

ENVIRONMENT IMPROVEMENT PROGRAMME
PURSUANT TO REQUIREMENTS UNDER THE
ENVIRONMENT PROTECTION ACT 1993

Document Number	1126 EIP Version 7
Document Date	26 August 2021
Licensee	Adelaide Brighton Cement Ltd (ABC)
EPA Licence Number	1126 Issued 1 November 2017 (Amended 9 November 2020)
Site to which this EIP is subject	<p>Victoria & Elder roads, Birkenhead SA 5015</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>CT5142/523 CT5142/522 CT5485/422 CT5411/669 CT5750/769 CT5750/770 CT5742/582 CT5742/581 CT5813/976 CT5816/637 CT5816/2 CT5841/73 CT5683/198 CT5968/732 CT6057/913 CT6057/917 CT6057/918 CT6057/920 CT6057/921 CT6057/922 CT6057/914 CT6087/695 CT6087/694 CT6087/700 CT6087/696 CT6087/697 CT6087/698 CT6087/701 CT6087/702 CT6126/858 CT6057/936 CT6057/933 CT6057/931 CT6057/929 CT6057/927 CT6057/925 CT6057/924 CT6145/889 CT6145/895 CT6146/576</p> </div>
Document Produced By	Adelaide Brighton Cement Ltd

Glossary

Term	Definition
$\mu\text{g}/\text{m}^3$	micrograms per cubic metre
μm	micrometre
m	metre
m^2	square metres
m^3	cubic metres
dB(A)	A unit of measurement, decibels(A), of sound pressure level with frequency filtered to closely match frequency response of the human ear
Nomenclature	Definition
TSP	Total suspended particulates
PM ₁₀	particulate matter with a diameter less than 10 micrometres
PM _{2.5}	particulate matter with a diameter less than 2.5 micrometres
Abbreviations	Definition
ABC	Adelaide Brighton Cement Ltd
ABC CLG	Adelaide Brighton Cement Community Liaison Group
Air EPP	Environment Protection (Air Quality) Policy 2016
APA	Australian Pipeline Authority
BH Gas Train	Birkenhead plant natural gas supply valves/pressure regulators and control
CFD	Computational Fluid Dynamics - mathematical analysis to analyse fluid flows
CKD	Clinker Kiln Dust
CLG	Community Liaison Group
CM1	Cement Mill 1
CM6	Cement Mill 6
CM7	Cement Mill 7
CM6 CF6	Cement Mill 6 Clinker feed
CM6 Clinker Gantry	Cement Mill 6 Clinker storage shed
CS2 CR2 CR3	Group of conveyors used to transfer clinker from kiln to storage stockpiles
EET	Emission Estimation Technique
EIP	Environment Improvement Programme
EP Act	Environment Protection Act 1993
EPA	Environment Protection Authority
Geo fabric	An impermeable fabric sheet
MM	Fringe Materials Management System- (transfer of bulk fringe materials to the kiln)

1. INTRODUCTION

1.1 Brief History

Adelaide Brighton Cement Ltd is licensed under the *Environment Protection Act 1993* to operate a cement works at Victoria Rd, Birkenhead (the Site). The following licensed activities are conducted on the Site;

- 2(3) Cement Works
- 3(4) Activities producing listed wastes
- 7(1) Bulk shipping facilities
- 7(3)c Crushing grinding and milling works (rock, ores or minerals)
- 8(2)a Fuel burning coal or wood
- 8(2)a Fuel burning not coal or wood

Adelaide Brighton is a manufacturer of cementitious products. Seven thousand tonnes of limestone is shipped to Birkenhead each day and stockpiled on the site, then used with other raw fringe materials to make clinker. The materials are processed in the pre-calciner towers and the dry kiln process to form clinker, which is then ground in ball mills (cement mills) with other additives to make cement and cement products. These products are transported from the plant by ship and road (bulk tanker and bagged products), to local and interstate markets.

1.2 Environmental Authorisation Compliance

Adelaide Brighton Cement Ltd is required to develop an Environmental Improvement Programme (EIP) in compliance with licence condition (U-925)

3.6 Environment Improvement Programme (U - 925)

The Licensee must:

- 3.6.1 *develop and submit to the EPA an Environment Improvement Programme (EIP) to the satisfaction of the EPA by the date listed below;*
- 3.6.2 *undertake public consultation in the course of developing the EIP;*
- 3.6.3 *ensure that the EIP includes, but is not limited to:*
 - a *summary of the results of public consultation undertaken in developing the EIP;*
 - b *details of actions, timeframes and milestones to be undertaken by the Licensee to address noise abatement options, taking into consideration the Vipac Engineers and Scientists Report, August 2018 'Environmental Noise Model Update';*
 - c *details of actions, timeframes and milestones to be undertaken by the Licensee to address options identified in the Adelaide Brighton Cement Limited Report, August 2018, 'Assessment of Options Report';*
 - d *a methodology and framework for reporting to the EPA three quarterly reports and one annual report, which demonstrate progression and completion of the EIP actions;*
 - e *a methodology and framework to assess the effectiveness of the actions detailed in the EIP; and*
 - f *a methodology and framework for providing public access to the EIP, quarterly and annual reporting;*
- 3.6.4 *implement the EIP upon approval in writing by the EPA.*

Compliance Date: 28-Feb-2019

1.3 Reference documentation

In developing this Environment Improvement Programme (EIP), Adelaide Brighton Cement Ltd (ABC) has considered the following inputs:

Technical reports:

- Adelaide Brighton Cement Limited Report, August 2018, 'Assessment of Options Report'
- Katestone Environmental Report, August 2018 "Birkenhead Cement Plant – Options Assessment Report"
- Katestone Environmental Report 2017 "Air Quality Assessment of the Birkenhead Cement Plant"
- Vipac Engineers and Scientists Report, August 2018 "Environmental Noise Model Update"
- Vipac Engineers and Scientists Report, February 2019 "Noise model Update and Abatement Options"

Community consultation:

Community consultation in the development of this EIP includes the following meetings, discussions and input:

- Discussion and minutes of the ABC Community Liaison Group (ABC CLG) meeting on 3 December 2018 including:
 - EIP requirements
 - Opportunity for community input into the EIP development through various means including;
 - ABC CLG resident representative workshops
 - Contact with ABC via various avenues including telephone, email and through ABC CLG resident representatives
 - EIP development has been advertised
 - ABC community website
 - ABC community newsletter circulated in December 2018
- Two EIP workshops for ABC CLG resident representatives were held on the 26 November 2018 and 12 December 2018 that included the following:
 - A brief summary/review of the last two Environment Improvement Programmes
 - Licence requirements for an EIP
 - Presentation and discussion of the "Assessment of Options Report" dated August 2018, including Recommended Proposed Options to be Taken (Table 3 from this report)
 - A review of the observations and conclusions from the Vipac Engineers and Scientists Report, August 2018 'Environmental Noise Model Update, which recommended;
 - further investigation into noise mitigation options be made for the APA Group owned, gas supply train
 - a separate study to determine future noise mitigation projects at the Birkenhead site
 - Future noise mitigation projects were not tabled at the workshops as the Vipac site noise study was in progress, and these had not been identified at the time
- Input from the ABC CLG resident members and ABC response to that input is attached in Appendix A

1.4 Intent

In order to reduce its environmental impact, Adelaide Brighton Cement Ltd plans to undertake projects listed in Table 1: Table of Intended Approach. The EIP projects are designed to continuously reduce noise and fugitive particulate emissions.

It should be noted that the fugitive particulate monitoring requirements contained in the EPA Licence (1126) issued 1/11/2017, are expected to provide baseline monitoring data against which the improvements from this EIP can be measured.

2 REPORTING AND PUBLIC ACCESS

2.1 Quarterly reporting

A quarterly report will be prepared detailing progress and completion of the EIP actions during the quarter.

A quarterly report will include where applicable:

- Details of steps taken to progress compliance actions
- Details of proposed next steps to be taken in the following quarter

A quarterly report will be submitted to the EPA, within 45 days of the end of each calendar quarter

2.2 Annual reporting

An annual report will include:

- A summary of EIP actions completed during the calendar year
- A summary of progress on EIP actions

An annual report will be submitted to the EPA, within 45 days of the anniversary of this EIP's approval date, namely 15th April of each year.

