Holcim (Australia) Pty Ltd

Dunloe EMP

Air Quality Management Plan

February 2020

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Table of contents

Table index

Figure index

Appendices

1. Introduction

This Air Quality Management Plan (AQMP) forms part of the Environmental Management Strategy (EMS) for Dunloe Sand Quarry. This AQMP has been prepared to meet the requirements of the Minister's Conditions of Approval (CoA) outlined in Development Consent No. 06_0030, the mitigation measures outlined in MOD2 (GHD 2017), the Environmental Impact Statement (EIS) (Planit 2007), the Environment Protection Licence 13077 (EPL) and relevant legislation.

1.1 Objectives

The key objective of the AQMP is to ensure appropriate controls and procedures are implemented in order to minimise the air quality impacts to the local community and the built environment.

To achieve this objective, Holcim will undertake the following:

- Ensure appropriate controls and procedures are implemented during the operation of the quarry to avoid or minimise dust generation, air quality impacts and potential adverse impacts to sensitive receivers.
- Ensure appropriate measures are implemented to address the relevant CoA outlined in Table 2-1.
- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in Section 2.1.

1.2 Targets

The following targets have been established for the management of air quality during the operational lifetime of Dunloe Sand Quarry:

- Minimise and manage potential air quality/dust impacts from the development in accordance with relevant legislative requirements and CoA.
- Control dust and exhaust emissions of plant and equipment from quarrying activities.
- Achieve particulate matter and dust concentrations that meet the approved air quality criteria.
- No visible offsite dust emissions as a result of site operations.
- No justifiable complaints related to air quality attributable to site operations.

1.3 Consultation

Extensive consultation was undertaken with the local community during preparation of the EIS and MOD2. Any concerns identified by relevant stakeholders were addressed in the EIS and MOD2 mitigation measures, which have been incorporated into this AQMP.

As per CoA 7A(b), Schedule 3, the Environment Protection Authority (EPA) were consulted in relation to the AQMP. Evidence of the consultation is provided in Appendix A.

2. Environmental requirements

2.1 Legislation

Legislation relevant to air quality management includes:

- *Protection of the Environment Operations Act 1997*
- *Protection of the Environment Operations (Clean Air) Regulation 2010*

Further discussion of the above legislation is provided in the EMS, as well as the MOD2 and the EIS.

2.2 Guidelines

The following guidelines have been consulted during development of this AQMP:

- National Environment Protection Council (NEPC) – National Environment Protection Measure (NEPM) for Ambient Air Quality
- AS 3580.1.1:2007 Methods for sampling and analysis of ambient air: Part 1.1: Guide to siting air monitoring equipment
- Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (Department of Environment and Conservation NSW (DEC), 2005)
- Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (DEC, 2007)

2.3 Conditions of approval

The consent conditions relevant to this AQMP are listed in Table 2-1. A cross reference is also included to indicate where the condition is addressed in this AQMP or other environmental management documents.

Table 2-1 Consent conditions relevant to the AQMP

<table>
<tr><th>Condition No.</th><th>Requirement</th><th>Reference</th></tr>
<tr><td>Schedule 3, Condition 6</td><td>The Proponent must ensure that particulate matter emissions generated by the project do not cause exceedances of the criteria in Table 3 at any residence on privately-owned land.

Table 3: Air quality criteria
<table>
<tr><th>Pollutant</th><th>Averaging Period</th><th>Criterion</th></tr>
<tr><td rowspan="2">Particulate matter < 10 µm (PM10)</td><td>Annual</td><td>[a,c] 30 µg/m^3</td></tr>
<tr><td>24 hour</td><td>[b] 50 µg/m^3</td></tr>
<tr><td>Total suspended particulates (TSP)</td><td>Annual</td><td>[a,c] 90 µg/m^3</td></tr>
<tr><td>Deposited dust</td><td>Annual</td><td>[b] 2 g/m^2/month
[a] 4 g/m^2/month</td></tr>
<tr><td colspan="3">Notes:
(a) Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources).
(b) Incremental impact (i.e. incremental increase in concentrations due to the project on its own).</td></tr>
</table></td><td>Section 4</td></tr>
</table>

