

Strength. Performance. Passion



# **ANNUAL REVIEW**

**1 January 2023 – 31 December 2023**

**Dunloe Sand Quarry**

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## Appendix

Appendix A – Dunloe Sand Quarry Noise Monitoring 2023

Appendix B – Dunloe Sand Quarry Long Term Monitoring Results

Appendix C – Dunloe Sand Quarry Audit Action Plan

SITE DETAILS

Name of operation	Dunloe Sand Quarry
Name of operator	Holcim (Australia) Pty Ltd
Project Approval	Project Approval 06 - 0030
Name of holder of Project Approval	Holcim (Australia) Pty Ltd
Annual review start date	January 1, 2023
Annual review end date	December 31, 2023
<p>I, <b>Matt Kelly</b>, certify that this audit report is a true and accurate record of the compliance status of the <b>DUNLOE SAND QUARRY</b> for the period of <b>1 JANUARY 2023 - 31 DECEMBER 2023</b> and that I am authorised to make this statement on behalf of <b>HOLCIM (AUSTRALIA) PTY LTD</b>.</p> <p>Note.</p> <p>a) The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000.</p> <p>b) The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or \$22,000, or both).</p>	
Name of authorised reporting officer	Matt Kelly
Title of authorised reporting officer	Quarry Manager
Signature of authorised reporting officer	
Date	22/03/2024

# 1 STATEMENT OF COMPLIANCE

The statement of commitments for the 2023 reporting period for the Dunloe Sand Quarry is provided in **Table 1**. **Table 3** details the non-compliances of Project Approval (PA) 06\_0030 identified within the 2023 reporting period, with the compliance status key provided in **Table 2**.

**Table 1 Statement of Commitments**

Were all conditions of the relevant approval(s) complied with?	
PA 06_0030	No
EPL 13077	Yes

**Table 2 DPHI 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"> <li>• potential for serious environmental consequences, but is unlikely to occur; or</li> <li>• potential for moderate environmental consequences, but is likely to occur</li> </ul>
Low	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> <li>• potential for moderate environmental consequences, but is unlikely to occur; or</li> <li>• potential for low environmental consequences, but is likely to occur</li> </ul>
Admin NC	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)

Approval	Condition	Reason	Compliance	Addressed Section
PA 06_0030	<p>Schedule 3, Condition 22</p> <p>The Blue-Green Algae Management Plan must:</p> <p>(a) be prepared by a suitably qualified blue-green algae expert, whose appointment has been approved by the Secretary;</p> <p>(b) be consistent with extant guidelines for blue-green algae management including the NHMRC's <i>Guidelines for Managing Risks in Recreational Water</i>;</p> <p>(c) describe the measures that would be implemented to prevent and control the sources of algal blooms over the short, medium, and long term; and</p> <p>(d) define procedures for the management and notification of identified algal blooms.</p>	Monitoring incomplete due to one Blue Green Algae sample reported missing from 21 December 2023	<b>Non-Compliant</b>	<b>Section 7</b> <b>Section 12</b>
PA 06_0030	<p>Schedule 5, Condition 3</p> <p>Within 24 hours of detecting an exceedance of the limits/performance criteria in this approval or the occurrence of an incident that causes (or may cause) material harm to the environment, the Proponent must notify the Department and other relevant agencies of the exceedance/incident.</p>	Incident relating to lost Blue Green Algae sample was not reported to the Department within 24hrs	<b>Non-Compliant</b>	<b>Section 12</b>
PA 06_0030	<p>Schedule 5, Condition 4</p> <p>Within 6 days of notifying the Department and other relevant agencies of an exceedance/incident, the Proponent must provide the Department and these agencies with a written report that:</p> <p>(a) describes the date, time, and nature of the exceedance/incident;</p> <p>(b) identifies the cause (or likely cause ) of the exceedance/incident;</p> <p>(c) describes what action has been taken to date; and</p> <p>(d) describes the proposed measures to address the exceedance/incident.</p>	Incident report relating to lost Blue Green Algae sample was not provided to the within 6 days of notifying the Department.	<b>Non-Compliant</b>	<b>Section 12</b>



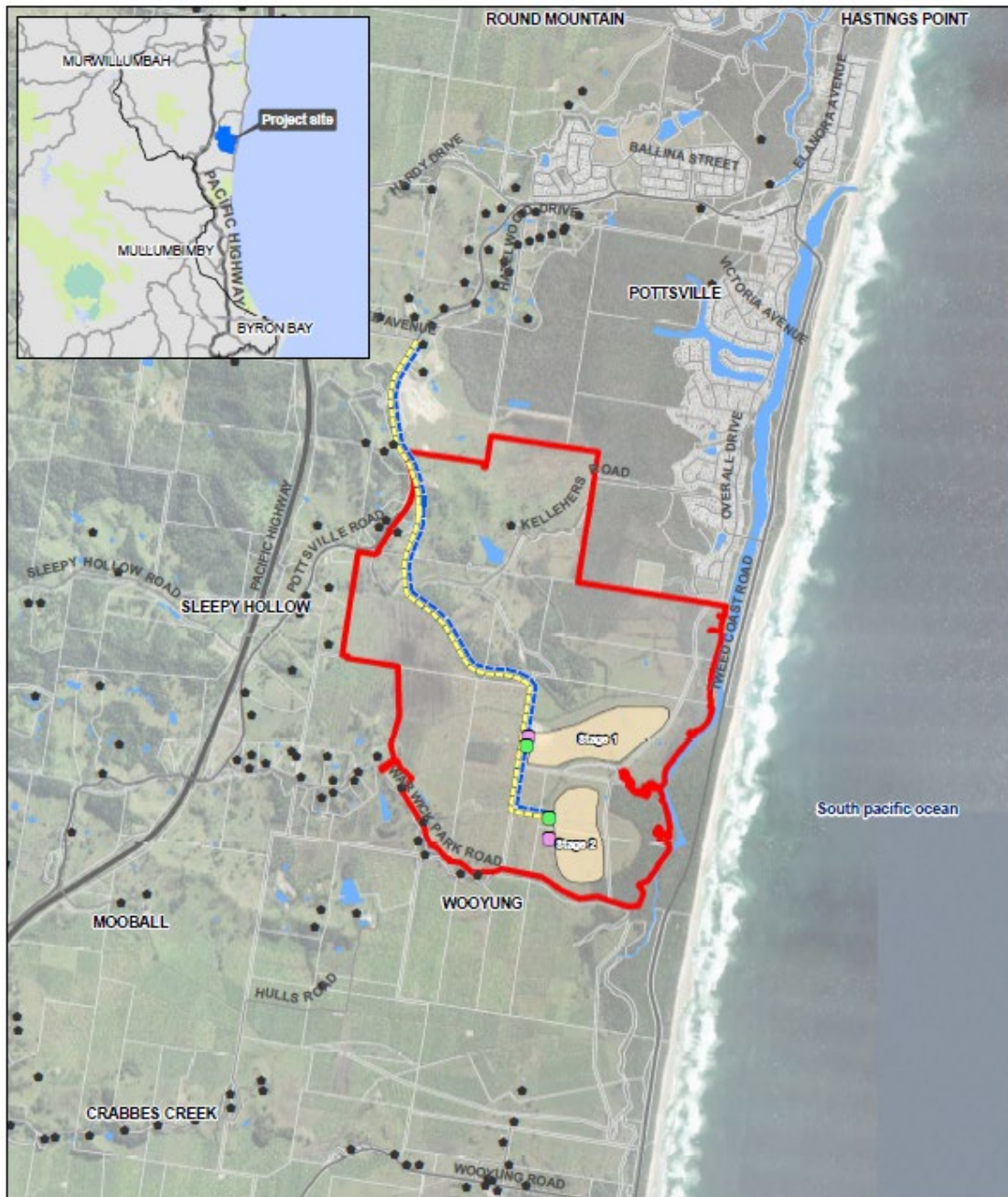
## 2 INTRODUCTION

Holcim Australia (Holcim) own and operate the Dunloe Sand Quarry (the site) which was granted PA 06\_0030 on 24 November 2008, with subsequent modifications to this approval granted on 28 August 2009 (Mod 1) and 6 November 2018 (Mod 2).

Dunloe Sands is located at Pottsville, within the Tweed Shire, NSW (refer **Figure 1** and **Figure 2**). The site is located adjacent to Mooball Creek and is approximately 4 km upstream of the creek mouth. Surrounding land use is agriculture; primarily sugar cane farming and grazing. The site produces a very high quality, fine concrete sand as well as a variety of other sand products including plasterer sand, bunker sand, and fill sand.



**Figure 1 : Aerial view of the Dunloe Sand Quarry located at Dunloe Park, Pottsville (Source: Near maps December 2022).**



- Legend**
- Project boundary
  - Sand extraction areas
  - Incoming haul road
  - Outgoing haul road
  - Site office
  - Washplant
  - Existing dwelling house

<p>Paper Size A4 0 0.25 0.5 1 Kilometers Map Projection: Transverse Mercator Horizontal Datum: GDA 1994 GCR: GDA 1994 MGA Zone 56</p>			<p>Holcim (Australia) Pty Ltd Dunloe Sand Modification</p>	<p>Job Number   22-20056 Revision   A Date   03 May 2019</p>
<p>Level 15, 133 Castlereagh Street Sydney NSW 2000 T 61 2 9236 7100 F 61 2 9236 7199 E sydml@ghd.com.au W www.ghd.com.au</p>			<p>Site location and layout <b>Figure 1-1</b></p>	
<p>N:\AU\Cofts Harbour\Projects\22-20056\GIS\Map\Deliverables\22-20056-2100_SiteLocation.mxd © 2019 Whilst every care has been taken to prepare this map, GHD (and its Suppliers, LPs) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unusable in any way and for any reason. Data source: Aerial Imagery: Sixmaps (2017 - NSW LP), LPI DCOS: Cadastre, 2012; LPI DTDB: Topo base data, 2012. Created by:arosa2</p>				

Figure 2 Site Location and Layout (Source EMS GHD: 2019)

Holcim commenced operations on the site on 1 August 2016 with all previous responsibilities falling under the management of Ramtech Pty Ltd (Ramtech). Ramtech were responsible for the commencement and operation of the site since Project Approval was granted in 2007.

In accordance with Schedule 5, Condition 5 of the modified PA 06\_0030 the site is required to undertake an Annual Review of the site in accordance with the conditions provided in **Table 3**.

**Table 3 Annual Review Requirements**

Condition	Section Addressed in Annual Review
<b>5. ANNUAL REVIEW</b>	
Within 12 months of the date of this approval, and annually thereafter, the Proponent shall submit an Annual Review to the Secretary and relevant agencies. This report must:	
a) identify the standards and performance measures that apply to the project;	<b>Section 4 and 6</b>
b) describe the works carried out in the last 12 months;	<b>Section 4 and 6</b>
c) describe the works that will be carried out in the next 12 months;	<b>Section 13</b>
d) include a summary of the complaints received during the past year, and compare this to the complaints received in previous years;	<b>Section 9.3</b>
e) include a summary of the monitoring results for the project during the past year;	<b>Section 6 and 7</b>
f) include an analysis of these monitoring results against the relevant: <ul style="list-style-type: none"> <li>• impact assessment criteria/limits;</li> <li>• monitoring results from previous years; and</li> <li>• predictions in the documents listed in condition 2 of Schedule 2.</li> </ul>	<b>Section 6 and 7</b>
g) identify any trends in the monitoring results over the life of the project;	<b>Section 6 and 7</b> <b>Appendix 2</b>
h) identify any non-compliance during the previous year; and	<b>Section 6, 7 and 11</b>
i) describe what actions were, or are being, taken to ensure compliance.	<b>Section 6, 7 and 11</b>

This Annual Review has been prepared in accordance with the *Annual Review Guideline: Post-Approval Requirements for State Significance Mining Developments* (October 2015).

This report documents the environmental performance of the site from 1 January to 31 December 2023.

## 2.1 Name and Contact Details

The key contact details for the site are outlined below in **Table 4**:

**Table 4 : Key Contact Details**

<b>Staff Member and Position</b>	<b>Contact Details</b>
<b>Quarry Manager</b> Matt Kelly	Mob: +61 429 790 895 Email: <a href="mailto:matt.kelly@holcim.com">matt.kelly@holcim.com</a>
<b>Site Supervisor</b> <b>Jade O'Brien</b>	Mob: 0484063221 Email: <a href="mailto:jade.obrien@holcim.com">jade.obrien@holcim.com</a>
<b>Area Manager Aggregates NSW North</b> Chris Hamilton	Work: +61 2 6656 8620 Mob: +61 429 790 213 Email: <a href="mailto:chris.s.hamilton@holcim.com">chris.s.hamilton@holcim.com</a>
<b>Environment Manager – NSW &amp; ACT</b> Dozie Egeonu	Mob: +61 429 557 493 Email: <a href="mailto:dozie.egeonu@holcim.com">dozie.egeonu@holcim.com</a>

### 3 APPROVALS

The site operates under the approvals listed in **Table 5**.

**Table 5 Approvals for the Dunloe Sand Quarry Operations**

Approval	Regulatory Authority
PA 06_0030	NSW Department of Planning, Housing, and Infrastructure (DPHI – the Department)
EPL No. 13077	NSW Environment Protection Authority (EPA)
Bore Licence 30BL183076, 30BL183077, 30BL183078, 30BL183079, 30BL183080, 30BL183081, 30BL183082, 30BL183084 and 30BL183086	NSW Department of Industry - Water

Holcim holds Environment Protection Licence (**EPL**) **13077** which covers its activities at the Dunloe Sand Quarry. **Table 6** outlines these licensing limits.

**Table 6 EPL Fee-Based Activity at the Dunloe Sand Quarry**

Scheduled Activity	Fee Based Activity	Scale
Extractive Activities	Land-based extractive activity	>100,000 – 500,000 T annual capacity to extract, process, or store

## 4 OPERATIONS SUMMARY

### 4.1 Exploration

There was no exploration undertaken at the Dunloe Sand Quarry during the 2023 reporting period.

### 4.2 Land Preparation

There was no land clearing during the 2023 reporting period.

### 4.3 Construction Activities

There were no construction activities undertaken at the Dunloe Sand Quarry during the 2023 reporting period.

### 4.4 Quarry Operations

Activities undertaken in 2023 included:

- Stripping of topsoil and overburden within the existing extraction limit boundary;
- Load and haul activities;
- Washing, screening, and stockpiling of product;
- Overburden removal and stockpiling;
- Maintenance of rehabilitation in the north and eastern areas of the site; and
- Load out and sales of topsoil, brickies loam and concrete sands to the local market.

During the reporting period the Wash Plant experienced a failure during May, with a replacement being hired for the remainder of the 2023 period. It is anticipated that a new Wash Plant will be purchased during 2024 or 2025.

All activities during the 2023 reporting period took place within the approved operating hours of:

- 7am to 5pm, Monday to Friday; and
- 7am to 12pm on Saturdays.

**Table 7** includes a summary of the operations undertaken during the 2023 reporting period against the Project Approval conditions regarding product transported from the Dunloe Sand Quarry.

**Table 7: Total Product Distributed (Tonnes)**

Material	Approval Limit (Tonnes/Annum)	2019	2020	2021	2022	2023	Proposed 2024
Product Distributed Total	300,000	186,280	156,918	127,515	175,010	153,044	200,000

The total production volume in 2023 was within the approved limits.

Schedule 3, Condition 45 states the proponent must report annual productions to the DPHI using the standard form and include a copy of this in the Annual Review. Note that the annual return that Holcim submit are financial (July-June), therefore total products will not align completely. **Table 8** details the annual productions.

**Table 8 2022-2023 Extractive production data – Dunloe Sands**

<b>Material</b>	<b>Mining Type</b>	<b>Production<sup>1</sup> (tonnes)</b>
Construction Sand (Filling/Packing Sand)	Construction sand	168.3
Fill & Crusher Fines (under 5mm)	Construction sand	10.3
Natural Sand	Construction sand	8.2
	Total	186.9

*Note 1 – Production total has been rounded*

## **4.5 Next Reporting Period**

Development activities proposed at the Dunloe Sand Quarry in 2023, include:

- Stripping of topsoil and overburden within the existing extraction limit boundary;
- Load and haul activities;
- Washing, screening, and stockpiling of product;
- Overburden removal and stockpiling;
- Maintenance of rehabilitation within the north-eastern area; and
- Load out and sales of topsoil, brickies loam and concrete sands to the local market.

## 5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

### 5.1 Actions from 2022 Annual Review – DPHI Actions

Holcim did not receive a letter from DPHI in response to the 2022 Annual Review.

### 5.2 Actions from 2022 Annual Review – Holcim Proposed Actions

**Table 9** outlines the proposed actions for 2023 from the 2022 Annual Review and the works undertaken in 2023.

**Table 9 Holcim Actions Proposed from 2022 Annual Review**

Action from Previous Annual Review	Works Undertaken	Section of this Annual Review
<p><b>Water Quality Monitoring</b></p> <p>Ensure all water quality monitoring is completed in accordance with the EMS, with a focus on correct monitoring frequencies.</p>	<p>The full water quality monitoring program was undertaken in 2023 With exception of one Blue Green Algae sample reported missing from 21 December.</p>	<p><b>Section 7</b></p>
<p><b>Dust Monitoring</b></p> <p>Ensure dust monitoring is completed in accordance with the EMS. Holcim will liaise with the monitoring contractor to improve monitoring notes.</p>	<p>The full dust monitoring program was completed in 2023.</p> <p>PM<sub>10</sub> monitoring not undertaken as Quarry productions below 200,00 tonnes per annum</p>	<p><b>Section 6.3</b></p>
<p><b>Biodiversity</b></p> <p>Weed spraying will continue at site during the next Annual Review period.</p>	<p>Quarterly monitoring was undertaken during the 2023 reporting period. Weed spraying was routinely conducted.</p>	<p><b>Section 6.5</b></p>
<p><b>Biodiversity</b></p> <p>Annual fauna box monitoring continues.</p>	<p>Fauna box monitored continued in 2023. Routine monitoring took place in June and December.</p>	<p><b>Section 6.5</b></p>
<p><b>Biodiversity</b></p> <p>Rehabilitation monitoring continues as per the Rehabilitation and Revegetation Management Plan.</p>	<p>Rehabilitation and biodiversity monitoring was undertaken in conjunction. The site kept records of the results of this monitoring, tracking positive and negative results as well as emerging trends to inform management measures.</p>	<p><b>Section 6.5 and 8</b></p>



## 6 ENVIRONMENTAL PERFORMANCE

Figure 3 details the environmental monitoring locations across site.

### 6.1 Meteorological Monitoring

This report uses 2023 rainfall data collected from the onsite Meteorological Station. These meteorological results are presented in **Table 10**.

**Table 10 Meteorological Monitoring Results 2023**

Month	Total Rainfall (mm)	Minimum Temperature (°C)	Maximum Temperature (°C)
January	162.2	15.9	31.8
February	259.4	15.9	32
March	92.2	12.8	33.4
April	56.8	11.3	30.6
May	143.0	4.6	25.9
June	19.8	2.9	27.1
July	33.2	3.8	24.8
August	38.4	5.7	29.3
September	44.2	8.1	30.9
October	120.6	10.8	32.1
November	234.2	12.9	32.8
December	66	17.1	32.0
<b>Annual TOTAL</b>	<b>1270mm</b>	2.9 (June)	33.4 (March)

During 2023, Dunloe Sand Quarry recorded 1270mm of rain. This is less than the 2022 period, where the site recorded 2895mm. It should be noted that the East coast of Australia was experiencing an active La Nina event during 2020-2022. Bureau of Meteorological Station 058198 at the Ballina Airport details the annual average since 1992 as 1760mm.