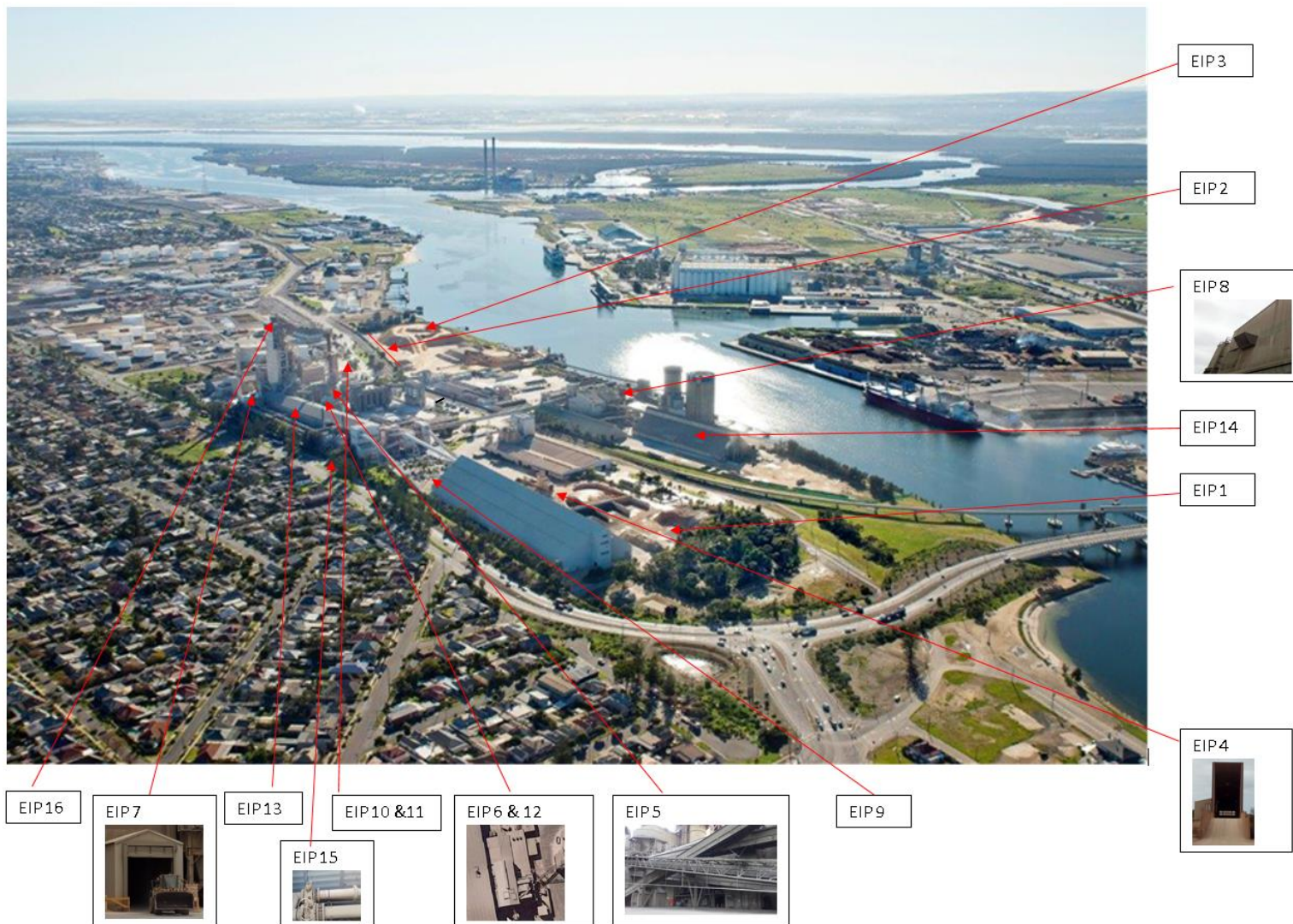
2.3 Public Access

A copy of the current version of this EIP, as approved by the EPA, will be made available on the ABC Community Web Site within seven days.

Following submission of the quarterly and annual EIP reports to the EPA, the reports will be made available on the ABC Community Web Site within seven days.

3 SITE MAPS

Figure 1 – Site map of ABC Birkenhead



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4 TABLE OF INTENDED APPROACH

Table 1: Intended Approach provides a general indication of the focus of activities at the site during the period of the EIP. This table is intended as a guide and therefore does not include the compliance actions that are required to be completed. The following section details the EIP compliance actions which are documented in Table 2: Compliance Actions.

Table 1: Intended Approach

EIP Project Number	Category	Project Title	Project Description	Potential Benefits	Implementation Timing	Comments
1	Fugitive Dust - Stockpile emission reduction	Relocate Bauxite Stockpile and cover with Geofabric	Relocate Bauxite stockpile from shell block close to the Materials Management (MM) Pit area and cover inactive stockpile areas with Geofabric.	<p>Optimising the location of the raw material stockpile reduces vehicle movements and associated fugitive dust as the stockpile is closer to the entry point of the process. Covering inactive areas of the stockpile with Geofabric prevents wind erosion and fugitive dust from the surface of the stockpile.</p> <p>Independent air quality modelling and analysis indicates that relocating the Bauxite stockpile and covering inactive areas with Geofabric may reduce maximum 24-hr average concentrations of PM₁₀ at the Community Park by 0.2 µg/m³.</p>	28-February-2020	<p>New Bauxite stockpile replaces an existing Limestone stockpile in the same location.</p> <p>Bauxite stockpile will be built in new location with the delivery of next shipment of Bauxite in May 2019. It is intended to deplete the existing Bauxite stockpile (shell block) through use and not relocate it to avoid further emissions from double handling</p> <p>Geofabric is applied after the stockpile has been completed and dust control methods such as chemical dust suppression and watering can be used until the stockpile can be covered. Slow stockpile turnover enables the majority of the stockpile to be covered.</p>

EIP Project Number	Category	Project Title	Project Description	Potential Benefits	Implementation Timing	Comments
2	Fugitive Dust - Stockpile emission reduction	Wind curtain - Limestone stockpile	Install a portable 6m high by 50m length wind curtain at the working face of the stockpile - (shell block).	<p>A porous windbreak curtain can reduce wind speed minimising dust lift-off and transport.</p> <p>A portable wind curtain provides the flexibility to manage the changing dynamics of the stockpile size, providing an effective means of reducing dust emissions from materials handling activities at the working face of the stockpile.</p> <p>Independent air quality modelling and analysis indicates that a portable wind curtain located at the working face of the stockpile when used in conjunction with chemical polymers applied to stockpile sides and exposed surface areas, and use of stockpile covers applied to 11,500m² of inactive non-working exposed surface areas of the limestone stockpile may reduce maximum 24-hr average concentrations of PM₁₀ at the Community Park by 2.3 µg/m³.</p>	April 2021	<p>A 6m high portable curtain will require detailed engineering analysis including consideration of:</p> <ul style="list-style-type: none"> • Wind loading /structural needs • Visual amenity impact <p>In order to proceed the project:</p> <ul style="list-style-type: none"> • Will require regulatory approvals <p>As the stockpile is dynamic, covers are applied to inactive non-working areas of the stockpile, that have been completed. Dust control methods such as chemical dust suppression and watering can be used until the stockpile area can be covered.</p>

EIP Project Number	Category	Project Title	Project Description	Potential Benefits	Implementation Timing	Comments
3	Fugitive Dust - Stockpile emission reduction	Geofabric - Limestone stockpile	Geofabric cover is to be applied to 11,500m ² of inactive areas of limestone stockpiles on shell block.	<p>Covering inactive areas of the stockpile with Geofabric prevents wind erosion and fugitive dust from the surface of the stockpile.</p> <p>Independent air quality modelling and analysis indicates that covering 11,500m² of inactive stockpile surface with Geofabric may reduce maximum 24-hr average concentrations of PM₁₀ at the Community Park by 0.9 µg/m³.</p>	17-January-2020	<p>Geo fabric is applied after areas of the stockpile have been completed. Dust control methods such as chemical suppression and watering can be used until the stockpile area is able to be covered.</p> <p>Geo fabric is to be applied progressively to non-working surfaces of the stockpile as the stockpile build allows. Stockpile is being built-up to cover for dry dock maintenance of the Accolade (limestone ship). By 30 September 2020, 77% of 11,500 m² surface area will be covered with the balance completed by the 17 January 2021</p>
4	Fugitive Dust - Transfer operation	MM Wheel wash system	Install a wheel wash at the exit of the MM receiving system	<p>Installing a wheel wash at the exit of the MM transfer system will reduce track out of material carried on the wheels of vehicles and the subsequent resuspension as dust.</p> <p>Independent air quality modelling and analysis indicates that installing a wheel wash system may reduce maximum 24-hr average concentrations of PM₁₀ at the Community Park by 0.1 µg/m³.</p>	01-April-2022	<p>Development approval will be required.</p> <p>Plant shutdown is needed for the installation of the MM wheel wash system (just in time material delivery system to the Kiln).</p> <p>Project timing is subject to approvals being obtained in time to enable planning and the procurement of labour, materials and equipment necessary for implementation are available at commencement of the scheduled annual plant shutdown in January 2022.</p>

EIP Project Number	Category	Project Title	Project Description	Potential Benefits	Implementation Timing	Comments
5	Fugitive Dust - Conveyors	CS2 CR2 CR3 wind shielding	Install wind shielding on onside of these conveyors	<p>Installing wind shielding on the weather-exposed side of the conveyors will reduce wind speed and minimise dust lift off.</p> <p>Reduction in off-site PM₁₀ dust concentration is not able to be quantified. It is expected this project will assist in reducing nuisance dust.</p>	30-April-2021	<p>Development approval will be required</p> <p>Plant shut down is required for installation of the wind shielding. Project timing is subject to approvals being obtained in time to enable planning and procurement of labour, materials and equipment necessary for implementation are available at commencement of the annual plant shutdown scheduled for March 2021</p>
6	Fugitive Dust - Storage/ processing buildings	CM6 CF6 Clinker Transfer Point Dust Collector	To install a dust collector on the CF6 clinker transfer point within the Cement Mill 6 (CM6) building.	<p>This project will reduce dust loadings within CM6 building and will lead to lower overall fugitive dust emissions from the building.</p> <p>Reduction in off-site PM₁₀ dust concentration is not able to be quantified. It is expected this project will assist in reducing nuisance dust.</p>	30-June-2021	Scheduled Cement Mill 6 shutdown in April 2021 is needed for installation.

