant agencies for review and approval.

The response to submissions for the MOD2 application will be finalised early within the next reporting period. It is anticipated that the application process for both the MOD2 and MOD3 applications will then be finalised during 2018.

No works are currently planned in relation to the realignment of Altona Drive during the next reporting period. Upgrades and maintenance works may be undertaken to existing roads and intersections pending the outcomes of MOD2 and MOD3 and discussions with the operator of the adjacent Tweed Sand Quarry.

Figure 4.2 presents a summary of the planned activities for the next reporting period.

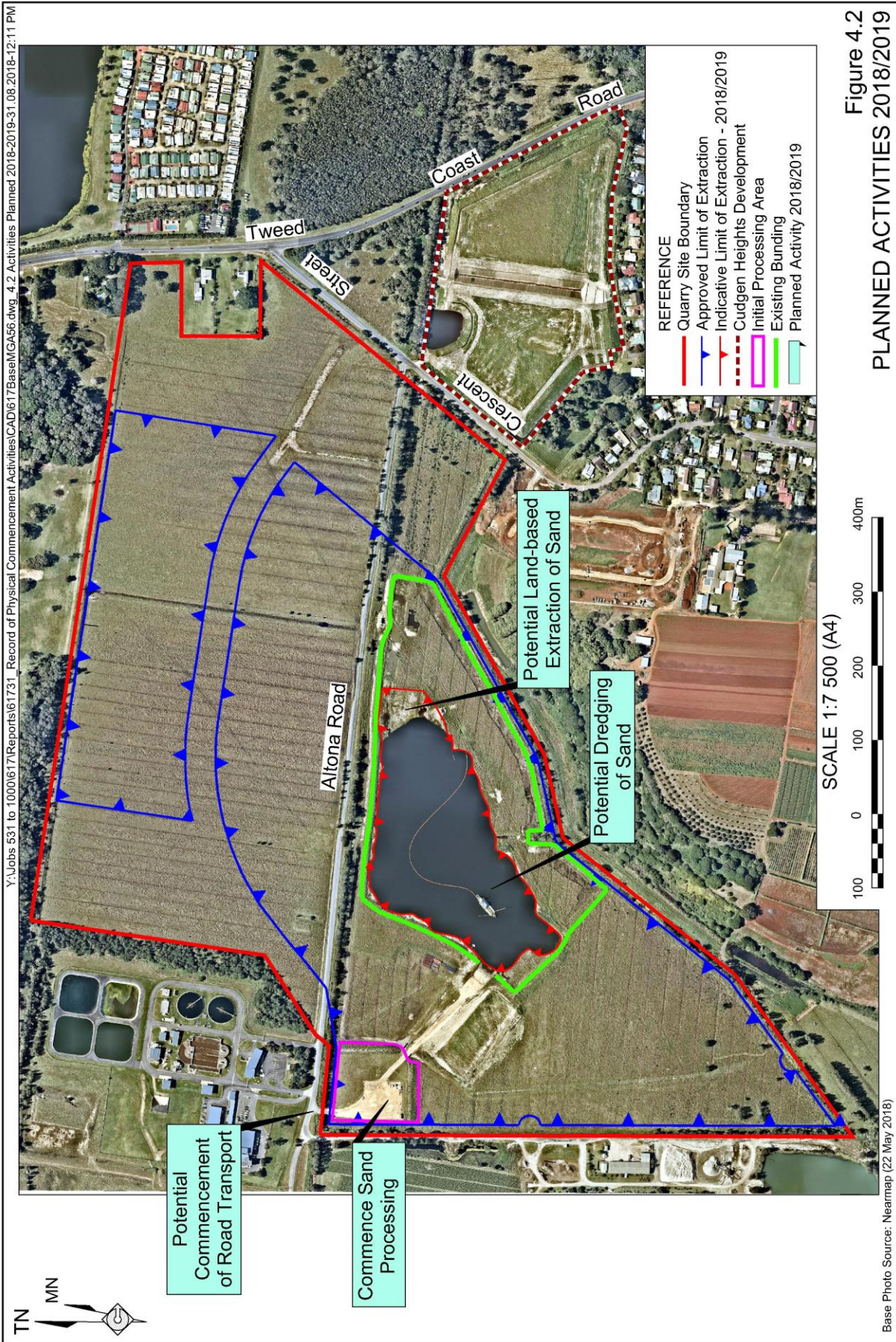


Figure 4.2
PLANNED ACTIVITIES 2018/2019

5. ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

The 2016/2017 Annual Review was submitted to DPE, Tweed Shire Council, Water NSW and EPA on 31 August 2017. The 2016/2017 Annual Review was accepted by DPE on 2 November 2017 without requirement for further actions. No feedback or comments was received from Tweed Shire Council, Water NSW or EPA.

6. ENVIRONMENTAL PERFORMANCE

6.1 SUMMARY OF ENVIRONMENTAL PERFORMANCE

A summary of environmental performance for the principal environmental aspects is provided in **Table 6.1**. Further detail regarding specific environmental aspects is also provided in the following subsections. Environmental performance relating to water is discussed in Section 7.

Table 6.1
Environmental performance

Aspect	Approval criteria / EIS prediction	Performance during the reporting period	Trend/key management implications	Implemented/proposed management actions
Noise	47dB(A) day & evening. 44dB(A) shoulder.	No complaints were received. Quarry-related operations generally not audible at monitoring locations.	No trends identifiable. Currently no management implications.	Hours of operation were strictly complied with. No other specific management measures were required during the reporting period. Monitoring of site establishment activities undertaken 10 July 2017 and operational activities 30 January 2018.
Blasting	Blasting is not an approved activity.	No blasting undertaken.	Nil.	Nil.
Air Quality	PM ₁₀ 24hr = 50ug/m ³ PM ₁₀ Annual = 30ug/m ³ TSP Annual = 90ug/m ³ Dep Dust Annual = 4g/m ² /month	No complaints were received. Several elevated monthly deposited dust results recorded, however, not Quarry related.	No trends identifiable. Currently no management implications.	Due to previous rainfall, no dust suppression was required for site establishment activities during the reporting period. No 'dry' sand extraction or processing during reporting period. Deposited dust monitoring commenced 11 July 2017. PM ₁₀ monitoring to commence prior to road transportation. No other specific management measures currently proposed.
Biodiversity	Establish rehabilitation bond. No significant impacts predicted.	No native vegetation was disturbed.	No trends applicable. Currently no management implications.	The rehabilitation bond for \$163,375 was lodged and accepted by DPE 12/04/17. No further specific management measures currently proposed.
Heritage	Prepare Aboriginal Cultural Heritage Management Plan. No items of heritage have been located.	No heritage items were identified or disturbed.	No trends applicable. Currently no management implications.	Induction by Tweed LALC previously completed. No further specific management measures currently proposed.
Acid Sulfate Soils	Manage acid sulfate soils in accordance with an Acid Sulfate Soil Management Plan.	No exceedance of Scr criteria was recorded for stripped topsoil. Existing soil acidity successfully limed in accordance with management plan.	Stripped topsoil was limed at required rates to treat existing acidity levels.	Continue implementation of Acid Sulfate Soil Management Plan. Ongoing acid sulfate soil monitoring requirements to be reviewed and rationalised.

6.2 METEOROLOGICAL MONITORING

Meteorological monitoring is undertaken in accordance with the Environmental Monitoring Program utilising an on-site automatic rain gauge (1 October 2017) and the Bureau of Meteorology's Coolangatta Station No. 040717. A summary of the rainfall data during the reporting period is presented in **Table 6.2** whilst monthly wind roses are presented in **Figures 6.1a** and **6.1b**.

Table 6.2
Monthly Rainfall Records

Period	Average Monthly Rainfall (mm)												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	
2017	142.8	55.6	444	28.6	100.2	211.8	15.6	6.2	1	212.4	142	77.2	1437.4
2018	60.8	239	147	51.6	42.6	40.2							

Bold italics values relevant to this reporting period.

Total rainfall during the 2017/2018 reporting year was 1 035.6mm, 477.8mm less than the long-term average rainfall of 1 513.4mm recorded at Coolangatta Station.

6.3 NOISE

Environmental Management

Site establishment activities commenced on 26 June 2017 and continued during the reporting period. Section 4.2 provides a summary of these activities. All site establishment and construction activities were undertaken within the approved hours of operation utilising appropriately sized and maintained equipment.

Dredging operations for the first extraction campaign commenced 30 October 2017 and concluded 8 February 2018. The principal items of noise generating equipment utilised included the cutter-suction dredge and booster pump. Both items of equipment had been acoustically treated and noise monitoring confirmed that their sound power levels were below those utilised within previous noise assessments (see **Appendix 2**).

No further noise management measures were able to feasibly be implemented during the reporting period.

Environmental Performance

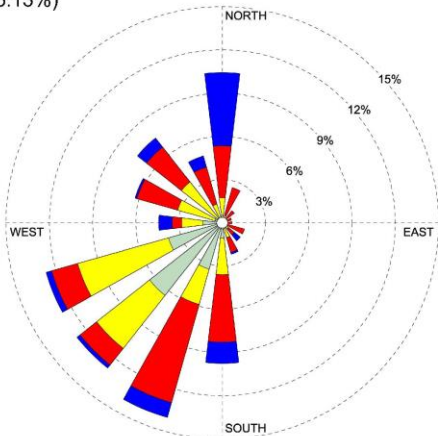
Noise monitoring was undertaken on 10 July 2017 for the site establishment activities and on 30 January 2018 for operational activities. A summary of the monitoring results is provided in **Table 6.2** and copies of the monitoring reports are provided in **Appendix 2**.

