

# ENVIRONMENT IMPROVEMENT PROGRAMME

## PURSUANT TO REQUIREMENTS UNDER THE

**COPY**

## ENVIRONMENT PROTECTION ACT 1993

Document Number	1126 EIP Version 2
Document Date	28 December 2016
Licensee	Adelaide Brighton Cement Ltd (ABC)
EPA Licence Number	1126
Site to which this EIP is subject	<p>Victoria &amp; Elder Roads, Birkenhead SA 5015</p> <p>CT 5084/747, CT 5142/401, CT 5142/519, CT 5142/520, CT 5142/522, CT 5142/523, CT 5142/528, CT 5142/531, CT 5142/532, CT 5406/509, CT 5411/669, CT 5485/422, CT 5683/195, CT 5683/196, CT 5683/197, CT 5683/198, CT 5742/581, CT 5742/582, CT 5750/769, CT 5750/770, CT 5813/976, CT 5816/2, CT 5816/637, CT 5841/73, CT 5858/225, CT 5968/732, CT 5980/55, CT 5980/56, CT 5980/68, CT 6007/792, CT 6027/127, CT 6027/128, CT 6053/766, CT 6053/767, CT 6053/768</p>
Document Produced By	Adelaide Brighton Cement Ltd

### ENVIRONMENT PROTECTION AUTHORITY

THIS IS THE APPROVED ..... EIP .....  
 REFERRED TO IN CONDITION ..... 4.583 .....  
 OF EPA AUTHORISATION NUMBER ..... 1126 .....  
 REVIEWED BY ..... [Signature] ..... DATE 24.1.2017 .....  
 DELEGATE ..... [Signature] ..... DATE 25.1.2017 .....

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Submitted T.B.

Approved [Signature]

## 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
- 7(3)c Crushing grinding and milling (of raw materials and clinker)
- 8(2)a Fuel burning: rate of heat released exceeding 5 megawatts
- 7(1) Bulk shipping facilities: unloading raw materials, loading of cement
- 3(4) Activities producing listed wastes, ie. kiln dust

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 clinker, after being processed in the pre-calciner towers and the dry kiln process 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 bulk tanker and bagged products are also distributed interstate by road and ship.

### 1.1 Environmental authorisation compliance

Adelaide Brighton Cement Ltd is required to develop an Environmental Improvement Programme (EIP) to address:

- Stack emissions – this includes non-compliance of Stack 4A and Stack 4B particulate emissions, with the mandatory provisions of the *Environment Protection (Air Quality) Policy 1994*, namely Schedule 1 emission limit of 250mg/m<sup>3</sup>;
- Nuisance dust from fugitive dust emissions; and
- Nuisance noise emissions from activities undertaken on site.

Licence condition U-583

*"The Licensee must:*

- 1. Implement and comply with the EPA approved Adelaide Brighton Cement Ltd document entitled "Environment Improvement Programme" (Version 1, dated 1 January 2016) or any revised Environment Improvement Programme document approved in writing by the EPA; and*
- 2. submit quarterly reports to the Authority by the last day of January, April, July and October each year that details progress towards implementation of, and compliance with, the EIP.*

*Note: The Licensee should ensure that the EIP has regard to environmental issues raised by the Adelaide Brighton Cement Community Liaison Group."*

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## 1.2 Reference documentation

In developing this EIP, Adelaide Brighton Cement Ltd (ABC) has considered the following in addition to other relevant meetings and documents:

- A special residents meeting on the 16<sup>th</sup> March 2015, at which the community provided input into the key issues to be addressed. At this meeting, an EIP Residents Select Committee (RSC) consisting of five members, was chosen to work with Adelaide Brighton Cement in the development of the EIP.
- Community Liaison Group (CLG) meetings held on 2<sup>nd</sup> March, 1<sup>st</sup> June and 7<sup>th</sup> September 2015.
- EIP development meetings with ABC management, RSC and the EPA on the 11<sup>th</sup> May, 20<sup>th</sup> June (site tour), 22<sup>nd</sup> June, 6<sup>th</sup> July, 17<sup>th</sup> August and 16<sup>th</sup> November 2015.
- Correspondence/letters to residents, minutes of all meetings (CLGs & EIP development) and emails (filed by ABC)