EIP Project Number	Category	Project Title	Project Description	Potential Benefits	Implementation Timing	Comments
7	Fugitive Dust - Storage/ processing buildings	CM6 Clinker Gantry Entry Air Knives	Install a high-speed blower/air knife system on the clinker gantry vehicle entry door.	<p>Reduce fugitive dust emissions from the CM6 clinker gantry doors when vehicles pass through.</p> <p>This project will further improve emissions from the CM6 Clinker gantry stockpile, which already has significant dust control measures in place (fully enclosed with dust collection and rapid raise doors and entry annex).</p> <p>Reduction in off-site PM₁₀ dust concentration is not able to be quantified. It is expected this project will assist in reducing nuisance dust.</p>	17-May-2021	

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EIP Project Number	Category	Project Title	Project Description	Potential Benefits	Implementation Timing	Comments
8	Fugitive Dust - Dust Collectors	CM1 Dust Collector - redirect outlet	Change Cement Mill 1 (CM1) dust collector from a horizontal to vertical release with the release point above the height of the CM1 building	<p>A vertical outlet on the dust collector will improve the dispersion of and reduce the potential impact of emissions.</p> <p>Independent air quality modelling and analysis indicates that redirecting the CM1 to vertical release, may reduce maximum 24-hr average concentrations of PM₁₀ at the Community Park by 0.45 µg/m³.</p>	20-April-2020	<p>This project will bring CM1 in line with dust collectors on cement mill 7 and cement mill 6, which have vertical discharges.</p> <p>Development approval will be required.</p> <p>Cement mill shutdown is needed for installation.</p> <p>The project timing is subject to approvals being obtained in time to enable planning and procurement of labour, materials and equipment necessary for implementation are available at commencement of the scheduled CM1 shutdown on 14/04/2020</p>
9	Fugitive dust - Sealing exposed unsealed surfaces	Seal area - north of reclaimer shed	Seal 1200m ² of unsealed surface area on the northern side of the reclaimer shed with bitumen	<p>Paving exposed surface area with bitumen removes the erodible surface and eliminates the potential for dust generation.</p> <p>Independent air quality modelling and analysis indicates that sealing 1200 m² of exposed unsealed surface may reduce maximum 24-hr average concentrations of PM₁₀ at the Community Park by 0.3 µg/m³.</p>	26-November-2019	

EIP Project Number	Category	Project Title	Project Description	Potential Benefits	Implementation Timing	Comments
10	Fugitive dust - Sealing exposed unsealed surfaces	Seal area North of Kiln	Seal 1200m ² of exposed unsealed surface area to the North of the kiln with bitumen.	<p>Paving exposed surface area with bitumen removes the erodible surface and eliminates the potential for dust generation.</p> <p>Independent air quality modelling and analysis indicates that sealing 1200 m² of exposed unsealed surface may reduce maximum 24-hr average concentrations of PM₁₀ at the Community Park by 0.3 µg/m³</p>	02-September-2022	
11	Fugitive dust - Sealing exposed unsealed surfaces	Seal contractor compound (area far North of the kiln)	Seal 1200m ² of unsealed surface area in the contractor compound with bitumen (far North of the kiln)	<p>Paving exposed surface area with bitumen removes the erodible surface and eliminates the potential for dust generation.</p> <p>Independent air quality modelling and analysis indicates that sealing 1200 m² of exposed unsealed surface may reduce maximum 24-hr average concentrations of PM₁₀ at the Community Park by 0.3 µg/m³.</p>	23-September-2022	
12	Fugitive Dust - Storage/ processing buildings	CM6 Cladding	Upgrade/maintain the cladding on the CM6 building to improve its air tightness.	<p>Improved sealing will reduce fugitive dust emissions from activities within the CM6 building.</p> <p>Reduction in off-site PM₁₀ dust concentration is not able to be quantified. It is expected this project will assist in reducing nuisance dust.</p>	30-April-2022	

EIP Project Number	Category	Project Title	Project Description	Potential Benefits	Implementation Timing	Comments
13	Fugitive Dust - Storage/ processing buildings	CM6 Gantry Cladding	Upgrade/maintain the cladding on the CM6 Gantry building to ensure it remains well sealed.	<p>To ensure the building is able to maintain a high standard of dust control into the future.</p> <p>The existing building is old but has a number of dust control measures in place including the building itself, rapid raise doors and dust collection.</p> <p>The Reduction in off-site PM₁₀ dust concentration is not able to be quantified. It is expected this project will assist in reducing nuisance dust.</p>	29-September-2022	
14	Noise	CM1/CM7 Clinker Gantry Dust Collector Fans	Reorientate the discharge of the dust collectors to face North	<p>This is predicted to reduce noise levels for sensitive receivers R(2),R(5) and R(12), with a predicted reduction of 0.7dBA, at the most sensitive receiver R(5).</p> <p>(Refer Vipac noise report for location of receptors).</p>	31-January-2020	Requires an annual plant shutdown for installation

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EIP Project Number	Category	Project Title	Project Description	Potential Benefits	Implementation Timing	Comments
15	Noise	BH Gas Train noise abatement (APA Project)	Work with APA and noise consultant Vipac to identify solutions to reduce noise levels from the APA gas train.	<p>Further reduction in noise levels are possible.</p> <p>If it is possible to reduce noise levels by 10dB(A) at source (i.e. the gas train), then a reduction in noise levels at nearest sensitive receiver (R2), of 2.5 dB(A) is predicted. A reduction of 1dB(A) is also predicted at sensitive receivers (R5) and R(12).</p> <p>Alternatively, additional shielding (roof over the gas train) is predicted to reduce noise levels at nearest sensitive receiver (R2) by 1.7dB(A) based on worst case meteorological conditions.</p> <p>(Refer Vipac noise report for location of receptors).</p>	27-February-2020	<p>APA is the owner of the gas train equipment and is responsible for selection, implementation and timing of noise mitigation measures.</p> <p>Noise source solutions will require an annual plant shutdown for installation.</p>
16	Noise	Kiln Feed Elevator Gear box	Replace gearbox and reinstate Western cladding to reduce noise levels	A 10 dBA Reduction in noise level at the gearbox may reduce noise emissions at sensitive receivers by up to 1 dBA.	26-April-2019	

EIP Project Number	Category	Project Title	Project Description	Potential Benefits	Implementation Timing	Comments
17	EIP project evaluation	EIP Project Evaluation	Evaluation of the improvement in fugitive dust and noise emissions from the Birkenhead site in accordance with approved EPA assessment methods.	Assess and validate the reductions achieved through the implementation of the EIP projects.	23/12/2022	<ul style="list-style-type: none"> • An evaluation of the whole of site air quality assessment in accordance with the Environment protection (Air Quality) Policy 2016 and EPA guidance publication "Ambient Air Quality Assessment - 2016" • An evaluation of noise emissions by undertaking site noise modelling in accordance with the Environment Protection (Noise) Policy 2007

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5 EIP COMPLIANCE ACTIONS

Adelaide Brighton Cement Ltd (ABC) has committed to undertaking the following specific actions to demonstrate that it will achieve compliance with the requirements of the *Environment Protection Act 1993*. These compliance actions listed in the Table of Compliance Actions are the tasks through which Adelaide Brighton Cement Ltd will demonstrate compliance with the conditions of licence.

If a compliance action cannot be implemented, ABC will seek a variation to a compliance action or timeframe from the EPA with justification and where applicable, an alternate proposed response. Changes will be communicated to the ABC Community Liaison Group.