During both monitoring events, total noise levels at most monitoring locations exceeded the project-specific criteria. However, noise from the Cudgen Lakes Sand Quarry could not be isolated and, in most cases, was not audible due to the continuous nature of the surrounding noise sources. As a result, Quarry specific noise levels could not be measured through direct monitoring at the specified monitoring locations. Therefore, during the January monitoring, near-field measurements were recorded for both the dredge and booster pump (the key operating equipment) in order to back calculate the contributions of these items at the surrounding monitoring locations (see **Table 6.2**). The calculated contributions were well below the 47dB(A) noise criteria with the highest Quarry contribution calculated at 42dB(A).

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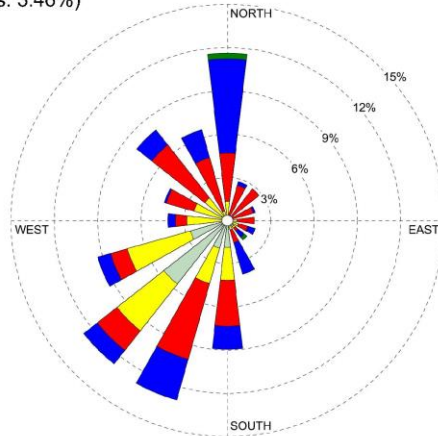
July 2017

(Calms: 6.13%)



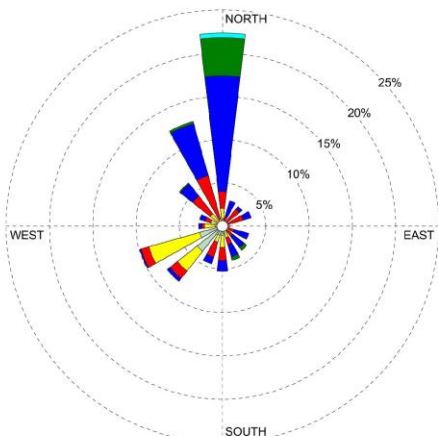
August 2017

(Calms: 3.46%)



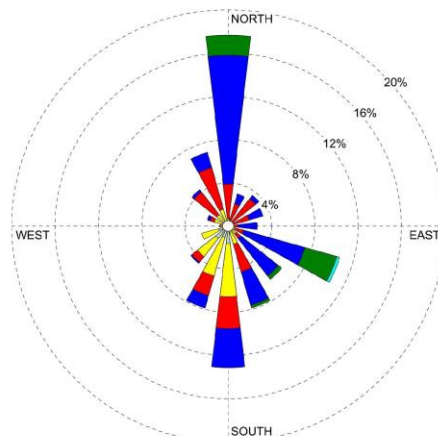
September 2017

(Calms: 3.58%)



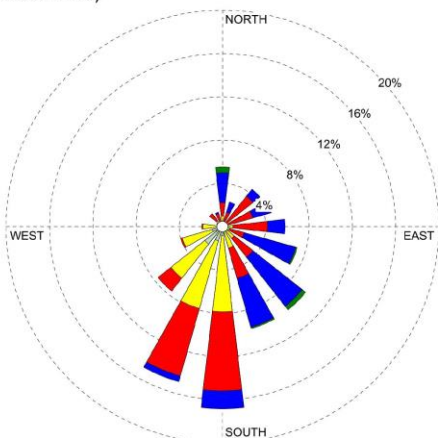
October 2017

(Calms: 2.0%)



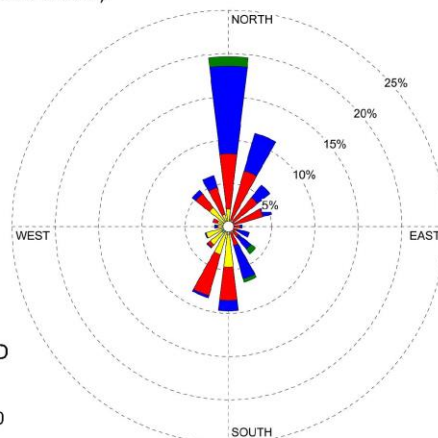
November 2017

(Calms: 1.1%)



December 2017

(Calms: 6.13%)



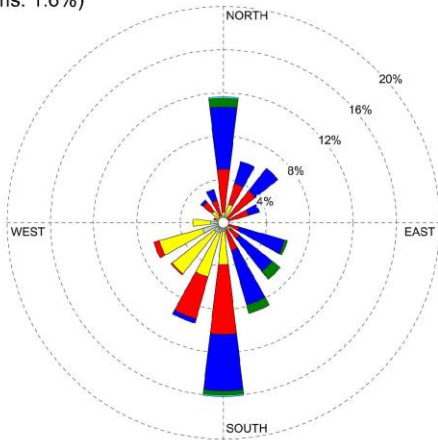
Source: Bureau of Meteorology, Coolangatta Weather Station 040717

Figure 6.1A
WIND ROSES - COOLANGATTA

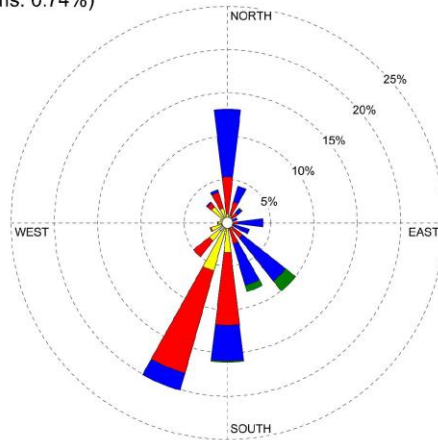


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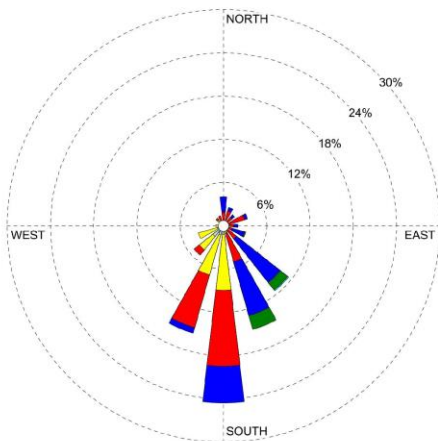
January 2018
 (Calms: 1.6%)



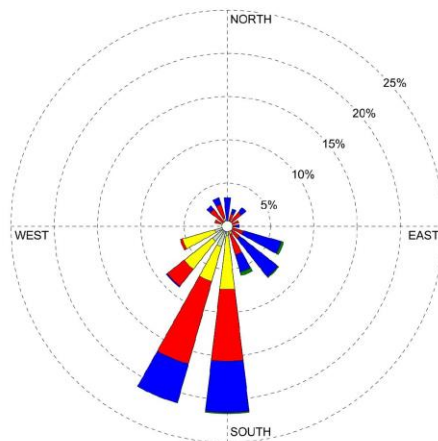
February 2018
 (Calms: 0.74%)



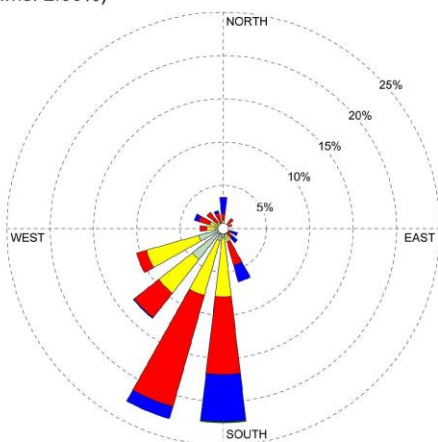
March 2018
 (Calms: 2.13%)



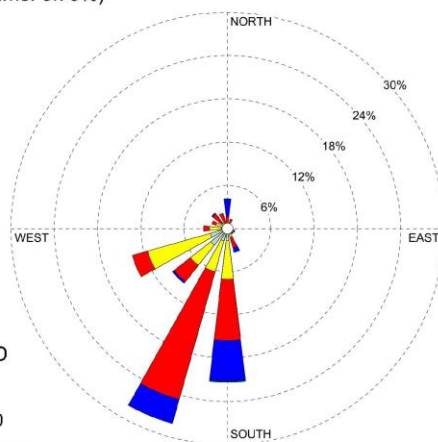
April 2018
 (Calms: 2.2%)



May 2018
 (Calms: 2.66%)



June 2018
 (Calms: 3.73%)



Source: Bureau of Meteorology, Coolangatta Weather Station 040717

Figure 6.1B
 WIND ROSES - COOLANGATTA



Table 6.3
Summary of Attended Noise Monitoring Results – 2017/2018

Location#	Noise Criteria	Attended Monitoring	Comments
	dB(A) LA _{eq(15min)}		
G 216 Tweed Coast Road	47	62.2 (July 2017)	Noise from Quarry not measurable / distinguishable above background. Other noise sources such as traffic noise from Tweed Coast Road dominated background. Rattle from dozer tracks occasionally audible.
		56.7 (Jan 2018)	Noise from Quarry not measurable / distinguishable above background. Calculated contributions: dredge = 36dB(A); booster pump = 39dB(A).
O 607 Cudgen Road	47	64.2 (July 2017)	Noise from Quarry not measurable / distinguishable above background. Dog barking, farm machinery noise constant, birds, chickens, noise from M1. Rattle from dozer tracks occasionally audible.
		46.0 (Jan 2018)	Noise from Quarry not measurable / distinguishable above background. Calculated contributions: dredge = 40dB(A); booster pump = 33dB(A).
B 15 Collier Street	47	56.8 (July 2017)	Noise from Quarry not measurable / distinguishable above background. Farm machinery noise in the distant, noise from ride on mower at school, constant, birds. Rattle from dozer tracks occasionally audible.
		48.4 (Jan 2018)	Noise from Quarry not measurable / distinguishable above background. Calculated contributions: dredge = 41 dB(A); booster pump = 40dB(A).
F 64 John Robb Way	47	42.7 (July 2017)	Distant traffic, electric saw. Dozer tracks audible - measured 44 LA _{max} . Other machinery not measurable above background.
		55.7 (Jan 2018)	Noise from Quarry not measurable / distinguishable above background. Calculated contributions: dredge = 37dB(A); booster pump = 38dB(A).
DD 34A Crescent Street	47	58.2 (July 2017)	Noise from Quarry not measurable / distinguishable above background. Traffic noise from Coast Road dominated background. Rattle from dozer tracks occasionally audible,
		56.6 (Jan 2018)	Noise from Quarry not measurable / distinguishable above background. Calculated contributions: dredge = 40dB(A); booster pump = 42dB(A).

