



Holcim (Australia) Pty Ltd
Dunloe Sand Quarry
Environmental Monitoring Program

July 2021

This report: has been prepared by GHD for Holcim (Australia) Pty Ltd and may only be used and relied on by Holcim (Australia) Pty Ltd for the purpose agreed between GHD and the Holcim (Australia) Pty Ltd as set out in section 1 of this report.

GHD otherwise disclaims responsibility to any person other than Holcim (Australia) Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Holcim (Australia) Pty Ltd and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

Table of contents

1. Introduction.....	1
2. Monitoring summary.....	2

Table index

Table 2-1 Monitoring summary	2
------------------------------------	---

Appendices

Appendix A – Environmental Inspection Checklist

1. Introduction

The Environmental Monitoring Program provides a summary of the monitoring required at Dunloe Quarry and addresses Condition 2, Schedule 5 of Development Consent 06_0030. Table 2-1 summarises the monitoring requirements from the individual sub plans in the Environmental Management Strategy (EMS).

The intent of the Environmental Monitoring Program is to consolidate the environmental monitoring requirements for Dunloe Sand Quarry in a single document. If further information is required regarding the monitoring, objectives, or contingencies if the monitoring identifies an impact, the individual sub plan will be referred to.

2. Monitoring summary

Table 2-1 Monitoring summary

Aspect	Frequency	Details	Analysis and interim trigger values/Criteria	Responsibility
General				
Routine inspections	Weekly	Routine weekly inspections by the Quarry Manager (or delegate) will occur throughout the operational lifetime of the quarry, using the <i>Environmental Inspection Checklist</i> in Appendix A.	-	Quarry Manager
Soil and Water Management Plan (SWMP)				
Weather	Daily	Weather forecasts will be monitored to inform quarry operations, for example: <ul style="list-style-type: none"> • If rain is forecast, sediment and erosion controls will be checked and maintained. • If dry weather and winds are forecast, dust controls will be implemented. 	-	Quarry Manager
Rainfall	Daily	Rainfall at the premises must be measured and recorded in millimetres per 24 hour period, at the same time each day.	-	Quarry Manager
Erosion and sediment controls	Weekly and following rain (>10 mm in 24 hr)	Erosion and sediment controls are to be monitored and maintained.	-	Quarry Manager
Blue Green Algae monitoring within the extraction area	October to April – fortnightly May to September - monthly	A sample will be collected from the extraction ponds and analysed for blue green algae. If results indicate cell growth to a level exceeding 500 cells/mL, weekly sampling will be implemented until such time as the results of the testing indicate <500 cells/mL for a period of greater than 3 months	<50,000 cells/mL (<i>M.aeruginosa</i>) <4 mm ³ /L (total biovolume)	Quarry Manager
	Quarterly	Chlorophyll a	2-10 µg/L	Quarry Manager
Surface water monitoring within the extraction area	Monthly	Water quality monitoring at Pond 1 and Pond 2 locations on Figure 6-1 in the SWMP.	pH - 5.0 – 8.5 Electrical conductivity - <5.50 mS/cm Dissolved oxygen - >4.00 mg/L Turbidity - <20 NTU Oil and grease - <10 mg/L	Quarry Manager