Table 2: Compliance Actions

EIP Project	Category	Project	Compliance Action	Project Milestones (Compliance actions)
1	Fugitive Dust - Stockpile emission reduction	Relocate Bauxite Stockpile and cover with Geofabric	1	By the 24/04/2019, ABC will select a suitable Geo fabric, determine installation methodology and project costs to enable a business case to be developed for capital expenditure approval.
			2	By 23/08/2019, ABC will obtain capital expenditure for purchase and installation of Geofabric on the Bauxite stockpile to be located at Southern end of site
			3	Subject to obtaining capital approval by 23/08/2019, ABC will complete implementation of Geofabric on the Bauxite Stockpile at the Southern end of the plant by 28/02/2020.
2	Fugitive Dust - Stockpile emission reduction	Wind curtain - Limestone stockpile	4	By 27/02/2020, ABC will complete a detailed cost-benefit analysis and technical assessment to enable capital approval to be obtained for the installation of a wind curtain for the limestone stockpile on shell block. The project will proceed if the front-end engineering costs are in line with the project selection criteria as outlined in the Adelaide Brighton Cement Limited Report, 2018, 'Assessment of Options Report'.
			5	By 29/09/2020, ABC will obtain capital and necessary expenditure for implementing the portable wind curtain.
			6	Subject to obtaining capital approval by 29/09/2020, ABC will complete the installation of the wind curtain by 1/04/2021.

EIP Project	Category	Project	Compliance Action	Project Milestones (Compliance actions)
			7	No longer required due to variation in EIP project.
			8	No longer required due to variation in EIP project.
3	Fugitive Dust - Stockpile emission reduction	Geofabric - Limestone stockpile	9	By 30/5/2019, ABC will select a suitable Geo fabric, determine installation methodology and project costs to enable a business case to be developed for capital expenditure approval.
			10	By 27/09/2019, ABC will obtain capital expenditure for purchase and installation of Geo fabric on the limestone stockpile on the shell block.
			11	Subject to obtaining capital approval by 27/09/2019, ABC will complete the installation of Geo fabric to 77% of 11,500 m ² of inactive stockpile areas by 30/09/2020, with the balance completed by 17/01/2021.
4	Fugitive Dust - Transfer operation	MM Wheel wash system	12	By the 01/06/2021, ABC will complete an engineering study, including selection and installation of truck wheel wash to enable approval for capital expenditure.
			13	By 01/06/2021, ABC will submit development application to the relevant regulatory authority for construction of a wheel wash.
			14	Subject to development approval by 01/09/2021, ABC will obtain capital expenditure for the purchase and installation of a wheel wash facility for the MM system by 21/11/2021.
			15	Subject to capital approval by 21/11/2021 and annual kiln shutdown commencing on 10/01/2022, ABC will complete installation and commissioning of the wheel wash by 01/04/2022.
5	Fugitive Dust - Conveyors	CS2 CR2 CR3 wind shielding	16	By the 11/05/2020, ABC will complete an engineering study to enable capital expenditure approval for wind shielding on one side of CS2 CR2/CR3 conveyors.
			17	By 12/05/2020, ABC will submit a development application to the relevant regulatory authority for construction of a CS2 CR2/CR3 conveyor wind shielding.
			18	Subject to development approval by 10/08/2020, ABC will obtain capital expenditure for the construction of a CS2 CR2 CR3 conveyor wind shielding by 9/11/2020.
			19	Subject to capital approval by 9/11/2020 and the annual kiln shutdown commencing on 24/2/2021, ABC will complete installation of the CS2 CR2 CR3 wind shielding by 30/04/2021.

EIP Project	Category	Project	Compliance Action	Project Milestones (Compliance actions)
6	Fugitive Dust - Storage/processing buildings	CM6 CF6 Clinker Transfer Point Dust Collector	20	By 29/08/2019, ABC will complete an engineering design to enable capital approval for selection and installation of a suitable dust collector.
			21	By 28/11/2019, ABC will obtain the capital expenditure for the installation of a CM6 CF6 Clinker transfer point dust collector.
			22	Subject to capital approval by 28/11/2019 and CM6 mill shutdown in April 2021, ABC will complete commissioning of dust collection system by 30/06/2021.
7	Fugitive Dust - Storage/processing buildings	CM6 Clinker Gantry entry air knives	23	By the 28/08/2020, ABC will complete the engineering design to enable capital expenditure approval for installation for CM6 Gantry air knives.
			24	By 30/10/2020, ABC will obtain the capital expenditure for installation for CM6 Gantry air knives.
			25	Subject to capital approval by 30/10/2020, ABC will complete the installation of air knives on the truck entry to the CM6 Clinker Gantry by 17/05/2021.
8	Fugitive Dust - Dust Collectors	CM1 Dust Collector - redirect outlet	26	By 30/07/2019, ABC will complete an engineering design to enable capital approval for changing the CM1 Dust collector outlet to a vertical discharge.
			27	By 31/07/2019, ABC will submit an application to the relevant regulatory authority for redirection of the CM1 Dust Collector outlet.
			28	Subject to development approval by 29/10/2019, ABC will obtain the capital expenditure for changing the CM1 Dust collector outlet to a vertical discharge by 28/01/2020.
			29	Subject to capital approval by 28/01/2020 and cement mill 1 shutdown for maintenance commencing on the 14/04/2020, ABC will complete the installation of the redirected CM1 dust collector outlet by 20/04/2020.
9	Fugitive dust - Sealing exposed unsealed surfaces	Seal area - north of reclaimer shed	30	By 25/06/2019, ABC will complete the engineering design to enable capital approval for sealing 1200m ² of unsealed surface area on the northern side of the reclaimer shed.
			31	By 24/09/2019, ABC will obtain capital expenditure for sealing 1200m ² of unsealed surfaces on the northern side of the reclaimer shed with bitumen
			32	Subject to capital approval by the 24/09/2019, ABC will seal 1200 m ² of unsealed surface area on the northern side of the limestone reclaimer by 26/11/2019.

EIP Project	Category	Project	Compliance Action	Project Milestones (Compliance actions)
10	Fugitive dust - Sealing exposed unsealed surfaces	Seal area North of Kiln	33	By 1/04/2022, ABC will complete the engineering design to enable capital approval for sealing 1200m ² of unsealed surface area to the North of the kiln
			34	By 1/07/2022, ABC will obtain the capital expenditure for sealing 1200m ² of unsealed surfaces to the North of the kiln.
			35	Subject to capital approval by 1/07/2019, ABC will seal 1200 m ² of unsealed surface area to the North of the kiln by 2/09/2022.
11	Fugitive dust - Sealing exposed unsealed surfaces	Seal contractor compound (area far North of kiln)	36	By 22/04/2022, ABC will complete the engineering design to enable capital approval for sealing 1200m ² of unsealed surface area to the far North of the kiln.
			37	By 22/07/2022, ABC will obtain the capital expenditure for sealing unsealed surfaces to the far North of the kiln.
			38	Subject to capital approval by 22/07/2022, ABC will seal 1200 m ² of unsealed surface area to the North of the kiln by 23/09/2022.
12	Fugitive Dust - Storage/processing buildings	CM6 Cladding	39	By 31/08/2020, ABC will complete an engineering study to enable capital approval for upgrading/maintaining the Cement Mill 6 (CM6) building cladding to improve the capture of dust generated from activities inside the building.
			40	By 1/12/2020, ABC will obtain the capital expenditure to upgrade/maintain the CM6 Cladding.
			41	Subject to capital approval by 1/12/2020, ABC will complete the upgrade/maintain the cladding on CM6 by 30/04/2022.
13	Fugitive Dust - Storage/processing buildings	CM6 Gantry Cladding	42	By 30/09/2021, ABC will complete an engineering study to enable capital approval to upgrade/maintain the CM6 Clinker Gantry cladding.
			43	By 30/09/2021, ABC will submit development application for CM6 Clinker Gantry cladding upgrade/maintenance.
			44	Subject to development approval, ABC will obtain the capital expenditure to upgrade/maintain the CM6 Clinker Gantry by 30/12/2021.
			45	Subject to capital approval by 30/12/2021, ABC will complete the CM6 Clinker Gantry cladding upgrade/maintenance by 29/09/2022.