Condition No.	Requirement	Reference
	(c) Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents or any other activity agreed by the Secretary. (d) Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method.	
Schedule 3, Condition 7	The Proponent must: (a) implement best management practice to minimise the dust emissions of the project, including routinely watering haul roads being used by heavy vehicles and equipment;	Section 5
	(b) regularly assess meteorological and air quality monitoring data to guide the day-to-day planning of operations and implementation of air quality mitigation measures to ensure compliance with the relevant conditions of this approval;	Section 5
	(c) minimise the air quality impacts of the project during adverse meteorological conditions and extraordinary events (see Note c to Table 3 above);	Section 5
	(d) monitor and report on compliance with the relevant air quality conditions in this approval; and	Section 6
	(e) minimise surface disturbance of the site, other than as permitted under this approval, to the satisfaction of the Secretary.	Section 5
Schedule 3, Condition 7A	Within three 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. This plan must: (a) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Secretary;	
	(b) be prepared in consultation with the EPA;	Appendix A
	(c) describe the measures to be implemented to ensure: (i) compliance with the air quality criteria and operating conditions in this approval; (ii) best practice management is being employed; and (iii) air quality impacts of the project are minimised during adverse meteorological conditions and extraordinary events;	Section 5
	(d) describe the air quality management system; and	Section 5
	(e) include an air quality monitoring program that: (i) is capable of evaluating the performance of the project against the air quality criteria; (ii) adequately supports the air quality management system; and (iii) includes a protocol for identifying any air quality-related exceedance, incident or noncompliance and for notifying the Department and relevant stakeholders of these events. The Project must implement the Air Quality Management Plan as approved by the Secretary.	Section 6

Condition No.	Requirement	Reference
Schedule 5, Condition 1A	The Proponent must ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:	
	(a) a summary relevant background or baseline data;	Section 3
	(b) a description of: • the relevant statutory requirements (including any relevant approval, licence or lease conditions); • any relevant limits or performance measures/criteria; and • the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;	Section 1.2 and Section 2
	(c) a description of the measures that to be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Section 5
	(d) a program to monitor and report on the: • impacts and environmental performance of the project; and • effectiveness of any management measures (see (c) above);	Section 6
	(e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Section 6.3
	(f) a program to investigate and implement ways to improve the environmental performance of the project over time;	Section 7
	(g) a protocol for managing and reporting any: • incidents; • complaints; • non-compliances with statutory requirements; and • exceedances of the impact assessment criteria and/or performance criteria; and	Refer to the EMS
	(h) a protocol for periodic review of the plan.	Section 7

2.4 Environment protection licence

The EPL conditions, relevant to this AQMP, are listed in Table 2-2. A cross reference is also included to indicate where the condition is addressed in this NMP or other environmental management documents.

Table 2-2 EPL conditions relevant to the NMP

Condition No.	Requirement	Reference
O3.1	The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.	Section 5

3. Existing environment and impacts

3.1 Existing environment

The nearest identified sensitive receivers located in the vicinity of the site are detailed in Table 3-1 and shown in Figure 3-1 below. Distances are stated from the receiver to the nearest point at the site boundary.