See Figure 6.2

No Quarry-related noise complaints or enquiries were received during the reporting period.

Reportable Incidents and Further Improvements

No reportable noise incidents occurred during the reporting period and no further improvements or management measures are currently planned.

6.4 AIR QUALITY

Environmental Management

Due to substantial rainfall prior to site establishment, the soil material was sufficiently moist so as not to require any specific dust control measures during establishment activities. Extraction was undertaken via dredging (a wet process) with no dry extraction or processing being undertaken. Therefore, no specific dust control measures were required during extraction.

Environmental Performance

Deposited dust monitoring commenced 11 July 2017 and concluded 9 February 2018 (i.e. following completion of extraction). The results of deposited dust monitoring are presented in **Table 6.3**.

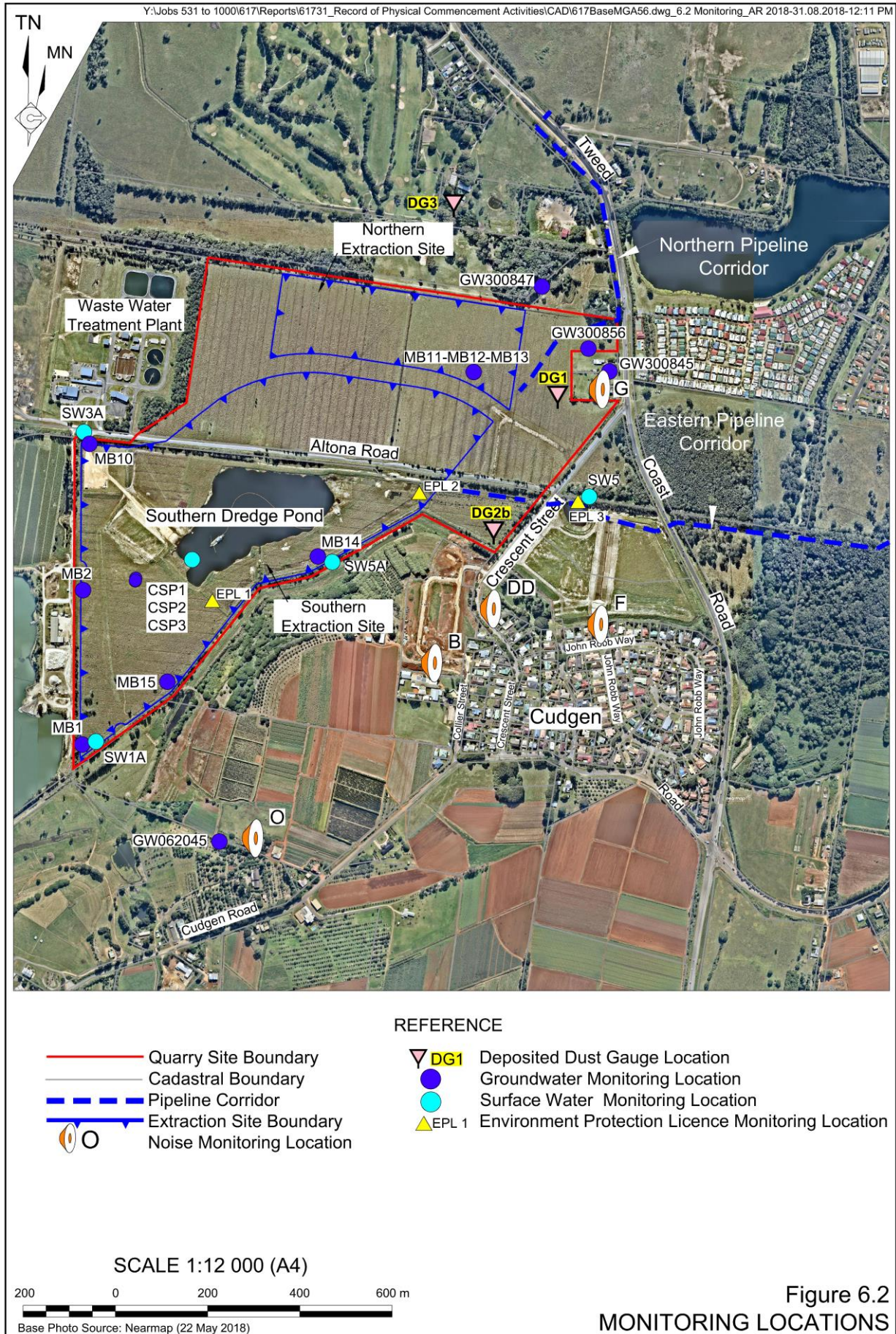


Table 6.4
Summary of Deposited Dust Monitoring Results – 2017/2018

Samples On	Samples Off	Month	DG1		DG2		DG3	
			Insoluble Matter	Rolling Average	Insoluble Matter	Rolling Average	Insoluble Matter	Rolling Average
11-07-17	10-08-17	Jul-17	0.28	0.28	0.98	0.98	0.42	0.42
10-08-17	09-09-17	Aug-17	0.54	0.41	0.82	0.90	0.74	0.58
09-09-17	09-10-17	Sep-17	1.36	0.73	0.66	0.82	0.68	0.61
09-10-17	08-11-17	Oct-17	4.23	1.60	1.71	1.04	0.36	0.55
08-11-17	09-12-17	Nov-17	17.4	4.76	15.55	3.94	1.02	0.64
09-12-17	09-01-18	Dec-17	9.25	5.51	0.84	3.43	0.7	0.65
09-01-18	09-02-18	Jan-18	3.56	5.23	0.39	2.99	1.04	0.71
Average			5.23		2.99		0.71	
Monthly Maximum			17.40		15.55		1.04	
Monthly Minimum			0.28		0.39		0.36	

As can be seen from the results, deposited dust levels remained low during site establishment activities, however, elevated results were recorded at site DG1 during October, November and December 2017. Elevated results were also recorded at site DG2 during November 2017. During these months, only dredging activities (a wet process) were occurring at the Quarry and therefore the Quarry is not considered to have contributed to these elevated results. Given the low levels of deposited dust prior to and following these months, it is considered likely that the annual average monthly deposited dust levels will have remained below the 4g/m²/month criteria.

It is noted that earthworks were commenced during October 2017 at two adjoining residential subdivisions which are potentially the source of this short-term elevation in deposited dust. Review of meteorological conditions during this time indicate that, whilst the dominant wind was from the north during October and December 2017 (~18% and ~20%) a substantial contribution also occurred from the south (~13% and ~10%). During November 2017 winds dominated from the south and south-southwest accounting for approximately 32% of winds (see **Figure 6.1a**) and correspond to the highest deposited dust results recorded at DG1 and DG2. Comparatively, winds from the west and west-southwest (which would be indicative of contributions from the Quarry) were marginal during these months.

No air quality complaints were received during the reporting period.

Reportable Incidents and Further Improvements

No reportable air quality incidents occurred during the reporting period and no further management measures are currently planned. In the event that road transportation is planned to occur during the next reporting, PM₁₀ monitoring will also commence in accordance with the Air Quality Monitoring Program.

It is noted that the Air Quality Monitoring Program does not explicitly provide for temporary cessation of deposited dust monitoring during periods of no operations. Therefore, it is planned to submit an updated Air Quality Monitoring Program to DPE for review and approval which addresses monitoring during non-operational periods.

The updated program will also update the location of gauge DG2. Gauge DG2 was required to be moved on 22 November 2017 due to earthwork requirements on that property associated with a residential subdivision (see location DG2a on **Figure 6.1**). As a result, the gauge was required to be moved by the monitoring consultant northwards to location DG2b to avoid the gauge being destroyed.

6.5 BIODIVERSITY

The rehabilitation bond for \$163,375 was lodged and accepted by DPE on 12 April 2017. No disturbance of native vegetation was required during the reporting period and no specific biodiversity management measures or monitoring was deemed necessary. No incidents occurred during the reporting period and no further improvements are currently planned.

6.6 HERITAGE

Environmental Management

The Contracts Manager for Neumann Contractors, the approved Quarry Operator for the Cudgen Lakes Sand Quarry, was inducted by the Tweed Local Aboriginal Land Council on 2 September 2016 in accordance with the approved Aboriginal Cultural Heritage Management Plan. The Contracts Manager has subsequently inducted all employees undertaking ground disturbing activities. No further management measures were required during the reporting period.

Environmental Performance, Reportable Incidents, and Further Improvements

No Aboriginal heritage sites were identified during the reporting period and no further improvements were deemed necessary. No reportable incidents occurred during the reporting period.