EIP Project	Category	Project	Compliance Action	Project Milestones (Compliance actions)
14	Noise	CM1/CM7 Clinker Gantry Dust Collector Fans	46	By 18/7/2019, ABC will complete an engineering study to enable approval of capital expenditure to reduce noise emissions from CM1/CM7 Clinker Gantry Dust Collection Fans
			47	By 17/10/2019, ABC will commit to a noise attenuation option and obtain approval for the necessary expenditure.
			48	Subject to capital approval by 17/10/2019 and annual plant shutdown commencing on 6/01/2020, ABC will implement the CM1/CM7 Clinker Gantry Dust Collection Fans by the 31/01/2020.
15	Noise	BH Gas Train noise abatement (APA Project)	49	By the 27/02/2020, ABC will work with APA Group (owners of the Gas Train and equipment) to assess and implement further noise abatement options. APA is solely responsible for the selection and implementation of noise attenuation measures.
16	Noise	Kiln Feed Elevator Gear box	50	By the 26/4/2019, ABC will have replaced the noisy gear box on the kiln feed elevator and reinstate its Western cladding.
17	EIP Project Evaluation	Evaluation of the improvement in fugitive dust and noise emissions from the Birkenhead site.	51	Subject to completion of all noise abatement EIP projects (EIP Project numbers 14 to 16) by the 27/02/2020, ABC will submit a report by 31/05/2020, that assess and validates the reductions achieved through the implementation of these EIP actions that includes: <ul style="list-style-type: none"> An evaluation of noise emissions by undertaking site noise modelling in accordance with the Environment Protection (Noise) Policy 2007
			52	Subject to completion of all particulate dust emissions EIP projects (EIP Project numbers 1 to 13) by the 29/09/2022, ABC will submit a report by 23/12/2022, that assess and validates the reductions achieved through the implementation of these EIP actions that includes: <ul style="list-style-type: none"> An evaluation of the whole of site air quality assessment in accordance with the Environment protection (Air Quality) Policy 2016 and EPA guidance publication "Ambient Air Quality Assessment - 2016"

6 COMPLIANCE ACTION GANTT CHART

Action Number	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22																														
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Legend	Milestone	X	Implementation action	Evaluation
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Submitted

Approved.....

APPENDIX A

Environment Improvement Programme - Consultation

The following matters were raised during community consultation for the new Environmental Improvement Programme (EIP) between November 2018 and February 2019

Matters Raised by the ABC Community Liaison Group

Comments and Input Related to Noise Emissions

Feedback:

"I believe there are updated national standards on noise - will ABC ensure that the new EIP will conform to these noise standards as part of the new licence?"

ABC Response:

ABC and acoustic consultants that are engaged, comply with the requirements of the SA EPA Environmental Protection (Noise) Policy 2007. The new Australian Standard AS 1055:2018 Acoustics - Description and Measurement of Environmental Noise, is not a regulatory document, users should identify the relevant requirements of regulatory authorities, and the details of specific requirements laid down in each State or Territory. The standard provides guidance on how environment noise should be measured and assessed rather than prescribing noise limits. In general, the procedures outlined in the Environment Protection (Noise) Policy 2007 reflect those outlined in AS 1055:1997, which is superseded by AS 1055:2018.

However, ABC takes a continuous improvement approach to reduce noise impacts through noise measurement, identification of contributing sources and implementation of noise reduction projects. Since 2011, ABC has implemented 17 noise reduction projects and reduced night time noise levels by about 6.5 dB(A), including removal of a tonal characteristic (5dB(A) penalty), for the nearest sensitive noise receivers.

Feedback:

"I asked whether the same noise monitors will be utilised in 2019; the answer was yes which I agree with for continuity of data however I also think ABC would benefit (over time) but placing more noise and dust monitors in the local suburbs of Birkenhead and Peterhead e.g. Fletcher's Slip may benefit from having one."

ABC Response:

ABC undertakes regular attended and unattended noise monitoring surveys in the community to gain an understanding of how noise emissions from the site impacts the community. Noise measurements are conducted in accordance with the SA EPA Environment Protection (Noise) Policy 2007, and defined measurement positions (19 in total) have been established allowing for trends in noise levels at each location to be established over time. In addition, noise emissions have been modelled which enable noise levels in surrounding areas of the community to be predicted.

In general, noise levels comply with the day-time indicative noise level of 57 L_{eq} , dB(A). For most noise sensitive receivers, noise levels comply with the night-time indicative criterion of 49 L_{eq} , dB(A), and where it is exceeded (within 250 metres of the site boundary), it is generally less than 3 dB(A), which subjectively, is a 'just noticeable change' when compared with the indicative noise level.

ABC therefore believes the existing noise-monitoring locations are fit for purpose. ABC will consider additional noise monitoring locations if the circumstances require it.

Feedback:

Refer to attached PAREPG document (attached) – noise issues

ABC Response:

Noise is an inherent part of most activities and includes an almost unlimited range of sources including industrial activities, road traffic, and domestic activities. The response to noise by individuals can be as wide and varied as the number of activities that produce it. However, to set limits for all situations can often result in unreasonable requirements. A contemporary noise policy needs to have the flexibility to consider the range of factors that include the level of noise, time of day, how loud or quiet that area is expected to be, the history of the area in which the noise is located, the solutions that are applied to the noise in other similar situations and the capacity to deliver the solutions that result in noise reduction. The Environment Protection (Noise) Policy therefore provides a set of appropriate guidelines for industry, acoustic consultants and regulators to manage the impact of noise emissions.

ABC uses acoustic noise specialists to undertake regular noise measurements on site, and in the local community in compliance with EPA noise measurement guidelines. ABC has measured noise in the community during normal operations and these results show that in general, noise levels comply with the day-time indicative noise level of 57 L_{eq} , dB(A). For most noise sensitive receivers, noise levels comply with the night-time indicative criterion of 49 L_{eq} , dB(A), and where it is exceeded (within 250 metres of the site boundary), it is generally less than 3 dB(A), which subjectively, is a 'just noticeable change' when compared with the indicative noise level.

Noise measurements taken in the local community during annual plant shut downs show significant periods where the ambient background night time noise levels are higher than the current night time noise policy guidelines. This demonstrates that there are significant other noise sources including road traffic.

On-site noise surveys are conducted regularly to identify significant noise sources and inform updates to the noise model. The on-site surveys allow the effectiveness of previous noise mitigation projects to be quantified, and an accurate noise model of the site to be maintained. Regular on-site noise surveys also allow for the continued effectiveness of previous noise mitigation projects to be verified.

More recent noise assessments consistently show that most noise sources impacting on the local community are from elevated areas within the plant. This is because the majority of plant activities that occur at ground level, are enclosed in buildings that provide suitable noise attenuation.

The latest noise assessment identifies the APA gas train as the ground level noise source that has a significant impact on sensitive receptors and recommends further “at source” attenuation measures. The APA gas train along with several other noise sources from elevated areas of the plant have been identified for noise attenuation and these have been included in the EIP.

A 4m high barrier will not reduce noise levels for nearby sensitive receivers as it cannot shield noise from elevated areas of the plant and will have a negligible impact on reducing noise from ground level sources. In addition, there is a risk that a wall may reflect traffic noise from Victoria Road potentially increasing background noise levels for nearby sensitive receivers.

ABC maintains a vegetation barrier consisting of mature trees and bushes along its boundary with Victoria Road, which improves the ground level visual amenity of site buildings and equipment. Construction of a 4 m barrier would result in the loss of this amenity.

Recent noise surveys have identified the APA gas train as a ground level source requiring further noise shielding and this opportunity for improvement has been included in this EIP.

ABC therefore considers the proposal for a 4 m barrier will result in a loss of visual amenity and not provide any noticeable reduction in noise benefit for nearby sensitive receivers.

As with previous practice, ABC will continue to use measurement surveys and modelling to make informed decisions relating to managing noise levels from the site’s operation.

Comments and input related to Dust Emissions

Feedback:

1. *"I asked whether the same noise monitors will be utilised in 2019; the answer was yes which I agree with for continuity of data however I also think ABC would benefit (over time) but placing more noise and dust monitors in the local suburbs of Birkenhead and Peterhead e.g. Fletcher's Slip may benefit from having one."* and,
2. *Refer to attached PAREPG document – Dust control measures*

ABC Response:

ABC engaged air quality specialists, Katestone Environmental Consultants (Katestone), to complete an air quality assessment (assessment) of the Birkenhead site as an input into the licence renewal process. The details of this assessment are contained in Katestone's Air Quality Assessment of the Birkenhead Cement Plant, August 2017 version 1.6.

The assessment was performed in compliance with the Environment Protection (Air Quality) Policy 2016 (2016 Air Quality Policy) and the prescribed testing, assessment, monitoring and modelling methodology for the pollutant or activity set out in the SA Environment Protection Authority's (EPA) Ambient Air Quality Assessment 2016 and Emission Testing Methodology for Air Pollution 2012 documents. Where there was no SA EPA criterion, the Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (NSW, EPA 2017) were used for the assessment, as was the case for deposited dust.

The conclusion of the above assessment is that the annual average dust deposition rate is predicted to be less than the NSW EPA Approved Methods criteria of 66 mg/m²/day at all residential areas.

ABC has undertaken an assessment of options to minimise dust emissions from fugitive sources on the site. This assessment included a review of best management practices and current dust management practices to identify reasonable and practicable measures to further reduce fugitive dust emissions. These improvement opportunities have been included in the new EIP.

Feedback:

Refer to attached PAREPG document – Assessment of Options report

ABC Response

The 2016 Air Quality Policy provides a framework for the regulation of air pollution in South Australia and includes ground level concentrations for pollutants.