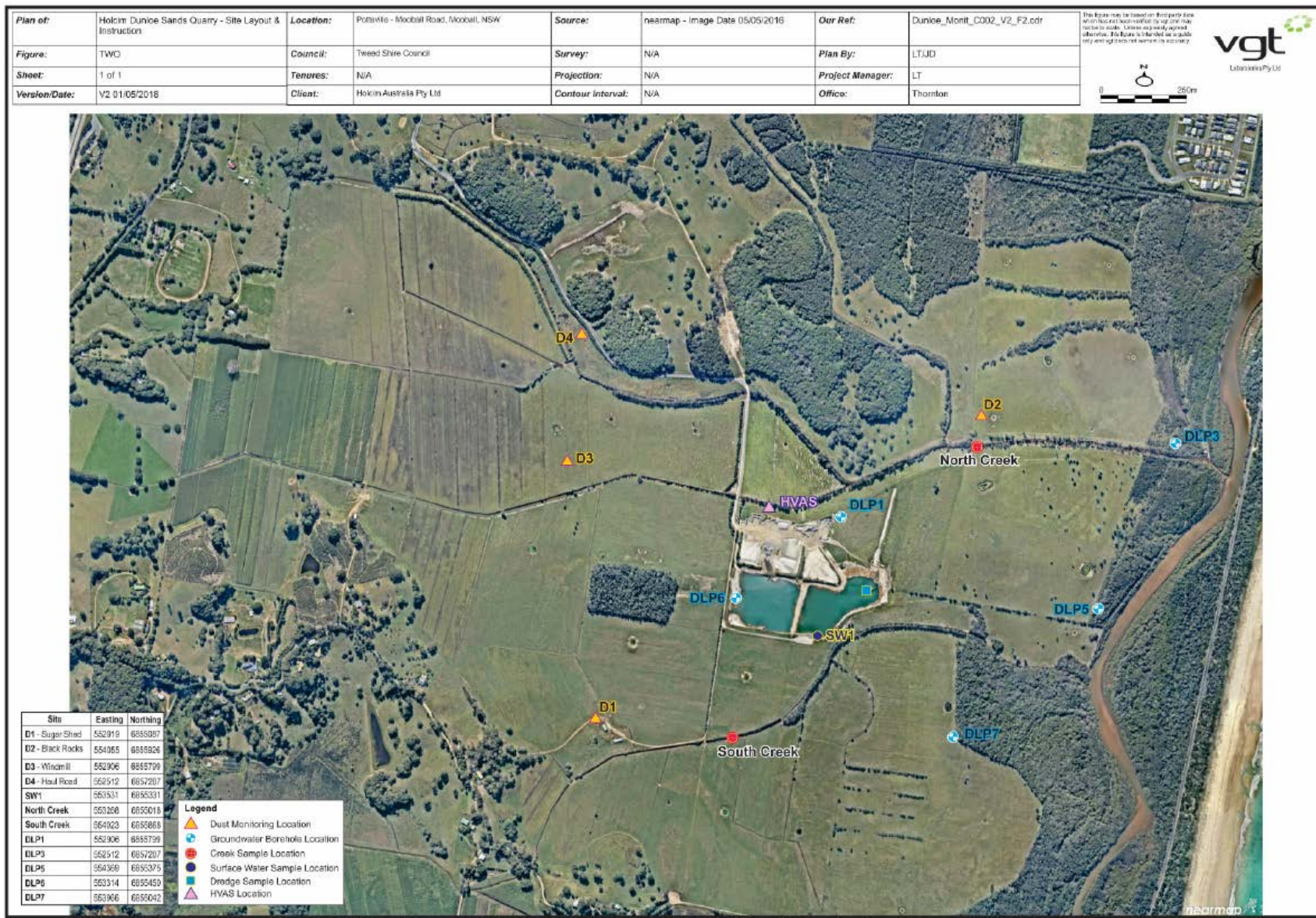


Figure 3 - Environmental Monitoring Locations (VGT,2018)

## 6.2 Noise

### 6.2.1 EIS Predictions

The site Environmental Impact Statement (EIS) (2007) states that based on noise modelling the operations within the south west corner of the southern extraction pond (stage 2) may generate levels which exceed the relevant noise impact requirements.

The EIS (2007) stated that to mitigate this minor impact, the dredge is to have acoustical treatment when operating within the southern extraction pond.

### 6.2.2 Approved Criteria

In accordance with Schedule 3 Condition 2 of PA 06\_0030, the approved noise criteria for the Dunloe Sand Quarry are outlined below.

Schedule 3 Condition 2 states:

*“The Proponent must ensure that the noise generated by the project does not exceed the criteria in Table 1 at any residence on privately-owned land.*

*Table 1: Noise Impact Assessment Criteria*

<i>Receiver Location</i>	<i>Day LAeq (15 min) dB(A)</i>
<i>R6 and R7</i>	<i>42</i>
<i>R8</i>	<i>48</i>
<i>All other residences</i>	<i>41</i>

*Noise generated by the project must be monitored and measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Noise Policy for Industry (EPA, 2017).*

*The noise criteria in Table 1 do not apply if the Proponent has an agreement with the owner/s of the relevant residence or land to exceed the noise criteria, and the Proponent has advised the Department in writing of the terms of this agreement.”*

### 6.2.3 Key Environmental Performance

Attended noise monitoring was undertaken quarterly at the Dunloe Sand Quarry in 2023 by Ramboll Australia Pty Ltd (Ramboll) on the following dates:

- Q1 11 January 2023;
- Q2 14 June 2023;
- Q3 11 July 2023;
- Q4 11 October 2023.

The compliance assessments for each receiver (R6, R7, and R8) are presented in **Table 11**. From September 2020 to December 2022, Muller Acoustics Consulting undertook monitoring at receivers R6, R7, and R8 to satisfy the commitment to monitor at these locations for two years following the approval of the Dunloe Sand Noise Management Plan (2020).

The assessments identified that noise emissions generated by the Dunloe Sand Quarry were compliant with relevant statutory noise criteria specified in the Project Approval on all occasions at all assessed residential receivers.

It should be noted noise monitoring conducted on 11 January 2023 resulted in inaudible quarry noise during the day across all receiver locations. These results meet the established noise criteria and indicate that noise emissions from Dunloe Sands Quarry did not contribute to noise nuisance.

**Table 11 Noise Monitoring Assessment for the Dunloe Sand Quarry 2023**

Assessment Period	Receiver No.	Quarrying Noise Criteria LAeq (15min)	Q1		Q2		Q3		Q4	
			Quarry Noise Contribution LAeq (15min)	Compliance Status	Quarry Noise Contribution LAeq (15min)	Compliance Status	Quarry Noise Contribution LAeq (15min)	Compliance Status	Quarry Noise Contribution LAeq (15min)	Compliance Status
Day	R6	42	<41 (Inaudible)	Compliant	<38	Compliant	<19	Compliant	<25	Compliant
	R7	42	<41 (Inaudible)	Compliant	<35	Compliant	<26	Compliant	<27	Compliant
	R8	48	<41 (Inaudible)	Compliant	<25	Compliant	<27	Compliant	<26	Compliant

#### **6.2.4 Management Measures**

Management measures relating to noise are outlined within the Dunloe Sand Environmental Management Strategy (2021) and the Noise Management Plan (2020). These include:

- Restriction of operation hours of the Dunloe Sand Quarry to Monday to Friday 7.00 am to 5.00 pm and Saturday 7.00 am to 12.00 pm;
- No work on Sundays or Public Holidays;
- All trucks to be well maintained and fitted with residential mufflers;
- Acoustic testing at commencement of quarry operations to ensure compliance with noise limit criteria;
- Dredge to be fitted with suitable mufflers if noise limit criteria is exceeded;
- Trucks to be limited to a speed of 25km/h on internal roads;
- Prescribed buffer zones around the extraction ponds to be planted and maintained;
- Cessation of excessively noisy activities during unfavourable meteorological conditions (refer to EPA's 2017 *NSW Noise Policy for Industry*); and
- Signage at the entrance of the site detailing a phone number and permanent site contact to ensure noise complaints are received and addressed in a timely manner.

#### **6.2.5 Proposed Improvements**

There are no further improvements proposed for noise management at the site. Dunloe Sand Quarry is committed to continuing to identify areas of improvement within noise management procedures.

## 6.3 Air Quality

### 6.3.1 EIS Predictions

The EIS (2017) Executive Summary states the following:

*“Airborne particulate matter concentrations and dust deposition from the proposed development were predicted to exceed the relevant requirements prescribed by the Office of Environment and Heritage (OEH) at three of the eight monitoring locations.*

*Exceedances are expected as a result of dust generated from the use of unsealed access roads by haul vehicles. To meet prescribed requirements, proposed dust controls include sealing of the entire internal roadway length, planting of a vegetated buffer along the southern boundary adjoining Warwick Park Road and the proposed outbound internal road.”*

### 6.3.2 Approved Criteria

Air Quality monitoring conducted at Dunloe Sand Quarry is compared to the monitoring criteria stipulated in PA 06\_0030 and listed in **Table 12**, **Table 13**, and **Table 14**.

**Table 12: Long Term Impact Assessment Criteria for Deposited Dust**

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited Dust	Annual	2 g/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month

**Table 13 Short Term Impact Assessment Criteria for Particulate Matter**

Pollutant	Averaging Period	Criterion
Particulate Matter < 10 µm (PM <sub>10</sub> )	24 Hour	50 µg/m <sup>3</sup>

**Table 14 Long Term Impact Assessment Criteria for Particulate Matter**

Pollutant	Averaging Period	Criterion
Total suspended particulate (TSP) matter	Annual	90 µg/m <sup>3</sup>
Particulate Matter < 10 µm (PM <sub>10</sub> )	Annual	30 µg/m <sup>3</sup>

### 6.3.3 Key Environmental Performance

#### 6.3.3.1 Depositional Dust

Dust deposition monitoring was undertaken at four locations during the 2023 reporting period (see **Table 15**).

**Table 15 2023 Dust Monitoring (Depositional Dust) at Dunloe Sand Quarry**

Date	Insoluble Solids (g/m <sup>2</sup> /month)			
	Haul Road DDG1	Windmill DDG2	Sugar Shed DDG3	Black Rock DDG4
January	0.1	0.1	0.1	0.2
February	0.2	0.3	0.5	0.1
March	0.5	3.1	0.3	0.1
April	0.3	0.2	0.8	0.2
May	0.4	0.5	4.3	0.5
June	0.1	0.1	0.7	1.1
July	0.1	3.5	0.2	0.3
August	0.2	0.4	0.2	0.1
September	0.2	2.2	0.5	0.3
October	0.3	2.3	0.2	0.1
November	1.1	2.0	0.7	1.0
December	0.5	2.8	0.8	0.3
Minimum	0.1	0.1	0.1	0.1
Maximum	1.1	3.5	4.3	1.1
Average	0.33	1.46	0.78	0.36

The depositional dust monitoring results obtained from May at DDG3 showcased a maximum result of 4.3g/m<sup>2</sup>/month, however the annual average was still below the criteria level. The depositional dust results at all locations were below the annual average criteria (4g/m<sup>2</sup>/month) and compliant with the Project Approval. Holcim notified the Department of this short-term exceedance.

A comparison of results from 2016 – 2023 has been undertaken in **Table 16**.



**Table 16 Depositional Dust Monitoring Summary (2016-2023)**

Depositional Dust Gauge	Monitoring Summary for Annual Review Period	Monitoring Period							
		2016	2017	2018	2019	2020	2021	2022	2023
		(g/m <sup>2</sup> /month)							
DDG1 Haul Road	Min. Insoluble Solids	0.13	0.1	0.1	0.1	0.1	0.2	0.1	0.1
	Max. Insoluble Solids	0.8	0.8	2.7	1.8	2.3	1.1	0.7	1.1
	Insoluble Solids Annual Average	0.4	0.4	0.6	0.7	0.89	0.4	0.3	0.33
DDG2 Windmill	Min. Insoluble Solids	0.4	<0.1	0.1	0.2	0.4	0.1	0.1	0.1
	Max. Insoluble Solids	4.7	0.9	0.7	1.8	3.6	0.9	3.7	3.5
	Insoluble Solids Annual Average	1.23	0.32	0.31	0.6	1.44	0.5	0.7	1.46
DDG3 Sugar Shed	Min. Insoluble Solids	0.2	0.2	0.1	0.2	0.2	0.2	0.1	0.1
	Max. Insoluble Solids	1.6	2.4	1.6	1.6	1.3	2.5	2.2	4.3
	Insoluble Solids Annual Average	0.5	0.8	0.8	0.6	0.53	1.0	0.6	0.78
DDG4 Black Rock	Min. Insoluble Solids	0.3	<0.1	0.1	0.2	0.6	0.5	0.1	0.1
	Max. Insoluble Solids	1.6	0.9	0.7	1.8	7.7	18.0	3.6	1.1
	Insoluble Solids Annual Average	0.6	0.4	0.4	0.9	2.94	6.6	1.3	0.36

### Long-term Trends:

The annual averages at all locations generally increased when compared to the 2022 annual averages as shown in **Table 16**. DDG 4 annual averaged decreased from 1.3 g/m<sup>2</sup>/month in 2022 to 0.36 g/m<sup>2</sup>/month in 2023.

All locations are within criteria, and consistent with EIS predictions and trends.

### Comparison to EIS Predictions:

All results for depositional dust were below the predicted limits of the EIS predictions (see **Section 6.3.1**).

#### 6.3.3.2 PM<sub>10</sub> Monitoring

With the approval of the Dust Monitoring Program by the DPHI on 27 July 2018, Holcim is no longer required to monitor for PM<sub>10</sub> unless the annual production rates increase to 200,000 tonnes or above.

Annual production was 153,044 tonnes in 2023, therefore no PM<sub>10</sub> monitoring was undertaken. Regardless of production volumes, the site has maintained dust suppression measures throughout the reporting period in accordance with the requirements of the EMS. Since 2019, Holcim has not exceeded 200,000 tonnes per annum, and PM<sub>10</sub> monitoring has not been carried out

Long-term Trends relating to PM<sub>10</sub> monitoring are outlined in **Table 17**.

**Table 17 PM<sub>10</sub> Monitoring Trends**

Monitoring Summary	Monitoring Period		
	2017	2018	2019 – 2023
PM <sub>10</sub> Reporting Period Average	10.97	24.9	NS
Max. PM <sub>10</sub>	35.9	125	NS
Min. PM <sub>10</sub>	1.2	2	NS

NS – Not Sampled

#### 6.3.4 Management Measures

Management measures relating to air quality are outlined within the *Dunloe Sand Quarry Environmental Management Strategy* and *Air Quality Management Plan*. These measures include:

- Sealing access and egress road from the Quarry to Pottsville Road;
- The wheel shaker screen is to be utilised by all traffic leaving the quarry;
- The route for trucks within the quarry will be wet down daily by a water sprinkler/spray system;
- Additional vegetation rehabilitation areas throughout the site contributing as a buffer to Mooball Creek and surrounding areas;
- Loaded trucks will be covered before exiting the site;
- Dust that is transported onto the access road immediately outside the active quarry area will be removed from the road at least once per month using a local street sweeper;
- Visual daily inspections of all stockpiles will be undertaken to ensure that dust emissions are mitigated where possible.
- Visual review of exposed areas, and whether these areas are generating dust, should be undertaken daily;

- Dust generation is generally limited to freshly disturbed areas and stockpiles. A portable hose or water spray/sprinkler system has been installed to dampen the surface and suppress dust. The system installed is capable of servicing the entire site;
- Topsoil will not be stripped during windy weather conditions; and
- Six monthly audits of dust levels are to be undertaken by management.

### 6.3.5 Proposed Improvements

No proposed improvements for 2024. Dunloe Sand Quarry continues to complete management measures and monitoring in accordance with the Air Quality Management Plan, Environmental Management Strategy, and Project Approval requirements.

## 6.4 Traffic Management

### 6.4.1 EIS Predictions

The proposed operational times outlined within the EIS are shown below:

**Table 18 Estimated Operational Times, Periods and Truck Movements (EIS 2007)**

Yearly Operation	Days Per Week	Hours per Week	Daily Times Operating	Truck Movements per Hour
50 weeks/year	5.5	46	Mon-Fri: 7:30am -5:00pm Sat: 7:30am -12:30pm	4

### 6.4.2 Approved Criteria

As per the Project Approval (Schedule 3, Condition 3), operations will be conducted Monday to Saturday. No operations are to be undertaken on Sunday or public holidays.

**Table 19 Operational Times, Periods and Truck Movements**

Yearly Operation	Days Per Week	Hours per Week	Daily Times Operating	Truck Movements per Hour
52 weeks/year	5.5	55	Mon-Fri: 7:00am - 5:00pm Sat: 7:00am - 12:00pm	24*

\* Not to exceed more than 24 heavy vehicle movements (in and out) per hour

The *Traffic Management Plan* (2019) states that truck speeds are limited to a maximum of 40km/hr within the site, however, internal roads are signposted to a 25-30km/h speed limit.

### **6.4.3 Key Environmental Performance**

Schedule 2 Condition 8 of Mod 2 Project Approval extends truck movements to 24 movements per hour (12 trucks per hour).

Daily records of truck movements are recorded by Holcim. During the reporting period, Holcim recorded a daily average of 20 trucks. This is within the criteria.

### **6.4.4 Management Measures**

Management measures relating to transport are outlined within the Dunloe Sand Quarry Environmental Management Strategy (2020) and the Traffic Management Plan (2019), including:

- Construction of a dedicated haulage road (sealed) to provide vehicular access between the sand extraction area and Pottsville-Mooball Road;
- Average truck movements limited to 24 movements per hour
- All vehicles to observe speed limits for public roads;
- No trucks are to leave the site via Warwick Park Road;
- Appropriate advisory signage placed on public roads to notify of trucks entering Pottsville – Mooball Road;
- Appropriate relevant advisory signage placed along the haulage road (especially approaches to the intersections with Kelleher’s Road and Pottsville – Mooball Road);
- Truck speed on the internal roads is to be limited to a maximum of 40km/h;
- All loaded vehicles entering or leaving the site are to have their loads covered; and
- Holcim shall ensure that all loaded vehicles leaving the site are cleaned of materials that may fall on the road before they leave the site.

### **6.4.5 Proposed Improvements**

There are no proposed changes to transport management. Truck movements will continue to be monitored and recorded in the oncoming reporting period to ensure that they remain within the approved criteria.

## 6.5 Biodiversity

### 6.5.1 EIS Predictions

As part of the EIS (2007), a number of threatened species were identified within the surrounding vegetated areas of the site with none being found or expected to occur within the previously disturbed areas of the site (including proposed extraction areas).

Rehabilitation and revegetation measures proposed will provide improved flora and fauna links, additional food resources for identified threatened species, improved opportunities for breeding through the installation of breeding boxes and other benefits associated with visual screening and the like.

No clearing of vegetation is required in respect of the proposal, inclusive of haulage routes and operational areas.

### 6.5.2 Approved Criteria

There are no specific criteria associated with biodiversity management for the site. Activities need to be completed in accordance with the EIS.

Biodiversity management measures are undertaken in accordance with the Landscape Management Plan.

### 6.5.3 Key Environmental Performance

There were no biodiversity issues identified during the Annual Review period.

Weed control continued in 2023 and will continue to occur in 2024 to control weed growth in established rehabilitation.

Biodiversity and rehabilitation monitoring was undertaken throughout 2023 as per the approved *Landscape Management Plan* and Project Approval. Routine rehabilitation monitoring occurred at each rehabilitation zone and investigated site conditions, forest structure, floristic composition, and fauna nest boxes. Site weeds, fire management, biodiversity, and general management were also assessed. Vegetation performance was reported as satisfactory.

Routine monitoring took place in April, June, July, and December 2023. Common weeds which have been established within the rehabilitation zones include:

- Senna (*Senna septemtrionalis*);
- Camphor Laurel (*Cinnamomum camphora*);
- Slash Pine (*Pinus elliottii*);
- Lantana (*Lantana camara*); and
- Ground Asparagus (*Asparagus aethiopicus*)

Weed control has been undertaken in each rehabilitation zone to manage and eradicate these weeds. It should be noted that the rehabilitation zones are on-track to achieve planned rehabilitation.

From 2020 it was found that the use of nest boxes by fauna was limited. During 2023 there were no signs of native fauna using the boxes.

#### **6.5.4 Management Measures**

Management measures relating to biodiversity are outlined in the *Landscape Management Plan* and the *Environmental Management Strategy*. These include:

- Detailed clearing protocol;
- Weed management;
- Maintenance of nest boxes; and
- Rehabilitation/Ecological monitoring program.

#### **6.5.5 Proposed Improvements**

The implementation of commitments within the *Dunloe Sand Quarry Rehabilitation and Revegetation Management Plan*, the *Dunloe Sand Landscape Management Plan*, and *Environmental Management Strategy* will continue to occur in the 2024 reporting period. Biodiversity management measures will continue in 2024 and focus on the maintenance of native vegetation species.

## **6.6 Heritage**

### **6.6.1 EIS Predictions**

A heritage assessment focusing on both Aboriginal and non-Aboriginal heritage was completed for the EIS (2007). An area of potential Aboriginal heritage significance was cordoned off.

### **6.6.2 Approved Criteria**

There are no specific criteria associated with heritage relating to the project.

### **6.6.3 Key Environmental Performance**

There were no issues relating to Aboriginal and historic heritage during the reporting period. An area of potential Aboriginal heritage significance was reviewed in 2018 with the assistance of Aboriginal Groups. It was not found to be an area of heritage significance.

The Dunloe Sand Quarry Aboriginal Cultural Heritage Management Plan (ACHMP) manages Aboriginal heritage. The site continued to act in accordance with the ACHMP in this report period.

### **6.6.4 Management Measures**

Management measures relating to heritage are outlined within the ACHMP. These include:

- Training of all staff and contractors through the induction process;
- Detailed excavation strategy and control of any finds; and
- Procedure for impacts of unexpected finds.

### **6.6.5 Proposed Improvements**

There are no proposed improvements to heritage management in 2024.