Aspect	Frequency	Details	Analysis and interim trigger values/Criteria	Responsibility
	Quarterly	Water quality monitoring at Pond 1 and Pond 2 locations on Figure 6-1 in the SWMP.	As above monthly monitoring, plus: Manganese - 0.15mg/L Magnesium - 40mg/L Sodium - 280 mg/L Potassium – 17.5 mg/L Bicarbonate - 400 mg/CaCO ₃ Chloride - 285 mg/L Sulfate - 175 mg/L Aluminium - 0.75 mg/L Arsenic - <0.005 mg/L Iron - <7.5 µg/L Chlorophyll a – 2-10 µg/L	Quarry Manager
	Quarterly	Vertical profile monitoring at one-metre intervals will be undertaken in the active extraction area.	pH - 5.0 – 8.5 Electrical conductivity - <5.50 mS/cm Dissolved oxygen - >4.00 mg/L Turbidity - <20 NTU Oil and grease - <10 mg/L	Quarry Manager
	When discharging either naturally (i.e. solely as a result of rainfall at the premises less than 82.5 millimetres over any consecutive five day period) or manually (i.e. pumped) but not if reused on site (e.g. dust suppression, wash plant)	Sampling at EPA Point 1 and EPA Point 2, as shown in Figure 6-1 in the SWMP. Sampling is to be done once <24 hours prior to; and, sampling the discharge daily during, each discharge event arising from rainfall of less than 82.5 mm in total over a period of up to five days duration. If the concentration limits are not achieved, the water will need to be treated and resampled. If the results do not achieve the criteria, treatment of the water may be required.	Oil and grease – Nil visible pH – 6.5-8.5 TSS – 50 mg/L	Quarry Manager

Aspect	Frequency	Details	Analysis and interim trigger values/Criteria	Responsibility
Surface water	Rainfall/event based and quarterly	<p>Water quality monitoring at the locations SW3, SW4, SW9 and SW10 on Figure 6-1 in the SWMP would be conducted monthly and during large rainfall events.</p> <p>Department of Planning, Industry and Environment (DPIE) acknowledges that short term exceedances of these objectives may occur during natural events such as flooding. DPIE 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 SWMP, as far as is reasonable and feasible and within the Proponent's control, to the satisfaction of the Secretary.</p>	<p>pH – 5.5-7.5 EC – 1800-2400 µS/cm Suspended solids - <25 mg/L Dissolved oxygen - >6 mg/L Total nitrogen - <1 mg/L Total phosphorus - <0.08 mg/L</p>	Quarry Manager
Streambank and bed profile	Rainfall/event based and quarterly	Streambank and bed profile and conditions at the locations SW3, SW4, SW9 and SW10 on Figure 6-1 in the SWMP will be visually inspected during surface water sampling events.	Any changes due to site operations are identified and repaired.	Quarry Manager
Spill kit	Monthly and following use	The spill kit is to be checked and any missing materials to be replaced.		Quarry Manager
Groundwater	Monthly	<p>The groundwater monitoring well locations are shown on Figure 6-1 in the SWMP. DLP1, DLP3, DLP5, DLP6 and DLP7 are to be monitored during Stage 1 of the extraction. DLP5, DLP6 DLP7, DLP8, and DLP10 are to be monitored during Stage 2 of the extraction.</p> <p>DPIE acknowledges that short term exceedances of these objectives may occur during natural events such as flooding. DPIE 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.</p>	<p>pH – 4.2 – 7.0 EC – <2.0 mS/cm Dissolved oxygen - >1.50 mg/L Level - <20% change from historical levels</p>	Quarry Manager
	Quarterly		<p>As monthly monitoring, plus: Ammonia - NA Calcium – 55 mg/L Magnesium – 0.40 mg/L Sodium - 280 mg/L Potassium – 17.5 mg/L Bicarbonate - 400 mg/L Sulfate - 175 mg/L Chloride - 285 mg/L Dissolved iron – 7.5 mg/L Dissolved aluminium – 0.75 mg/L Dissolved arsenic – 0.005 mg/L Oil and grease – NA</p>	Quarry Manager