As previously noted, ABC engaged air quality specialists, Katestone, to complete an air quality assessment (assessment) of the Birkenhead site as an input into the licence renewal process. The details of this assessment are contained in Katestone's Air Quality Assessment of the Birkenhead Cement Plant, August 2017 version 1.6.

The assessment incorporates source characteristics, air pollution emission rates, local meteorology, terrain and land use, and uses EPA approved pollution dispersion modelling programs, methodology and meteorological data.

The assessment takes into account emissions from point sources and fugitive sources. Point sources include stacks and dust collectors, and fugitive sources include emissions from material loading, unloading and transfer points, vehicle movements on sealed and unsealed roads, wind erosion of stockpiles and cleared areas and combustion emissions from vehicles on site.

Emissions from stacks have been based on independent stack tests and where multiple test results are available from the same source, the highest concentration was used in the modelling. In addition, two scenarios with higher particulate emissions rate from the Kiln (4A) and Calciner (4B) stacks was modelled to evaluate the impact of a continuous high level emission of particulates (250 mg/Nm³) from both stacks at the same time.

Emissions from fugitive sources have been calculated using EPA recognised emissions techniques, primarily National Pollutant Inventory (NPI) Emissions Estimation Techniques (EET) Manual for Cement Manufacturing, NPI EET for Mining, and US EPA AP42 Paved Roads Handbook.

Data from the EPA's Le Fevre 1 ambient air monitoring station was used to determine the background particulate levels (PM₁₀ and PM_{2.5}).

Modelling of emissions of particulate matter for typical site operations was conducted. The results show:

- 24-hour average concentrations of PM₁₀ are predicted to be more than 50 µg/m³ only within a limited area beyond the site boundary.
- 24-hour average concentrations of PM_{2.5} are predicted to be less than 25 µg/m³ beyond the site boundary.
- Annual average concentrations of PM_{2.5} are predicted to be more than 8 µg/m³ within a limited area beyond the site boundary. The background concentration of 7.3 µg/m³ is the major contributor to concentrations of PM_{2.5}.
- Annual average dust deposition rate is predicted to be less than the NSW EPA Approved Methods criteria of 66 mg/m²/day at all residential areas.

The modelling shows that fugitive sources of PM₁₀ and PM_{2.5} are the major contributors to ground level concentrations.

Stack and fugitive source contributions at the Community Park (Alfred Street, Peterhead) and EPA Le Fevre 1 ambient air monitors are shown in Figures 9, 10, 11 and 12 below.

Rank = The predicted top 25 worst days per annum

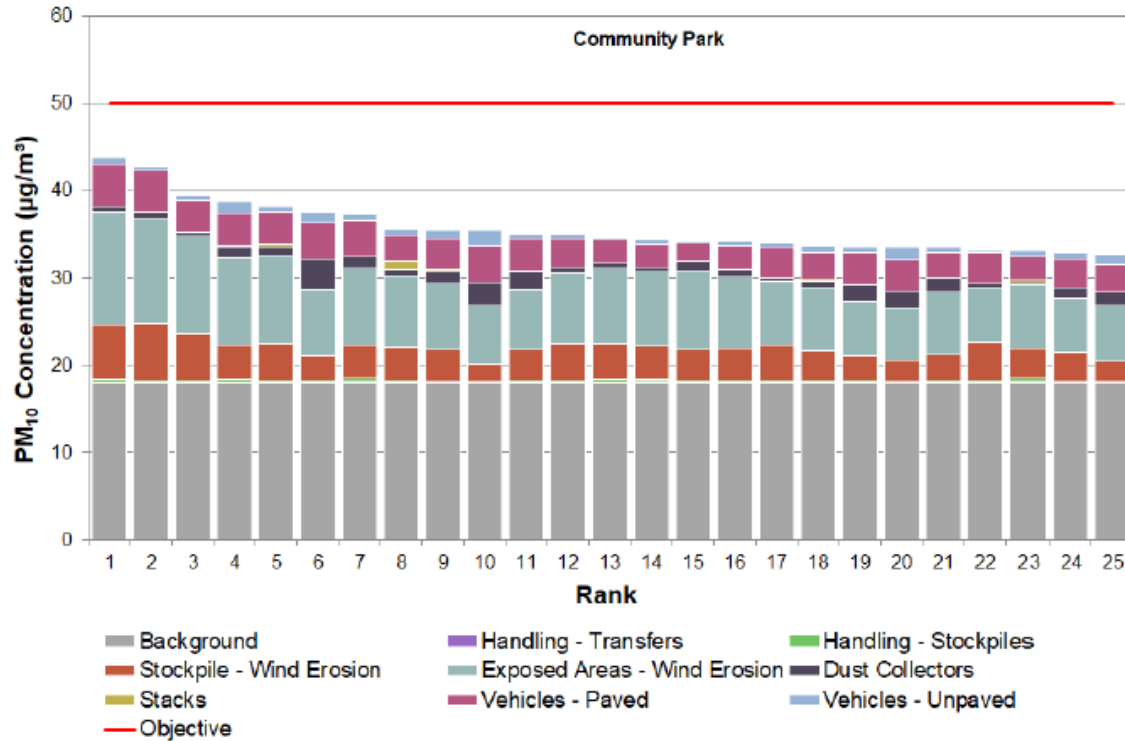


Figure 9 Source contributions for the top 25 predicted 24-hour average concentrations of PM₁₀ at the Community Park

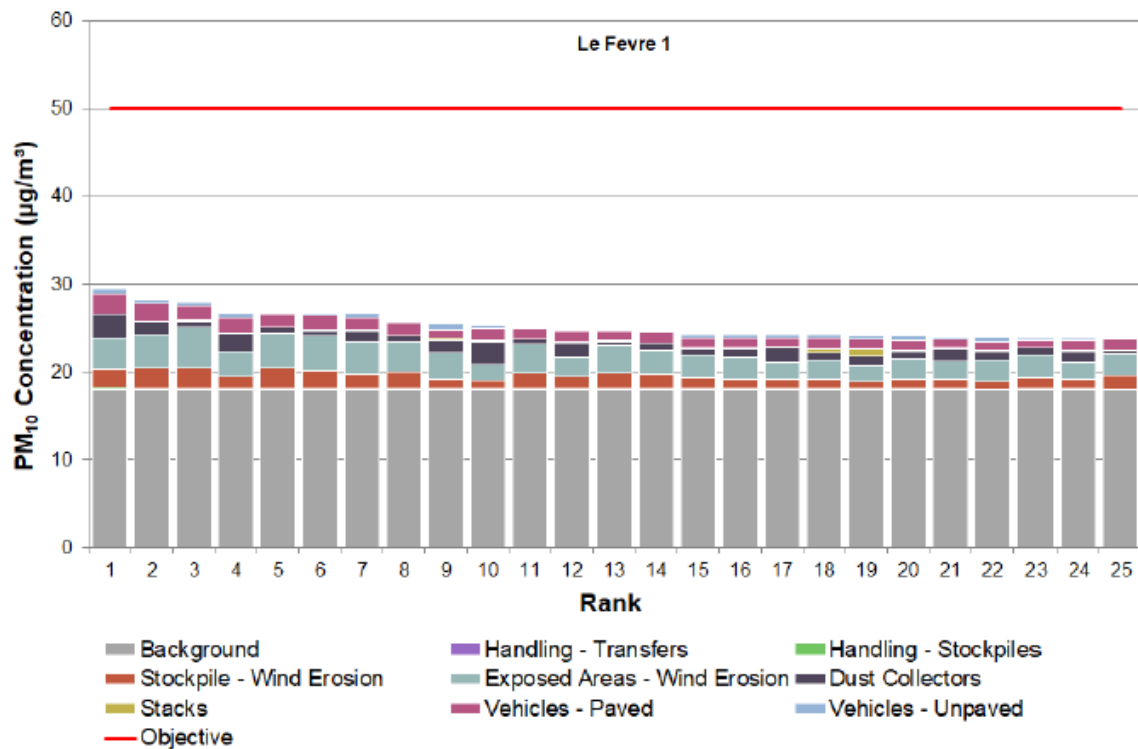


Figure 10 Source contributions for the top 25 predicted 24-hour average concentrations of PM₁₀ at the Le Fevre 1 monitoring site