## 6.7 Acid Sulphate Soils Management and Management of Fines

Holcim undertakes fines management in accordance with Schedule 3 of Conditions 10 and 11, PA 06\_0030, in the following manner:

Condition 10

*“The Proponent shall ensure that all excavated potential acid sulphate soil fines material is returned back to below the water table as soon as possible to prevent oxidation. No potential acid sulphate soil shall be removed from the site, unless adequately neutralised in accordance with methods approved under the Soil and Water Management Plan.”*

Condition 11

*“The Proponent shall ensure that all potential acid sulphate soil fines material is discharged into the pond at a depth of no less than 3 metres from the water surface, and that all fines are deposited to a final depth of at least 8 metres from the water surface, unless an alternative method(s) is approved by OOW and the Director-General.”*

Under the operation of Holcim, the site has undertaken a number of improvement works to ensure the effective management of **Acid Sulphate Soils (ASS) and Potential Acid Sulphate Soils (PASS)** during extraction, processing, and sales operations. Details of specific management measures are outlined below.

### 6.7.1 Acid Sulphate Soils Sampling

Holcim undertakes acid sulphate soils sampling prior to extraction of materials. The drilling program was developed and undertaken in line with the following activities:

- A minimum of 2 sand cores are drilled per hectare;
- All samples are sent to a NATA Accredited lab for immediate testing in accordance with the ASSMAC Guidelines;
- A NATA Accredited lab provides a volume per m<sup>2</sup> for lime to be seeded across each hectare before stripping takes place;
- Stockpiled topsoil is tested by a NATA accredited laboratory to confirm there is no presence of PASS.

The ongoing management of acid sulphate soils during extraction in the sampled area is undertaken in accordance with the site's EMS and Acid Sulphate Soil Management Plan (2020).

Monitoring continued into 2023 and found there was no ASS/PASS observed. Monitoring and management of ASS and PASS will continue into 2024.



### **6.7.2 Extraction**

Excavation of loam, dredging and washing activities is undertaken in accordance with the EMS and has been developed in line with the following activities:

1. Excavated loam is stockpiled and tested by NATA accredited laboratory to confirm there is no presence of PASS;
2. In the event that PASS is present in loam stockpiles a NATA accredited laboratory will provide a detailed report with liming rates for lime to be added by Holcim staff to screened loam to ensure no presence of PASS;
3. All dredged material is sent through the plant with fines re-interned below the 3 metre water mark at a depth of 8 metres in the returns pond; and
4. Testing of stockpiles to ensure that no PASS are present in concrete sands.

### **6.7.3 Stockpiling & Sales**

Holcim have developed and implemented a testing regime using a NATA accredited laboratory to ensure compliance with PASS requirements for all sales of sand materials. This process includes:

1. Routine sampling of sales material stockpiles at designated locations; and
2. Implementation of a series of sales and production stockpiles to ensure any materials that have not been tested are isolated until tests confirm no presence of PASS thereafter sales loading occurs.

# 7 WATER MANAGEMENT

## 7.1 EIS Predictions

The site is located within the Mooball Creek catchment and Sheens Creek sub-catchment areas. Detailed flood modelling confirms that the proposal will have no significant impact upon existing drainage regimes within the catchment.

Extraction operations have been designed in conformity with best practice environmental management procedures, including the use of appropriate sediment and water quality devices and the retention of ground cover in areas outside of the extraction ponds.

No negative impacts to water are predicted with controls in place.

## 7.2 Criteria

The site has the requirement to monitor discharges from the two Licenced Discharge Points (LDP) per the criteria listed in EPL 13077 (reproduced in **Table 20** and **Table 21**). LDP001 refers to Silt Pond discharge and monitoring point (Point 1) and LDP002 refers to Dredge Pond discharge and monitoring point (Point 2).

**Table 20 Discharge Criteria – LDP001 and LDP002**

### POINT 1

Pollutant	Units of Measure	50 Percentile concentration limit	90 Percentile concentration limit	3DGM concentration limit	100 percentile concentration limit
Oil and Grease	Visible				nil
pH	pH				6.5 - 8.5
TSS	milligrams per litre				50

### POINT 2

Pollutant	Units of Measure	50 Percentile concentration limit	90 Percentile concentration limit	3DGM concentration limit	100 percentile concentration limit
Oil and Grease	Visible				nil
pH	pH				6.5 - 8.5
TSS	milligrams per litre				50

Exceedance of quality limits specified in EPL 13077 is permitted if the discharge from LDP001 or LDP002 occurs solely as the result of rainfall on site exceeding a total of 82.5 mm over any consecutive five-day period. Holcim undertakes all practical measures to avoid or minimise TSS, pH and Oil and Grease exceedances in wet weather discharges.

**Table 21 LDP001 and LDP002 monitoring requirements from EPL 13077**

**POINT 1,2**

Pollutant	Units of measure	Frequency	Sampling Method
Oil and Grease	Visible	Special Frequency 1	Visual Inspection
pH	pH	Special Frequency 1	Probe
TSS	milligrams per litre	Special Frequency 1	Grab sample

Condition M2.3 of the EPL details that Special Frequency 1:

*“sampling once <24 hours prior to; and sampling the discharge daily during each discharge event arising from rainfall of less than 82.5 mm falling in total over a period of up to five days duration.”*

The site also has criteria outlined within the Soil and Water Management Plan. This includes commitments to undertaking monthly and quarterly monitoring at the Dredge Pond (Dam 1) and Silt Pond (Dam 2) (see **Table 22**, **Table 23**, and **Table 24**) Other sampling criteria and commitments from the EMS are outlined within **Tables 24-28**.

**Table 22 Monthly Surface Water Quality Criteria – Dam 1 and Dam 2**

Parameter	Interim Target Criteria	Baseline Data
pH	5.0 – 8.5	3.55-8.44 (6.49)
Electrical conductivity	<5.50 mS/cm	0.286-45 (11.930mS/cm)
Dissolved oxygen	>4.00 mg/L	0.81-7.49 (4.34) mg/L
Turbidity	<20 NTU	3-67 (14.4) NTU
Oil and grease	<10 mg/L	NA

**Table 23 Quarterly Surface Water Quality Criteria – Dam 1 and Dam 2**

Parameter	Interim Target Criteria	Baseline Data
Manganese	0.15 mg/L	0.01-0.56 mg/L
Magnesium	40 mg/L	0.8-173.0 (20) mg/L
Sodium	280 mg/L	7-1770 (213) mg/L
Potassium	17.5 mg/L	0-71(12) mg/L
Bicarbonate	400 mg/CaCO3	NA
Chloride	285 mg/L	15-3500 (356) mg/L
Sulfate	175 mg/L	9-753 (100) mg/L
Aluminium	0.75 mg/L	<0.01-4.96 (0.50) mg/L
Arsenic	<0.005 mg/L	<0.005-0.027 (0.01) mg/L
Iron	<7.5 µg/L	0.03-43 (6.12) µg/L
Chlorophyll a	2-10 µg/L	2-10 µg/L

**Table 24 Quarterly Vertical Profile Water Quality Criteria – Dam 1 and Dam 2**

<i>Pollutant</i>	<i>Unit of Measure</i>	<i>Water Quality Objectives</i>
Turbidity	NTU	5 – 20 NTU
pH	pH	6.5 – 8.5
Oil and Grease	mg/L	10 mg/L
Salinity	µS/cm	<3,000 µS/cm
Dissolved oxygen	mg/L	>6 mg/L
Chlorophyll-a	µg/L	2-10 µg/L
Faecal coliforms	Median No./100mL	<1000 cfu/100mL
Enterococci	Median No./100mL	<230 cfu/100mL
Algae and blue-green algae	No.cells/mL (M.aeruginosa)	<50,000 cells/mL
	mm <sup>3</sup> /L (total biovolume)	<4 mm <sup>3</sup> /L
Sodium	mg/L	500mg/L
Potassium ion	mg/L	40mg/L
Magnesium ion	mg/L	100mg/L
Chloride ion	mg/L	1000mg/L
Sulphate ion	mg/L	800mg/L
Bicarbonate ion	mg/L	400mg/L
Soluble iron	mg/L	20mg/L
Soluble aluminium ion	mg/L	0.5mg/L

Ammonium ion	mg/L	20mg/L
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- 1) *The Department acknowledges that short term exceedances of these objectives may occur during natural events such as flooding.*
- 2) *The Department acknowledges that pre-existing water quality may not meet the objectives for some analytes, including salinity. The proponent shall strive to meet the water quality objectives through implementation of the Soil and Water Management Plan (see condition 18 below), as far as is reasonable and feasible and within the Proponent's control, to the satisfaction of the Secretary.*

The site has a commitment to Blue Green Algae monitoring within the extraction ponds in accordance with the criteria listed in **Table 25**.

**Table 25 Monthly Monitoring Criteria – Blue Green Algae**

Algae and Blue-green algae	No.cells/mL (M.aeruginosa)	<50,000
	mm <sup>3</sup> /L (total biovolume)	<4

The site has a commitment to complete quarterly creek water monitoring within the surrounding environment in accordance with the criteria listed in **Table 25**.

**Table 26 Quarterly Surface Water Quality Criteria – Surrounding Environment**

<i>Pollutant</i>	<i>Unit of Measure</i>	<i>Interim Target Criteria</i>	<i>Baseline Monitoring 9/06-8/07</i>
pH	pH	5.5 – 7.5	3.55-8.44 (6.49)
Electrical Conductivity	µS/cm	1800-24000	286-45000 (11930)
Dissolved Oxygen	mg/L	>6	0.81-7.49 (4.34)
Turbidity	NTU	<20	3-67 (14.4)
Suspended Solids	mg/L	<25	1.5-48 (19)

### Groundwater

The site has an annual requirement to monitor water quality from the five on site groundwater bores per the criteria listed in EPL 13077 and reproduced in **Table 27**.

**Table 27 Groundwater monitoring requirements (DLP3-DLP7) from EPL 13077**

**POINT 3,4,5,6,7**

<b>Pollutant</b>	<b>Units of measure</b>	<b>Frequency</b>	<b>Sampling Method</b>
Ammonia	milligrams per litre	Yearly	Grab sample
Chloride	milligrams per litre	Yearly	Grab sample
Electrical conductivity	microsiemens per centimetre	Yearly	Grab sample
Oil and Grease	milligrams per litre	Yearly	Grab sample
pH	pH	Yearly	Grab sample
Standing Water Level	metres (Australian Height Datum)	Yearly	No method specified
Sulfate	milligrams per litre	Yearly	Grab sample

The site has a commitment to complete monthly groundwater monitoring within the surrounding environment in accordance with the criteria listed in **Table 28**.

**Table 28 Monthly Groundwater Quality Criteria – Surrounding Environment**

<b>Parameter</b>	<b>Interim Target Criteria</b>	<b>Baseline Data</b>
pH	4.2-7.0	3.58-7.54 (5.43)
Electrical conductivity	<2.0 mS/cm	0.07-6.47 (1.24)mS/cm)
Dissolved oxygen	<1.50 mg/L	0.16-4.83 (0.84) mg/L
REDOX Potential	<20 NTU	3-67 (14.4) NTU
Groundwater level	M (AHD)	0.25-1.52 (0.68)

The site has a commitment to complete quarterly groundwater monitoring within the surrounding environment in accordance with the criteria listed in **Table 29**.

**Table 29 Quarterly Groundwater Quality Criteria – Surrounding Environment**

Parameter	Interim Target Criteria	Baseline Data
Calcium	55 mg/L	0.7-144 (26)
Manganese	0.15 mg/L	0.01-0.56 mg/L
Magnesium	40 mg/L	0.8-173.0 (20) mg/L
Sodium	280 mg/L	7-1770 (213) mg/L
Potassium	17.5 mg/L	0-71(12) mg/L
Bicarbonate	400 mg/CaCO <sub>3</sub>	NA
Chloride	285 mg/L	15-3500 (356) mg/L
Alkalinity	185 mg/L	0-534 (109) mg/L
Sulfate	175 mg/L	9-753 (100) mg/L
Dissolved Aluminium	0.75 mg/L	<0.01-4.96 (0.50) mg/L
Dissolved Arsenic	<0.005 mg/L	<0.005-0.027 (0.01) mg/L
Dissolved Iron	7.5 mg/L	0.03-43 (6.12) mg/L

### 7.3 Surface Water Monitoring

It should be noted that there were no surface water discharges in 2023, therefore, criteria related to **Table 22** have not been triggered. A summary of results obtained from monthly sampling in the ponds is provided in **Table 30**.

**Table 30 Monthly Dredge Pond and Silt Pond Monitoring 2023 Results**

Parameter	Interim Target Criteria	Dredge Pond (Dam 2 )			Silt Pond (Dam 1)		
		Min	Max	Average	Min	Max	Average
pH	6.5-8.5	4.4	8.2	5.8	3.9	8.9	6.3
EC (uS/cm)	<2000	73	960	207.3	83	1490	272.7
DO (mg/L)	>4	5.6	8.3	7.4	4.7	8.3	6.7
Turbidity (NTU)	<20	1	74.7	9.2	5.1	1000	233.4
Oil and Grease (mg/L)	10	5	23	10.2	5	31	11.5

## Monthly Surface Water Monitoring Results

- **pH**  
The Dredge Pond and the Silt Pond reported pH outside of the interim target criteria, with an annual average of pH 5.8, and pH 6.3, respectively.
- **Electrical Conductivity (EC)**  
The Dredge Pond and Silt Pond did not have any EC exceedances during the 2023 reporting period.
- **Turbidity**  
There were multiple exceedances for Turbidity at the Silt Pond location with the maximum exceedance of 1000 NTU in November. As a result, the annual average exceeded the criteria for turbidity with an average of 233.4 NTU. The Dredge Pond location recorded one exceedance with the maximum turbidity of 74.7 NTU , and an annual average of 9.2 NTU's.
- **Oil and Grease**  
Oil and grease levels at both the Dredge Pond and Silt Pond saw maximum exceedances of 23mg/L and 31mg/L, respectively. Annual averages at both sites were above the interim target criteria, with the Dredge Pond location recording an average of 10.2mg/L, and the Silt Pond an average of 11.6 mg/L.
- **Dissolved Oxygen (DO)**  
Both the Silt Pond and Dredge Pond were within criteria for DO during the 2023 period.

Long-term monitoring results for the Dredge Pond and Silt Pond from the 2018 reporting periods are presented in **Table 31**.

While exceedances above trigger levels were recorded during the reporting period, Holcim does not view this as a non-compliance, as there was no discharge from site. See **Appendix B** for complete monitoring data.

**Table 31 Long-term Results for Dredge Pond (Dam 1) and Silt Pond (Dam 2)**

Parameter	Interim Target Criteria	Baseline (2006/2007)	Dredge Pond (Dam 1)						Silt Pond (Dam 2)				
			2018	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
pH	6.5-8.5	3.55-8.44	4.2	4.4	4.2	5.7	5.8	5.8	6.9	5.2	6.3	7.1	6.3
EC (uS/cm)	<2000	286-450	388.0	545.0	573.1	604.8	145	207.3	508.0	645.3	834.1	178	272.7
DO (mg/L)	>4	0.81-7.49	22.4	35.7	6.4	7.2	6.3	7.4	33.3	6.7	6.5	6.3	6.7
Turbidity (NTU)	<20	3.0-67.0	5.3	7.5	12.1	12.0	91	9.2	12.2	83.7	17.9	95	233.4
Oil and Grease (mg/L)	10	-	<5	<5	7.1	11.2	6.8	10.2	5.0	6.9	12.2	11.6	11.5



## Long Term Surface Water Monitoring Results

- **pH**

As seen in the comparison from 2018 to 2023 in **Table 31** the Dredge Pond has been consistently acidic and reported pH outside of the interim target criteria. There was an increase in pH annual average at the Silt Pond in this reporting period.

- **EC**

There has been a significant decrease in average EC in both the Dredge Pond and the Silt Pond in comparison to previous years. However, the 2023 average's was within baseline criteria.

- **Dissolved oxygen (DO)**

DO was consistent with previous years at both the Dredge Pond and Silt Pond. DO was reported above the interim target criteria (>4 mg/L), however, within baseline criteria.

- **Turbidity**

The 2023 average for turbidity at the Dredge Pond decreased significantly from the 2022 annual averages, however, is consistent with other years. Turbidity at the Silt Pond increased significantly from the 2022 averages and has recorded the highest average since 2019. NTU was reported are above the interim target criteria (<20 NTU) and outside baseline criteria.

- **Oil and Grease**

Oil and grease levels have increased at the Dredge Pond and Silt Pond when compared to the 2022 annual averages. Both the Dredge Pond and Silt Pond are above the interim target criteria.

A summary of the long-term chemical analysis results from years 2018 to 2023 is provided in **Table 32**.

**Table 32 Long-term Analyte Monitoring Results**

Parameter (mg/L)	Interim Target Criteria	Baseline Target (2006/07)	Dredge Pond (Dam 1)						Silt Pond (Dam 2)				
			2018	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
Manganese	0.15	0.01-0.56	0.3	0.3	0.2	0.2	0.2	0.3	0.1	0.3	0.2	0.1	0.1
Magnesium	40	0.8-173.0	6.0	10.0	10.2	20.0	3.7	2.7	10.0	10.0	11.3	4.0	3.2
Sodium	280	7-1,770	24.0	45.0	45.3	50.8	16.1	8.9	42.0	45.0	50.8	18.2	9.7
Potassium	17.5	0-71	3.7	4.8	4.8	4.5	2.3	1.9	4.0	4.7	4.0	2.4	2.1
Bicarbonate	400	-	-	1.0	21.7	20.0	98.8	20.0	12.0	20.0	20.0	110	22.8
Chloride	285	15-3,500	42.0	79.0	85.7	92.3	29.7	13.0	72.0	92.5	93.8	31.7	16.0
Sulphate	175	9-753	114.0	170.0	185.3	210.0	79.3	62.0	163.0	210.0	212.5	85.7	75.5
Aluminium	0.75	<0.01-4.96	0.7	0.8	1.1	0.1	0.26	0.3	0.2	1.2	0.3	0.3	0.8
Arsenic	0.005	<0.005-0.027	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Iron (Dissolved)	7.5	0.03-43	0.1	0.3	0.4	0.1	0.1	0.4	0.1	0.2	0.2	0.1	0.7
Chlorophyll a	2-10	2 - 10	-	1.0	5.7	6.0	5.0	7.8	4.0	5.0	5.8	5.0	8.3

Results obtained from quarterly chemical analysis of extraction pond water shows analytical results to be generally below the baseline criteria and interim target criteria of the EMS. Magnesium, sodium, potassium, bicarbonate, chloride, and sulphate, saw a decrease in 2023 compared to previous years, and were below the target criteria and consistent with historical results. Arsenic had two results similar to previous years and remained below the target criteria.

Aluminium and Iron (Dissolved) remained within the target criteria but saw an increase in 2023 compared to previous years.

Manganese was above the target criteria in 2023 at the Dredge Pond and Silt Pond but did not exceed the baseline upper value.

Annual averages for the Quarterly Vertical Profile for Dam 1 and Dam 2 commitments outlined in **Table 26**, is shown below in **Table 33**. See **Appendix B** for complete monitoring data.

**Table 33 Quarterly Vertical Profile Results for 2023**

Parameter	Unit of Measure	Objective Values	Dredge Pond - Dam 1	Silt Pond - Dam 2
			Annual Average	Annual Average
Faecal coliforms	Median No./1000mL	<1000 CFU/100mL	50	662.5
Enterococci	Median No./1000mL	<230 CFU/100mL	125	530
Soluble iron	mg/L	20	0.4	0.7
Ammonium	mg/L	20	0.02	0.05
Soluble aluminium ion	mg/L	0.5	0.26	0.75

Results from the vertical profile monitoring at Dams 1 and 2 show that parameters within these water bodies generally did not exceed the objective values. Soluble aluminium ion was above the objective value; however, Holcim do not view this as a non-compliance as no discharge events occurred during 2023. Holcim will continue to monitor parameters listed in **Table 33** and aims to meet objectives.

Additional Quarterly results are presented in and discussed alongside **Table 34** and **Table 35**.

The site has committed to completing quarterly creek monitoring within the surrounding environment in accordance with the EMS. A summary of results obtained from quarterly water quality monitoring is provided in **Table 34** and **Table 35**.