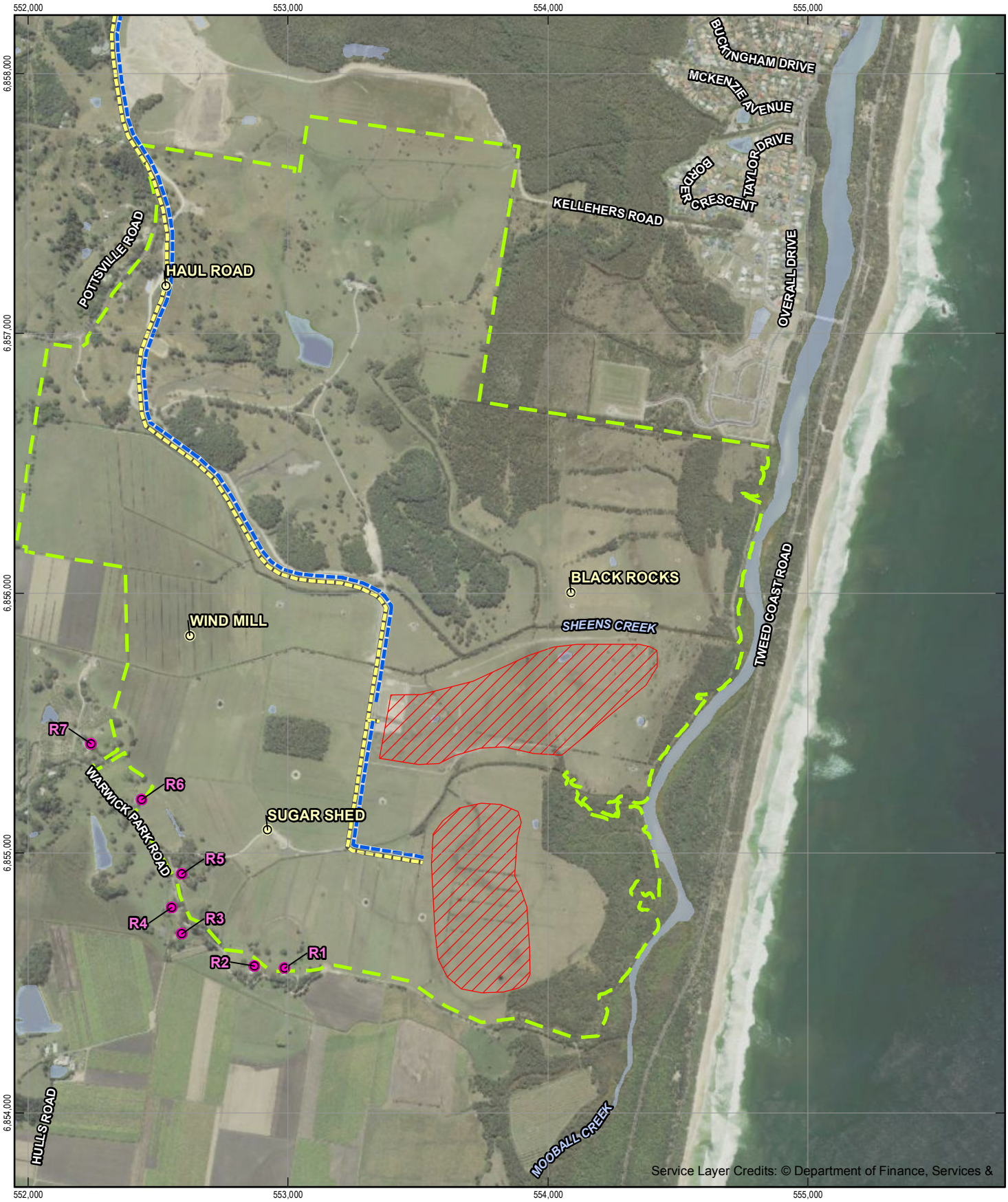
Table 3-1 Identified air quality sensitive receivers

Receiver	Receiver type	Address	Distance from site activity (metres)	Direction from site
R1	Residential	265 Warwick Park Road	1030	South
R2	Residential	265 Warwick Park Road	1060	South
R3	Residential	200 Warwick Park Road	1070	Southwest
R4	Residential	200 Warwick Park Road	1060	Southwest
R5	Residential	175 Warwick Park Road	960	Southwest
R6	Residential	157 Warwick Park Road	970	Southwest
R7	Residential	129 Warwick Park Road	1090	West

Holcim conducts monthly dust deposition monitoring at four locations surrounding the site, as shown on Figure 3-1, as required by Project Approval 06/-0030. A summary of the results provided by Holcim for 2016 is provided in Table 3-2. The annual average dust deposition for all four sites is well below the criteria of 4g/m^2/year. The highest annual average dust levels are at site DDG2, and represent only 30 per cent of the allowable dust levels, however these results are skewed from one month with elevated levels. The results show that dust impacts from the site are minimal and the site is readily complying with the criteria.