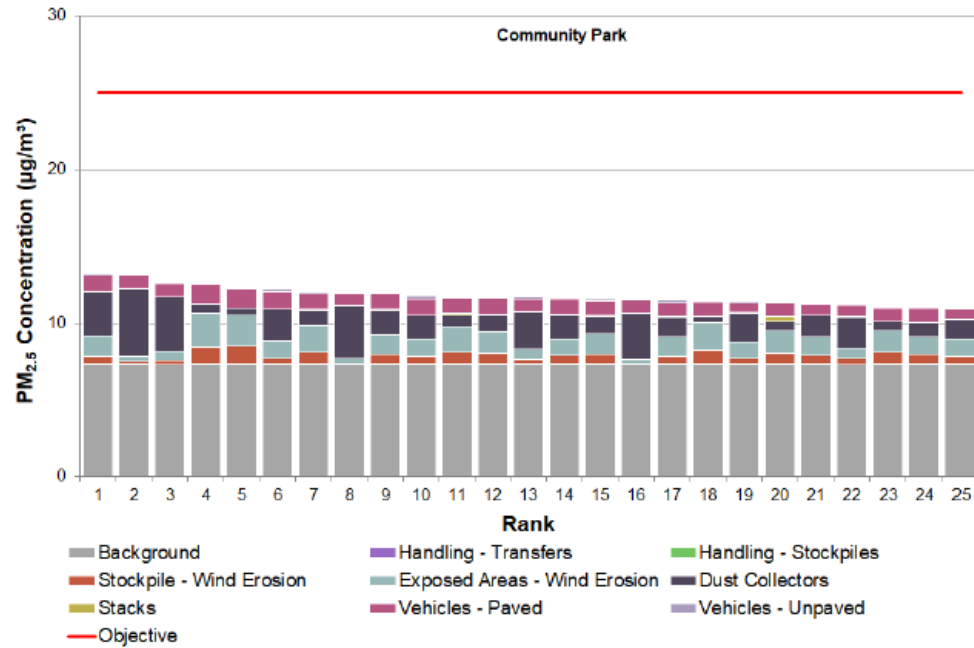


Figure 11 Source contributions for the top 25 predicted 24-hour average concentrations of PM_{2.5} at the Community Park

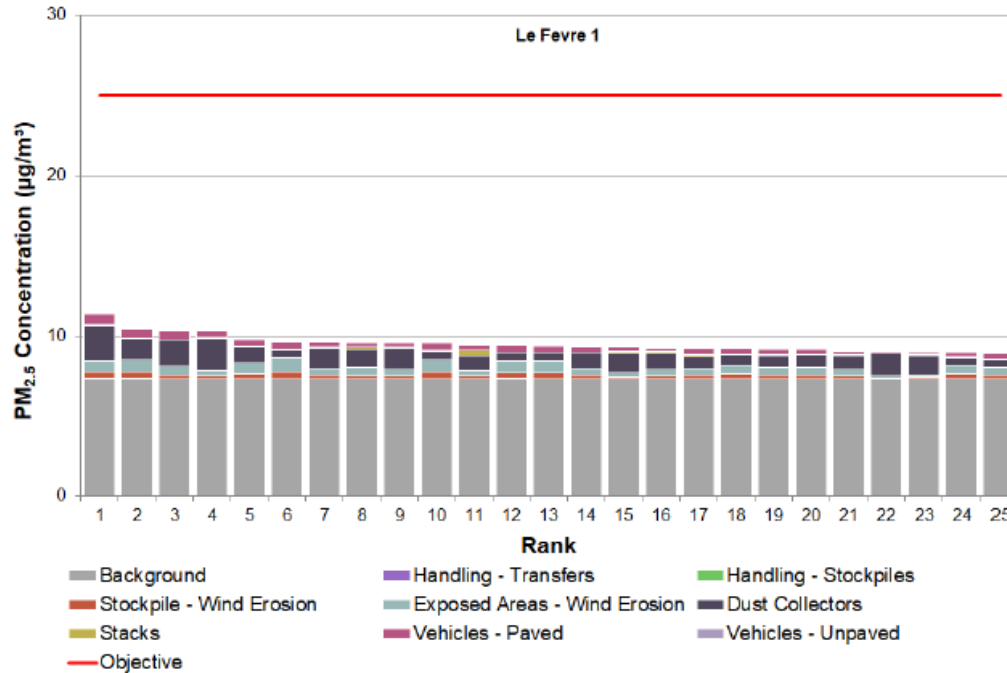


Figure 12 Source contributions for the top 25 predicted 24-hour average concentrations of PM_{2.5} at the Le Fevre 1 monitoring site

Note: background ambient ground level concentration (sources not from ABC) for PM₁₀ = 18 µg/m³ and PM_{2.5} = 7.3 µg/m³ (24-hour average). The red line on the graphs represents the National Environmental Protection Measure (NEPM) and also 2016 Air Quality Policy criterion for PM₁₀ and PM_{2.5}, which is 50 µg/m³ and 25 µg/m³ (24-hour average), respectively.

The modelling and the above charts show that the major contributors to dust at ground level from ABC’s operation are fugitive sources (wind erosion of stockpiles and exposed areas, vehicle movements and dust collectors), and that the kiln stacks do not make a significant contribution to the ground level concentrations.

Improving dispersion of particulates from the CM1 dust collector reduces ground level concentration of particulates.

ABC has two ambient particulate monitors located close to the plant at the Community Park and Gunn Street. In addition, the EPA also has an ambient particulate monitor located at LeFevre 1 and LeFevre 2. The data from these monitors is consistent with the modelling undertaken by Katestone, which predicts compliance with EPA ground level particulate concentration criteria. For this reason, ABC believes the current ambient particulate monitor network is fit for purpose.

ABC are committing to undertake thirteen fugitive dust reduction projects as part of the EIP to further improve ambient air quality.

Feedback:

Refer to attached PAREPG document – Instrumentation and TSP

ABC Response:

The 2016 Air Quality Policy does not have a ground level concentration criterion for TSP. Despite this, ABC has conducted modelling predictions for TSP, which shows that it is well below the NSW EPA publication “Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (NSW EPA, 2017) criterion of 90 µg/m³ (annual average)”.

Total Suspended Particulates (TSP) includes the PM₁₀ and PM_{2.5} particulate size fractions. The TSP/PM₁₀ and the PM₁₀/PM_{2.5} fractions are relatively consistent across fugitive sources, and more importantly reducing PM₁₀ emissions will lead to similar reductions in TSP and PM_{2.5} fractions.

Predicted contributions of each fugitive dust source group to PM₁₀ concentrations at the community Park were estimated in the Air Quality Assessment (see figure 9) and is representative of the maximum potential concentrations of fugitive particulates within the local community.

Rank = The predicted top 25 worst days per annum

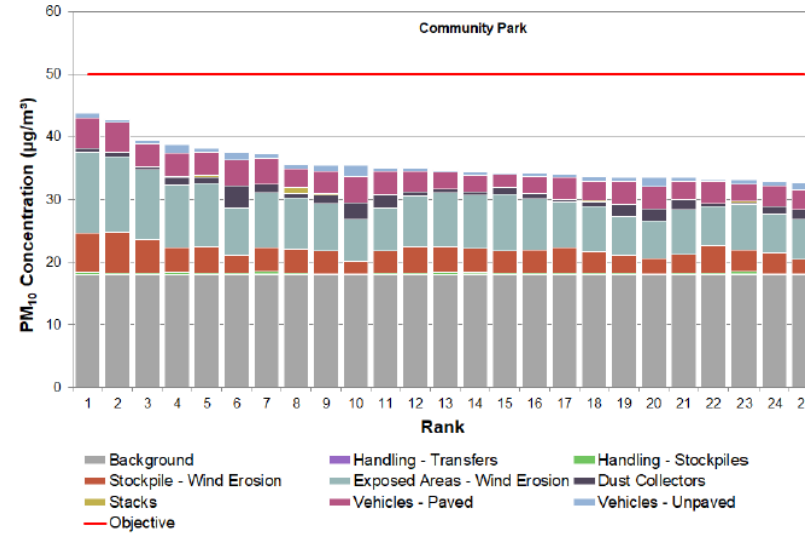


Figure 9 Source contributions for the top 25 predicted 24-hour average concentrations of PM₁₀ at the Community Park

The “Birkenhead Cement Plant-Options Assessment Report” – Katestone, August 2018 – located in Appendix A of the ABC, “Assessment of Options Report” – August 2018, provides details and quantifies the predicted improvements in fugitive dust concentrations at the Community Park and Gunn Street locations for each of the identified fugitive dust improvement options. ABC has ambient particulate monitors located at the Community Park and Gun Street locations, that continuously measure PM₁₀ particulate dust fractions.

The current ambient dust monitors located in the community provide monitoring data that validates the modelling predictions and measures air quality against the EPA ground level particulate concentration criteria.

Comments and input related to new development at fletchers slip

Feedback:

Fletcher's Slip is the talk of the town now with a stall present at the recent Semaphore Street Fair for people to gain information. I think it would be beneficial for ABC to get on the front foot and approach the developers to provide information on ABC, prior to purchasing in the area e.g. what improvements have been made and notify them that groups such as the CLG exist.