*This EIP, including compliance items, compliance dates and relevant actions was develop in conjunction with the EPA and RSC. Each phase was communicated at the 2015 CLG meetings.*

## 1.3 Intent

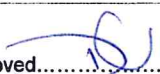
In order to reduce its environmental impact, Adelaide Brighton Cement Ltd plans to undertake projects listed in Table 1. The projects are designed to abate noise emissions and reduce stack and fugitive particulate emissions.

It should be noted that the stack and fugitive particulate monitoring requirements contained in the current EPA Licence (1126) are expected to provide a driver for further improvements as well as providing baseline monitoring data against which the improvements from this EIP can be measured.

## 1.4 Communication Plan

It is recognised by all parties that communication of the objectives and outcomes of this EIP is necessary. A Communication Plan will be developed by the CLG. This Plan will include details of community engagement in projects, feedback on outcomes of projects and education programs to address health concerns and sustainability initiatives.

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## 2. SITE MAPS

Figure 1 – Site map of ABC Birkenhead



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### 3. TABLE OF INTENDED APPROACH

Category	Item	Title	Action to be undertaken	Potential benefits	Timing	Comment
Stack emissions	1.1	Stack Emission Improvement Study	Leading independent consulting firm, FLS (a global cement industry technical expert) to be contracted to audit /study the cement manufacturing process. The study will include a desk-top assessment, benchmarking against other comparable cement manufacturers and a review of process (operational & during the 2016 plant shutdown). The outcomes will be a report to clarify 1. what technology/changes are required to produce best possible (lowest) emission levels both under normal and unstable operating conditions, and 2. what is required to eliminate the need for Exemption from the current <i>Environment Protection (Air Quality) Policy 1994</i> . A reasonable and practical action plan ensuring best possible outcomes for the environment and adjacent community will be developed in item 1.2.	Reduction in stack emissions during both normal and unstable operating conditions	30 Sept 2016	ABC to produce/communicate details of FLS project to CLG group
Action 1						
Action 2	1.2	Stack Emission Improvement Study Outcome Actions	By 31 December 2016 implementation of the agreed options contained in the above report (as agreed between EPA and ABC) will commence. The detailed action plan will need to be reasonable and practical to ensure best possible outcomes for the environment and adjacent community.	Reduction in stack emissions during both normal and unstable operating conditions	31 Dec 2016	Submit a revised EIP with implementation actions for agreed option from study
Action 2A Action 2B Action 2C	1.2.1	Stack Emission Improvement Study Actions	Three Stack Emission Improvement Study Actions as required by compliance action 2, have been selected for implementation <ul style="list-style-type: none"> <li>Upgrade 4A Bypass Gas Conditioning Tower (GCT) Spray System</li> <li>Upgrade 4A Gas Conditioning Tower (GCT) Sprays System</li> <li>Upgrade 4A Clinker Cooler Baghouse Controller and Particulate detection system</li> </ul>	Significant reduction in site stack emissions during both normal and unstable operating conditions	31 <sup>st</sup> October 2017	
Action 3	1.3	Cooler Bag filter improvements (4A stack stream)	Trial new cooler bag filter controller technology.	Longer life and protection of bags and a subsequent reduction in 4A Stack particle emissions at all times	30 June 2016	Cooler bag filter cleans air used for cooling clinker prior to exhaust through 4A Stack
Action 4	1.4	Cooler Bag filter improvements (4A Stack stream)	After completion of the trial, implement improved filter bag technology. For example, shorter bags with increased surface area; Increased separation/collection distance from fast flowing abrasive material in gas stream	Longer life and protection of bags and a subsequent reduction in 4A Stack particle emissions	31 March 2016	
Action 5	1.5	Install suitable back-up power supply for stack emission monitors during power	Determine and install a suitable back-up power supply for stack particle emission monitors during power outages	Enable stack particle emissions to be measured during power outages	30 June 2016	