Aspect	Frequency	Details	Analysis and interim trigger values/Criteria	Responsibility
Noise Management Plan (NMP)				
Noise	Quarterly	<p>Attended noise compliance monitoring will occur at R6, R7 and R8 (refer to Figure 3-1 in the NMP) quarterly for the first two years following approval of the NMP. If this monitoring indicates compliance with the criteria and DPIE approve, the noise monitoring will cease unless there is:</p> <ul style="list-style-type: none"> • A justifiable noise complaint in relation to Dunloe Sand Quarry operations • A change in operating conditions that are likely to increase noise emissions from the site <p>The assessment must be conducted by a suitably qualified and experienced acoustic consultant in accordance with the Noise Policy for Industry (EPA 2017).</p>	<p>R6 and R7 – 42 dB(A) R8 – 48 dB(A) All other residences - 41 dB(A)</p>	Quarry Manager
Air Quality Management Plan (AQMP)				
Dust	Monthly	<p>Deposited dust is to be monitored at four locations, surrounding the quarry (as shown on Figure 3-1 in the AQMP).</p> <p>Airborne particulate monitoring of PM10 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.</p> <p>Monitoring may cease after 2 years for deposited dust and three months for PM10 and TSP – refer to AQMP for details.</p>	<p>PM10 (annual) - 30 µg/m³ PM10 (24 hour) - 50 µg/m³ TSP (annual) – 90 µg/m³ Deposited dust - 4 g/m²/month</p>	Quarry Manager
Landscape Management Plan (LMP)				
Routine Rehabilitation Monitoring	Quarterly	Monitor the whole area of each of the three Rehabilitation Areas or the 13 permanent monitoring locations shown on Figure 5-1 in the LMP using Form A (Appendix F of the LMP)	-	Quarry Manager
Site Condition	Six Monthly	Monitor the whole area of each of the three Rehabilitation Areas or the 13 permanent monitoring locations shown on Figure 5-1 in the LMP using Form B (Appendix F of the LMP)	-	Quarry Manager
Revegetation / Forest Structure	Annually (end-calendar-year)	Monitor the 13 permanent monitoring locations, as shown on Figure 5-1 in the LMP using Form C (Appendix F of the LMP)	-	Quarry Manager

Aspect	Frequency	Details	Analysis and interim trigger values/Criteria	Responsibility
Floristic Composition	Annually (end-calendar-year)	Monitor the 13 permanent monitoring locations, as shown on Figure 5-1 in the LMP using Form D (Appendix F of the LMP)	-	Quarry Manager
Photographs at established photo points	Quarterly	Thirteen permanent photo points have been established (Figure 5-1 in the LMP) where photographs will be taken at regular intervals to provide a visual indication of plant growth (height and extent) and weed presence. Photographs shall be taken at the SW, SE, NW, NE corners of each monitoring site.	-	Quarry Manager
Fauna Box Monitoring	Six Monthly	Refer to Fauna Box Monitoring Form (Appendix F of the LMP)	-	Quarry Manager
Koala Monitoring	On-going	Refer to Section 1.3 Appendix E of the LMP	-	Quarry Manager
Transport Management Plan (TMP)				
Truck movements	Daily	Truck movements to and from the site (including time of arrival and dispatch) will be monitored and recorded using the Dunloe Daily Sales register.		Quarry Manager
Routine check	Daily	Holcim trucks and machinery are to be checked daily before use, using the pre-start check in Appendix C of the TMP.	-	Quarry Manager
Waste Management Plan (WMP)				
Waste	Weekly	Waste removed from site will be recorded in a waste register along with the relevant dockets from the contractors removing the material.	-	Quarry Manager

Appendices

Appendix A – Environmental Inspection Checklist

Environmental Inspection Checklist

Inspection Date :	Inspection Conducted By:
Weather Conditions: Dry <input type="checkbox"/> Slight Wind <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Strong Wind <input type="checkbox"/>	
Rainfall (Past 5 Days):	