Table 3-2 Dust deposition sampling results for 2016

Month / Site	DDG 1	DDG 2	DDG 3	DDG 4
January	0.3	0.4	0.5	0.6
February	0.4	0.6	0.5	0.5
March	0.2	4.7	0.3	0.5
April	0.2	1.6	0.2	0.8
May	0.3	1.2	0.3	1.6
June	0.3	1.1	1.6	0.5
July	0.1	0.5	0.4	0.4
August	0.6	0.5	0.3	0.4
September	0.8	0.5	0.4	0.3
October	0.8	0.5	0.4	0.3
November	0.4	1.9	0.3	0.4
December	0.5	1.7	0.6	0.5
Annual Average	**0.41**	**1.23**	**0.48**	**0.57**



LEGEND

- Project boundary
- Incoming haul road
- Outgoing haul road
- Receiver locations
- Dust deposition monitoring locations
- Sand extraction areas

Paper Size A4

0 175 350 700

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Holcim (Australia) Pty Ltd
Dunloe Sand Quarry

Site location, sensitive receivers & monitoring locations

Job Number 21-18823
Revision A
Date 12 Apr 2019

Figure 3.1

Level 15, 133 Castlereagh Street Sydney NSW 2000 **T** 61 2 9239 7100 **F** 61 2 9239 7199 **E** sydmail@ghd.com.au **W** www.ghd.com.au

N:\AU\Sydney\Projects\22\18823\GIS\Maps\Deliverables\22_18823_Z003_NoiseFigures.mxd

Data source: Aerial Imagery: Sixmaps (2017 - NSW LPI), General Topo: NSW DTDB 2012. Created by:apmiller

The transport and dispersion of the air emissions from the quarry is influenced by prevailing meteorology including vertical temperature profiles that will alter both diurnally and with wind direction.

Meteorological data from the Bureau of Meteorology's Coolangatta Automatic Weather Station (AWS) indicates that the wind speeds, which are of particular importance when determining the potential for dust impacts, are typically greater in spring and summer. As shown in Figure 3-2, the five-year wind rose shows that calm, light and gentle winds occur for nearly 70 per cent of the time, with roughly 30 per cent of wind above 19.8 kilometres per hour. This is a level that could cause nuisance dust. Most high winds occur from the north, meaning that dust impacts would be more likely to occur opposite to this direction, southwards.

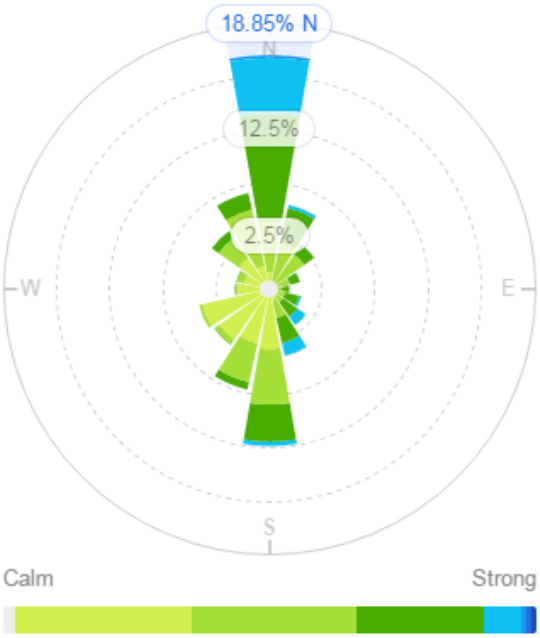


Figure 3-2 Wind rose for Coolangatta

3.2 Predicted impacts

A summary of the predicted impacts from the quarry based on truck volumes and access road conditions is presented below in Table 3-3.