ABC Response:

ABC provided a submission to Renewal SA in 2015, about the continued drive for development of land around the inner harbour at Port Adelaide, seeking assurance from Renewal SA that potential developers will be advised of existing land use rights and operations of ABC and that any future development of land, not result in encroachment of sensitive land uses which may impact on the operations of the ABC site.

Despite ABC's proactive submission to Renewal SA, development plans do not require the developer to inform potential buyers about ABC's operations.

Never the less ABC through its EIP continues to improve its environmental footprint to sustainably co-habitat with its neighbours.

Comments and input related to Visual Amenity

Feedback:

In rural SA, silo art has become an attraction for small country towns attracting people as they pass through. I believe it would benefit ABC to look into the main stack or the large shed for the possibility of some artwork. At the meeting, I was told that the main stack is the 2nd tallest building in Adelaide. It is a landmark to be seen from far and wide (including the air as you fly into Adelaide); why not capitalise on this?

ABC Response:

ABC is a large complex industrial manufacturing site and this proposal would present significant safety challenges.

However, ABC does have a site beautification committee that is tasked with improving site visual amenity through programs such as tree planting days.

Port Adelaide Resident's Environment Protection Group

e: parepg@parepg.org.au



Response to Adelaide Brighton Cement consultation session on proposed Environment Improvement Program

Noise actions

In spite of considerable investment in noise mitigation measures, measurements at community locations generally do not indicate substantial change, exceptions being the rectification of faults in the mechanisms in the processing shed adjacent to Victoria Rd. Plant noise is still not compliant with the EPA noise policy.

As mentioned at the consultation meeting, our suggestion is to include a different approach in the present noise reduction strategy. That approach is to reduce the amount of noise coming from ground level operations by constructing a barrier on the western boundary of the plant, as shown in Fig 1. We were pleased to note this approach was well received, and would be considered for inclusion in the noise modelling exercise to inform the Environment Improvement Program.

As discussed we believe the following are important:

- The barrier should be constructed of sound absorbent material such as earth. Hard surfaces on the residential face will reflect Victoria Rd Traffic noise back to adjacent properties, and on the ABC face contribute to noise reflections from adjacent hard structures.
- The height of the barrier should be sufficient to absorb an appreciative proportion of the noise. An earthen barrier of effective height would require a horizontal spread of ~ twice the height¹. ie a 4m high earth barrier would extend over 8m on either side of the peak. This would be possible in most cases assuming use of the road reserve, in other cases small retaining walls may be required on the ABC side of the mound.
- Vegetation on the upper part of the mound should be sufficiently dense to play a part in the reduction of coarse particulates produced by plant ground level operations.



Fig 1: Proposed noise barrier location

Approved.....

Dust control measures

Submitted

Approved.....



Fig 2: Modelled dust deposition (mg/sqm/day)²

Birkehead dust deposition project: Comparison of residential samples vs controls
Samples not affected by rain only

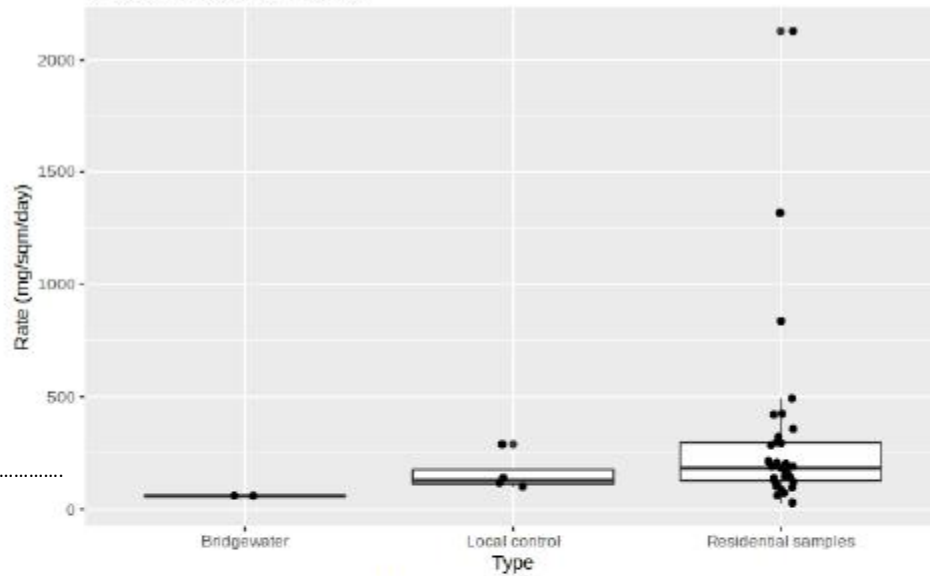


Fig 2: Measured dust deposition³

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- Calculated the annual coarse emissions of each component by subtracting the Total Solid Particulates(TSP) from the PM10 values.
- Calculated the Coarse particle component as a percentage of ground based coarse emissions.
- Calculated the coarse particle component of each component as a percentage of total coarse emissions.
- Sorted the table components by the percentage coarse based emissions relative to total emissions

The results are shown in Table 1

Activity	Emission Rate g/s			Emission Rate kg/yr			Coarse (TSP-PM10)	Coarse %	Coarse % of ground level emissions	Coarse % of all emissions
	TSP	PM10	PM2.5	TSP	PM10	PM2.5				
Stacks	4,794	3,049	1,199	149,775	96,164	37,822	149,751	100.0%		76.31%
Dust collectors	0.508	0.170	0.132	16,011	5,363	4,164	15,987	99.9%	34.38%	8.15%
Vehicle movements - paved	0.398	0.076	0.018	12,554	2,410	583	12,530	99.8%	26.95%	6.38%
Exposed unsealed areas wind erosion	0.293	0.147	0.022	9,248	4,624	694	9,224	99.7%	19.84%	4.70%
Stockpile wind erosion	0.156	0.078	0.012	4,907	2,454	368	4,883	99.5%	10.50%	2.49%
Vehicle movements-unpaved	0.077	0.021	0.002	2,415	666	67	2,391	99.0%	5.14%	1.22%
Combustion emissions – vehicles/stationary engines	0.039	0.039	0.035	1,233	1,233	1,118	1,209	98.1%	2.60%	0.62%
Handling-Stockpiles	0.012	0.006	0.001	272	128	19	248	91.2%	0.53%	0.13%
Handling-Transfer Points	0.003	0.001	0.000	51	24	4	27	52.9%	0.06%	0.01%
Total	6.2	3.6	1.4	196,466	113,066	44,839	196,442	100.0%		100%

Table 1: Calculation of coarse particle emissions from the Birkenhead plant

The calculation shows that the dominant source of coarse particles are stack emissions (76%), followed by dust collectors(~8%), both of which are point sources, and amenable control by regulation.

The largest reductions predicted are by full enclosure of the the limestone stockpiles (2.5mg/sqm/day) or surrounding the stockpile with bunker walls (2.5 mg/sqm/day).

ABC's preferred approach is to:

- Construct a 15 M high windbreak around the stockpile (0.8 mg/sqm/day)
- Cover the stockpile with a geofabric (0.3 mg/sqm/day)

The approach to reducing coarse particle discharge from dust collectors is to change the orientation of the dust collector on cement mill 1 so that it discharges vertically rather than horizontally resulting in a reduction of 1.6 mg/sqm/day. Cement mill 1 is located near the ship loading wharf adjacent to the river, so it's not clear to us how changing the discharge direction will impact significantly on coarse particle deposition rates.

The report estimates that other proposed activities such as sealing some unsealed areas, shielding some conveyors, enclosing some transfer points and sealing some buildings will have a much

Approved.....

instrument measuring TSP, and another measuring PM10 would give a measure of coarse particle content in adjacent residential areas.

One of the problems confounding current particulate measurements is the effect of background sources. Given the limited distribution of coarse particulates, this approach would lead to a more focused view of coarse particle emissions from the Birkenhead plant.

Conclusion

In our view,

- the estimates documented in the options report suggest measures in the proposed EIP are unlikely to make a significant difference to coarse particle deposition in adjacent residential areas.
- The instrumentation techniques suggested above offer an opportunity to provide information on the effects of the proposed changes and provide an more focused and reliable evidence base for future improvement.

References

1. *Guideline for Batter Surface Stabilisation using vegetation.* (Roads and Maritime Services NSW, 2015).
2. Katestone Environmental. *Air Quality Assessment of the Birkenhead Cement Plant.* 87 (2017).
3. *Birkenhead Dust Deposition Survey.* (2017).
4. Katestone Environmental. *Birkenhead Cement Plant Assessment of options report.* (2018).

7 SUBMITTED

Submitted by:

Name

Position

Authorised on behalf of

ADELAIDE BRIGHTON CEMENT LTD.



APPROVED

Approved by:

David Vaughan

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DELEGATE OF THE ENVIRONMENT PROTECTION AUTHORITY



Submitted

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