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		outages.				
<b>Action 6</b>	1.6	Investigate optimization technology to improve Electrostatic Precipitator performance	Optimisation of EP performance during all types of plant conditions	Reduction in stack emissions to the community during both normal and unstable operating conditions	30 April 2017	Electrostatic precipitators separate clean air from raw materials prior to the air going through 4A and 4B stack
<b>Ambient Dust</b>  <b>Action 7</b>	2.1	Construction of new Slag Stockpile Storage Bunker and a reduction in the limestone inventory stockpile height	Slag to be stored/contained within a new five metre high, three sided concrete bunker adjacent to the Slag Dryer	This will minimise traffic movements and fugitive dust generation from this stockpile. It will also mean a reduction in the height of all stockpiles in this area that have been shown to be potential sources of fugitive dust	31 March 2016	
<b>Action 8</b>	2.2	Dedicated water truck/cart for adding dust suppressant to stockpiles	Effectively add dust suppressant/sealing agents (typically green) in real time as stockpiles are being worked.	Minimise fugitive dust emissions from stockpiles during activity	30 June 2016	This dust suppression technique will continue
<b>Action 9</b>	2.3	Cladding/sealing replacement program for main Clinker Storage Gantry	Implement critical repairs and cladding/ sealing solutions as required	Reduce fugitive dust emissions from the Clinker Storage Gantry	From 1 <sup>st</sup> Jan 2016 to 31 <sup>st</sup> Oct 2017	Program to be communicated to CLG
<b>Action 10</b>	2.4	Bitumen sealing of the road at the southern end of Cement Mill 1	Seal the roadway for raw materials delivery at the southern end of the site	Reduce fugitive dust emissions from truck movements in this area	31 Jan 2017	
<b>Action 11</b>	2.5	Eliminate internal trucking clinker movements on the site	Install a new conveyor system to allow site clinker movements to occur without the use of trucks	Reduce fugitive dust from truck movements & opening/closing of doors on clinker sheds	28 Feb 2017	
<b>Action 12</b>	2.6	Dedicated water truck/cart for road stabilization of all unsealed surfaces around the site	Apply stabilization material via water truck. Initially more regularly (e.g. weekly) to establish hard surfaces and then application will be as required.	Reduce fugitive dust from unsealed surfaces around the site	From 1 <sup>st</sup> Jan 2016 to 31 <sup>st</sup> Oct 2017	Continuing throughout EIP time period
<b>Noise</b> <b>Action 13</b>	3.1	Reduce noise emissions through noise mapping	Develop noise impact mapping model (on site and in adjacent areas) and implement a subsequent noise monitoring and reduction program	Reduce noise emissions from the site	From 31 <sup>st</sup> Jan 2016 to 31 <sup>st</sup> Oct 2017	Continuing throughout EIP time period
<b>Action 14</b>	3.2	Reduce noise	Undertake the following noise abatement		By 30th	

Submitted T.S.