**Table 34 Quarterly Northern Creek Water Quality Monitoring for 2023 and Previous Years**

Parameter (mg/L)	Interim Target Criteria	Baseline (2006/07)	SW3							SW4						
			2023 Min	2023 Max	2023 Average	2022 Average	2021 Average	2020 Average	2019 Average	2023 Min	2023 Max	2023 average	2022 Average	2021 Average	2020 Average	2019 Average
pH	5.5-7.5	3.55-8.44	6.4	7.9	7.0	5.65	6.3	4.3	6.7	6.2	7.5	6.9	6	7.10	5.8	7.2
EC	1800-24000	286-45000	2850	16200	10702.5	3583	11701	2942	19988	1020	18100	6432.5	5339	22	6742	23298
DO	>6	0.81-7.49	3.4	5.3	4.4	3.4	5.3	4.6	32.2	3.1	5.9	4.7	4.2	6.1	558.8	31.3
Turbidity	<20	3-67	1.8	<b>1000</b>	<b>254.7</b>	12	14	37	9	6.5	<b>1000</b>	<b>262.2</b>	15	87	15	3
Suspended Solids	<25	1.5-48	5	55	<b>30.8</b>	17	35	97	7.0	12	120	<b>44.8</b>	13	27	18	6.0

**Table 35 Quarterly Southern Creek Water Quality Monitoring 2023 and Previous Years**

Parameter (mg/L)	Interim Target Criteria	Baseline (2006/07)	SW9						SW10					
			2023 Min	2023 Max	2023 Average	2022 Average	2021 Average	2020 Average	2023 Min	2023 Max	2023 Average	2022 Average	2021 Average	2020 Average
pH	5.5-7.5	3.55-8.44	6.7	7.4	7.1	6.4	7.1	7.2	6	7.8	7.1	5.6	6.725	4.47
EC	1800-24000	286-45000	1120	35000	14277.5	4522.5	22872.5	14100	3690	19800	11615.5	2335	12957.5	3079
DO	>6	0.81-7.49	3	5.8	4.8	4	5.16	6.54	3.23	6.4	4.9	4.2	4.23	3.21
Turbidity	<20	03-67	2.6	18.6	7.9	47	18.53	9.05	10	<b>233</b>	<b>70.65</b>	43	27.43	74.1
Suspended Solids	<25	1.5-48	15	77	48.0	11.7	13.6	37	6.9	91	38.0	36	14.85	38

Results obtained from quarterly water quality monitoring show the results are generally reported within the baseline criteria and below the interim target criteria of the EMS.

The results of the monthly algae monitoring for the 2023 reporting period are displayed within **Table 36**.

**Table 36 Surface Water Quality Monitoring 2023 Results – Blue Green Algae**

Date	Dredge Pond		Silt Pond	
	M. aeruginosa (cells/mL)	Total Biovolume (mm <sup>3</sup> /L)	M. aeruginosa (cells/mL)	Total Biovolume (mm <sup>3</sup> /L)
	Criteria: <50,000	Criteria: <4	Criteria: <50,000	Criteria: <4
11/01/2023	1	0.01	1	0.01
20/01/2023	1	0.01	1	0.01
13/02/2023	1	0.01	1	0.01
20/02/2023	1	0.01	1	0.01
15/03/2023	1	0.01	1	0.01
20/03/2023	1	0.01	1	0.01
11/04/2023	1	0.01	1	0.01
19/04/2023	1	0.01	1	0.01
11/05/2023	1	0.01	1	0.01
14/06/2023	1	0.01	1	0.01
11/07/2023	1	0.01	1	0.01
08/08/2023	1	0.01	1	0.01
11/09/2023	1	0.01	1	0.01
11/10/2023	1	0.01	1	0.01
20/10/2023	1	0.01	1	0.01
13/11/2023	1	0.01	1	0.01
20/11/2023	1	0.01	1	0.01
12/12/2023	1	0.01	1	0.01
21/12/2023	Sample Lost	Sample Lost	Sample Lost	Sample Lost
Average	1	0.01	1	0.01

Monitoring for Blue Green Algae was conducted fortnightly from October to April, and monthly from May to September (section 6.2 EMP). Both the algal cell count and total biovolume for the Dredge Pond and Silt Pond fell considerably below the criteria level committed to in the EMS and the Soil and Water Management Plan. On 21 December, samples for the Dredge Pond and Silt Pond were reported as missing. This is a low non-compliance with the Blue Green Algae Management Plan (Schedule 3, Condition 22). Holcim notified the Department of this in February 2024.

As this was not reported to the department immediately, this is also an administrative non-compliance for Schedule 5, Condition 3 and Schedule 5, Condition 4 (Incident Reporting)

Schedule 5, Condition 3 states:

*“Within 24 hours of detecting an exceedance of the limits/performance criteria in this approval or the occurrence of an incident that causes (or may cause) material harm to the environment, the Proponent must notify the Department and other relevant agencies of the exceedance/incident.”*

Schedule 5, Condition 4 states:

*“Within 6 days of notifying the Department and other relevant agencies of an exceedance/incident, the Proponent must provide the Department and these agencies with a written report that:*

- (a) describes the date, time, and nature of the exceedance/incident;*
- (b) identifies the cause (or likely cause ) of the exceedance/incident;*
- (c) describes what action has been taken to date; and*
- (d) describes the proposed measures to address the exceedance/incident”*

The project approval defines an incident as a set of circumstances that:

- causes or threatens to cause material harm to the environment; and/or
- breaches or exceeds the limits or performance measures/criteria in this approval

The total algae count results gathered at site across several years are variable. It is noted that variations in total algae count results are not identified as exceedances of the monitoring criteria listed in the EMS and the key to monitoring Blue Green Algae activity generally lies with total algae count readings.

#### **Long-term Trends:**

Key parameters continued to follow long-term trends, including:

- There was no surface water discharge in 2023;
- Generally acidic pH readings;
- High variability of turbidity;
- Consistent levels of total algae within long-term trends; and
- EC was variable, but within long-term trends.

#### **Comparison to EIS Predictions:**

There was no evidence of any detrimental impact from the Quarry on surface water. This is consistent with the EIS predictions.

## **7.4 Groundwater Results**

Monthly groundwater monitoring was undertaken at 5 locations (DLP 1, DLP 3, DLP 5, DLP 6 and DLP 7) during the 2023 reporting period.

DLP 7 sits immediately adjacent to the existing wetland, which act as a ‘drawer’ of permanently saline conditions in order to sustain its dominant vegetative makeup. It is therefore considered likely that some localised salinisation of surficial groundwater has occurred within the vicinity of DLP3 and DLP 7 due to tidal influences within these nearby waterways and wetlands. This trend has previously been identified in Annual Reports prepared under the previous operator and is considered to be consistent with the natural salinity levels in the local environment.

A summary of monthly groundwater results for pH and EC is provided in **Table 37**.

**Table 37 Monthly Groundwater Quality Monitoring 2023 Results Summary (pH and EC)**

Location	Parameter	Interim Target Criteria	2023 Minimum	2023 Maximum	2023 Average	2022 Average	2021 Average	2020 Average	2019 Average	2018 Average	2017 Average
DLP1	pH	4.2-7.0	6.4	<b>7.6</b>	<b>7.1</b>	6.8	5.9	5.7	4.9	4.4	4.3
	EC (uS/cm)	<2000	158	<b>2956</b>	1585	1258.3	346.6	214.5	698	146	134
DLP3	pH	4.2-7.0	5.6	6.2	5.8	6.1	6.0	6.1	5.5	5.9	6
	EC (uS/cm)	<2000	1190	<b>7310</b>	<b>3750</b>	7615	7997.5	7639.2	6731	7320	7464
DLP5	pH	4.2-7.0	<b>3.6</b>	5.8	4.05	4.6	5.4	5.5	5.4	4.7	5.1
	EC (uS/cm)	<2000	890	<b>8530</b>	<b>2115</b>	1783.8	307.4	1121.1	1782	847.5	406
DLP6	pH	4.2-7.0	4.4	5.2	5	5.1	4.5	5.1	4.6	3.9	3.8
	EC (uS/cm)	<2000	59	840	210	130	260.8	546.1	2561	607.5	1270
DLP7	pH	4.2-7.0	6.7	<b>7.2</b>	6.9	6.95	7.0	6.8	6.3	7.0	6.9
	EC (uS/cm)	<2000	1850	<b>4690</b>	<b>2563</b>	3085	3551.7	2939.7	3039	3379	3125

## Monthly Groundwater Monitoring Results

- **pH**  
From 2017 to 2023 pH annual averages were slightly acidic across all locations with the exception of DLP7 which has remained relatively neutral. DLP1 exceeded the maximum interim target criteria range, recording pH 7.6, and DLP5 exceeded the minimum interim target criteria range, recording pH3.6
- **EC**  
DLP3, DP5, and DLP7 present annual average EC above the maximum interim target criteria of 2000  $\mu\text{S}/\text{cm}$  stated within the EMS, with this also being the case in previous years. EC displayed high variability across locations, from DLP6's minimum of 59  $\mu\text{S}/\text{cm}$  to DLP5's maximum of 8530  $\mu\text{S}/\text{cm}$ .  
DLP3, DLP5 and DLP7 exceeded the criteria with the respective values of 7310  $\mu\text{S}/\text{cm}$ , 8530  $\mu\text{S}/\text{cm}$ , and 4690  $\mu\text{S}/\text{cm}$ , respectively.

Holcim does not view these exceedances as a non-compliance, as DPHI (then DPI&E) stated

*“DPI&E acknowledges that pre-existing water quality may not meet the objectives for some analytes, including salinity. Holcim must strive to meet the water quality objectives through implementation of the Soil and Water Management Plan, as far as is reasonable and feasible and within the Proponent's control, to the satisfaction of the Secretary.”*

Holcim will continue to monitor Groundwater data in the 2024 period and make observations regarding trends. A summary of quarterly monitoring for Manganese and Magnesium is outlined in **Table 38**.

See **Appendix B** for complete monitoring data.



**Table 38 Quarterly Groundwater Quality Monitoring 2023 Results (Manganese and Magnesium)**

Location	Parameter	Interim Target Criteria	Q1	Q2	Q3	Q4	2023 Average	2022 Average	2021 Average	2020 Average	2019 Average	2018 Average	2017 Average
DLP1	Manganese (mg/L)	0.15	<b>0.18</b>	<b>0.29</b>	<b>0.28</b>	0.005	0.19	0.3	0.13	0.12	0.039	0.014	0.024
	Magnesium (mg/L)	100	36	37	40	3	29.00	28	12.35	5.03	1.25	0.87	0.65
DLP3	Manganese (mg/L)	0.15	<b>0.87</b>	<b>0.7</b>	<b>0.77</b>	0.8	0.79	0.65	0.68	0.71	0.92	0.65	0.63
	Magnesium (mg/L)	100	<b>180</b>	<b>130</b>	<b>150</b>	130	147.50	120	130.00	125.00	175.3	131.2	126.7
DLP5	Manganese (mg/L)	0.15	<b>0.28</b>	0.14	0.14	0.099	0.16	0.28	0.01	0.21	0.13	0.031	0.060
	Magnesium (mg/L)	100	37	24	24	20	26.25	40.3	3.65	31.75	39.3	11.2	14.5
DLP6	Manganese (mg/L)	0.15	0.057	0.073	<b>0.2</b>	0.2	0.13	0.13	0.12	0.22	0.47	0.49	1.12
	Magnesium (mg/L)	100	<b>1</b>	<b>1.2</b>	<b>3.5</b>	3.2	2.23	1.75	7.63	3.63	7.0	6.8	14.45
DLP7	Manganese (mg/L)	0.15	0.063	0.069	0.06	0.052	0.06	0.059	0.07	0.06	0.077	0.21	0.068
	Magnesium (mg/L)	100	34	33	35	31	33.25	31.5	35.00	36.75	39.00	39.25	37.3

Annual averages for Manganese and Magnesium in the 2023 reporting period are generally consistent with 2022 results. DLP3 values for 2022 follow the long-term trend of exceeding the interim target criteria for both Manganese (0.65 mg/L) and Magnesium (120.00 mg/L).

**Long-term Trends:**

Results for Manganese and Magnesium are similar to previous years. DLP3 has consistently been reported above the interim target criteria. However, DLP5 has reported a significant increase in Manganese and Magnesium concentrations when compared to previous years.

**Comparison to EIS Predictions:**

There was no evidence of any detrimental impact from the Quarry on groundwater. This is consistent with the EIS predictions.

## **7.5 Proposed Water Management Improvements**

There are no proposed improvements to water management in 2024. Holcim will continue to monitor and implement all water monitoring commitments.

The *Soil and Water Management Plan* is currently being updated in line with the requested amendments in consultation with DPHI. It is expected this will be approved in the 2024 reporting period.

## **7.6 Flood Storage Capacity**

In accordance with Schedule 3 Condition 17 of the Project Approval, this Annual Review reports on the flood storage capacity of the site.

The site has been constructed in accordance with the extraction plans approved by the DPHI. The entire northern extraction area has been bunded to a height of approximately 1 metre along the perimeter of disturbance.

Due to no significant changes to the infrastructure or landform site in 2023, there has been no changes to the flood storage capacity at the site. The flood capacity at the site would be no less than the capacity at the commencement of the project.

## **7.7 Water Take**

There is no water take associated with the Dunloe Sand Quarry.

## 8 REHABILITATION AND LANDSCAPE MANAGEMENT

### 8.1 Rehabilitation Performance during the Reporting Period

As part of the site's approved EMS, revegetation and regenerative landscaping is required. Ongoing management of the surrounding vegetation is being carried out by Ramtech Pty Ltd over the lifetime of the Dunloe Sand Quarry operations.

The regenerative works have been undertaken via a combination of assisted and natural regrowth and all areas have been fenced so as to limit the intrusion of cattle. In this regard, depending on soil types and topography, each of the areas has been very successful in establishing quality regrowth.

The only limiting factors have been some cattle getting in and around existing fences (primarily at low tide where they have been able to traverse the creek lines).

Arbor Ecological undertook quarterly rehabilitation and landscape monitoring in April, July, September, and December 2023 as per Condition 28 in Schedule 3 of the Project Approval.

A summary of rehabilitation at the Dunloe Sand Quarry is outlined in **Table 39**.

**Table 39 Rehabilitation Performance in 2023**

Guideline Requirement	Site Comment
Extent of the operations and rehabilitation at completion of the reporting period	There was no rehabilitation at site in 2023.
Agreed post-rehabilitation land use	The proposed rehabilitation aims to return the land to an endangered ecological community (EEC) Swamp Sclerophyll plus Eucalypt Open Forest species and EEC Coastal Wetland within the localised she-oaks.
Key rehabilitation performance indicators	Criteria are outlined in the <i>Landscape Management Plan</i> .
Renovation or removal of buildings	None during reporting period.
Any other Rehabilitation taken including: <ul style="list-style-type: none"> <li>● Exploration activities;</li> <li>● Infrastructure;</li> <li>● Dams; and</li> <li>● The installation or maintenance of fences, bunds, and any other works.</li> </ul>	No rehabilitation of these features was completed.
Any rehabilitation areas which have received formal sign off from the Resources Regulator.	None.
Variations to activities undertaken to those proposed (including why there were variations and whether Resources Regulator was notified)	No variations to the Rehabilitation and Revegetation Management Plan.
Outcomes of trials, research projects and other initiatives	No specific trials done.
Key issues that may affect successful rehabilitation	There are several potential issues including availability of material, seed stock, climatic events, tidal inundation, and rehabilitation methodology.

## 8.2 Summary of Current Rehabilitation and Performance

A summary of the rehabilitation and disturbance status is outlined in **Table 40**. This is also shown in **Figure 4**.

**Table 40 Rehabilitation and Disturbance Status**

Quarry Area Type	2019	2020	2021	2022	2023	2024 <sup>1</sup>
	(ha)					
A. Total Quarry Footprint	32.2	32.2	32.2	32.2	32.2	32.2
B. Total Active Disturbance	18.8	18.8	18.8	18.8	18.8	18.8
C. Land Being Prepared for Rehabilitation	0	0	0	0	0	0
D. Land Under Active Rehabilitation	13.4	13.4	13.4	13.4	13.4	13.4
E. Completed Rehabilitation	0	0	0	0	0	0

Note 1 – Predicted Rehabilitation and Disturbance status

At the end of 2023 there was approximately 18.8 Ha of active disturbance and 13.4 Ha of active rehabilitation. This has remained on consistent since 2019, with operations remaining in existing footprint. (see **Figure 4**).

Quarterly rehabilitation monitoring of established rehabilitation areas found:

- No evidence of fauna using the nest boxes in 2023.
- Rehabilitation has been occurring primarily as natural regeneration.
- Dominant species continued to be Coast Banksia, Paperbark. and Swamp Oak.
- Weed control continued in all areas, including to control Camphor Laurel, Lantana, Senna, Ipomoea and Ground Asparagus.
- No Koala habitat trees are present
- No evidence of any threatened flora or fauna across site.
- Native fauna observed during monitoring including the Tawny Grassbird, Rufous Whistler, Egrets, Emerald Dove, and Major Skink
- Rehabilitation areas are generally on track to achieving rehabilitation outcomes.

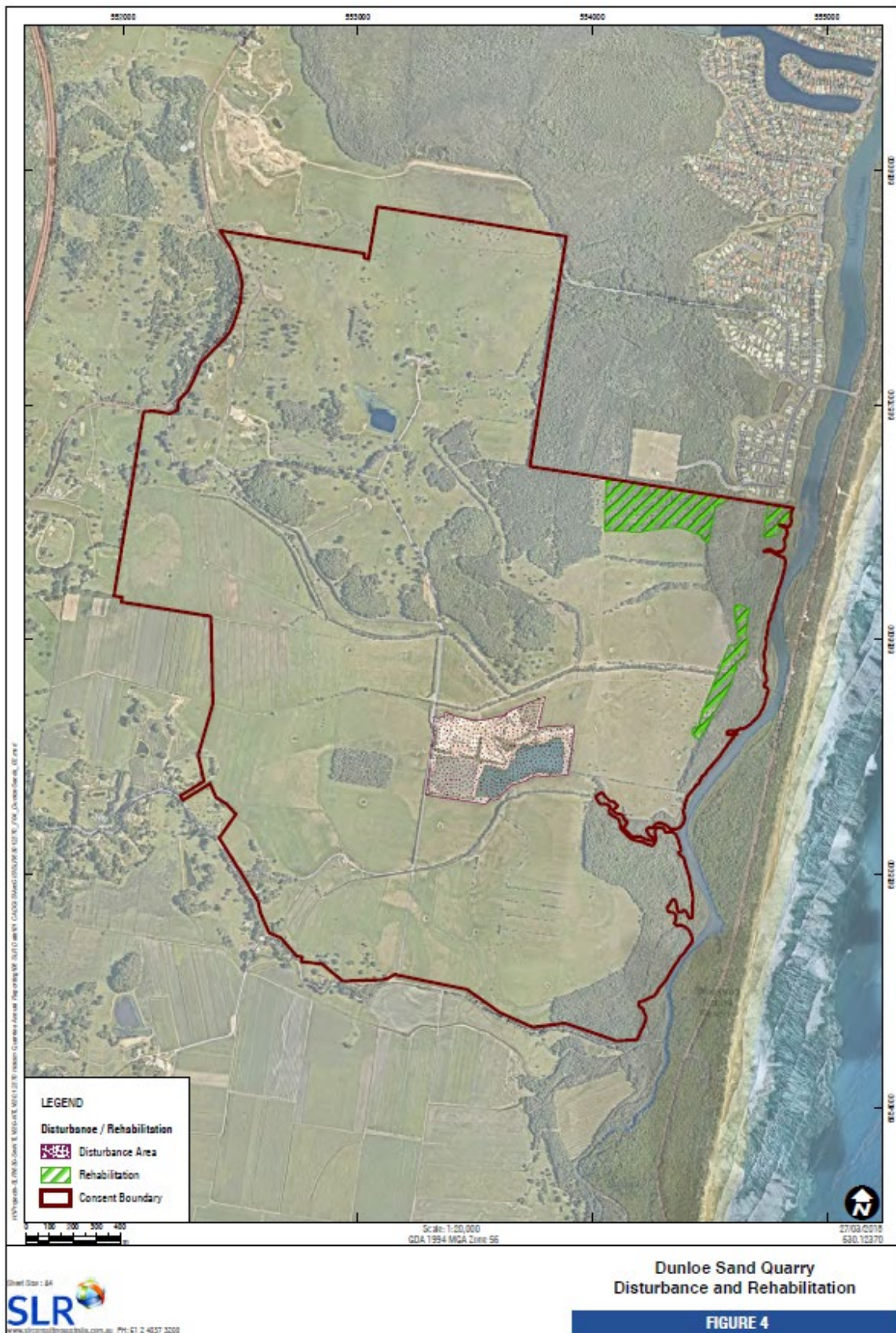


Figure 4 Rehabilitation and Disturbance

### 8.3 Actions for the Next Reporting Period

The *Annual Review Guidelines (DPE 2015)* require the Annual Review to outline the rehabilitation actions proposed during the next reporting period (1 January 2024 to 31 December 2024). These actions are detailed in **Table 41**.

**Table 41 Rehabilitation Actions for the Next Reporting Period (2024)**

Requirement	Site Comment
Outline proposed rehabilitation trials, research projects and other initiatives to be undertaken during the next reporting period.	Rehabilitation inspections/monitoring to continue as per the Rehabilitation and Revegetation Management Plan and the Dunloe Sand Environmental Management Strategy.
Summary of rehabilitation activities proposed for next report period.	No specific rehabilitation proposed for 2024. The three rehabilitation zones will continue to be managed and monitored in accordance with the approved EMS including invasive species removal and monitoring.

## 9. SUMMARY OF ENVIRONMENTAL PERFORMANCE

A summary of the performance of environmental management measures and sampling results for 2023 are detailed in **Table 42** below.