6.7 ACID SULFATE SOILS

Environmental Management

Topsoil stripped during the reporting period was managed in accordance with the Acid Sulfate Soils Management Plan which included sampling and application of lime at rates calculated in accordance with the sample results.

A total of 22 soil samples were previously taken on 29 May 2017 (i.e. during the previous reporting period) for comparison against the action criteria for chromium reducible sulfur content (Scr) of $>0.03\%$ and for Total Actual Acidity (TAA) of $>18\text{mol H}^+/\text{t}$. All samples recorded a Scr of 0.01% or less, except for one sample which recorded a Scr of 0.02% . These results indicate that the soil has extremely limited potential for any further acidification as result of pyritic material and was therefore not considered potentially acid sulfate soil. As the topsoil (the upper 25cm of the soil profile) is well above the water table and the associated reducing conditions, no potential acid sulfate soil is expected to be encountered within the topsoil material.

The existing TAA ranged between 0 and 83mol H⁺/t and averaged 43mol H⁺/t, exceeding the >18mol H⁺/t action criteria. Due to the existing acidity, lime was added at the recommended liming rate (averaged ~31t/ha) to reduce the TAA.

In accordance with the Acid Sulfate Soils Management Plan a total of 18 samples were also collected of the sand hydraulically placed at the Cudgen Heights fill site. All samples recorded a positive acid neutralising capacity / negative net acidity and therefore required no liming or treatment.

Environmental Performance

A total of 21 soil samples were collected on 18 January 2018 to complete validation testing on the previously limed topsoil material. This testing confirmed that, as a result of liming, the TAA was reduced to nil for all samples. All samples also recorded a positive acid neutralising capacity / negative net acidity, indicating that excess neutralising capacity is available and no further liming is required.

Reportable Incidents

No reportable acid sulfate soil incidents occurred during the reporting period.

Further Improvements

Given that the soils naturally have existing acidity, as also occurs in non-acid sulfate soils, and no samples recorded chromium reducible sulfur concentrations near the action criteria (i.e. there was no potential for oxidation and further acidification), it is intended to review and rationalise the acid sulfate soil monitoring program as part of a review of the Soil and Water Management Plan.

No other specific acid sulfate soil management measures were required during the reporting period and no reportable incidents occurred.

7. WATER MANAGEMENT

7.1 WATER TAKE

Applicable water licencing held for the Quarry operations include Water Supply Works and Use Approval 30CA321269 and Water Access Licence (WAL) 40902, which has a water share component of 700ML. The Quarry Site is located within the *Water Sharing Plan for the North Coast Coastal Sands Groundwater Sources 2016*, which commenced on 1 July 2016.

Water usage calculations confirm a ‘water take’ during the reporting period of 355.3ML, i.e. well below licenced water allocation. Details of the water take calculations are presented in Section 8.6 of the 2017/2018 Annual Groundwater Monitoring Report (see **Appendix 4**).

7.2 SURFACE WATER

Environmental Management

The principal surface water management measure is the installation of the bunding surrounding the extraction pond which prevents ‘clean’ water running into the extraction area and discharge of water from within the extraction area (excluding during flood events). Stripped topsoil and disturbed areas not required for ongoing operations were temporarily rehabilitated through selective placement of the upper layer of soil containing the pasture grass on the surface of the completed area. This resulted in effective and rapid re-establishment of the pasture cover without further seeding being required (see Section 8.1). No further surface water controls were required during the reporting period.

Environmental Performance

Water quality monitoring was undertaken throughout the reporting period at four surrounding monitoring sites located within existing agricultural drains (see **Figure 6.2**). Monitoring was also undertaken in the dredge pond, however, as the pond is effectively a ‘window’ into the groundwater table, this monitoring is discussed with the groundwater information (Section 7.3) but results for key analytes are presented graphically for comparative purposes.

A summary of the monitoring results is provided in **Table 7.1**, key analytes are displayed graphically in **Figure 7.1** and a discussion of the key parameters is provided as follows. A full copy of the non-summarised results is presented in **Appendix 5**. In reviewing the results, it should be noted that there were no discharges during the reporting period.

Physical Parameters

During the reporting period there were five instances of turbidity exceeding the upper objective limit (20NTU). However, none of these exceedances coincided with elevated total suspended solids and, except for one, were within the ranges recorded pre-extraction. Therefore, the Quarry is not likely to have influenced these turbidity levels.

Table 7.1
Surface Water Monitoring Summary

Parameter	Physical										Major Cations & Anions						Metals			Nutrients / Bacteria / Algae										
	Water Level m AHD	Temp °C	pH	Electrical Conductivity µS/cm	Dissolved Oxygen mg/L	Redox mV	Total Suspended Solids mg/L	Turbidity NTU	Oil & Grease mg/L	Sodium mg/L	Calcium mg/L	Magnesium mg/L	Potassium mg/L	Chloride mg/L	Sulfate mg/L	Bicarbonate mg/L	Aluminium mg/L	Arsenic mg/L	Iron (filterable) mg/L	Total Phosphorous mg/L	Reactive Phosphorous mg/L	Total Nitrogen mg/L	Nitrite mg/L	Nitrate mg/L	TKN mg/L	Ammonia mg/L	NOx mg/L	Faecal coliforms cells/ml	Enterococci cells/ml	
Objectives	-	-	6.5-8.5	<3000	>6		5-20	10	<500		<100	<40	<1000	<800	<400	<0.5	<0.42	<20	0.01	<0.005	0.35				<20	0.01	<1000/100	<230/100		
SW1A																														
Pre-Extraction	Average	0.42	23.1	6.98	1244	2.17	103.5	30	20.3	3.7	35	17	8.7	6	59	15.1	68	0.10	0.001	1.45	0.27	0.04	1.83	0.01	0.010	1.83	0.04	0.017	828	1610
	Maximum	0.79	26.8	8.42	19510	8.17	196	57	32	5	51	26	12	9	120	66	94	0.45	0.002	3.13	0.56	0.12	4.27	0.01	0.01	4.25	0.08	0.02	2040	4160
	Minimum	0.05	18.7	6.34	6	0.24	-16.6	13	10.7	2	17	8	4.9	1	26	1	41	0.01	0.001	0.17	0.1	0.01	0.6	0.01	0.009	0.6	0.01	0.009	30	80
2017/2018 (Extraction)	Average	0.77	21.5	7.16	337	3.86	146.2	20	17.8	5.0	139	41	22	7	268	82.7	90	0.02	0.001	0.65	0.17	0.01	1.9	0.01	0.36	1.53	0.09	0.36	273	1483
	Maximum	0.86	27.5	8	2599	6.15	220	27	23.6	5	334	92	49	15	682	232	130	0.05	0.001	1.04	0.18	0.02	2.2	0.01	0.85	1.7	0.2	0.85	370	3650
	Minimum	0.6	18.9	6.38	107	1.7	-83	12	6.5	5	25	8	5	2	33	6	53	0.01	0.001	0.45	0.16	0.01	1.6	0.01	0.01	1.3	0.02	0.01	160	160
SW3A																														
Pre-Extraction	Average	0.448	25.7	7.73	4524	5.11	119.9	39.7	14.0	4	275	84	51.2	18	627	102	219	0.14	0.00	0.52	0.45	0.126	2.47	0.04	0.05	2.46	0.04	0.04	845	1077
	Maximum	0.880	29.5	8.93	24200	9	198	130	21.7	5	808	161	108	31	1700	265	360	0.75	0.005	0.92	0.64	0.210	3.5	0.07	0.07	3.4	0.16	0.14	2410	3880
	Minimum	0.048	22.7	6	488	0.36	55	15	6.5	2	76	13	9.3	5	110	15	51	0.01	0.001	0.21	0.23	0.070	1.6	0.01	0.03	1.6	0.02	0.02	140	10
2017/2018 (Extraction)	Average	0.770	21.6	7.34	397	4.26	169.1	11	9.5	5	267	133	62.5	14	496	524	108	4.35	0.00	29.96	0.11	0.010	1.90	0.01	0.01	1.9	0.33	0.02	705	730
	Maximum	0.770	27.8	8	3202	6.21	339	11	16.7	5	470	163	74	18	911	775	214	8.69	0.005	59.8	0.12	0.010	2.3	0.01	0.01	2.3	0.63	0.02	1400	1400
	Minimum	0.770	18.5	3.99	16	2.52	-11.8	11	2.3	5	63	103	51	10	80	273	1	0.01	0.002	0.11	0.1	0.010	1.5	0.01	0.01	1.5	0.03	0.01	10	60
SW5A																														
Pre-Extraction	Average	0.41	22.9	7.37	291	3.39	109.9	13.7	10.0	4	28	14.0	8.1	4.2	53	13.9	59	0.18	0.001	1.073	0.19	0.030	1.28	-	-	0.90	0.02	0.40	413	1637
	Maximum	0.76	26.6	9.3	602	7.09	199	19	26	5	37	21	14	5	123	28	94	1.18	0.001	5.14	0.26	0.050	1.93	0	0	1.91	0.02	1.2	960	3120
	Minimum	0.05	18.9	6.5	62	0.39	19	8.8	4.5	2	13	5.9	3	0.9	16	1	20	0.01	0.001	0.06	0.11	0.020	0.87	0	0	0.01	0.01	0.02	10	80
2017/2018 (Extraction)	Average	0.77	21.4	7.06	460	3.81	123.6	25	11.8	5	232	82.3	39.3	9.3	447	171	148	0.01	0.00	0.14	0.22	0.027	1.40	0.01	0.01	1.40	0.02	0.01	1240	956.67
	Maximum	0.82	25.5	7.9	3865	8.28	205	36	23.7	5	495	166	82	18	997	410	208	0.01	0.001	0.31	0.3	0.060	1.9	0.01	0.01	1.9	0.04	0.01	2640	1400
	Minimum	0.7	19.0	4.6	92	1.1	-84.2	14	3.7	5	36	18	9	2	43	11	105	0.01	0.001	0.06	0.12	0.010	1	0.01	0.01	1	0.01	0.01	430	730
SW5																														
Pre-Extraction	Average	0.405	23.5	6.94	1212	1.60	142.8	31	17	4	161	41	26.9	9	273	79	149	0.15	0.001	0.88	0.22	0.052	2.40	0.01	0.08	1.93	0.23	0.48	208	567
	Maximum	0.730	28.1	7.51	1808	3.12	197.0	58	25	5	255	77	40	14	424	316	250	0.38	0.002	2.15	0.45	0.140	3.35	0.01	0.08	3.35	0.98	2.70	430	1760
	Minimum	0.072	20.4	6.33	267	0	65.2	10	11	2	29	13	5.5	5	44	15	32	0.01	0.001	0.25	0.06	0.010	1.44	0.01	0.08	0.01	0.01	0.02	10	80
2017/2018 (Extraction)	Average	0.573	21.5	7.25	761	3.88	151.7	39	26.8	5	458	145	77	17	863	289	263	0.01	0.002	0.24	0.11	0.010	1.90	0.01	0.05	1.87	0.31	0.05	243	473
	Maximum	0.610	27.4	7.98	4296	10.79	227	39	46.7	5	579	190	96	23	1050	395	304	0.01	0.002	0.52	0.14	0.010	2.20	0.01	0.12	2.2	0.82	0.12	460	530
	Minimum	0.520	18.7	6.76	174	0.57	-12	39	11.9	5	265	75	46	11	520	119	218	0.01	0.001	0.08	0.08	0.010	1.40	0.01	0.01	1.4	0.01	0.01	90	370