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		emissions through construction projects, determined	works already identified as being necessary through existing noise monitoring program. <ul style="list-style-type: none"> <li>Replace operational chain assembly, limestone reclaimer</li> <li>Install quiet motor on Cement Mill one dust collector</li> <li>Install an upgraded noise abatement silencer in Stack 4B</li> <li>Design, manufacture and install a noise abatement solution for Cement Mill 1 compressor</li> </ul>		April 2016  By 31 <sup>st</sup> Jan 2016  By 30 <sup>th</sup> April 2016  By 31 <sup>st</sup> March 2016	
Action 15	3.3	Site wide personal access (PA) door replacement program	PA doors to be self-closing and self-sealing	Improve building/shed sealing and thereby reduce the activation of site false alarms caused by dust in load centres	By 31 <sup>st</sup> Oct 2017	The associated compliance action will begin in January 2016 and be completed by Oct 2017
Vibration Action 16	4.1	Conduct a vibration study in community	Conduct a vibration study and impact assessment in the adjacent residential community to determine affected areas and any associated impacts  The outcome of the study will be to submit an action plan to determine vibration impacts associated with plant operations	Outcome will determine vibration impacts caused by site operations	By 30 <sup>th</sup> Nov 2016  By 31 <sup>st</sup> Dec 2016	Use community engagement to determine areas in the community to focus on
Earthcare / greening program Action 17	5.1	Site greening/earth-care program	Plantings in areas to include: <ol style="list-style-type: none"> <li>South of site (river side of train line)</li> <li>Schroder Park extension</li> <li>Victoria Road adjacent to the Limestone Reclaimer Shed</li> <li>West of limestone stockpile</li> </ol>	Improve site aesthetics and reduce fugitive dust emissions	From Jan 2016 to 31 <sup>st</sup> October 2017	Planting will continue throughout the EIP
Monitoring Action 18	6.1	Investigate particle emission composition and quantities	Deposition trays to be placed in the community.  Monitoring plan will be agreed with the EPA by 31 January 2016 and will include the nature and extent of trays/measurements to be undertaken.	Collate information on dust composition and measureable characteristics in the community to monitor progress and guide future projects	28 <sup>th</sup> Feb 2016 plan due  Report due 31 <sup>st</sup> March 2017	To ensure any results are useful 12 months data will be required.  Further dust abatement programs can be determined from the final report

This table of stages 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 by October 2017. These compliance actions are included in the following section.

#### 4. 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 below are the tasks through which Adelaide Brighton Cement Ltd will demonstrate compliance with the conditions of licence. In requiring compliance with the Environment Improvement Programme (EIP), the Environment Protection Authority (EPA) requires that each of these compliance actions are fulfilled.

##### Compliance Action 1      **Status: Completed**

By 30<sup>th</sup> September 2016, ABC will complete a 'Stack Emission Improvement Study' of all its 4A and 4B Stack emission control equipment - to be undertaken by FLS (global cement industry technical experts). The study will include a desk top study, industry benchmarking assessment of the best available emissions reduction techniques and a review of the current process both during operational and shutdown phases (planned shutdown March 2016).

A final report which will table options to reduce stack emissions will be submitted to the EPA for assessment. The options contained in the report will include the following:

- a) The expected reduction in particulate emissions of each option;
- b) The annualised total mass emissions and short term variability projected using the different options; and
- c) The projected reduction in emissions under both stable and unstable operations for each option.

##### Compliance Action 2      **Status: Completed**

By 31<sup>st</sup> December 2016, ABC will submit a revised EIP to the EPA that will include an action plan for implementing the agreed emission reduction actions approved by the EPA as detailed in the FLS study report. The revised EIP will include timeframes for completion of the works to be undertaken. Actions to be implemented will need to be reasonable and practical whilst ensuring the best possible outcomes for the adjacent community.

##### Compliance Action 2A

By 31 October 2017, ABC will have completed an upgrade of the 4A Bypass Gas Conditioning Tower (GCT) Spray System which is expected to lower particle emissions from 4A tower during both stable and unstable operation.

Submitted T.B.

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Work involved includes:

- upgrading from single (water only) to dual phase (air/water) sprays; &
- installing thermodynamic feed forward controls.

These improvements will facilitate conditions for smaller droplets resulting in greater surface area and faster more efficient evaporation and is expected to result in lower particle emissions from the 4A tower.

#### Compliance Action 2B

By 31 October 2017, ABC will have completed an upgrade of the 4A GCT which is also expected to lower particle emissions from 4A tower during both stable and unstable operation.

The work and the improvements will be the same as that in compliance action 2A above.

#### Compliance Action 2C

By 31 October 2017, ABC will have completed an upgrade of the 4A Clinker Cooler Baghouse Controller and Particulate Detection System which is expected to lower particle emissions from 4A tower.

Work involved includes:

- upgrading the Differential Pressure Controller (dP); &
- installing Particle Sensor to detect broken bags.

These improvements will enable broken bags to be immediately detected and isolated and allow pulsing to be adjusted to optimise cleaning and minimise wear on bags and is expected to result in lower particle emissions from the 4A tower.