**Table 42 Environmental Performance at the Dunloe Sand Quarry in 2023**

Aspect	Approval Criteria / EIS Prediction	Performance during 2023 reporting period	Trend / key management implications	Implemented / proposed management actions
Meteorological	EIS predictions are all below Project Approval criteria.	Meteorological data collected from the on-site meteorological station.	Full monitoring continued in 2023. Data collected was verified against BOM data during the report period.	No further improvement measures.
Noise	EIS predictions are all below Project Approval criteria.	Quarterly monitoring has met the Project Approval Criteria.	Consistently meets criteria.	No further improvement measures.
Air Quality	EIS predictions are all below Project Approval criteria.	One short term impact recorded in May at DDG3. All monitoring locations below tarter criteria.	Consistent with EIS predictions and trends.	Continue to implement air quality monitoring is done in accordance with the Air Quality Management Plan. Holcim will ensure monthly monitoring is undertaken for depositional dust.
Traffic Management	EIS predictions are all below Project Approval criteria.	Met operating criteria (number of trucks per day).	Continual improvement from some past years.	None Required.
Water Management	EIS predictions are all below Project Approval criteria.	Criteria meets EIS, EPL and Project Approval criteria.	Surface water and Groundwater consistent with trend data.	Ensure water quality monitoring and analysis is completed in accordance with

Aspect	Approval Criteria / EIS Prediction	Performance during 2023 reporting period	Trend / key management implications	Implemented / proposed management actions
		Exceedances occurred in the surface water target levels in the Dredge Dam and Slit Pond however no discharges occurred from these in the period. Therefore, these are not deemed a non-compliance to report.	Water monitoring results were generally consistent with trend data.	the Soil and Water Management Plan. Holcim will identify any emerging trends in future Annual Reviews, as data capture and implementation of the Monitoring Program improves.
Biodiversity	No impacts to threatened species. No Project Approval criteria.	Biodiversity monitoring was undertaken in 2023.	Rehabilitation and biodiversity monitoring continued from 2019 to 2023.	Biodiversity monitoring will continue in 2024.
Heritage	No impacts to Aboriginal Heritage. No Project Approval criteria.	No impacts were recorded in 2023.	Consistently no impacts.	None required.

## **10 COMMUNITY**

### **10.1 Community Engagement Activities**

The site implemented a Community Consultative Committee (CCC) when under the operation of Ramtech as part of the conditions of Approval.

Holcim has maintained community engagement measures, including:

- Maintenance of a website (containing publicly available documents);
- A telephone number, email, and postal address (on the website) for community complaints and feedback;
- A copy of the Complaints Register is maintained on the company website; and
- All documents and items displayed on the website are regularly updated by Holcim staff.

During the 2023 reporting period, Holcim conducted two CCC meetings on 16 February and 20 July.

### **10.2 Community Contributions**

Holcim did not engage in any community activities during the Annual Review period.

### **10.3 Complaints**

There were no community complaints for the site during 2023. This trend has continued since 2018. Community complaints reports are published on the Holcim website quarterly.

## 11 INDEPENDENT AUDIT

The site undertook an Independent Environmental Audit (IEA) in July 2021 in accordance with the timeframes of the Project Approval. The IEA Report by NGH Consultants is presented in **Appendix C**. Holcim have commenced addressing the improvement actions raised in the IEA Improvement Actions in **Appendix D**.

The next IEA is due August 2024.

## 12 INCIDENTS AND NON-COMPLIANCE

**Table 43** summarises the incidents and non-compliances at the Dunloe Sand Quarry in 2023.

**Table 43 Summary of Incidents and Non-Compliances**

Date	Incident/Non-Compliance	Action/Comment
May 2023	Holcim notified the Department of a Short Term dust exceedance at DDG3, which recorded 4.3 (g/m <sup>2</sup> /month). Annual averages were within target criteria levels, and no additional actions required.	Holcim will continue to monitor Air Quality, and report to the Department as required.
21 December 2023	Schedule 3, Condition 22 The Blue-Green Algae Management Plan. Full monitoring was unable to be completed due to a lost sample on 21 December 2023.	Holcim will continue to monitor Blue Green Algae as per the approved Management Plan. Holcim completed samples on 21 December however sample was lost by laboratory.
December 2023	Schedule 5, Condition 3 (Incident Reporting) Incident relating to lost sample was not reported to the Department within 24hrs	Holcim will report all incidents to the Department within 24hr once made aware
December 2023	Schedule 5, Condition 4 (Incident Reporting) Incident report relating to lost Blue Green Algae sample was not provided to the within 6 days of notifying the Department.	Holcim will provide an Incident Report within 6 days of notifying the Department

## 13 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

Holcim staff will undertake the following works and improvement measures and projects in 2023 to ensure that effective environmental management controls are in place and operating in accordance with the requirements of the Approval. See **Table 44** for an outline of improvement measures and associated activities for 2023. The improvement actions also consider the recommendations of the IEA (**Appendix C**).

**Table 44 Improvement Actions for 2024**

Improvement Measure	Activities
Water Quality Monitoring	<p>Ensure all water quality monitoring is completed in accordance with the EMS, with a focus on correct monitoring frequencies.</p> <p>Holcim will implement water monitoring recommendations from <b>Section 7.5</b>.</p>
Dust Monitoring	<p>Ensure dust monitoring is completed in accordance with the EMS. Holcim will liaise with the monitoring contractor to improve monitoring notes.</p>
Biodiversity	<p>Weed spraying will continue at site during the next Annual Review period.</p> <p>Annual fauna box monitoring continues.</p> <p>Rehabilitation monitoring continues as per the Rehabilitation and Revegetation Management Plan.</p>

## **14 APPENDICES**

## **APPENDIX A**

# **DUNLOE SAND QUARRY NOISE MONITORING**



Intended for  
**Holcim (Australia) Pty Ltd**

Document type  
**Report**

Date  
**April 2023**

Project number  
**318000911**

# **QUARTERLY NOISE MONITORING ASSESSMENT – QUARTER 1 2023 DUNLOE SANDS QUARRY, POTTSVILLE, NSW**

**QUARTERLY NOISE MONITORING ASSESSMENT –  
QUARTER 1 2023  
DUNLOE SANDS QUARRY, POTTSVILLE, NSW**

Project name **Quarterly Noise Monitoring Assessment for Dunloe Sands Quarry – Quarter 1 2023**  
Project no. **318000911**  
Recipient **Matt Kelly**  
Document type **Report**  
Version **1**  
Date **11/04/2023**  
Prepared by **Matilda Englert, Jake Bourke**  
Checked by **Greer Laing**  
Approved by **Greer Laing**  
Description **Data collected on 11 January 2023 for Dunloe Quarry during Quarter 1 2023 at Pottsville, NSW, as part of the routine noise monitoring program**

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## ABBREVIATIONS AND DEFINITIONS

<b>Ambient Noise</b>	The all-encompassing noise within a given environment. It is the composite of sounds from many sources, both near and far.
<b>Background noise</b>	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is described using the LA90 descriptor (see below).
<b>dB</b>	Abbreviation for decibel, a measure of sound equivalent to 20 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure, and 10 times the logarithm of a given sound power to a reference power.
<b>dB(A)</b>	A measure of A-weighted sound levels. A Weighting is an adjustment made to the sound level measurement to approximate the response of the human ear.
<b>Extraneous noise</b>	Noise resulting from activities that are not typical of the area. Atypical activities may include construction, and traffic generated by holiday periods. Normal daily traffic is not extraneous noise.
<b>LA1</b>	The noise level, measured in dB(A), which is exceeded for 1 per cent of the measurement period.
<b>LA1(1min)</b>	The noise level, measured in dB(A), which is exceeded for 1 per cent of the time over a 1-minute measurement period, i.e., is exceeded for 0.6 seconds. This measure can approximate to the maximum noise level but may be less if there is more than 1 noise event during this 0.6 second period.
<b>LA10</b>	The noise level, measured in dB(A), which is exceeded for 10 per cent of the time.
<b>LA90</b>	The noise level, measured in dB(A), which is exceeded for 90 per cent of the time, referred to as the background noise level. This is considered to represent the background noise (see above).
<b>LAeq</b>	The level of noise equivalent to the energy average of noise levels occurring over a defined measurement period.
<b>LAeq (period)</b>	The average equivalent noise level, measured in dB(A), during a measurement period (e.g., 15-minute, day, evening, or night).
<b>LAm<sub>ax</sub></b>	The A-weighted sound pressure level that represents the maximum noise level measured over the time that a given sound is measured.
<b>NMA</b>	Noise Monitoring Assessment
<b>NMP</b>	Noise Management Plan

Source: Noise Guide for Local Government (NSW EPA, 2013)

# 1. OVERVIEW

## 1.1 Project Driver

Ramboll Australia Pty Ltd (Ramboll) has been commissioned by Holcim (Australia) Pty Ltd (Holcim) to complete a Noise Monitoring Assessment (NMA) for Dunloe Sands Quarry (“the quarry”) at Pottsville, NSW.

This NMA was done in accordance with the following documents:

- Noise Policy for Industry (NPI) (NSW EPA, 2017).
- Dunloe Sand Quarry Noise Management Plan (NMP) (GHD, 2020).
- Environment Protection Licence (EPL) number 13077 (NSW EPA, 2020).
- Notice of Modification (Draft) (NSW EPA, 2018).
- Australian Standard AS 1055:2018 Acoustics—Description and measurement of environmental noise (Standards Australia, 2018).
- IEC 60942 Ed. 3.0 b:2003 Electroacoustics - Sound calibrators (Standards Australia, 2003).

This NMA has been undertaken for the quarterly period January to March 2023, and forms part of the monitoring program to determine compliance with conditions of the Environmental Protection License (EPL).

## 1.2 Site Location and Sensitive Receptors

The quarry is approximately 2.5 km south of Pottsville, NSW, a town in the Northern Rivers region in Tweed Shire. Sensitive receptors surrounding the quarry are primarily rural and residential properties in coastal bushland with elevated and undulating topography.

Three monitoring locations have been selected as part of the NMA and in accordance with the EPL and are shown in **Table 1-1**.

**Table 1-1: Monitoring locations locality and sensitive receptors**

Monitoring Locations	Locality and Sensitive Receptors
R6	West of the quarry situated at a rural residential property at 157 Warwick Park Road.
R7	West of the quarry situated at a rural residential property at 129 Warwick Park Road.
R8	Northwest of the quarry situated at a rural residential property at 679 Pottsville Road.

The monitoring locations with respect to the quarry and assessed receivers are presented in the locality plan shown in **Figure 1**.



**Legend**

- Noise monitoring location



**Figure 1: Noise monitoring locations at Dunloe Sands Quarry**

## 2. NOISE CRITERIA

**Table 2-1** summarises the applicable noise criteria outlined in the NMP for residential receivers (R6, R7 and R8) surrounding the quarry. The noise criteria apply when the site is operational within the permitted operating hours Monday to Friday 7am - 5pm, Saturday 7am - 12pm with no operations on Sunday.

Compliance with the noise criteria below would also determine compliance with the noise limits outlined in the sites EPL (EPL 13077) which requires that the quarry’s noise contribution will not exceed 48 dB LAeq(15min) at any of the residential receivers.

**Table 2-1: Monitoring locations and noise criteria**

Receiver	Monitoring Locations	Day <sup>1</sup>
		LAeq (15min)
		dB(A)
157 Warwick Park Road	R6	42
129 Warwick Park Road	R7	48
679 Pottsville Road	R8	41
<sup>1</sup> 7 am–6 pm Monday to Saturday Note: no operations on Sundays and public holidays		

### 3. METHODOLOGY

The monitoring program was designed in accordance with the procedures described in *Australian Standard AS 1055:2018* and the Approval Documents referenced in Section 1. The measurements were completed using a RION Sound Level Meter NL-52 on Wednesday 11 January 2023. The acoustic instrumentation used carried a current NATA calibration and that complied with *AS/NZS IEC 61672-1:2013/2002 class 1*. Calibration of all instrumentation was checked prior to and following measurements using a Pulsar Acoustic Calibrator 105 which carried a current NATA calibration and complies with *IEC 60942:2003*. Drift in calibration did not exceed  $\pm 0.3$  dBA.

Attended noise monitoring was conducted for 15-minutes at each location during the day period over one day. Where possible, throughout each measurement the operator(s) quantified the contribution of each significant noise source.

Where the quarry was not distinctly audible during the attended monitoring, the quarry contribution was estimated to be at least 10 dBA below the ambient noise level, as determined by the LA90.



## 4. RESULTS AND DISCUSSION

### 4.1 Location R6

Noise monitoring at location R6 was completed on Wednesday 11 January 2023. The quarry was inaudible during the monitoring period. These results meet the noise criteria and indicate that noise emissions from Dunloe Sands Quarry did not contribute to noise nuisance during the monitoring period. The results and observations taken during the monitoring event at Location R6 are presented in Table 4-1. Noise sources measured included aircraft, wind, birds and passing vehicles.

**Table 4-1: Noise survey results and observations for Location R6**

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and LAeq (dBA)	Dunloe Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)
		LAmx	LAeq	LA90				
11-01-2023	3:14 (Day)	77.3	55.4	45.9	WD: 315° WS: 1.3 m/s Rain: Nil	Aircraft 74 Truck 77 Cars 50-66 Wind 47-57 Bird 46 Quarry inaudible	Inaudible	42

### 4.2 Location R7

Noise monitoring at location R7 was completed on Wednesday 11 January 2023. The quarry was not audible. These results meet the established noise criteria and indicate that noise emissions from Dunloe Sands Quarry did not contribute to noise nuisance. The results and observations taken during the monitoring events at Location R7 are presented in Table 4-2. Noise sources measured included wind, passing vehicles, insects and barking dogs.

**Table 4-2: Noise survey results and observations for Location R7**

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and LAeq (dBA)	Dunloe Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)
		LAmx	LAeq	LA90				
11-01-2023	2:55 (Day)	82.8	61.5	53.6	WD: 315° WS: 1.9 m/s Rain: Nil	Passing vehicles 53-83 Wind 49-51 Insects 62-67 Barking dog 66 Quarry inaudible	Inaudible	48

### 4.3 Location R8

Noise monitoring at location R8 conducted on Wednesday 11 January 2023 resulted in inaudible quarry noise during the day. These results meet the established noise criteria and indicate that noise emissions from Dunloe Sands Quarry did not contribute to noise nuisance. The results and observations taken during the monitoring events at Location R8 are presented in Table 4-3. Noise sources measured included wind and passing cars on Pottsville Road.

**Table 4-3: Noise survey results and observations for Location R8**

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and LAeq (dBA)	Dunloe Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)
		LAmx	LAeq	LA90				
11-01-2023	2:26 (Day)	81.0	62.6	52.9	WD: 315° WS: 3.4 m/s Rain: Nil	Wind 52-62 Passing cars 58-75 Quarry inaudible	Inaudible	41

## 5. CONCLUSION

This NMA was completed by Ramboll at the Holcim Dunloe Sands Quarry, Pottsville, NSW as a quarterly requirement of the NMP showed compliance to the relevant noise criteria. Monitoring was carried out on Wednesday 11 January 2023 at three locations selected as representative to the sensitive receptors at the surroundings to Dunloe Sands Quarry. No audible quarry noise was recorded at any of the selected monitoring locations.

## 6. REFERENCES

GHD (2020). Dunloe Sand Quarry Noise Management Plan.

NSW EPA (2018). Notice of Modification (Draft).

NSW EPA (2020). Environment Protection Licence number 13077.

NSW EPA (2013) *Noise Guide for Local Government*. Sydney NSW: NSW Environment Protection Authority. Available at: <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/noise/20130127nlg.pdf> (Accessed: 25 October 2022).

NSW EPA (2017) *Noise Policy for Industry (NPI)*. Sydney NSW: NSW Environment Protection Authority. Available at: <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/noise/17p0524-noise-policy-for-industry.pdf> (Accessed: 25 October 2022).

Standards Australia (2018) *AS 1055:2018 Acoustics—Description and measurement of environmental noise*. Australian Standard. Available at: [https://infostore.saiglobal.com/preview/825367946534.pdf?sku=1131503\\_SAIG\\_AS\\_AS\\_2626154](https://infostore.saiglobal.com/preview/825367946534.pdf?sku=1131503_SAIG_AS_AS_2626154) (Accessed: 19 January 2023).

Standards Australia (2003) *AS 60942:2003 Electroacoustics - Sound calibrators*. Australian Standard.

Intended for  
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Document type  
**Report**

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**July 2023**

Project number  
**318000911**

# **QUARTERLY NOISE MONITORING ASSESSMENT – QUARTER 2 2023 DUNLOE SANDS QUARRY, POTTSVILLE, NSW**

**QUARTERLY NOISE MONITORING ASSESSMENT –  
QUARTER 2 2023  
DUNLOE SANDS QUARRY, POTTSVILLE, NSW**

Project name	<b>Quarterly Noise Monitoring Assessment for Dunloe Sands Quarry – Quarter 1 2023</b>	Ramboll Level 2, Suite 18 Eastpoint 50 Glebe Road PO Box 435 The Junction NSW 2291 Australia
Project no.	<b>318000911</b>	
Recipient	<b>Matt Kelly</b>	
Document type	<b>Report</b>	
Version	<b>1</b>	
Date	<b>25/07/2023</b>	
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Checked by	<b>Andrew Bell, Rachel Condon</b>	<a href="https://ramboll.com">https://ramboll.com</a>
Approved by	<b>Belinda Sinclair</b>	
Description	<b>Data collected on 14 June 2023 for Dunloe Quarry during Quarter 2 2023 at Pottsville, NSW, as part of the routine noise monitoring program</b>	

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## ABBREVIATIONS AND DEFINITIONS

<b>Ambient Noise</b>	The all-encompassing noise within a given environment. It is the composite of sounds from many sources, both near and far.
<b>Background noise</b>	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is described using the LA90 descriptor (see below).
<b>dB</b>	Abbreviation for decibel, a measure of sound equivalent to 20 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure, and 10 times the logarithm of a given sound power to a reference power.
<b>dB(A)</b>	A measure of A-weighted sound levels. A Weighting is an adjustment made to the sound level measurement to approximate the response of the human ear.
<b>Extraneous noise</b>	Noise resulting from activities that are not typical of the area. Atypical activities may include construction, and traffic generated by holiday periods. Normal daily traffic is not extraneous noise.
<b>LA1</b>	The noise level, measured in dB(A), which is exceeded for 1 per cent of the measurement period.
<b>LA1(1min)</b>	The noise level, measured in dB(A), which is exceeded for 1 per cent of the time over a 1-minute measurement period, i.e., is exceeded for 0.6 seconds. This measure can approximate to the maximum noise level but may be less if there is more than 1 noise event during this 0.6 second period.
<b>LA10</b>	The noise level, measured in dB(A), which is exceeded for 10 per cent of the time.
<b>LA90</b>	The noise level, measured in dB(A), which is exceeded for 90 per cent of the time, referred to as the background noise level. This is considered to represent the background noise (see above).
<b>LAeq</b>	The level of noise equivalent to the energy average of noise levels occurring over a defined measurement period.
<b>LAeq (period)</b>	The average equivalent noise level, measured in dB(A), during a measurement period (e.g., 15-minute, day, evening, or night).
<b>LAm<sub>ax</sub></b>	The A-weighted sound pressure level that represents the maximum noise level measured over the time that a given sound is measured.
<b>NMA</b>	Noise Monitoring Assessment
<b>NMP</b>	Noise Management Plan

Source: Noise Guide for Local Government (NSW EPA, 2013)



# 1. OVERVIEW

## 1.1 Project Driver

Ramboll Australia Pty Ltd (Ramboll) has been commissioned by Holcim (Australia) Pty Ltd (Holcim) to complete a Noise Monitoring Assessment (NMA) for Dunloe Sands Quarry (“the quarry”) at Pottsville, NSW.

This NMA was done in accordance with the following documents:

- Noise Policy for Industry (NPI) (NSW EPA, 2017).
- Dunloe Sand Quarry Noise Management Plan (NMP) (GHD, 2020).
- Environment Protection Licence (EPL) number 13077 (NSW EPA, 2020).
- Notice of Modification (Draft) (NSW EPA, 2018).
- Australian Standard AS 1055:2018 Acoustics—Description and measurement of environmental noise (Standards Australia, 2018).
- IEC 60942 Ed. 3.0 b:2003 Electroacoustics - Sound calibrators (Standards Australia, 2003).

This NMA has been undertaken for the quarterly period April to June 2023, and forms part of the monitoring program to determine compliance with conditions of the Environmental Protection License (EPL).

## 1.2 Site Location and Sensitive Receptors

The quarry is approximately 2.5 km south of Pottsville, NSW, a town in the Northern Rivers region in Tweed Shire. Sensitive receptors surrounding the quarry are primarily rural and residential properties in coastal bushland with elevated and undulating topography.

Three monitoring locations have been selected as part of the NMA and in accordance with the EPL and are shown in **Table 1-1**.