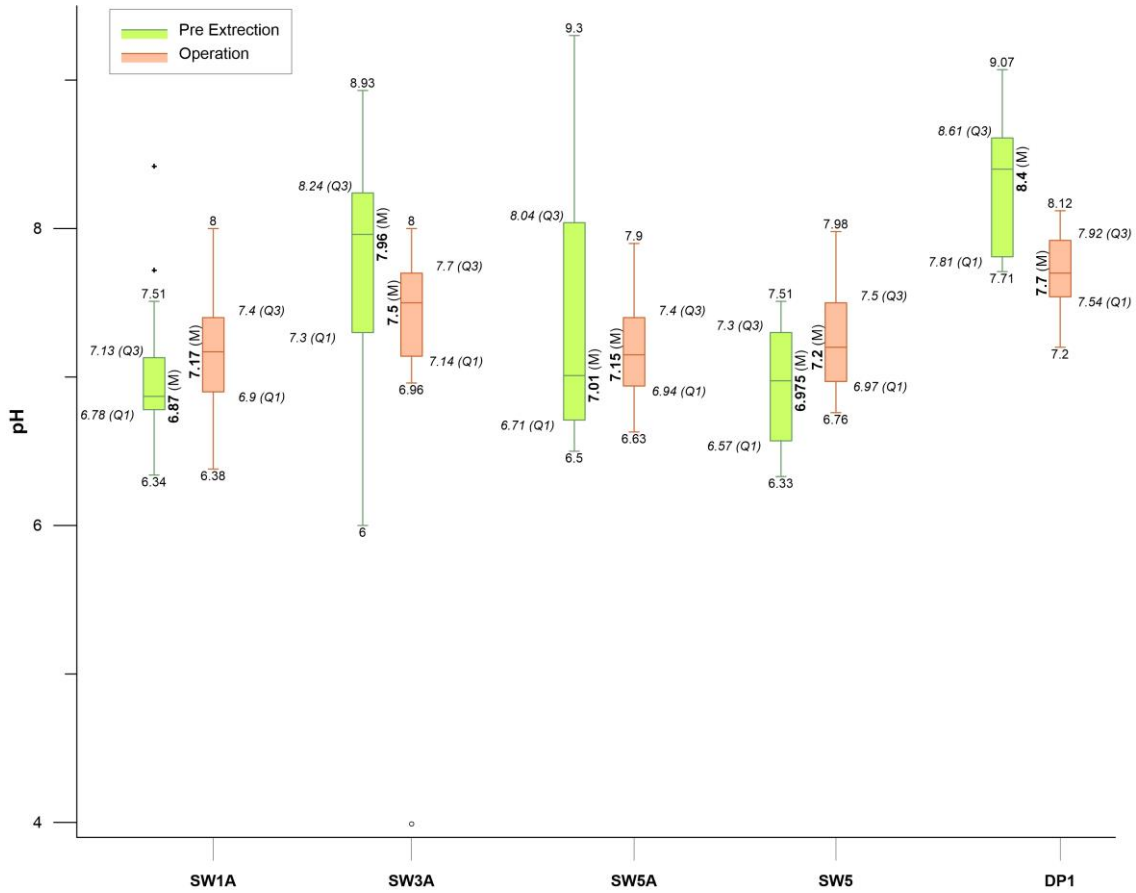


Figure 7.1a Surface Water Quality Parameters - pH

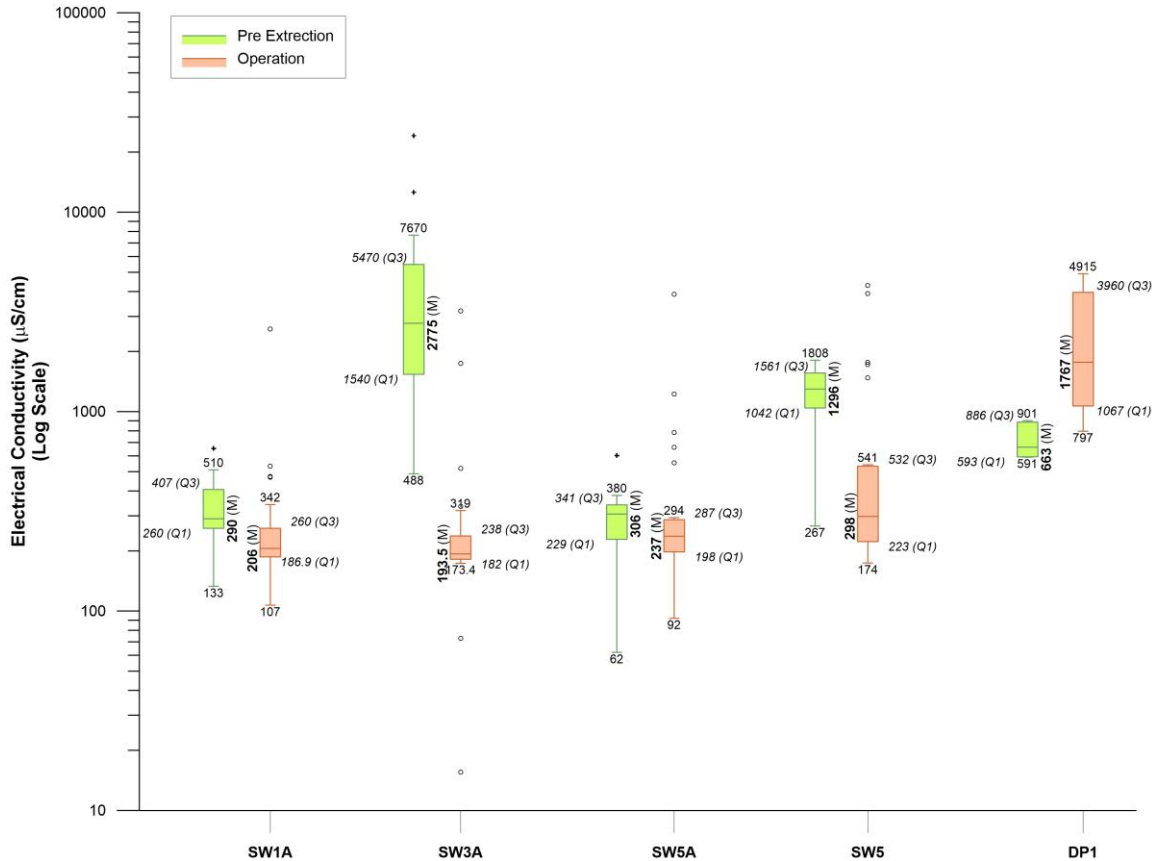


Figure 7.1b Surface Water Quality Parameters – Electric Conductivity



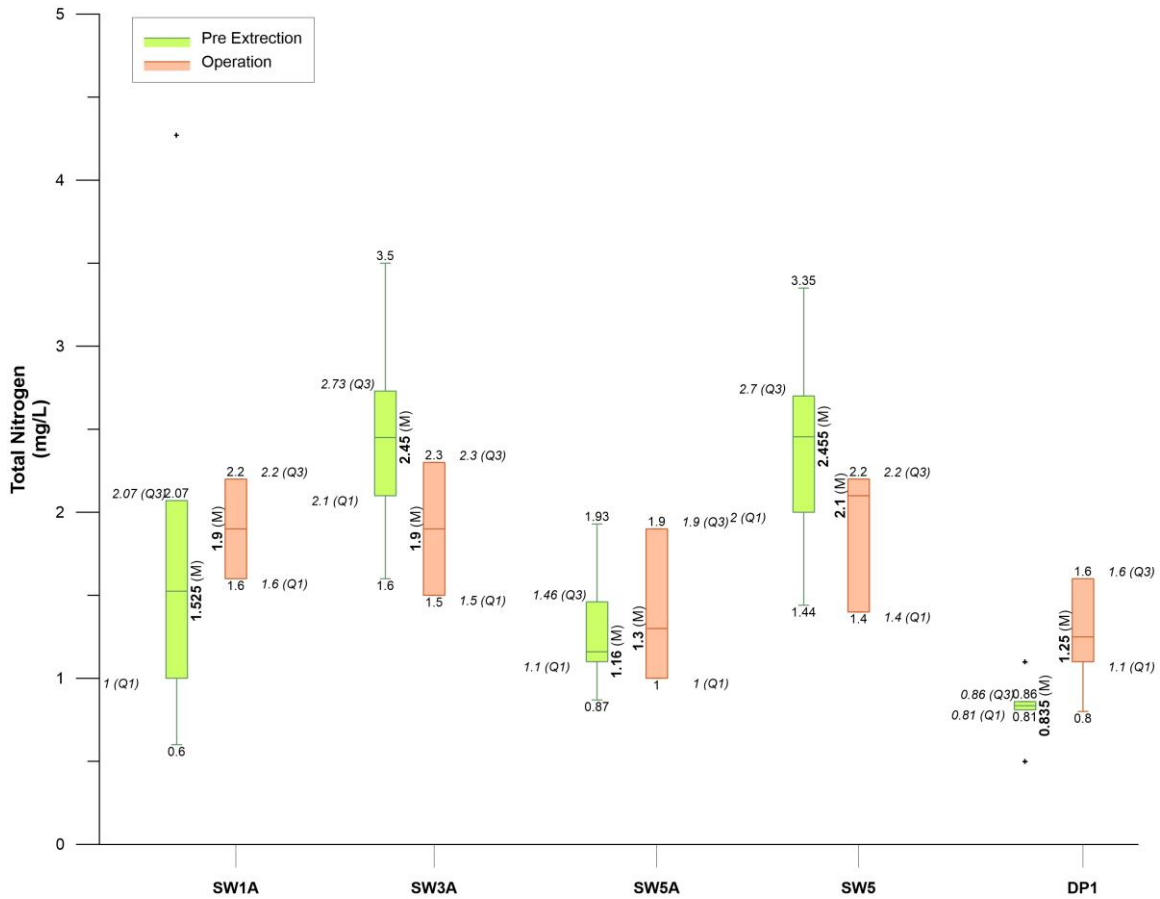


Figure 7.1c Surface Water Quality Parameters – Total Nitrogen

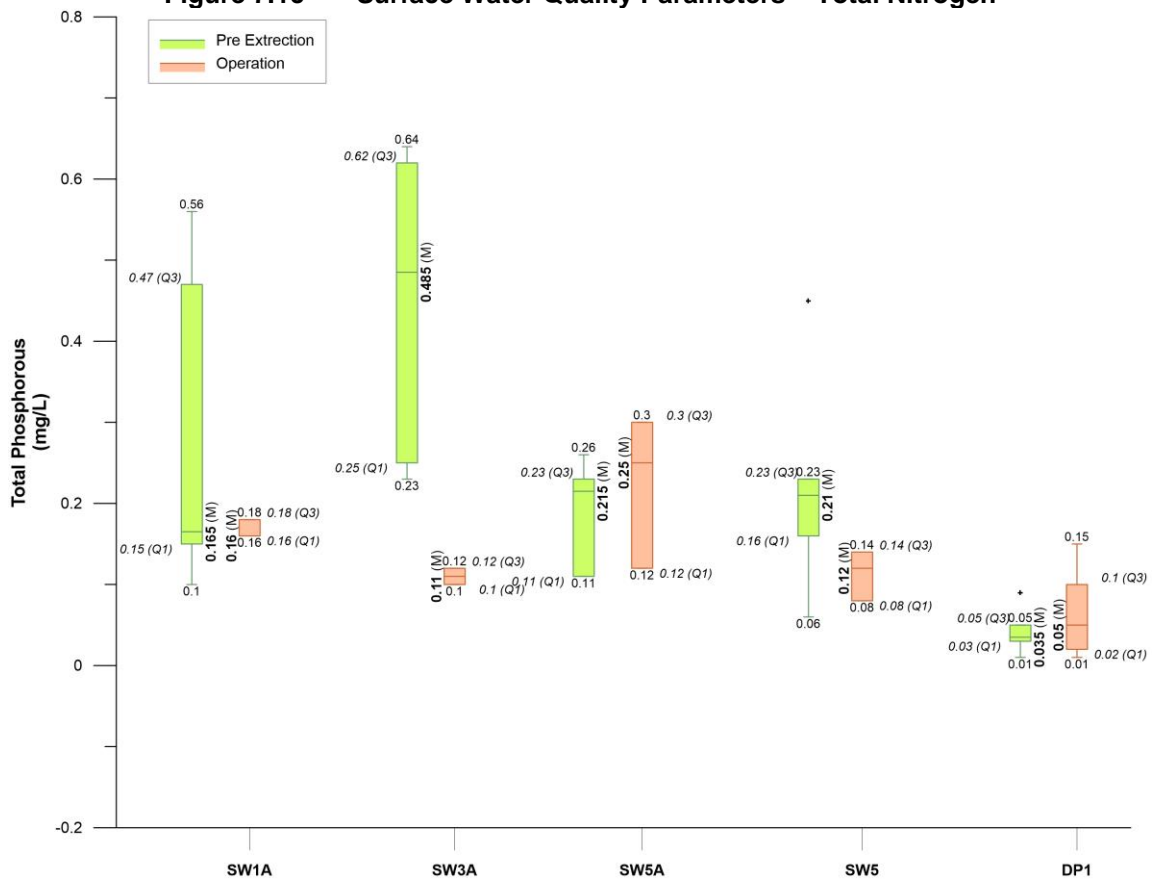


Figure 7.1b Surface Water Quality Parameters – Total Phosphorous

The average electrical conductivity (EC) remained below the objective limit at all surface water monitoring sites, however, the EC was above the objective the limit ($3\,000\mu\text{S}/\text{cm}$) at SW3A ($3\,202\mu\text{S}/\text{cm}$ on 28/11/17), SW5A ($3\,865\mu\text{S}/\text{cm}$ on 7/02/18) and SW5 ($3\,902\mu\text{S}/\text{cm}$ on 11/01/18 and $4\,296\mu\text{S}/\text{cm}$ on 7/02/18). However, elevated EC naturally occurs within these drains with pre-extraction ECs of up to $24\,200\mu\text{S}/\text{cm}$ having been recorded at both SW3A and SW5. Notably, the EC recorded at MB14, adjacent to SW5A, on 7/02/18 was $751\mu\text{S}/\text{cm}$. This indicates that the groundwater was not contributing to the elevated EC. The agricultural drains are known to be affected by tidal influences which is the likely cause of the recorded ECs.

The average pH similarly remained within the objective limits, however, the minimum pH recorded at SW1A (6.38 on 7/02/18) and SW3A (3.99 on 7/02/18) fell below the objective limit of 6.5. At SW1A, the lowest pH of 6.38 remains within the pre-extraction range and is only marginally below the objective limit. However, a pH of 3.99 has not previously been recorded at SW3A. A similarly anomalous result, pH of 2.73, has historically been recorded at SW5. Given that aluminium and iron levels were also elevated at SW3A on 7/02/18 it is considered likely the low pH is the result of acidification of acid sulfate soils.