#### Compliance Action 3

**Status: Completed**

By 30<sup>th</sup> June 2016, Adelaide Brighton Cement Ltd will have implemented new operating controller assessment technology in the Cooler Bag filtering process. The intent is to optimise bag life and Cooler bag performance associated with the 4A gas stream by a noticeable percentage. An analysis report detailing the effectiveness of this change will be provided to the EPA for assessment.

Submitted T.G.

Approved [Signature]

**Compliance Action 4**

a) By 31<sup>st</sup> March 2016, Adelaide Brighton Cement Ltd will have completed a trial of new filter bag technology in the Cooler Bag filtering process. The intent is to optimise bag life and Cooler bag performance associated with the 4A Stack gas stream by a noticeable percentage. An analysis report detailing the effectiveness of the trial actions (bag life performance) will be provided to the EPA for assessment. **Status: Completed**

b) By 31<sup>st</sup> October 2017, Adelaide Brighton Cement Ltd will implement the new trialled technology across all areas of the cooler bag filtering process if the trial is considered successful.

**Compliance Action 5****Status: Completed**

By 30<sup>th</sup> June 2016, Adelaide Brighton Cement Ltd will have determined and installed suitable back-up power supply provisions for Stack 4A and Stack 4B emission monitors during power failures, to ensure that particulate emissions are monitored at all times.

**Compliance Action 6****Status: Completed**

By 31<sup>st</sup> April 2016, Adelaide Brighton Cement Ltd will have optimised the performance of its Electrostatic Precipitators. This action will reduce stack particulate emissions across variable plant operating conditions.

**Compliance Action 7****Status: Completed**

By 31<sup>st</sup> March 2016, Adelaide Brighton Cement Ltd will have installed a five-metre high, three sided concrete bunker to store/contain all slag material in the same location on site. This action item will assist in reducing fugitive particulate emissions from this source.

**Compliance Action 8****Status: Completed**Submitted T.B.Approved 



By 30<sup>th</sup> June 2016, Adelaide Brighton Cement Ltd will have a dedicated water truck/cart and will have commenced applying dust suppressant/sealing agents (typically green) in real-time, to all external raw material stockpiles and unsealed access areas whenever they are being worked or used. This action item will assist in reducing fugitive particulate emissions from these sources.

**Compliance Action 9**      **Status: Completed**

Commencing the 1<sup>st</sup> January 2016, Adelaide Brighton Cement Ltd will have a preventative maintenance and cladding replacement program for the main Clinker Storage Gantry. Actions outlined in the maintenance and replacement program will be carried out continuously throughout this EIP. This action item will assist in reducing fugitive particulate emissions from this source.

**Compliance Action 10**

By 31<sup>st</sup> January 2017, Adelaide Brighton Cement Ltd will have laid bitumen to seal all trafficked areas/roadways at the southern end of Cement Mill 1. This action item will assist in reducing fugitive particulate emissions from this source.

**Compliance Action 11**

By 28<sup>th</sup> February 2017, Adelaide Brighton Cement Ltd will have installed a new fully enclosed conveyor system to allow all internal site clinker movements to occur without the use of trucks. This action item will assist in reducing fugitive particulate and noise emissions from this source

**Compliance Action 12**      **Status: Completed**

Commencing the 1<sup>st</sup> January 2016 Adelaide Brighton Cement Ltd will apply, using a dedicated water truck/cart, a road stabilisation agent to all unsealed surfaces around the site, as required, to ensure fugitive dust is minimised from

these areas (this may be more frequently undertaken in warm and/or windy conditions).

### Compliance Action 13

From the 31<sup>st</sup> January 2016, and to be continued throughout this EIP, Adelaide Brighton Cement Ltd, will undertake a Noise Impact Mapping/Modelling Program. The modelling program will be undertaken by Acoustic Consultants employed by Adelaide Brighton Cement Ltd, who will manage and complete the modelling program in addition to the current noise monitoring program that has been in progress for the last four years. The Program will continue to inform noise abatement actions to be undertaken on site.