**Table 1-1: Monitoring locations locality and sensitive receptors**

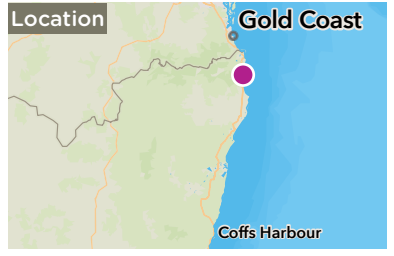
Monitoring Locations	Locality and Sensitive Receptors
R6	West of the quarry situated at a rural residential property at 157 Warwick Park Road.
R7	West of the quarry situated at a rural residential property at 129 Warwick Park Road.
R8	Northwest of the quarry situated at a rural residential property at 679 Pottsville Road.

The monitoring locations with respect to the quarry and assessed receivers are presented in the locality plan shown in **Figure 1**.



**Legend**

- Noise monitoring location



**Figure 1: Noise monitoring locations at Dunloe Sands Quarry**

RAMBOLL AUSTRALIA - GIS MAP file : 318000911\_GIS\_P006\_NoiseMonitoring | E005\_NoiseMonitoring\_Dunloe\_V01 | 12/10/2022  
 Imagery@ESRI World Imagery

## 2. NOISE CRITERIA

**Table 2-1** summarises the applicable noise criteria outlined in the NMP for residential receivers (R6, R7 and R8) surrounding the quarry. The noise criteria apply when the site is operational within the permitted operating hours Monday to Friday 7am - 5pm, Saturday 7am - 12pm with no operations on Sunday.

Compliance with the noise criteria below would also determine compliance with the noise limits outlined in the sites EPL (EPL 13077) which requires that the quarry’s noise contribution will not exceed 48 dB LAeq(15min) at any of the residential receivers.

**Table 2-1: Monitoring locations and noise criteria**

Receiver	Monitoring Locations	Day <sup>1</sup>
		LAeq (15min)
		dB(A)
157 Warwick Park Road	R6	42
129 Warwick Park Road	R7	48
679 Pottsville Road	R8	41
<sup>1</sup> 7 am–6 pm Monday to Saturday Note: no operations on Sundays and public holidays		

### 3. METHODOLOGY

The monitoring program was designed in accordance with the procedures described in *Australian Standard AS 1055:2018* and the Approval Documents referenced in Section 1. The measurements were completed using a RION Sound Level Meter NL-52 on Wednesday 14 June 2023. The acoustic instrumentation used carried a current NATA calibration and that complied with *AS/NZS IEC 61672-1:2013/2002 class 1*. Calibration of all instrumentation was checked prior to and following measurements using a Pulsar Acoustic Calibrator 105 which carried a current NATA calibration and complies with *IEC 60942:2003*. Drift in calibration did not exceed  $\pm 0.3$  dBA.

Attended noise monitoring was conducted for 15-minutes at each location during the day period over one day. Where possible, throughout each measurement the operator(s) quantified the contribution of each significant noise source.

Where the quarry was not distinctly audible during the attended monitoring, the quarry contribution was estimated to be at least 10 dBA below the ambient noise level, as determined by the LA90.

## 4. RESULTS AND DISCUSSION

### 4.1 Location R6

Noise monitoring at location R6 was completed on Wednesday 14 June 2023. The quarry was inaudible during the monitoring period, and the ambient noise environment was dominated by aircraft, passing cars, water pump from a property and distance road noise. These results meet the noise criteria and indicate that noise emissions from Dunloe Sands Quarry did not contribute to noise nuisance during the monitoring period. The results and observations taken during the monitoring event at Location R6 are presented in **Table 4-1**.

**Table 4-1: Noise survey results and observations for Location R6**

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and LAeq (dBA)	Dunloe Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)
		LAmx	LAeq	LA90				
14-06-2023	9:01am to 9:16am (Day)	71.1	51.0	48.4	WD: n/a WS: 0 m/s Rain: Nil	Aircraft 51 Passing cars 57-68 Distant road traffic hum 50-51 Water pump from property 48 Quarry inaudible	<38	42

### 4.2 Location R7

Noise monitoring at location R7 was completed on Wednesday 14 June 2023. The quarry was inaudible during the monitoring periods, and the ambient environment was dominated by birds, horses, passing cars and distant road noise. These results meet the established noise criteria and indicate that noise emissions from Dunloe Sands Quarry did not contribute to noise nuisance. The results and observations taken during the monitoring events at Location R7 are presented in **Table 4-2**.

**Table 4-2: Noise survey results and observations for Location R7**

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and LAeq (dBA)	Dunloe Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)
		LAmx	LAeq	LA90				
14-06-2023	8:39am to 8:54am (Day)	76.7	53.5	45.4	WD: n/a WS: 0 m/s Rain: Nil	Passing cars 65-75 Birds 50-55 Horses 48-49 Distant road traffic hum 48-56 Quarry inaudible	<35	48

### 4.3 Location R8

Noise monitoring at location R8 conducted on Wednesday 14 June 2023. The quarry was inaudible during the monitoring periods, and the ambient environment was dominated by passing cars on Pottsville Road. These results meet the established noise criteria and indicate that noise emissions from Dunloe Sands Quarry did not contribute to noise nuisance. The results and observations taken during the monitoring events at Location R8 are presented in **Table 4-3**.

**Table 4-3: Noise survey results and observations for Location R8**

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and LAeq (dBA)	Dunloe Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)
		LAmx	LAeq	LA90				
14-06-2023	9:22am to 9:37am (Day)	82.8	61.1	35.4	WD: n/a WS: 0 m/s Rain: Nil	Passing cars 58-80 Quarry inaudible	<25	41

## 5. CONCLUSION

This NMA was completed by Ramboll at the Holcim Dunloe Sands Quarry, Pottsville, NSW as a quarterly requirement of the NMP showed compliance to the relevant noise criteria. Monitoring was carried out on Wednesday 14 June 2023 at three locations selected as representative to the sensitive receptors at the surroundings to Dunloe Sands Quarry. No audible quarry noise was recorded at any of the selected monitoring locations.

The results presented in this NMA show compliance with the relevant noise criteria at the Holcim Dunloe Sands Quarry, Pottsville, NSW.

## 6. REFERENCES

GHD (2020). Dunloe Sand Quarry Noise Management Plan.

NSW EPA (2018). Notice of Modification (Draft).

NSW EPA (2020). Environment Protection Licence number 13077.

NSW EPA (2013) *Noise Guide for Local Government*. Sydney NSW: NSW Environment Protection Authority. Available at: <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/noise/20130127nlg.pdf> (Accessed: 25 October 2022).

NSW EPA (2017) *Noise Policy for Industry (NPfI)*. Sydney NSW: NSW Environment Protection Authority. Available at: <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/noise/17p0524-noise-policy-for-industry.pdf> (Accessed: 25 October 2022).

Standards Australia (2018) *AS 1055:2018 Acoustics—Description and measurement of environmental noise*. Australian Standard. Available at: [https://infostore.saiglobal.com/preview/825367946534.pdf?sku=1131503\\_SAIG\\_AS\\_AS\\_2626154](https://infostore.saiglobal.com/preview/825367946534.pdf?sku=1131503_SAIG_AS_AS_2626154) (Accessed: 19 January 2023).

Standards Australia (2003) *AS 60942:2003 Electroacoustics - Sound calibrators*. Australian Standard.



Intended for  
**Holcim (Australia) Pty Ltd**

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**Report**

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**October 2023**

Project number  
**318001799**

# **QUARTERLY NOISE MONITORING ASSESSMENT – QUARTER 3 2023 DUNLOE SANDS QUARRY, POTTSVILLE, NSW**

**QUARTERLY NOISE MONITORING ASSESSMENT –  
QUARTER 3 2023  
DUNLOE SANDS QUARRY, POTTSVILLE, NSW**

Project name **Quarterly Noise Monitoring Assessment for Dunloe Sands Quarry – Quarter 3 2023**  
Project no. **318001799**  
Recipient **Matt Kelly**  
Document type **Report**  
Version **1**  
Date **26/10/2023**  
Prepared by **Jake Bourke, Matilda Englert**  
Checked by **Arnold Cho, Rachel Condon**  
Approved by **Belinda Sinclair**  
Description **Data collected on 11 July 2023 for Dunloe Quarry during Quarter 3 2023 at Pottsville, NSW, as part of the routine noise monitoring program**

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## ABBREVIATIONS AND DEFINITIONS

<b>Ambient Noise</b>	The all-encompassing noise within a given environment. It is the composite of sounds from many sources, both near and far.
<b>Background noise</b>	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is described using the LA90 descriptor (see below).
<b>dB</b>	Abbreviation for decibel, a measure of sound equivalent to 20 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure, and 10 times the logarithm of a given sound power to a reference power.
<b>dB(A)</b>	A measure of A-weighted sound levels. A Weighting is an adjustment made to the sound level measurement to approximate the response of the human ear.
<b>Extraneous noise</b>	Noise resulting from activities that are not typical of the area. Atypical activities may include construction, and traffic generated by holiday periods. Normal daily traffic is not extraneous noise.
<b>LA1</b>	The noise level, measured in dB(A), which is exceeded for 1 per cent of the measurement period.
<b>LA1(1min)</b>	The noise level, measured in dB(A), which is exceeded for 1 per cent of the time over a 1-minute measurement period, i.e., is exceeded for 0.6 seconds. This measure can approximate to the maximum noise level but may be less if there is more than 1 noise event during this 0.6 second period.
<b>LA10</b>	The noise level, measured in dB(A), which is exceeded for 10 per cent of the time.
<b>LA90</b>	The noise level, measured in dB(A), which is exceeded for 90 per cent of the time, referred to as the background noise level. This is considered to represent the background noise (see above).
<b>LAeq</b>	The level of noise equivalent to the energy average of noise levels occurring over a defined measurement period.
<b>LAeq (period)</b>	The average equivalent noise level, measured in dB(A), during a measurement period (e.g., 15-minute, day, evening, or night).
<b>LAm<sub>ax</sub></b>	The A-weighted sound pressure level that represents the maximum noise level measured over the time that a given sound is measured.
<b>NMA</b>	Noise Monitoring Assessment
<b>NMP</b>	Noise Management Plan
<b>SPL</b>	The Sound Pressure Level. Sound pressure is the fluctuation in air pressure, from the steady atmospheric pressure, created by sound. The sound pressure level is the sound pressure expressed on a decibel scale.

Source: Noise Guide for Local Government (NSW EPA, 2023)

# 1. OVERVIEW

## 1.1 Project Driver

Ramboll Australia Pty Ltd (Ramboll) has been commissioned by Holcim (Australia) Pty Ltd (Holcim) to complete a Noise Monitoring Assessment (NMA) for Dunloe Sands Quarry (“the quarry”) at Pottsville, NSW.

This NMA was done in accordance with the following documents:

- Noise Policy for Industry (NPI) (NSW EPA, 2017).
- Dunloe Sand Quarry Noise Management Plan (NMP) (GHD, 2020).
- Environment Protection Licence (EPL) number 13077 (NSW EPA, 2020).
- Development Consent No. 06\_0030, MOD2 (NSW EPA, 2018)
- Australian Standard AS 1055:2018 Acoustics—Description and measurement of environmental noise (Standards Australia, 2018).
- IEC 60942 Ed. 3.0 b:2003 Electroacoustics - Sound calibrators (Standards Australia, 2003).

This NMA has been undertaken for the quarterly period July to September 2023, and forms part of the monitoring program to determine compliance with conditions of the Environmental Protection License (EPL).

## 1.2 Site Location and Sensitive Receptors

The quarry is approximately 2.5 km south of Pottsville, NSW, a town in the Northern Rivers region in Tweed Shire. Sensitive receptors surrounding the quarry are primarily rural and residential properties in coastal bushland with elevated and undulating topography.

Three monitoring locations have been selected as part of the NMA and in accordance with the EPL and are shown in **Table 1-1**.

**Table 1-1: Monitoring locations locality and sensitive receptors**

Monitoring Locations	Locality and Sensitive Receptors
R6	West of the quarry situated at a rural residential property at 157 Warwick Park Road.
R7	West of the quarry situated at a rural residential property at 129 Warwick Park Road.
R8	Northwest of the quarry situated at a rural residential property at 679 Pottsville Road.

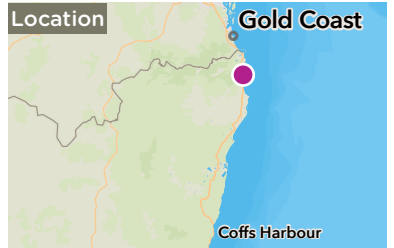
The monitoring locations with respect to the quarry and assessed receivers are presented in the locality plan shown in **Figure 1**.



RAMBOLL AUSTRALIA - GIS MAP file : 318000911\_GIS\_P006\_NoiseMonitoring | E005\_NoiseMonitoring\_Dunloe\_V01 | 12/10/2022

Imagery@ESRI World Imagery

**Legend**  
 Noise monitoring location



**Figure 1: Noise monitoring locations at Dunloe Sands Quarry**

## 2. NOISE CRITERIA

**Table 2-1** summarises the applicable noise criteria outlined in the NMP for residential receivers (R6, R7 and R8) surrounding the quarry. The noise criteria apply when the site is operational within the permitted operating hours Monday to Friday 7am - 5pm, Saturday 7am - 12pm with no operations on Sunday.

Compliance with the noise criteria below would also determine compliance with the noise limits outlined in the sites EPL (EPL 13077) which requires that the quarry’s noise contribution will not exceed 48 dB LAeq(15min) at any of the residential receivers.

**Table 2-1: Monitoring locations and noise criteria**

Receiver	Monitoring Locations	Day <sup>1</sup>
		LAeq (15min)
		dB(A)
157 Warwick Park Road	R6	42
129 Warwick Park Road	R7	48
679 Pottsville Road	R8	41
<sup>1</sup> 7 am–6 pm Monday to Saturday Note: no operations on Sundays and public holidays		

### 3. METHODOLOGY

The monitoring program was designed in accordance with the procedures described in *Australian Standard AS 1055:2018* and the Approval Documents referenced in Section 1. The measurements were completed using a RION Sound Level Meter NL-52 on Tuesday 11 July 2023. The acoustic instrumentation used carried a current NATA calibration and that complied with *AS/NZS IEC 61672-1:2013/2002 class 1*. Calibration of all instrumentation was checked prior to and following measurements using a Pulsar Acoustic Calibrator 105 which carried a current NATA calibration and complies with *IEC 60942:2003*. Drift in calibration did not exceed  $\pm 0.3$  dBA.

Attended noise monitoring was conducted for 15-minutes at each location during the day period over one day. Where possible, throughout each measurement the operator(s) quantified the contribution of each significant noise source.

Where the quarry was not distinctly audible during the attended monitoring, the quarry contribution was estimated to be at least 10 dBA below the ambient noise level, as determined by the LA90.



## 4. RESULTS AND DISCUSSION

### 4.1 Location R6

Noise monitoring at location R6 was completed on Tuesday 11 July 2023. The quarry was audible during the monitoring period, with a bulldozer heard from the quarry, although quarry contribution was still estimated to be below criteria. The ambient noise environment was dominated by aircraft and birds. These results meet the noise criteria and indicate that noise emissions from Dunloe Sands Quarry did not contribute to noise nuisance during the monitoring period. The results and observations taken during the monitoring event at Location R6 are presented in **Table 4-1**.

**Table 4-1: Noise survey results and observations for Location R6**

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and SPL (dBA)	Dunloe Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)
		LAmx	LAeq	LA90				
11-07-2023	12:59pm to 1:14pm (Day)	55.7	37.5	28.8	WD: n/a WS: 0 m/s Rain: Nil	Birds 30-45 Aircraft 30-36 Bulldozer from site 27-30 Site audible	<19	42

### 4.2 Location R7

Noise monitoring at location R7 was completed on Tuesday 11 July 2023. The quarry was inaudible during the monitoring periods, and the ambient environment was dominated by birds and wind. These results meet the established noise criteria and indicate that noise emissions from Dunloe Sands Quarry did not contribute to noise nuisance. The results and observations taken during the monitoring events at Location R7 are presented in **Table 4-2**.

**Table 4-2: Noise survey results and observations for Location R7**

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and SPL (dBA)	Dunloe Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)
		LAmx	LAeq	LA90				
11-07-2023	12:47pm to 1:02pm (Day)	60.7	41.8	35.8	WD: 347° WS: 3.1 m/s Rain: Nil	Background wind noise 37-41 Birds 41-44 Quarry inaudible	<26	48

### 4.3 Location R8

Noise monitoring at location R8 conducted on Tuesday 11 July 2023. The quarry was inaudible during the monitoring periods, and the ambient environment was dominated by passing cars on Pottsville Road, wind, and birds. These results meet the established noise criteria and indicate that noise emissions from Dunloe Sands Quarry did not contribute to noise nuisance. The results and observations taken during the monitoring events at Location R8 are presented in **Table 4-3**.

**Table 4-3: Noise survey results and observations for Location R8**

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and SPL (dBA)	Dunloe Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)
		LAmx	LAeq	LA90				
11-07-2023	1:21pm to 1:34pm (Day)	87.4	63.3	37.4	WD: 344° WS: 2.0 m/s Rain: Nil	Background passing cars 50-87 Background wind 37-38 Birds 38-41 Quarry inaudible	<27	41

## 5. CONCLUSION

This NMA was completed by Ramboll at the Holcim Dunloe Sands Quarry, Pottsville, NSW as a quarterly requirement of the NMP showed compliance to the relevant noise criteria. Monitoring was carried out on Tuesday 11 July 2023 at three locations selected as representative to the sensitive receptors at the surroundings to Dunloe Sands Quarry. Audible quarry noise was recorded at one of the selected monitoring locations but did not exceed the criteria.

The results presented in this NMA show compliance with the relevant noise criteria at the Holcim Dunloe Sands Quarry, Pottsville, NSW.

## 6. REFERENCES

GHD (2020). Dunloe Sand Quarry Noise Management Plan.

NSW EPA (2018). Development Consent No. 06\_0030, MOD2 (November 2018)

NSW EPA (2020). Environment Protection Licence number 13077.

NSW EPA (2013) *Noise Guide for Local Government*. Sydney NSW: NSW Environment Protection Authority. Available at: <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/noise/20130127nlg.pdf> (Accessed: 25 October 2022).

NSW EPA (2017) *Noise Policy for Industry (NPfI)*. Sydney NSW: NSW Environment Protection Authority. Available at: <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/noise/17p0524-noise-policy-for-industry.pdf> (Accessed: 25 October 2022).

Standards Australia (2018) *AS 1055:2018 Acoustics—Description and measurement of environmental noise*. Australian Standard. Available at: [https://infostore.saiglobal.com/preview/825367946534.pdf?sku=1131503\\_SAIG\\_AS\\_AS\\_2626154](https://infostore.saiglobal.com/preview/825367946534.pdf?sku=1131503_SAIG_AS_AS_2626154) (Accessed: 19 January 2023).

Standards Australia (2003) *AS 60942:2003 Electroacoustics - Sound calibrators*. Australian Standard.

Intended for  
**Holcim (Australia) Pty Ltd**

Document type  
**Report**

Date  
**February 2024**

Project number  
**318001799**

# **QUARTERLY NOISE MONITORING ASSESSMENT – QUARTER 4 2023 DUNLOE SANDS QUARRY, POTTSVILLE, NSW**

**QUARTERLY NOISE MONITORING ASSESSMENT –  
QUARTER 4 2023  
DUNLOE SANDS QUARRY, POTTSVILLE, NSW**

Project name **Quarterly Noise Monitoring Assessment for Dunloe Sands Quarry – Quarter 4 2023**  
Project no. **318001799**  
Recipient **Matt Kelly**  
Document type **Report**  
Version **1**  
Date **01/02/2024**  
Prepared by **Jake Bourke, Matilda Englert**  
Checked by **Arnold Cho**  
Approved by **Belinda Sinclair**  
Description **Data collected on 11 October 2023 for Dunloe Quarry during Quarter 4 2023 at Pottsville, NSW, as part of the routine noise monitoring program**

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## ABBREVIATIONS AND DEFINITIONS

<b>Ambient Noise</b>	The all-encompassing noise within a given environment. It is the composite of sounds from many sources, both near and far.
<b>Background noise</b>	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is described using the LA90 descriptor (see below).
<b>dB</b>	Abbreviation for decibel, a measure of sound equivalent to 20 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure, and 10 times the logarithm of a given sound power to a reference power.
<b>dB(A)</b>	A measure of A-weighted sound levels. A Weighting is an adjustment made to the sound level measurement to approximate the response of the human ear.
<b>Extraneous noise</b>	Noise resulting from activities that are not typical of the area. Atypical activities may include construction, and traffic generated by holiday periods. Normal daily traffic is not extraneous noise.
<b>LA1</b>	The noise level, measured in dB(A), which is exceeded for 1 per cent of the measurement period.
<b>LA1(1min)</b>	The noise level, measured in dB(A), which is exceeded for 1 per cent of the time over a 1-minute measurement period, i.e., is exceeded for 0.6 seconds. This measure can approximate to the maximum noise level but may be less if there is more than 1 noise event during this 0.6 second period.
<b>LA10</b>	The noise level, measured in dB(A), which is exceeded for 10 per cent of the time.
<b>LA90</b>	The noise level, measured in dB(A), which is exceeded for 90 per cent of the time, referred to as the background noise level. This is considered to represent the background noise (see above).
<b>LAeq</b>	The level of noise equivalent to the energy average of noise levels occurring over a defined measurement period.
<b>LAeq (period)</b>	The average equivalent noise level, measured in dB(A), during a measurement period (e.g., 15-minute, day, evening, or night).
<b>LAm<sub>ax</sub></b>	The A-weighted sound pressure level that represents the maximum noise level measured over the time that a given sound is measured.
<b>NMA</b>	Noise Monitoring Assessment
<b>NMP</b>	Noise Management Plan
<b>SPL</b>	The Sound Pressure Level. Sound pressure is the fluctuation in air pressure, from the steady atmospheric pressure, created by sound. The sound pressure level is the sound pressure expressed on a decibel scale.