Table 3-3 Predicted maximum 24 hour PM_{10} concentration from trucks µg/m³

Sensitive receptor	Existing scenario one (four trucks)	Proposed scenario two (twelve trucks) gravel road	Proposed scenario three (twelve trucks) sandy road
R1	0.6	1.8	0
R2	0.7	1.5	0
R3	0.7	1.7	0
R4	0.9	1.8	0
R5	0.9	2.0	0
R6	0.8	1.6	0
R7	0.2	0.7	0

The results in Table 3-3 show that dust impacts from the additional trucks do not have any significant impact at nearby sensitive receptors. The maximum predicted increment of 2 µg/m³ is well below the criteria of 50 µg/m³. This was predicted from a worst case gravel road, which does not currently or would likely exist and has been presented as a comparison only.

Due to the quarry extracting sand which has a low dust potential, cumulative impacts are not expected, which is demonstrated by the low levels of dust in the monthly sampling at all sites.

Dust monitoring data provided in Section 3.1, shows that the annual and monthly deposition results to be consistently below the criteria and importantly no dust complaints have been made at the site.

Results show that worst case dust impacts from increasing the number of trucks to twelve each hour are minimal and adverse dust impacts are not expected.

4. Operating criteria

4.1 Air quality criteria

Development Consent No. 06_0030 air quality criteria are provided in Table 4-1.

Table 4-1 Air quality criteria

Pollutant	Averaging Period	Criterion
Particulate matter < 10 µm (PM10)	Annual	[a,c] 30 µg/m^3
	24 hour	[b] 50 µg/m^3
Total suspended particulates (TSP)	Annual	[a,c] 90 µg/m^3
d Deposited dust	Annual	[b] 2 g/m^2/month [a] 4 g/m^2/month

Notes:

a Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources).

b Incremental impact (i.e. incremental increase in concentrations due to the project on its own).

c Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents or any other activity agreed by the Secretary.

d Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method.

5. Environmental control measures

Environmental requirements and control measures are identified in the CoA, EIS and MOD2. Specific measures and requirements to address air quality impacts are outlined in Table 5-1.

Table 5-1 Environmental controls and mitigation measures

Ref.	Environmental Management Measure	Timing	Responsibility
AQ01	The air quality criteria specified in the consent conditions and outlined in Table 4-1 are not to be exceeded.	At all times during operation	Quarry Manager
AQ02	Monitor meteorological conditions daily and if adverse conditions or extraordinary events (i.e. bushfires, prescribed burning, dust storms, sea fog, fire incidents) exist, quarry operations will reduce and potentially cease accordingly.	Daily during operation	Quarry Manager
AQ03	Monitoring and reporting on compliance with the relevant air quality conditions is required, refer to Section 6.	As per triggers in Table 6-1	Quarry Manager
AQ04	The full length of internal haulage roadways will be sealed and maintained.	At all times	Quarry Manager
AQ05	A vegetation barrier for dust control along the southern boundary adjoining Warwick Park Road has been established and is maintained in accordance with Section 4.4, Appendix A of the Landscape Management Plan).	At all times	Quarry Manager
AQ06	The area of surface disturbance is to be minimised and progressive rehabilitation must be undertaken at the site, as per Section 4.0, Appendix A of the Landscape Management Plan.	At all times during operation	Quarry Manager
AQ07	Topsoil stripping will be undertaken in sub-stages of 1 hectare or less and not on days with excessive winds.	At all times during operation	Quarry Manager
AQ08	Water sprays are required on screening plant, when dust is visible.	During operation when dust is visible	Quarry Manager
AQ09	A rumble grid is installed at the weighbridge to minimise mud tracking onto the road and material collected by the rumble grid removed monthly.	Monthly	Quarry Manager
AQ10	When mud tracking on to Pottsville Road is observed, a street sweeper will be engaged to clean the road.	When observed	Quarry Manager
AQ11	Haul road routes will be watered as required, particularly during peak periods of high frequency vehicle movements and extended dry spells.	When dust is observed	Quarry Manager
AQ12	Loaded trucks leaving the site will be covered to minimise the transport of dust off site.	At all times during operation	Quarry Manager