Item	Observation	Action required & location	Responsibility	Closed
Soil and Water				
<input type="checkbox"/>	Erosion and Sediment controls installed & in good working order?			<input type="checkbox"/>
<input type="checkbox"/>	Are all disturbed areas and stockpiles draining back to the ponds?			<input type="checkbox"/>
<input type="checkbox"/>	Are basins full and requiring treatment and discharge? If yes, check water quality			<input type="checkbox"/>
<input type="checkbox"/>	Are monitoring points discharging? If yes, check water quality			<input type="checkbox"/>
<input type="checkbox"/>	Are clean and dirty water separated?			<input type="checkbox"/>
<input type="checkbox"/>	Are extracted materials hydraulically separated with pyretic fines being returned at depth no less than 3 m from the water surface?			<input type="checkbox"/>
<input type="checkbox"/>	Are blue green algae signs in place?			<input type="checkbox"/>
<input type="checkbox"/>	Are survey pegs in place?			<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>	Are site access locations free from mud or excessive dirt on the local roads? Do any rubble grids installed require maintenance?			<input type="checkbox"/>
Air Quality				
<input type="checkbox"/>	Is dust from quarry operation visible during inspection?			<input type="checkbox"/>
<input type="checkbox"/>	Are dust suppression measures in place? And effective?			<input type="checkbox"/>
<input type="checkbox"/>	Are non-active areas and topsoil stockpiles stabilised?			<input type="checkbox"/>
<input type="checkbox"/>	Is any machinery emitting smoky exhaust?			<input type="checkbox"/>
<input type="checkbox"/>	Are truck loads leaving site covered?			<input type="checkbox"/>
Flora and Fauna				
<input type="checkbox"/>	Is vegetation protected with fencing? Is fencing in good repair?			<input type="checkbox"/>
<input type="checkbox"/>	Are hygiene measures being implemented?			<input type="checkbox"/>
<input type="checkbox"/>	Are there any weeds?			<input type="checkbox"/>
<input type="checkbox"/>	Have any unexpected species of fauna (eg koala) been identified / relocated in the past week?			<input type="checkbox"/>
Noise & Vibration				
<input type="checkbox"/>	Are noise controls installed and effective?			<input type="checkbox"/>
<input type="checkbox"/>	Have all activities occurred within permitted hours in the last week?			<input type="checkbox"/>
<input type="checkbox"/>	Are any works outside the approved operation hours proposed?			<input type="checkbox"/>
<input type="checkbox"/>	Do plant/equipment have appropriate mitigation measures installed and been serviced?			<input type="checkbox"/>

Item	Observation	Action required & location	Responsibility	Closed
Traffic				
<input type="checkbox"/>	Are trucks leaving site clean?			<input type="checkbox"/>
<input type="checkbox"/>	Are trucks travelling at 40km/h or less?			<input type="checkbox"/>
Heritage				
<input type="checkbox"/>	Have any unexpected finds of heritage items or human remains occurred in the past week?			<input type="checkbox"/>
Hazardous Substances & Dangerous Goods				
<input type="checkbox"/>	Are spill kits available in all work areas and in stock?			<input type="checkbox"/>
<input type="checkbox"/>	Is there evidence of hydraulic/vehicle oil spills/leaks on site?			<input type="checkbox"/>
<input type="checkbox"/>	Are stored chemicals in bunded areas with at least 110% storage capacity of the largest container? Is the bunded area free from accumulated storm water or spilled chemicals?			<input type="checkbox"/>
Waste Management				
<input type="checkbox"/>	Is the site free from litter and waste bins available?			<input type="checkbox"/>
<input type="checkbox"/>	Are appropriate and segregated waste bins available?			<input type="checkbox"/>
Complaints				
<input type="checkbox"/>	Have any complaints relating to environmental issues been received in the past week? If so, please detail.			<input type="checkbox"/>
Additional Items/ Opportunities for improvement/ Innovations				
Inspection By				
Signature				

GHD

230 Harbour Drive
Coffs Harbour NSW 2450
T: 61 2 6650 5600 F: 61 2 9475 0725 E: cfsmail@ghd.com



© GHD 2021

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

22-SO-976847825-

35/[https://projects.ghd.com/oc/Newcastle3/holcimdunloesandquar/Delivery/Documents/2220056_RPT-A_Dunloe Environmental Monitoring Plan.pdf.docx](https://projects.ghd.com/oc/Newcastle3/holcimdunloesandquar/Delivery/Documents/2220056_RPT-A_Dunloe%20Environmental%20Monitoring%20Plan.pdf.docx)

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	B Luffman	S Lawer		S Lawer		17/10/2019
1	B Luffman	S Lawer		S Lawer		18/12/2019
2	B Luffman	S Lawer		S Lawer		15/07/2021

www.ghd.com