However, it is considered that this low pH result is not a result of the dredging operations. In order for the dredging operations to have resulted in this low pH, drawdown levels would need to have caused acidification of acid sulfate soils. However, groundwater levels within MB10, located adjacent SW3A ranged between -0.91m AHD and 0.19m AHD with an average of -0.38m AHD during the dredging operations. The water level on 7 February was -0.46m AHD . These levels are well within the predicted range of drawdown.

Furthermore, the pH recorded at SW3A remained above 7.0 during the dredging operation with a pH of 7.9 recorded at SW3A one week prior (31/01/18). Therefore, the water levels over the 3 month period between commencement of dredging on 30 October 2017 and 31 January 2018 caused no discernible impact on the pH at SW3A. The pH within groundwater monitoring bore MB10 similarly remained above 7.79 during dredging operations.

The pH at surface water monitoring sites SW1A and SW5A also did not experience declines in pH despite their close proximity to the dredging operations and similar groundwater level drawdowns occurring in their respective corresponding groundwater bores MB1 and MB14. Rainfall records do not indicate any likely influence and no other activities occurring at the Quarry would have contributed to this sudden drop in pH at SW3A. Therefore, for unknown reasons not related to the operations at the Quarry, the pH at SW3A experienced a sudden short-term drop in pH despite the pH in local groundwater remaining alkaline. Therefore, the low pH water is likely derived from elsewhere in the locality.

Dissolved oxygen was regularly below the objective limit at all monitoring sites, however, the levels were consistent historical monitoring prior to commencement of extraction.

Oil and grease was consistently below the objective limit at all sites.

Major Cations and Anions

All major cations and anions remained within the objective limits except for one sampling event on 7 February 2018 at SW5 where sodium ($579\text{mg}/\text{L}$) and chloride ($1\,050\text{mg}/\text{L}$) slightly exceeded the limits ($500\text{mg}/\text{L}$ and $1\,000\text{mg}/\text{L}$ respectively). This corresponded with an elevated EC, indicating some tidal influence and is consistent with the previous interpretation of pre-extraction monitoring results.