Ref.	Environmental Management Measure	Timing	Responsibility
AQ13	Stockpiled topsoil (and stockpiles to remain undisturbed for 3 months or longer) will be seeded to stabilise.	As soon as possible following establishment of stockpiles	Quarry Manager
AQ14	Dust monitoring, as per Section 6.2), will be undertaken.	Monthly – refer to Section 6.2	Quarry Manager
AQ15	Mitigation measures to reduce greenhouse gas emissions are: • Opportunities for the use of biodiesel will be investigated. • Efficient plant and vehicles will be used where reasonable and feasible to do so. • Turn off engines when not in use. • All machinery and vehicles will be maintained in good working order and made to comply with relevant exhaust standards.	At all times during operation	Quarry Manager

6. Monitoring and reporting

6.1 Environmental inspections

Routine weekly inspections by the Quarry Manager (or delegate) will occur throughout the operational lifetime of the quarry to identify any ad-hoc air quality issues such as dust emissions, using the *Environmental Inspection Checklist* in the Environmental Monitoring and Management Plan.

6.2 Dust monitoring

Deposited dust is an indicator of the effectiveness of site dust management practices and the potential for off-site dust nuisance. Deposited dust has been monitored at four locations, surrounding the quarry (as shown on Figure 3-1), in the past. Monitoring is conducted with dust deposition gauges that are located both upwind and downwind of the activity area to reflect the impact of the quarry operations during the most predominant wind directions.

Based on the separation distance between the nearest sensitive receptors and the site operations, it is considered that monitoring of deposited dust will provide the best indicator for site impacts on local amenity. Adverse health impacts due to fine particulate matter from an operation of this size usually have an impact zone measured in tens of metres rather than hundreds of metres.

Airborne particulate monitoring of PM_{10} and TSP is only required to be undertaken if annual production rates increase to 200,000 tonnes or above, or in the event of a valid complaint relating to Dunloe Sand Quarry operations.

Monitoring results will be reviewed regularly, as discussed in Section 6.3 and 6.4 below. After two years of dust deposition monitoring or three months of PM_{10} and TSP monitoring, the results will be reviewed by a suitably qualified and experienced air quality consultant. The requirement for further dust monitoring will be determined based on this assessment. If monitoring results clearly indicate that no dust impacts have been recorded, dust monitoring will cease. Dust monitoring will then only occur following:

- A justifiable dust complaint in relation to Dunloe Sand Quarry operations, or
- A change in operating conditions that are likely to increase dust emissions from the site.

6.3 Contingency plan

If the above monitoring detects an impact or there is a justified community, dust related, complaint in relation to Dunloe Sand Quarry operations, a contingency plan or trigger and response plan is to be implemented, as described in Table 6-1.

Table 6-1 Contingency plan

Trigger	Response
Excessively dusty conditions or dust blown offsite	• Quarry Manager to stop work and implement additional controls e.g. watering, cover stockpiles • Revegetate any unused, unvegetated areas within the Dunloe Sand Quarry operational area.
Non-compliance with dust criteria	• Identifying the dust source that has caused the exceedance. • Reassess the mitigation measures employed at the site to reduce the impact of the dust source. • Following the adoption of additional dust mitigation, conduct further dust monitoring to ensure the success of the mitigation measure

Trigger	Response
Justified dust related complaint	• Consult complainant to determine time and source of dust. • Offer dust monitoring. • If monitoring indicates the complaint is justified and relates to Dunloe Sand Quarry operations, reassess the mitigation measures employed at the site to reduce the impact of the dust source. • Following the adoption of dust mitigation, conduct further dust monitoring to ensure the success of the mitigation measure. • Provide details of the response and dust monitoring to the complainant.

6.4 Reporting

The general reporting requirements are described in Section 8.4 of the EMS. In relation to the dust monitoring, the routine dust monitoring will be recorded on the *Environmental Inspection Checklist* in the Environmental Monitoring and Management Plan.