Regular reports from monitoring and modelling undertaken will be provided to the EPA for assessment within 1 calendar month of any such report being received by ABC from the engaged acoustic consultants. Noise abatement actions to be implemented will need agreed by the EPA and be reasonable and practical and ensure the best possible outcomes for the adjacent community.

### Compliance Action 14      **Status: Completed**

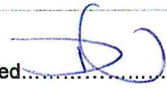
Adelaide Brighton Cement will undertake the following identified noise abatement works which will reduce noise emissions from the site:

- (a) – By 30<sup>th</sup> April 2016 Adelaide Brighton Cement Ltd will replace/upgrade the entire operational chain assembly of the Limestone Reclaiming Conveyor System in the limestone shed.
- (b) – By 31<sup>st</sup> January 2016 Adelaide Brighton Cement Ltd will install an energy efficient and quieter motor system in Cement Mill 1 Dust Collector.
- (c) – By 30<sup>th</sup> April 2016 Adelaide Brighton Cement Ltd will install an upgraded noise abatement silencer in Stack 4B.
- (d) – By 31<sup>st</sup> March 2016 Adelaide Brighton Cement Ltd will have designed, manufactured and installed an effective noise abatement solution for the Cement Mill 1 Compressor.

### Compliance Action 15

By the 31<sup>st</sup> October 2017, Adelaide Brighton Cement Ltd will replace all required personal access (PA) doors site wide. PA doors are to be of a self-

Submitted .....T.B.....

Approved.....



closing and self-sealing design. This action will assist in reducing fugitive particulate emissions from buildings and reduce noise in dust sensitive areas containing fire alarm sensors.

Compliance Action 16

Status: Completed

By 30<sup>th</sup> November 2016, Adelaide Brighton Cement Ltd will ensure a vibration study/impact assessment is undertaken in the adjacent community to determine affected areas and any associated impacts. The outcome of the study will be an action plan to determine vibration impacts associated with plant operations. The action plan will be submitted to the EPA for assessment by 31<sup>st</sup> December 2016.

Compliance Action 17

From 31<sup>st</sup> January 2016 and continuing through to 31<sup>st</sup> October 2017 Adelaide Brighton Cement Ltd, will implement and undertake a site greening/earth-care program. Plantings of native trees and shrubs will be undertaken in the following areas:

- Southern area of the site adjacent to Cement Mill 1 Gantry and on the river side of train line;
- Schroder Park extension area (most southern end of plant);
- Victoria Road, adjacent to the Limestone Reclaimer Shed; and
- Along the western boundary of the main limestone stockpile at the northern end of the site.

Compliance Action 18

By the 28<sup>th</sup> February 2016, Adelaide Brighton Cement Ltd will implement a particle deposition tray program in the adjacent community to analyse the nature and extent of the deposition of particulate material originating from the plant.

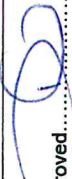
By the 31<sup>st</sup> March 2017, Adelaide Brighton Cement Ltd will provide a detailed report to the EPA outlining the findings of the deposition tray program.

Submitted T.B.

Approved 

## 5. COMPLIANCE ACTION GANT CHART

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Approved.....  




Action	Jan 16	Feb 16	Mar 16	Apr 16	May 16	Jun 16	Jul 16	Aug 16	Sept 16	Oct 16	Nov 16	Dec 16	Jan 17	Feb 17	Mar 17	Apr 17	May 17	Jun 17	Jul 17	Aug 17	Sep 17	Oct 17
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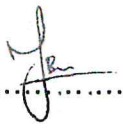
**6. SUBMITTED**

Submitted by:

Name TU BUI

Position OPERATIONS MANAGER SA.

Authorised on behalf of

**ADELAIDE BRIGHTON CEMENT LTD.**Signed :  .....

Dated : 20 / 1 / 2017

**• APPROVED**

Approved by:

.....DAVID VAUGHAN

**DELEGATE OF THE ENVIRONMENT PROTECTION  
AUTHORITY**Signed :  .....

Dated : 25 / 1 / 2017

Submitted T.B. ....

Approved  .....