Metals

As discussed above, filterable iron (59.8mg/L) and aluminium (8.69mg/L) exceeded the objectives (<20mg/L and <0.5mg/L respectively) at SW3A on 7/02/18, corresponding to the low pH recording. Iron and aluminium remained below the objective limits at all other sites and arsenic remained well below the objective limits during all sampling events. This supports that the elevated results for SW3A on 7/02/18 are anomalous and likely related to a short-term acidification event in the locality.

Nutrients and Bacteria

Total nitrogen and phosphorous were elevated at all monitoring sites for all sampling events and is consistent with baseline levels recorded pre-extraction. The elevated levels are considered likely the result of previous and existing surrounding agricultural uses.

Elevated levels of faecal coliforms and enterococci were also regularly recorded during most monitoring events at all sites. These levels are consistent with baseline levels recorded pre-extraction and the elevated nitrogen and phosphorous levels.

The levels of nutrients and bacteria in the surrounding drainage network are considered not to have been affected by the Quarry operations.

No discernible trends are yet evident for water quality in the surrounding agricultural drains.

Reportable Incidents

No reportable surface water incidents occurred during the reporting period with Quarry operations considered not to have adversely effected surface water quality in the surrounding agricultural drains.

Further Improvements

Given the large suite of analytes currently recorded, it is proposed that the analytes monitored and frequency of sampling be reviewed and reduced to those that are providing useful information. It is expected that this review will be consistent with the recommended revised groundwater monitoring program (see Section 7.3). A revised Soil and Water Management Plan with the proposed updated surface water monitoring program will be prepared and submitted to DPE and Water NSW for review and approval.

7.3 GROUNDWATER

Environmental Management and Performance

A full and detailed review of groundwater matters is included in the 2017/2018 Annual Groundwater Monitoring Report presented as **Appendix 4**. A summary of the key findings is provided as follows.

Groundwater levels and water quality were monitored in ten dedicated monitoring bores, and at three regional private bores throughout the reporting period (see **Figure 6.2**). Additionally, water was measured within the dredge pond at both surface and regular depth intervals. In addition to manual sampling, the monitoring network includes seven continuous groundwater level loggers, three of which also record electrical conductivity.

Groundwater Levels

Groundwater levels responded as expected with a reduction in levels observed at the commencement of dredging and a rapid recovery following cessation of dredging. Groundwater levels did not fall below the trigger levels (>1.75m drawdown over a 6 month period) as outlined in the approved Soil and Water Management Plan. The greatest drawdown was observed at CSP3 (located in the central western part of the Quarry Site – see **Figure 6.2**), with the lowest level recorded at -1.87m AHD. However, drawdown below -1.75m AHD only occurred between 4 and 6 December 2017 with the spear system switched off on 5 December 2017 allowing water levels to recover.

The highest groundwater drawdown to the south (i.e. with potential to affect the adjoining landholder R. Julius) was -0.52m AHD (MB14) and -1.07m AHD (MB15), well within the predicted drawdown levels. Groundwater levels within the dredge pond were managed through use of the spear system to internally transfer water thereby avoiding a concentrated area of drawdown. Drawdown within the dredge pond did not exceed -1.10m AHD.

To understand the groundwater drawdown more broadly, groundwater contours were generated from the monitoring data. These indicate that the approximate 0.1m extent of drawdown was limited to a 300m distance from the pond towards the north and east (i.e. remaining within the Quarry Site) and 500m to the west. Monitoring did not indicate any impacts from drawdown at the surrounding registered groundwater bores.

Groundwater Quality

Groundwater quality monitoring shows that the dredging campaign had little direct impact on groundwater quality at surrounding groundwater bores. The critical parameters that would indicate development of acid sulfate soil conditions are pH, iron, aluminium and arsenic ions.

The pH of the groundwater remained within the objective of 6.5 to 8.5 in the monitoring bores before, during and after the dredging, with the exception of MB2 which is consistently about pH 5.50 and corresponds with the pH recorded in pre-extraction monitoring. Within the dredge pond the pH remained within a narrow band of pH 7 to 8.

The metals also did not exceed the water quality objective values, except for iron at MB2 which was occasionally over or near to the water quality objective during sand extraction. Similar to pH, iron has previously been recognised as elevated in bore MB2 pre-extraction. Within the dredge pond all metals remained either below or close to the limit of detection at both surface and throughout the profile.

The EC in monitoring bores remained within the guideline of <3 000µS/cm, except for bores MB10 and MB13 which recorded maximum ECs of 36 887µS/cm and 34 036µS/cm respectively. These two bores have the screened section located close to the basal saline layer in the shallow aquifer and have historically recorded elevated ECs of up to 43 800µS/cm and 36 800µS/cm respectively, i.e. greater than those recorded during the reporting period.

Within the dredge pond, the EC pre-dredging remained less than 1 000µS/cm and increased throughout the campaign reaching a maximum of 4 994µS/cm (at 8m depth). An increase in the EC within the dredge pond was expected due to mixing of the deeper brackish water with the shallow fresh water. Following completion of dredging, the EC declined to <4 000µS/cm across all depths by 31 May 2018, likely due to dilution from rainfall and recharge of fresh groundwater from the upper part of the shallow Quaternary sand aquifer.

Levels of phosphorous and nitrogen were consistently above the water quality objective values at all monitoring locations throughout the reporting period and is reflective of the pre-extraction conditions. The high nutrient loadings are likely due to previous agricultural land use at the Quarry Site and existing surrounding agricultural land uses and are not related to Quarry operations. Of note, the levels of ammonia in MB10 greatly exceed the guideline values, prior, during and after dredging. As this bore is located directly adjacent to the waste water treatment plant the ammonia could be originating from the treatment plant. Ongoing monitoring is required.

As would be expected with the high nutrient levels, Enterococci were frequently observed in high concentrations in MB10, MB11, MB12 and MB13. The presence of Enterococci is likely attributed to previous stocking of the property with cattle and possibly poultry. The values were also high in the private registered bores, prior to, during and post dredging.

In summary, analysis groundwater quality parameters shows that the dredging had little direct impact on groundwater quality.

Reportable Incidents

There were no reportable groundwater incidents during the reporting period.

Further Improvements

In light of the monitoring results and experience gained during the initial dredging campaign undertaken during this reporting period, the following improvements and rationalisation of monitoring are planned to be undertaken.

Should a spear system be planned to be used for greater than 6 months, additional spears would be installed at either end of the spears and in the centre and either side of the spears to monitor groundwater levels. This will allow more rapid assessment of groundwater drawdown from the spears and alteration of the rate of pumping / scheduling of pumping such that the system is less likely to be required to be switched off.

The Groundwater Monitoring Program (forming part of the Soil Water Management Plan) will also be reviewed and updated in consultation with DPE and Water NSW in order to rationalise the number of analytes and frequency of sampling, consistent with the program recommended by AGE Consultants (see Section 12 of **Appendix 4**).

8. REHABILITATION

8.1 REHABILITATION PERFORMANCE DURING THE REPORTING PERIOD

Figure 8.1 shows the status of disturbance and rehabilitation at the end of the reporting period whilst Table 8.1 provides a summary of the disturbance and rehabilitation areas.

Table 8.1
Rehabilitation Summary

Quarry Area Type	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
	Year 8 (ha)	Year 9 (ha)	Year 10 (ha)
Total Quarry footprint	5.7 ¹	11.8 ²	11.8 ³
Total active disturbance	5.7 ¹	11.8 ²	11.8 ³
Land being prepared for rehabilitation	0	0	0
Land under active rehabilitation	0	0	0
Completed rehabilitation	0	0	0

Notes: 1. Includes approximately 1.2ha of temporary rehabilitation.
2. Includes approximately 3.6ha of temporary rehabilitation.
3. Estimate pending commencement and extent of operation dredging during next reporting period.

During the reporting period, the total active disturbance area increased to 11.8ha as a result of the completion of site establishment activities and initial extraction campaign. However, of this active disturbance area, approximately 3.6ha is considered to have been temporarily rehabilitated as at the end of this reporting period. Temporarily rehabilitation activities during the reporting period included spreading of topsoil across areas of the Initial Processing Area not yet utilised and across the area of the previous sand stockpile disturbed to create the Initial Processing Area. In both these instances and also as part of the bund construction and creation of topsoil stockpiles, topsoil with the existing grass cover was placed on the surface in order to rapidly re-establish the grass cover. As a result, seeding of pasture species was not required.

Landscaping activities were also undertaken by Bushland Restoration Services including planting 450 additional tubestock for the visual screening along Crescent Street during September 2017 and a further 30 replacement tubestock in October 2017. A total of 300 tubestock were also planted on the southern and eastern amenity bunding on the temporary processing area during October 2017. Maintenance activities, including watering of tubestock and spraying of grass around tubestock, occurred throughout the reporting period. Plates 8.1 to 8.4 show the progress of these landscaping works.

A small area (approximately 0.5ha) of disturbance is also present in relation to the physical commencement of DA 05/1450 for the realignment of Altona Drive. No rehabilitation works for this area are planned until following the realignment of Altona Drive. As these works are managed under separate approval, these areas are not included in Table 8.1.

8.2 ACTIONS FOR THE NEXT REPORTING PERIOD

No specific rehabilitation actions or trials are planned during the next reporting period and no areas will become available for final rehabilitation. Further, given that extraction activities during the next reporting period are expected to be confined to the existing initial extraction area, no additional areas are expected to require temporary rehabilitation.