A report will be prepared by the Quarry Manager following the 12 months of compliance monitoring. This is to include, as a minimum:

- The date(s) of the monitoring
- The time(s) of the monitoring
- The location of the monitoring
- The activities occurring during the monitoring
- A comparison of the results with the adopted dust criteria

If an exceedance of the criteria is recorded, the affected landowners and Department of Planning, Industry and Environment (DPIE) will be notified in writing and provided with quarterly monitoring results until the results show that the project is complying with the relevant criteria.

A summary of air quality results will be presented in the Annual Report (refer to Section 8.4.1 of the EMS). All records will be:

- Maintained in a legible form
- Kept for at least 4 years
- Produced to any authorised officer of the EPA and/or DPIE upon request

7. Review and improvement

Continuous improvement of this AQMP will be achieved in accordance with Section 9 of the EMS, through the ongoing evaluation of environmental management performance against environmental policies, objectives and targets.

The continuous improvement process is designed to:

- Identify areas of opportunity for improvement of environmental management and performance.
- Determine the cause or causes of non-conformances and deficiencies.
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies.
- Verify the effectiveness of the corrective and preventative actions.
- Document any changes in procedures resulting from process improvement; and make comparisons with objectives and targets.

Appendices

Appendix A – Agency consultation

Ben Luffman

From: Geff Cramb <Geff.Cramb@epa.nsw.gov.au>
Sent: Wednesday, 21 August 2019 11:20 AM
To: Ben Luffman
Subject: RE: Dunloe Quarry Management Plan consultation

CompleteRepository: 2220056
Description: Dunloe EMP
JobNo: 20056
OperatingCentre: 22
RepoEmail: 2220056@ghd.com
RepoType: Job

Dear Ben

The EPA do not intend to review and provide comment upon the management plans. The EPA are content with the scope. However, it is understood that EPA will undertake compliance reviews against the requirements of the Environment Protection Licence issued and the implementation of the management plan at our discretion.

Regards
Geff

Geff Cramb
Operations Officer – Environment Management Unit
North Coast, NSW Environment Protection Authority
+61 2 6640 2510

Mon	Tues	Wed	Thurs	Fri
✓	✓	✓	✓	x

geff.cramb@epa.nsw.gov.au www.epa.nsw.gov.au @EPA_NSW
Report pollution and environmental incidents 131 555 (NSW only) or +61 2 9995 5555

From: Ben Luffman <Ben.Luffman@ghd.com>
Sent: Thursday, 8 August 2019 12:51 PM
To: Peter Lynch <Peter.Lynch@epa.nsw.gov.au>
Cc: Janelle Bancroft <Janelle.Bancroft@epa.nsw.gov.au>; Victoria Musgrove <victoria.musgrove@lafargeholcim.com>
Subject: Dunloe Quarry Management Plan consultation

Hi Peter,

Not sure if you are the correct person to contact but we have updated the management plans for Dunloe Quarry following the recent approval of MOD2. The conditions of the Project Approval – SSD 06_0030 require a number of the plans to be prepared in consultation with the EPA. We have therefore attached the relevant plans for review.

The updates have mainly been a reformatting to remove duplication and inclusion of additional information to address the new requirements of the conditions.

We would appreciate your comments by 23 August 2019.

Please contact me if you have any questions.

Regards

Ben Luffman | A GHD Associate
B.App.Sc. (Hons) | Grad.Dip. Urban and Regional Planning | Environmental Auditor
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22-SO-976847825-5/https://projects.ghd.com/oc/Newcastle3/holcimdunloesandquar/Delivery/Documents/2220056_RPT_Dunloe Air Management Plan.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	B Luffman	S Lawer	*S Lawer*	S Lawer	*S Lawer*	23/09/2019
1	B Luffman	S Lawer	*S Lawer*	S Lawer	*S Lawer*	21/11/2019
2	B Luffman	S Lawer		S Lawer		04/02/2020

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