Source: Noise Guide for Local Government (NSW EPA, 2023)



# 1. OVERVIEW

## 1.1 Project Driver

Ramboll Australia Pty Ltd (Ramboll) has been commissioned by Holcim (Australia) Pty Ltd (Holcim) to complete a Noise Monitoring Assessment (NMA) for Dunloe Sands Quarry (“the quarry”) at Pottsville, NSW.

This NMA was done in accordance with the following documents:

- Noise Policy for Industry (NPfI) (NSW EPA, 2017).
- Dunloe Sand Quarry Noise Management Plan (NMP) (GHD, 2020).
- Environment Protection Licence (EPL) number 13077 (NSW EPA, 2020).
- Development Consent No. 06\_0030, MOD2 (NSW EPA, 2018)
- Australian Standard AS 1055:2018 Acoustics—Description and measurement of environmental noise (Standards Australia, 2018).
- IEC 60942 Ed. 3.0 b:2003 Electroacoustics - Sound calibrators (Standards Australia, 2003).

This NMA has been undertaken for the quarterly period October to December 2023, and forms part of the monitoring program to determine compliance with conditions of the Environmental Protection License (EPL).

## 1.2 Site Location and Sensitive Receptors

The quarry is approximately 2.5 km south of Pottsville, NSW, a town in the Northern Rivers region in Tweed Shire. Sensitive receptors surrounding the quarry are primarily rural and residential properties in coastal bushland with elevated and undulating topography.

Three monitoring locations have been selected as part of the NMA and in accordance with the EPL and are shown in **Table 1-1**.

**Table 1-1: Monitoring locations locality and sensitive receptors**

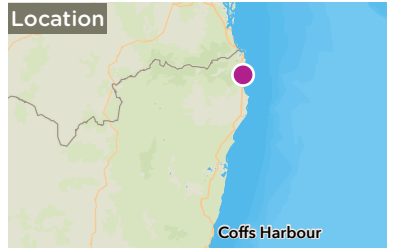
Monitoring Locations	Locality and Sensitive Receptors
R6	West of the quarry situated at a rural residential property at 157 Warwick Park Road.
R7	West of the quarry situated at a rural residential property at 129 Warwick Park Road.
R8	Northwest of the quarry situated at a rural residential property at 679 Pottsville Road.

The monitoring locations with respect to the quarry and assessed receivers are presented in the locality plan shown in **Figure 1**. It should be noted that while the NMP states monitoring locations be measured from the most affected points within surrounding residential property boundaries or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary, this has not been possible for this NMA due to access restrictions. Monitoring was completed at the property boundary of each location where accessible and in each case the property dwelling was approximately 40 to 100 metres from the boundary. This would have resulted in a conservative assessment as the monitoring locations were closer to the site.



RAMBOLL AUSTRALIA - GIS/MAP file - 318000911 GIS\_P006 NoiseMonitoring | F005 NoiseMonitoring\_Dunloe\_V03 | 29/01/2024

- Legend**
- Noise monitoring location
  - Property dwelling



**Figure 1: Noise monitoring locations at Dunloe Sands Quarry**

## 2. NOISE CRITERIA

**Table 2-1** summarises the applicable noise criteria outlined in the NMP for residential receivers (R6, R7 and R8) surrounding the quarry. The noise criteria apply when the site is operational within the permitted operating hours Monday to Friday 7am - 5pm, Saturday 7am - 12pm with no operations on Sunday.

Compliance with the noise criteria below would also determine compliance with the noise limits outlined in the sites EPL (EPL 13077) which requires that the quarry’s noise contribution will not exceed 48 dB LAeq(15min) at any of the residential receivers.

**Table 2-1: Monitoring locations and noise criteria**

Receiver	Monitoring Locations	Day <sup>1</sup>
		LAeq (15min)
		dB(A)
157 Warwick Park Road	R6	42
129 Warwick Park Road	R7	42
679 Pottsville Road	R8	48
All other residences		41
<sup>1</sup> 7 am–6 pm Monday to Saturday Note: no operations on Sundays and public holidays		

### 3. METHODOLOGY

The monitoring program was developed in accordance with the procedures described in *Australian Standard AS 1055:2018* and the Approval Documents referenced in Section 1. The measurements were completed using a RION Sound Level Meter NL-52 on Wednesday 11 October 2023. The acoustic instrumentation used carried a current NATA calibration and that complied with *AS/NZS IEC 61672-1:2013/2002 class 1*. Calibration of all instrumentation was checked prior to and following measurements using a Pulsar Acoustic Calibrator 105 which carried a current NATA calibration and complies with *IEC 60942:2003*. Drift in calibration did not exceed  $\pm 0.3$  dBA.

Each attended noise measurement was conducted for 15-minutes in duration at each monitoring location during the day period over one day. Where possible, throughout each measurement the operator(s) quantified the contribution of each significant noise source.

Where the quarry was not distinctly audible during the attended monitoring, the quarry contribution was estimated to be at least 10 dBA below the ambient noise level, as determined by the LA90.

## 4. RESULTS AND DISCUSSION

### 4.1 Location R6

Noise monitoring at location R6 was completed on Wednesday 11 October 2023. The quarry was inaudible during the monitoring periods, and the ambient environment was dominated by wind, trees, birds, and an aircraft. These results meet the noise criteria and indicate that noise emissions from Dunloe Sands Quarry did not contribute to noise nuisance during the monitoring period. The results and observations taken during the monitoring event at Location R6 are presented in **Table 4-1**.

**Table 4-1: Noise survey results and observations for Location R6**

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and SPL (dBA)	Dunloe Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)
		LAmx	LAeq	LA90				
11-10-2023	10:02am to 10:17am (Day)	58.6	38.9	35.4	WD: 20° WS: 3.6 m/s Rain: Nil	Background wind/trees/birds 32-41 Aircraft 38-58 (occurred once for 11 seconds) Quarry inaudible	<25	42

### 4.2 Location R7

Noise monitoring at location R7 was completed on Wednesday 11 October 2023. The quarry was inaudible during the monitoring periods, and the ambient environment was dominated by motorway hum, wind, trees, birds, and an aircraft. These results meet the established noise criteria and indicate that noise emissions from Dunloe Sands Quarry did not contribute to noise nuisance. The results and observations taken during the monitoring events at Location R7 are presented in **Table 4-2**.

**Table 4-2: Noise survey results and observations for Location R7**

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and SPL (dBA)	Dunloe Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)
		LAmx	LAeq	LA90				
11-10-2023	10:19am to 10:36am (Day)	72.1	46.0	36.9	WD: 20° WS: 3.8 m/s Rain: Nil	Background motorway/wind/trees/birds 34-58 Aircraft 45-72 (occurred once for 14 seconds) Quarry inaudible	<27	42

### 4.3 Location R8

Noise monitoring at location R8 conducted on Wednesday 11 October 2023. The quarry was inaudible during the monitoring periods, and the ambient environment was dominated by passing cars on Pottsville Road, insects, birds, and an aircraft. These results meet the established noise criteria and indicate that noise emissions from Dunloe Sands Quarry did not contribute to noise nuisance. The results and observations taken during the monitoring events at Location R8 are presented in **Table 4-3**.

**Table 4-3: Noise survey results and observations for Location R8**

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and SPL (dBA)	Dunloe Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)
		LAm <sub>ax</sub>	LA <sub>eq</sub>	LA <sub>90</sub>				
11-10-2023	10:42am to 10:57am (Day)	73.5	57.2	35.5	WD: - WS: - Rain: -	Background insects 35-36 Passing cars (occurred 11 times for ~14 seconds each time) Birds 34-36 Aircraft 34-44 (occurred once for 10 seconds) Quarry inaudible	<26	48

## 5. CONCLUSION

This NMA was completed by Ramboll at the Holcim Dunloe Sands Quarry, Pottsville, NSW as a quarterly requirement of the NMP showed compliance with the relevant noise criteria. Monitoring was carried out on Wednesday 11 October 2023 at three locations selected as representative to the sensitive receptors at the surroundings to Dunloe Sands Quarry. No audible quarry noise was recorded at any of the selected monitoring locations.

As monitoring was completed at the property boundary of each location and each property dwelling was approximately 40 to 100 metres from the boundary, it is recommended that permission from the property owners be sought to access their property to complete future noise monitoring within 30 metres of the property dwellings. The results presented in this NMA show compliance with the relevant noise criteria at the Holcim Dunloe Sands Quarry, Pottsville, NSW.

## 6. REFERENCES

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## **APPENDIX B**

# **DUNLOE SAND QUARRY LONG-TERM ENVIRONMENTAL MONITORING**

Long-term Depositional Dust Monitoring at Dunloe Sands Quarry						
Data located	Date	Location	D1	D2	D3	D4
			g/m2/month	g/m2/month	g/m2/month	g/m2/month
Appendix of 2015 AEMR	17/07/2015	Dunloe Sands	0.3	0.2	0.7	0.4
	19/08/2015	Dunloe Sands	0.3	0.3	0.2	0.2
	17/09/2015	Dunloe Sands	0.5	1.6	0.4	0.5
	21/10/2015	Dunloe Sands	0.1	0.6	0.2	0.1
	25/11/2015	Dunloe Sands	0.3	1.7	0.6	0.5
	16/12/2015	Dunloe Sands	0.7	0.8	0.4	0.6
2016 AEMR	Jan-16	Dunloe Sands	0.3	0.4	0.5	0.6
	Feb-16	Dunloe Sands	0.4	0.6	0.5	0.5
	Mar-16	Dunloe Sands	0.2	4.7	0.3	0.5
	Apr-16	Dunloe Sands	0.2	1.6	0.2	0.8
	May-16	Dunloe Sands	0.3	1.2	0.3	1.6
	Jun-16	Dunloe Sands	0.3	1.1	1.6	0.5
	Jul-16	Dunloe Sands	0.13	0.52	0.41	0.39
	Aug-16	Dunloe Sands	0.6	0.5	0.3	0.4
	Sep-16	Dunloe Sands	0.8	0.5	0.4	0.3
	Oct-16	Dunloe Sands	0.8	0.5	0.4	0.3
	Nov-16	Dunloe Sands	0.4	1.9	0.3	0.4
	Dec-16	Dunloe Sands	0.5	1.7	0.6	0.5
2017 Environmental Monitoring	30/01/2017	Dunloe Sands	0.3	0.2	0.5	0.3
	27/02/2017	Dunloe Sands	0.3	0.2	0.2	0.3
	22/03/2017	Dunloe Sands	0.2	0.1	2.4	0.3
	19/04/2017	Dunloe Sands	0.2	0.9	1	0.3
	17/05/2017	Dunloe Sands	0.8	0.8	1.4	0.7
	14/06/2017	Dunloe Sands	0.2	0.2	0.2	0.2
	12/07/2017	Dunloe Sands	0.3	0.1	0.2	0.3
	9/08/2017	Dunloe Sands	0.1	0.1	0.2	0.5
	6/09/2017	Dunloe Sands	0.5	0.2	0.5	0.5
	4/10/2017	Dunloe Sands	0.7	0.6	2.4	0.9
	1/11/2017	Dunloe Sands	0.5	0.3	0.8	0.5
	29/11/2017	Dunloe Sands	0.1	0.2	0.3	0.1
	28/12/2017	Dunloe Sands	0.4	0.3	0.2	0.2
	24/01/2018	Dunloe Sands	0.1	0.1	0.1	0.1
	2018 Enviro Monitoring	21/02/2018	Dunloe Sands	2.7	0.7	1.6
21/03/2018		Dunloe Sands	0.4	4.9c	11.8c	7.1c
18/04/2018		Dunloe Sands	0.4	0.1	0.3	0.2
16/05/2018		Dunloe Sands	0.2	0.4	0.6	0.3
13/06/2018		Dunloe Sands	0.3	0.2	5.2c	0.4
11/07/2018		Dunloe Sands	0.5	0.4	0.5	0.2
8/08/2018		Dunloe Sands	0.4	0.5	0.3	0.2
5/09/2018		Dunloe Sands	NS	NS	NS	NS
5/10/2018		Dunloe Sands	0.1	0.4	0.3	0.7
6/11/2018		Dunloe Sands	0.1	0.1	1.5	0.7
7/12/2018		Dunloe Sands	1	0.2	1.6	0.3
8/01/2019		Dunloe Sands	0.5	0.6	0.5	0.3
5/02/2019		Dunloe Sands	0.2	0.2	0.2	0.2
8/03/2019		Dunloe Sands	1.1	1	1.2	0.9
5/04/2019		Dunloe Sands	0.5	0.2	0.2	0.9
7/05/2019	Dunloe Sands	0.1	0.4	0.2	1.2	
4/06/2019	Dunloe Sands	0.2	0.4	0.7	0.2	
4/07/2019	Dunloe Sands	0.3	0.3	0.2	1.1	
29/08/2019	Dunloe Sands	0.5	0.5	0.4	1.8	
26/09/2019	Dunloe Sands	0.7	0.6	0.5	1.5	
24/10/2019	Dunloe Sands	1.2	0.7	0.5	1.4	
22/11/2019	Dunloe Sands	0.8	0.5	0.8	0.5	
20/12/2019	Dunloe Sands	1.8	1.8	1.6	1	
2020 Enviro Monitoring Portal	17/01/2020	Dunloe Sands	2.3	2.5	1.3	NS
	14/02/2020	Dunloe Sands	0.3	NS	NS	NS
	18/03/2020	Dunloe Sands	0.4	6.1*	0.5*	5.4*
	16/04/2020	Dunloe Sands	1	0.6	0.5	0.6
	14/05/2020	Dunloe Sands	2	3.6	0.3	0.6
	11/06/2020	Dunloe Sands	0.1	0.9	0.3	2.5*
	9/07/2020	Dunloe Sands	0.1	2.1	0.2	4
	10/08/2020	Dunloe Sands	1.4	0.7	0.2	3
	10/09/2020	Dunloe Sands	0.5	0.6	0.7	0.8
	8/10/2020	Dunloe Sands	0.5	0.4	1	7.7
	9/11/2020	Dunloe Sands	1.1	1.6	0.4	3
	10/12/2020	Dunloe Sands	1	NS	0.4	3.8
2021 Enviro Monitoring Portal	11/01/2021	Dunloe Sands	0.2	NS	0.7	0.5
	11/02/2021	Dunloe Sands	0.5	0.3	2.5	1.1
	15/03/2021	Dunloe Sands	0.2	0.6	0.7	12
	13/04/2021	Dunloe Sands	0.4	0.6	1.3	1.5
	12/05/2021	Dunloe Sands	0.3	0.5	1.9	14
	10/06/2021	Dunloe Sands	0.2	0.2	0.2	7
	8/07/2021	Dunloe Sands	0.2	0.1	0.3	NS
	9/08/2021	Dunloe Sands	0.3	0.4	0.3	18
	9/09/2021	Dunloe Sands	0.8	0.4	0.5	8.2
	11/10/2021	Dunloe Sands	1.1	0.7	1.2	1.2
	13/12/2021	Dunloe Sands	0.5	0.9	1.3	3.7
	2022 Environmental Monitoring	12/01/2022	Dunloe Sands	0.4	3.7	0.9
10/02/2022		Dunloe Sands	0.7	0.5	0.9	0.4
14/03/2022		Dunloe Sands	0.2	NS	2.2	1.0
13/04/2022		Dunloe Sands	0.4	0.5	0.3	0.4
11/05/2022		Dunloe Sands	0.4	1.2	0.5	3.2
9/06/2022		Dunloe Sands	0.4	0.4	0.4	1.8
11/07/2022		Dunloe Sands	0.3	0.3	0.3	2.8
11/08/2022		Dunloe Sands	0.2	0.2	0.3	1.6
12/09/2022		Dunloe Sands	0.2	0.2	0.1	0.7
13/10/2022		Dunloe Sands	0.1	0.1	0.1	0.1
14/11/2022		Dunloe Sands	0.1	0.2	0.6	0.2
14/12/2022		Dunloe Sands	0.1	0.3	0.1	0.1
2023 Environmental Monitoring	January 2023	Dunloe Sands	0.1	0.1	0.1	0.2
	February 2023	Dunloe Sands	0.2	0.3	0.5	0.1
	March 2023	Dunloe Sands	0.5	3.1	0.3	0.1
	April 2023	Dunloe Sands	1.3	0.2	0.8	0.2
	May 2023	Dunloe Sands	0.4	0.5	4.3	0.5
	June 2023	Dunloe Sands	0.1	0.1	0.7	1.1
	July 2023	Dunloe Sands	0.1	3.5	0.2	0.3
	August 2023	Dunloe Sands	0.2	0.4	0.2	0.1
	September 2023	Dunloe Sands	0.2	2.2	0.5	0.3
	October 2023	Dunloe Sands	0.3	2.3	0.2	0.1
	November 2023	Dunloe Sands	1.1	2.0	0.7	1.0
	December 2023	Dunloe Sands	0.5	2.8	0.8	0.3
<b>Minimum</b>			<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>
<b>Maximum</b>			<b>2.7</b>	<b>4.7</b>	<b>4.3</b>	<b>18</b>
<b>Average</b>			<b>0.49</b>	<b>0.82</b>	<b>0.67</b>	<b>1.47</b>

Long-term Groundwater Depth Monitoring at Dunloe Sands Quarry

Date	DPL1	DPL3	DPL5	DPL6	DPL7
Nov-13	0.61	0.57	0.67	0.59	0.61
Apr-14	0.61	0.58	0.68	0.61	0.62
Nov-14	1.30	1.90	1.20	1.40	1.90
Dec-14	1.20	1.80	1.20	1.40	1.80
Jan-15	1.10	1.40	0.90	1.20	1.40
Feb-15	0.30	1.00	0.20	0.80	1.50
Mar-15	0.70	1.00	0.40	1.00	1.20
Apr-15	0.90	1.00	0.80	1.20	1.40
May-15	1.10	1.70	0.80	1.40	1.20
Jun-15	1.40	1.40	0.80	1.20	1.30
Jul-15	1.00	1.50	1.10	1.10	1.00
Aug-15	1.30	1.50	0.90	1.10	1.60
Sep-15	1.30	1.80	1.30	1.20	1.70
Oct-15	1.40	1.70	1.10	1.20	1.80
Nov-15	1.20	1.40	1.20	1.30	1.70
Dec-15	1.10	1.20	0.90	1.20	1.60
22/03/2017	1.58	1.28	1.38	1.95	1.20
19/04/2017	1.53	1.46	1.51	1.26	
17/05/2017	1.64	1.44	1.54	1.51	1.51
14/06/2017	0.89			1.08	
12/07/2017	1.69	1.52	1.60	1.54	1.47
9/08/2017	1.83	1.60	1.68	1.77	1.69
6/09/2017	1.90	1.61	1.67	1.85	1.80
4/10/2017	1.91	1.54	1.61	1.81	1.89
1/11/2017	1.92	1.64	1.72	1.81	1.72
29/11/2017	1.93	1.65	1.74	1.81	1.77
28/12/2017	1.94	1.66	1.74	1.97	1.78
24/01/2018	2.03	1.70	1.77	1.88	1.9
21/02/2018	1.94	1.52	1.62	1.87	1.89
21/03/2018	1.68	1.38	1.49	1.62	1.4
18/04/2018	1.6	1.33	1.41	1.52	1.24
16/05/2018	1.62	1.23	1.36	1.65	1.37
13/06/2018	1.74	1.42	1.56	1.78	1.55
11/07/2018	1.78	1.48	1.58	1.71	1.62
8/08/2018	1.98	1.72	1.80	1.78	1.78
5/09/2018		1.36	1.74	1.6	1.78
5/10/2018	1.73	1.39	1.39	1.73	1.64
6/11/2018	1.74	1.74	1.54	1.62	1.52
7/12/2018		1.39	1.46	1.58	1.34
8/01/2019	1.75	1.63	1.60	1.91	1.8
5/02/2019	1.99	1.64	1.71	2.1	1.93
9/03/2019	1.97	1.83	1.88	1.51	1.59
5/04/2019	1.58	1.35	1.39	1.46	1.56
7/05/2019	NA	NA	NA	NA	NA
4/06/2019	1.75	1.35	1.75	1.64	1.6
4/07/2019	1.68	1.26	1.42	1.49	1.31
1/08/2019	1.85	1.49	1.59	1.58	1.61
28/09/2019	2.45	1.74	2.77	1.64	2.76
24/10/2019	NR	NR	NR	NR	NR
22/11/2019	2.03	2.02	1.81	2.01	1.99
20/12/2019	2.13	1.79	1.83	1.68	2.01
17/01/2020	2.59				
18/03/2020	0.7	1.2	1.25	1	1.15
16/04/2020	1.7	1.4	1.50	1.4	1.4
14/05/2020	1.9	1.7	1.8	1.8	1.7
11/06/2020	1.8	1.5	1.65	1.55	1.7
9/07/2020	2.05	1.7	1.66	1.65	1.8
10/08/2020	1.05	1.5		1.6	1.55
10/09/2020					
24/09/2020	1.94	1.75	1.75	1.43	1.66
8/10/2020	2.07	1.79	1.7	1.72	1.82
9/11/2020	2.15	1.68	1.64	1.71	1.71
10/12/2020	2.25	1.87	1.76	2.3	1.97
11/01/2021	1.8	1.44	1.58	1.7	1.46
11/02/2021	1.75	1.52	1.53	1.65	1.61
13/03/2021	1.78	1.4	1.43	1.46	1.26
13/04/2021	1.4	1.25	1.23	1.03	1.33
11/05/2021	1.61	1.45	1.48	1.33	1.19
10/06/2021	1.91	1.59	1.77	1.76	1.89
8/07/2021	1.68	1.35	1.49	1.56	1.37
9/08/2021	1.89	1.49	1.58	1.73	1.53
9/09/2021	1.97	1.66	1.73	2.02	1.96
11/10/2021	2.08	1.8	1.83	2.1	1.86
11/11/2021	2.03	1.64	1.71	1.92	1.67
13/12/2021	1.82	1.34	1.44	1.62	1.36
12/01/2022	1.79	1.4	1.45	1.58	1.41
9/02/2022	1.58	1.26	1.34	1.48	1.29
14/03/2022	1.48	1.29	1.36	1.06	1.26
13/04/2022	1.37	1.28	1.36	1.09	1.29
11/05/2022	1.34	1.18	1.3	1.14	1.17
9/06/2022	1.46	1.46	1.52	1.2	1.32
11/07/2022	1.77	1.58	1.52	1.38	1.37
10/08/2022	1.75	1.67	1.68	1.49	1.61
13/09/2022	1.9	1.63	1.7	1.6	1.57
13/10/2022	1.71	1.5	1.57	1.48	1.47
14/11/2022	1.87	1.64	1.65	1.59	1.62
14/12/2022	1.92	1.61	1.59	1.54	1.62
Minimum	0.3	0.57	0.2	0.59	0.61
Maximum	2.45	2.74	2.77	2.3	2.75
Average	1.63	1.50	1.46	1.52	1.55