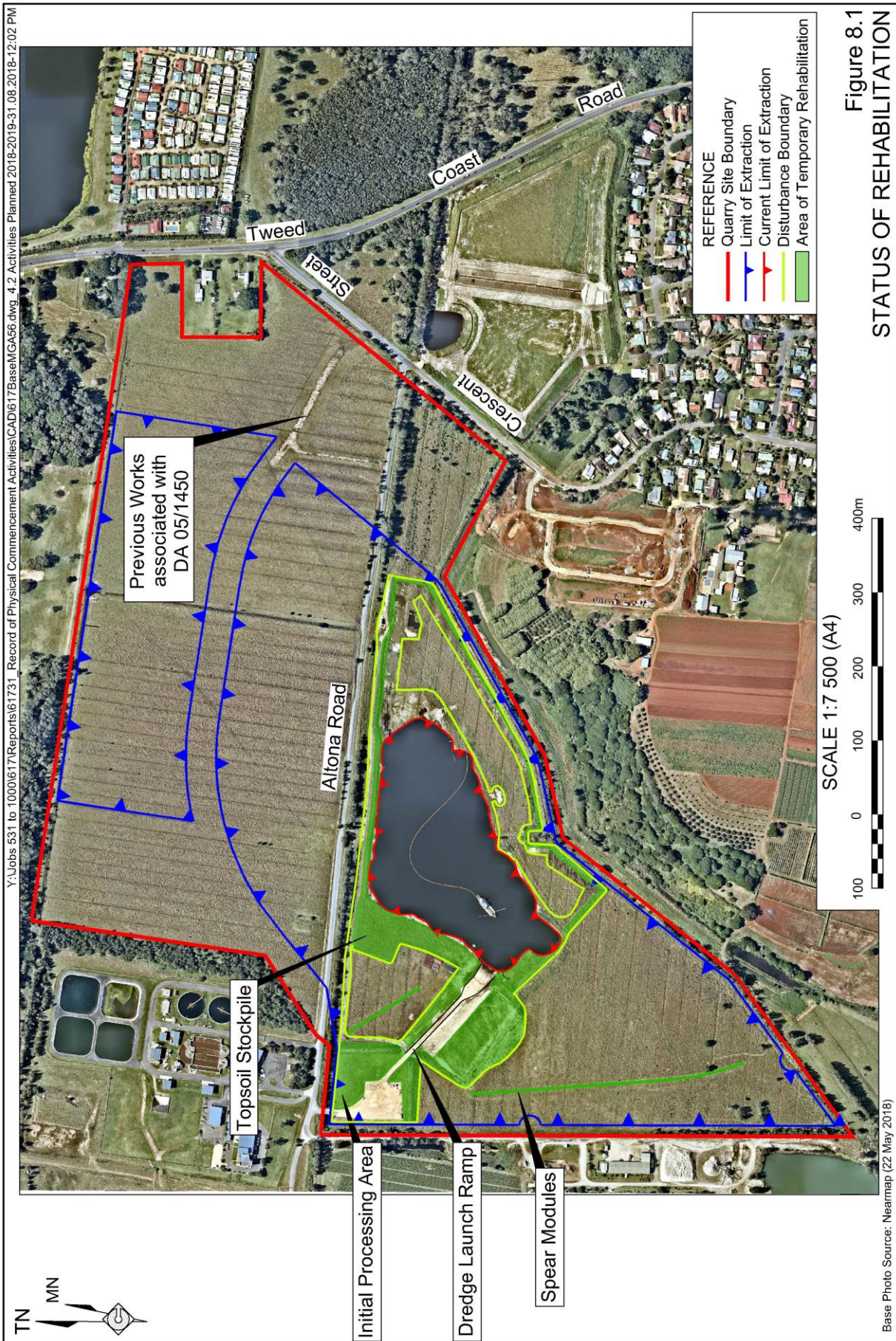


Plate 8.1 View Northeast
of Visual Screen
Adjacent Crescent Street
– 11 October 2016

*(Photo Source: Bushland
Restoration Services)*



Plate 8.2 View Northeast of
Visual Screen Adjacent
Crescent Street
– 28 August 2018

*(Photo Source: Bushland
Restoration Services)*

Plate 8.3 View Southwest
of Visual Screen
Adjacent Crescent Street
– 28 August 2018

*(Photo Source: Bushland
Restoration Services)*



Plate 8.4 Landscaping on
Eastern Bund of
Temporary Processing
Area – 28 August 2018

*(Photo Source: Bushland Restoration
Services)*

9. COMMUNITY

9.1 COMMUNITY COMPLAINTS

No complaints were received during the reporting period and no complaints have been received in previous reporting periods. It is noted that one enquiry was received on 11 September 2017 in relation to noise / activities at the Cudgen Heights fill site. This was recorded in the Quarry complaints system for recording purposes but was not a formal complaint nor relating to Quarry activities.

9.2 COMMUNITY LIAISON

The principal form of formal community consultation relating to the Quarry during the reporting period was via the Community Consultative Committee (CCC). During the reporting period, the CCC consisted of following representatives.

- The CCC Chairperson - Mr John Griffin who was approved as the chairperson by DPE on 8 July 2016.
- Community members – Ms Felicia Cecil and Mr Barrie Green who were approved by DPE on 14 November 2016.
- Company representatives – Dr Stephen Segal of Gales-Kingscliff and Mr Gareth Brown of Neumann Contractors.
- Tweed Shire Council representatives – Ms Denise Galle, Team Leader Development Assessment, Mr Ray Clark, Traffic Engineer, and Mr Mark Longbottom, Environmental Health Officer.

During the reporting period the CCC held one meeting on 20 November 2017. In addition to approved representatives, Mr Stewart McLachlan and Ms Genevieve Seed from DPE and Ms Marion Gardner, a Cudgen resident also attended the meeting. Apologies were received from Mr Clark and Mr Longbottom. A site inspection was undertaken as part of the meeting.

Company representatives provided an overview of operations and monitoring undertaken to date. No specific issues were raised by CCC members in relation to the Quarry with discussion principally relating to the Cudgen Heights fill site and potential flood effects associated with that development. This included discussing the main outcomes from a community meeting held on 12 October 2017 by the developers of the Cudgen Heights fill site (Intrapac).

In addition to the CCC, Gales held a community open day on 14 October 2017 on land owned by Gales east of Tweed Coast Road and addressing Gales broader development plans. These discussions entailed overlap between the Quarry operations and the planned fill sites. No specific issues were raised in relation to the Quarry operations.

Continued CCC meetings will be undertaken at times set by the CCC. Minutes from these meetings will also continue to be placed on the Company website and reported through the respective Annual Review.

10. INDEPENDENT AUDIT

No independent audit was undertaken during the reporting period. The first independent audit is required within 2 years of the commencement of quarrying operations. Extraction operations did not commence during the reporting period, however, site establishment activities did commence on 26 June 2017. With confirmation from DPE, it is proposed that the first independent audit be undertaken in July 2019 and address the period to 30 June 2019 to coincide with the Annual Review reporting periods.

11. INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

11.1 REPORTABLE INCIDENTS AND NON-COMPLIANCES

During the reporting period, there were no reportable incidents.

A total of one administrative non-compliance was recorded against Project Approval 05_0103 during the reporting period (see **Table 1.2**). Further detail relating to this non-compliance is provided as follows.

Project Approval 05_0103 – Schedule 3, Condition 9 Air Quality Monitoring Program

The Air Quality Monitoring Program was largely implemented as applicable to activities during the reporting period. However, deposited dust monitoring ceased (on 9 February 2018) following cessation of extraction (on 8 February 2018). The Air Quality Monitoring Program currently does not explicitly provide for cessation of deposited dust monitoring during periods of nil operation.

As a result, an update to the Air Quality Monitoring Program is to be sought. Given the short-term elevated levels of deposited dust recorded as a result of surrounding activities, it is proposed that, rather than cease deposited dust monitoring during periods of nil operation, collection and analysis be undertaken on a reduced frequency (to be confirmed in the updated Air Quality Monitoring Program). Whilst not strictly in compliance with Australian Standards, this provides for the calculation of an annual average monthly deposited dust level. Monthly collection would then resume the month prior to operational activities recommencing.

11.2 COMPLIANCE REVIEWS / INSPECTIONS

In addition to attendance at the CCC meeting, DPE compliance officers also completed a site inspection on 10 October 2017. No compliance issues were raised. However, it was suggested that copies of monitoring results collected for the Quarry by third parties (namely HMC) be retained on site by Neumann Contractors. HMC was therefore requested to email copies of monitoring results to Neumann contractors concurrently with Gales, AGE and RWC.

Officers of EPA also undertook a site inspection on 12 December 2017. The officers verbally confirmed that there were no issues or concerns identified.

12. ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

Activities planned to be completed during the next reporting period are outlined in Section 4.3 and planned improvements in environmental management practices in Sections 6 and 7. In summary, the key activities planned for the next reporting period are as follows.

- Potential establishment of processing equipment in the Initial Processing Area and completion of any road upgrades necessary to enable commencement of road transportation.
- Potential continuation of extraction, either by dredge or excavator and haul truck for the production saleable products within the initial processing area. These products would be transported via road.
- Continued environmental monitoring.
- Continued community consultation, principally through the CCC.
- Finalisation of the MOD2 and MOD3 development applications.

Key environmental improvements planned during the next reporting period include the review and update of the various management plans. In particular, a range of updates to the Soil and Water Management Plan are planned to be undertaken to rationalise water monitoring and acid sulfate soil testing.

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