Long-term Groundwater Quality Monitoring at Dunloe Sands Quarry

Table with columns: Data located, Date, Location, pH, EC, DO (membrane electrode), Redox Potential, Alkalinity as CaCO3, Bicarbonate as CaCO3, Chloride, Total Phosphorus-P, Total N, Ammonia, Calcium, Magnesium, Sodium, Potassium, Sulfate as Sulfate, Aluminum (Total), Arsenic (Total), Iron (Total), Manganese. Data is organized into sections for different years (2011-2019) and monitoring reports.







Long-term Algae Monitoring at Dunloe Sands Quarry

Data located	Date	Location	Cyanophyta (Blue Green Algae)	Chlorophyta (Total Algae Count)	Diatoms (Bacillariophyta)	Dinophyta (Dinoflagellates)	Euglenophyta (Euglenoids)	M. Aeruginosa	Total Biovolume
			cells/mL	cells/mL	cells/mL	cells/mL	cells/mL	cells/mL	mm3/
2011/2012 AEMR	30/11/2011	Extraction Pond	240						
	22/12/2012	Extraction Pond	800						
	2/02/2012	Extraction Pond	<100						
	20/02/2012	Extraction Pond	700						
	28/02/2012	Extraction Pond	14375						
	27/03/2012	Extraction Pond	1200						
	30/05/2012	Extraction Pond	<100						
	27/06/2012	Extraction Pond	130	0.01					
	26/07/2012	Extraction Pond	16360	2520					
	27/08/2012	Extraction Pond	24640	3720					
	27/09/2012	Extraction Pond	68000	35000					
	29/10/2012	Extraction Pond	<100	7900					
2012/2013 AEMR	28/11/2012	Extraction Pond	<100	80670					
	24/12/2012	Extraction Pond	<100						
	17/01/2013	Extraction Pond	<100						
	1/02/2013	Extraction Pond	<100						
	15/02/2013	Extraction Pond	<100						
	8/03/2013	Extraction Pond	<100	215					
	30/05/2013	Extraction Pond	<100	880					
	30/06/2013	Extraction Pond	<100						
	30/07/2013	Extraction Pond	<100	34000					
	28/08/2013	Extraction Pond	<100	205					
	30/09/2013	Extraction Pond	<100						
	25/10/2013	Extraction Pond	<100	17430					
2013/2014 AEMR	25/11/2013	Extraction Pond				480			
	12/12/2013	Extraction Pond	1150	39500					
	19/12/2013	Extraction Pond		22000					
	9/01/2014	Extraction Pond		123000					
	29/01/2014	Extraction Pond		34000					
	31/03/2014	Extraction Pond			295				
	28/04/2014	Extraction Pond		7700	45				
	29/05/2014	Extraction Pond	ND	7600					
	26/06/2014	Extraction Pond	ND	52000					
	31/07/2014	Extraction Pond	ND	28000					
	28/10/2014	Extraction Pond	ND	168000					
	Appendix of 2015 AEMR	28/11/2014	Extraction Pond	ND	123000	260	60		
19/12/2014		Extraction Pond	ND	106500	220	35			
22/01/2015		Extraction Pond	ND	37000					
26/02/2015		Extraction Pond	ND						
26/03/2015		Extraction Pond	ND	8750					
24/04/2015		Extraction Pond	ND	8000					
29/05/2015		Extraction Pond	ND	76000	4200				
29/08/2015		Extraction Pond	ND	211000	6300				
21/10/2015		Extraction Pond	ND	18330	65	35	155		
26/11/2015		Extraction Pond	ND	4850		5			
11/12/2015		Extraction Pond	ND	11900	30	10			
2016 AEMR		25/01/2016	Extraction Pond	ND	34000				
	8/02/2016	Extraction Pond	ND	0					
	24/02/2016	Extraction Pond	ND	3700					
	10/03/2016	Extraction Pond	ND	1675					
	24/03/2016	Extraction Pond	ND	7600					
	7/04/2016	Extraction Pond	ND	9700					
	29/04/2016	Extraction Pond	ND	11800					
	24/05/2016	Extraction Pond	ND	5700					
	30/06/2016	Extraction Pond	ND	28930					
	31/08/2016	Extraction Pond	840	61500					
	30/09/2016	Extraction Pond	ND	920					
	4/10/2016	Extraction Pond	ND	920					
2017 Q1 Env Monitoring report	28/10/2016	Extraction Pond	ND	29000					
	21/12/2016	Extraction Pond	ND	10830					
	30/01/2017	Extraction Pond	ND	1480					
	27/02/2017	Extraction Pond	ND	640					
	22/03/2017	Extraction Pond	ND	175					
	19/04/2017	Extraction Pond	ND	600					
	17/05/2017	Extraction Pond	ND	2820					
	14/06/2017	Extraction Pond	ND	1830					
	12/07/2017	Extraction Pond	ND	5260					
	9/08/2017	Extraction Pond	ND	41500					
	6/09/2017	Extraction Pond	ND	99800					
	4/10/2017	Extraction Pond	ND	128000					
2018 Env Monitoring	1/11/2017	Extraction Pond	ND	38600					
	29/11/2017	Extraction Pond	ND	8150					
	28/12/2017	Extraction Pond	ND	1890					
	24/01/2018	Extraction Pond	<5	350					
	21/02/2018	Extraction Pond	<5	100					
	21/03/2018	Extraction Pond	<5	3,960					
	18/04/2018	Extraction Pond	<5	4,580					
	16/05/2018	Extraction Pond	<5	290					
	13/06/2018	Extraction Pond	<5	5,820					
	11/07/2018	Extraction Pond	<5	16,100					
	8/08/2018	Extraction Pond	<5	13,800					
	5/09/2018	Extraction Pond	ND	ND					
5/10/2018	Extraction Pond	<5	ND						
6/11/2018	Extraction Pond	ND	ND						
7/12/2018	Extraction Pond	ND	ND						
2019 Env Monitoring	8/03/2019	Point 1 Silt Pond (Dam 2)	<0.001	<5					
	4/06/2019	Point 1 Silt Pond (Dam 2)	<0.001	500					
	29/08/2019	Point 1 Silt Pond (Dam 2)	<0.001	525					
	22/11/2019	Point 1 Silt Pond (Dam 2)	2.13	10800					
	8/03/2019	Point 2 Dredge Pond	<0.001	<5					
	4/06/2019	Point 2 Dredge Pond	<0.001	550					
2020 Annual Review	29/08/2019	Point 2 Dredge Pond	0.002	30900					
	22/11/2019	Point 2 Dredge Pond	0.002	900					
	14/02/2020	Silt Pond (Dam 2)					5	0.001	
	18/03/2020	Dredge Pond (Dam 1)					735	1.0199	
	18/03/2020	Silt Pond (Dam 2)					727	1.032	
	16/04/2020	Dredge Pond (Dam 1)					430	0.0166	
	16/04/2020	Silt Pond (Dam 2)					0	0	
	14/05/2020	Dredge Pond (Dam 1)					90	0.0043	
	14/05/2020	Silt Pond (Dam 2)					270	0.115	
	11/06/2020	Dredge Pond (Dam 1)					0	0	
	11/06/2020	Silt Pond (Dam 2)					0	0	
	9/07/2020	Dredge Pond (Dam 1)					0	0	
9/07/2020	Silt Pond (Dam 2)					110	0.0011		
10/08/2020	Dredge Pond (Dam 1)					210	0.0153		
10/08/2020	Silt Pond (Dam 2)					170	0.0151		
8/09/2020	Dredge Pond (Dam 1)					326	0.00171		
8/09/2020	Silt Pond (Dam 2)					2252	0.0089		
8/10/2020	Dredge Pond (Dam 1)					0	0		
8/10/2020	Silt Pond (Dam 2)					148	0.00186		
9/11/2020	Dredge Pond (Dam 1)					1	0.01		
9/11/2020	Silt Pond (Dam 2)					1	0.01		
24/11/2020	Dredge Pond (Dam 1)					1	0.01		
24/11/2020	Silt Pond (Dam 2)					1	0.01		
10/12/2020	Dredge Pond (Dam 1)					1	0.01		
10/12/2020	Silt Pond (Dam 2)					1	0.01		
1/01/2021	Dredge Pond (Dam 1)					1	0.01		



2021 Annual Review	22/01/2021	Dredge Pond (Dam 1)							1	0.01	
	11/02/2021	Dredge Pond (Dam 1)							1	0.01	
	3/03/2021	Dredge Pond (Dam 1)							1	0.01	
	16/03/2021	Dredge Pond (Dam 1)							1	0.01	
	22/03/2021	Dredge Pond (Dam 1)							1	0.01	
	3/04/2021	Dredge Pond (Dam 1)							1	0.01	
	12/05/2021	Dredge Pond (Dam 1)							1	0.01	
	10/06/2021	Dredge Pond (Dam 1)							1	0.01	
	8/07/2021	Dredge Pond (Dam 1)							1	0.01	
	9/08/2021	Dredge Pond (Dam 1)							1	0.01	
	9/09/2021	Dredge Pond (Dam 1)							1	0.01	
	11/10/2021	Dredge Pond (Dam 1)							1	0.01	
	22/10/2021	Dredge Pond (Dam 1)							1	0.01	
	10/11/2021	Dredge Pond (Dam 1)							1	0.01	
	10/12/2021	Dredge Pond (Dam 1)							1	0.01	
	1/01/2021	Silt Pond (Dam 2)							1	0.01	
	22/01/2021	Silt Pond (Dam 2)							1	0.01	
	11/02/2021	Silt Pond (Dam 2)							1	0.01	
	3/03/2021	Silt Pond (Dam 2)							1	0.01	
	16/03/2021	Silt Pond (Dam 2)							1	0.01	
	22/03/2021	Silt Pond (Dam 2)							1	0.01	
	3/04/2021	Silt Pond (Dam 2)							1	0.01	
	12/05/2021	Silt Pond (Dam 2)							1	0.01	
	10/06/2021	Silt Pond (Dam 2)							1	0.01	
	8/07/2021	Silt Pond (Dam 2)							1	0.01	
	9/08/2021	Silt Pond (Dam 2)							1	0.01	
	9/09/2021	Silt Pond (Dam 2)							1	0.01	
	11/10/2021	Silt Pond (Dam 2)							1	0.01	
	22/10/2021	Silt Pond (Dam 2)							1	0.01	
	10/11/2021	Silt Pond (Dam 2)							1	0.01	
10/12/2021	Silt Pond (Dam 2)							1	0.01		
2022 Env Monitoring	12/01/2022	Dredge Pond (Dam 1)								0.01	
	9/02/2022	Dredge Pond (Dam 1)								0.01	
	14/03/2022	Dredge Pond (Dam 1)								0.01	
	13/04/2022	Dredge Pond (Dam 1)								0.01	
	11/05/2022	Dredge Pond (Dam 1)								0.01	
	8/06/2022	Dredge Pond (Dam 1)								0.01	
	11/07/2022	Dredge Pond (Dam 1)								0.01	
	10/08/2022	Dredge Pond (Dam 1)								0.01	
	12/09/2022	Dredge Pond (Dam 1)								0.01	
	14/11/2022	Dredge Pond (Dam 1)								0.01	
	14/12/2022	Dredge Pond (Dam 1)								0.01	
	12/01/2022	Silt Pond (Dam 2)								0.01	
	9/02/2022	Silt Pond (Dam 2)								0.01	
	14/03/2022	Silt Pond (Dam 2)								0.02	
	13/04/2022	Silt Pond (Dam 2)								0.01	
	11/05/2022	Silt Pond (Dam 2)								0.01	
	8/06/2022	Silt Pond (Dam 2)								0.01	
	11/07/2022	Silt Pond (Dam 2)								0.01	
	10/08/2022	Silt Pond (Dam 2)								0.01	
	12/09/2022	Silt Pond (Dam 2)								0.01	
	12/10/2022	Silt Pond (Dam 2)								0.01	
	14/11/2022	Silt Pond (Dam 2)								0.01	
	14/12/2022	Silt Pond (Dam 2)								0.01	
	2023 Env Monitoring	11/01/2023	Dredge Pond							1	0.01
		20/01/2023	Dredge Pond							1	0.01
		13/02/2023	Dredge Pond							1	0.01
20/02/2023		Dredge Pond							1	0.01	
15/03/2023		Dredge Pond							1	0.01	
20/03/2023		Dredge Pond							1	0.01	
11/04/2023		Dredge Pond							1	0.01	
19/04/2023		Dredge Pond							1	0.01	
11/05/2023		Dredge Pond							1	0.01	
14/06/2023		Dredge Pond							1	0.01	
11/07/2023		Dredge Pond							1	0.01	
8/08/2023		Dredge Pond							1	0.01	
11/09/2023		Dredge Pond							1	0.01	
11/10/2023		Dredge Pond							1	0.01	
20/10/2023		Dredge Pond							1	0.01	
13/11/2023		Dredge Pond							1	0.01	
20/11/2023		Dredge Pond							1	0.01	
12/12/2023		Dredge Pond							1	0.01	
				Mini	0.002	0	30	5	155	1	0
				Maximum	68000	211000	6300	480	155	2252	1.032
				Average	9174.1	26700.4	1426.9	104.2	155.0	60.3	0.0





## **APPENDIX C**

# **DUNLOE SAND QUARRY INDEPENDENT ENVIRONMENTAL ACTION PLAN 2023**

Reference	Required Audit action and Terms and Conditions.	Finding	Auditor's comment	Holcim's comment	Status
4	The proponent must comply with any reasonable requirement /s of the Secretary arising from the Department's assessment of b) any reviews, reports or audits undertaken or commissioned by the Department regarding compliance with the conditions of this approval; and (c) the implementation of any actions or measures contained in these documents	Non - Compliant	The findings of the previous audit have been mostly implemented and corrections to various aspects of the monitoring program have been effected. However, several actions from the previous audit are still open.	All the non-compliances that were identified have been worked through. Monitoring program has been reviewed in 2019. New monitoring contractors were established and we have had no gaps. Any concerns were proactively reported to DPIE and EPA.	Completed
5	Within 3 months of the approval of Modification 2, the proponent must prepare a Noise Monitoring Plan for the project to the satisfaction of the Secretary.	Non - Compliant	Mod 2 approved in Nov 2018, Consultation with EPA in Aug 2019 DPIE approval of plan in July 2020. As such the plan was not prepared within 3 months of the approval of the Mod 2.	The position managing this role was not replaced until Q2 2019. Resourcing issue.	Completed
7A	Within 3 months of the approval of Modification 2, the proponent must prepare an Air Quality Management Plan for the project to the satisfaction of the Secretary.	Non - complaint	Mod 2 approved in Nov 2018, Consultation with EPA in Aug 2019 DPIE approval of plan in July 2020. As such the plan was not prepared within 3 months of the approval of the Mod 2.	Same as above.	Completed
9	The proponent must aim to meet the water quality objectives in Table 4 for water in the dredge ponds and in groundwater adjacent the dredge ponds, unless otherwise approved by the Secretary.	Non - compliant	The proponent should seek to alter the limits for pH in the ponds to be more inline with groundwater levels and a range of 5.5 to 7.5. Significant improvements have been made regarding fines management and reducing the impacts on ground water by ensuring that fines are piped directly to Pond 1. Stockpiling of screened material should be managed to reduce the transmission to ground water of stormwater that infiltrates the stockpiles. To this end consideration should be given to forming stockpile areas so they drain to the ponds, lining the stockpile areas with a barrier to prevent seepage to groundwater and lining drains to the ponds with limestone or similar.	Dunloe water assessment was conducted by the water specialist. All of the recommended actions from the report was completed. Soil and Water Management Plan with changes are in the process of getting submitted in March 2022 to DPIE. ASS Resource Assessment for silt reuse are being assessed. This will be submitted by April 2022.	In process
17	The proponent must ensure that the flood storage capacity of the site is no less than the pre-existing flood storage capacity at all stages of the project. Details of the available flood capacity must be reported in Annual Review.	Non - Compliant	Report on flood storage capacity in the Annual review.	Flood storage capacity will be reported in 2021 - 2022 Annual Environmental Management Plan.	Completed

18	The proponent must prepare a Soil and Water management Plan ( SWMP) for the project to the satisfaction of the Secretary. This plan must include Acid Sulphate Soil Management Plan.	Non - Compliant	Update plan to include the use of Sodium Bicarbonate for the wash plant.	The updated Soil and Water Management Plan will be submitted to DPIE in March 2022.	In process
18	The proponent must implement the plan as approved by the Secretary.	Non - Compliant	Update the management plan to include current and planned action that deviate from SWMP.	Same as above.	In process
358	The proponent must prepare a Traffic Management Plan for the project to the satisfaction of the Secretary. The plan must include - Complaint resolution procedures - any complaint consultation measured in respect of peak haulage periods.	Non - Compliant	Insert cross reference to EMS for complaint resolution Insert cross reference to TMP community consultation.	Will share with DPIE in May 2022.	Completed
1	Environmental Management Strategy b) be prepared in conjunction with the relevant agencies. - manage cumulative impacts.	Non - Compliant	The EMS 2020 notes agency consultation but it is not appended to the plan on the website Include statement addressing cumulative impact for multiple issues or singular repeat issues.	Will be added - March 2022.	Completed
<b>Reference</b>	<b>Required Audit action and Terms and Conditions.</b>	<b>Finding</b>	<b>Auditor's comment</b>	<b>Holcim's comment</b>	
19	Surface water quality control - Surface water monitoring shall be undertaken in accordance with the requirements in as outlines with the draft EMP under Appendix G	Non - Compliant	Ensure sub contractors complete monitoring as required.	This has been well managed for the past 2 years. Results are on a portal and any non - compliance reading creates alert messages.	Completed
21	Provision of reliable in situ monitoring equipment at all times for use by Quarry staff. This equipment will be calibrated at least monthly.	Non - compliant	Redundant commitment, remove with next modification	This will be explored going forward. Calibration of automatic monitoring equipment to be set up.	Completed
26	All ground water bores will be licenced by DIPNR	Non - compliant	Register water bore with Water NSW. Groundwater bore not discoverable on the Water NSW website at the time of the audit	No extractive bores, only for monitoring. Land owner bores registered with Water NSW	Completed
28	Contour profiling of groundwater head data will be undertaken as part of site monitoring and reporting procedures.	Non - compliant.	Ground water head data assessed in Ramboll Report Set 2021. Issue Closed	Issue Closed.	Completed