



Construction Environmental Management Plan v2 – Chloride Bypass System



February 2022

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List of Abbreviations

ARP	Annual Rehabilitation Plan
AEMR	Annual Environmental Management Report
CEMP	Construction Environmental Management Plan
Council	Wingecarribee Shire Council
CBS	Chloride Bypass System
CLG	Community Liaison Group
CNML	Construction Noise Management Level
dBA LAeq(15minute)	The a weighted equivalent noise level
EPA	Environment Protection Authority (NSW)
ESC	Erosion and Sediment Control
DPI Water	Department of Primary Industries - Water (NSW)
DRE	Division of Resources & Energy (NSW) within the Department of Planning & Environment
DPiE	Department of Planning Industry & Environment (NSW)
EEC	Endangered Ecological Community as per listing in the TSC Act or EPBC Act
EMS	Environmental Management System
EP&A Act	<i>Environmental Planning & Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
GADDC	<i>Guidance on the Assessment of Dust from Demolition and Construction</i>
PEF	Process Engineered Fuels
RBL	(Sound) Rating Background Level
RBLMS	Rehabilitation Biodiversity and Land Management System
RDF	Refuse Derived Fuels
SRF	Solid Recovered Fuel
SWDF	Solid Waste Derived Fuels
SWL	Sound Power Level
TDF	Chipped used Tyre Derived Fuel
TSC Act	<i>Threatened Species Conservation Act 1995 (NSW)</i>
tpa	tonnes per annum
WoC Group	Whole of Community Group
WWDF	Wood Waste Derived Fuel

1. Introduction

The Berrima Cement Works (hereafter 'Berrima Cement') is located on Taylor Avenue, New Berrima, in the Southern Highlands of NSW. The site is owned and operated by Boral Cement Limited and has operated continuously since 1927. The site operates the last large scale cement kiln (Kiln 6) manufacturing cement clinker in the state.

On 12 May 2003, the then Minister for Planning issued development consent for the upgrade of Kiln 6 (DA-401-11-2002-i). Since then, the development consent has been modified on 13 occasions.

Modification 13 was approved on 31 May 2021 to construct and operate a Chloride Bypass System (CBS) for Kiln 6 ('the Project').

This Construction Environmental Management Plan has been prepared in recognition of Condition 6.1, 6.1A and 6.1B of the development consent as modified, which states:

'6.1 The Applicant shall update the Construction Environmental Management Plan (CEMP) to the satisfaction of the Secretary. The updated CEMP shall:

- a) be approved by the Secretary prior to the commencement of construction;*
- b) identify the statutory approvals that apply to the development;*
- c) outline all environmental management practices and procedures to be followed during construction works associated with the development;*
- d) describe all activities to be undertaken on the site during construction of the development, including a clear indication of construction stages;*
- e) detail how the environmental performance of the construction works will be monitored, and what actions will be taken to address identified adverse environmental impacts;*
- f) describe the roles and responsibilities for all relevant employees involved in construction works associated with the development; and*
- g) include the management plans required under condition 6.1A and 6.2 of this consent.'*

6.1A As part of the CEMP required under condition 6.1 of this consent, the Applicant shall include the following:

- a) Construction Traffic Management Plan;*
- b) Erosion and Sediment Plan;*
- c) Construction Noise Management Plan;*
- d) Construction and Demolition Waste Management Plan;*
- e) a protocol to manage groundwater and contaminated soil;*
- f) a Community Consultation and Engagement Plan, including complaints management.*

6.1B The Applicant shall carry out the construction of the development in accordance with the CEMP approved by the Planning Secretary (and as revised and approved by the Planning Secretary from time to time), unless otherwise agreed by the Planning Secretary.

6.2 As part of the CEMP for the cement works upgrade, required under condition 6.1 of this consent, the Applicant shall prepare and implement the following Management Plans:

- a) a Fire Safety Study for the cement works upgrade, covering all relevant aspects detailed in the Department's publication Hazardous Industry Planning Advisory Paper No. 2 – Fire Safety Guidelines and the New South Wales Government's Best Practice Guidelines for Contaminated Water Retention and Treatment Systems. The Study shall be submitted for the approval of the Commissioner of the NSW Fire Brigades prior to inclusion in the CEMP.*
- b) a Hazard and Operability Study of the cement works upgrade chaired by an independent, qualified person or team approved by the Director-General. The Study shall be carried out in accordance with the Department's publication Hazardous Industry Planning Advisory Paper No. 8 - HAZOP Guidelines.*
- c) a Construction Safety Study for the cement works upgrade, prepared in accordance with the Department's Hazardous Industry Planning Advisory Paper No. 7 - Construction Safety Study Guidelines.*



Construction Environmental Management Plan v2 Chloride Bypass System

- d) *an Erosion and Sedimentation Management Protocol to detail measures to minimise erosion during construction of the cement works upgrade. The Plan shall address the requirements of the EPA and shall include, but not necessarily be limited to:*
 - i) *details of erosion, sediment and surface water pollution control measures and practices to be implemented during construction of the cement works upgrade; and*
 - ii) *demonstration that erosion and sediment control measures will conform with, or exceed, the relevant requirements and guidelines provided in the DLWC's publication Urban Erosion and Sedimentation Handbook, the EPA's publication Pollution Control Manual for Urban Stormwater, and the Department of Housing's publications Soil and Water Management for Urban Development and Managing Urban Stormwater – Soils and Construction.*

It is noted that the documents required under Condition 6.2 relate to the Kiln 6 upgrade CEMP within the initial development consent 470-11-2002-1 and remain as approved with that document. These documents were submitted to the then Department of Planning in 2003. For completeness these documents have been included in Appendix B as per the previously approved CEMP relating to the Solid Waste Derived Fuels Project (MOD 9).

1.1. Company Environmental Policy

Boral Cement owns and operates the Berrima Cement Works (Berrima Cement). Boral Cement Limited is a wholly owned subsidiary of Boral Limited (Boral) and is committed to best practise environmental controls in order to protect the environment. Boral's Environmental Policy applies to all employees, contractors and sub-contractors working on, or for Boral operations.

The construction required for the Chloride Bypass System project will be undertaken in accordance with Boral's Environmental Policy as detailed below in **Figure 1**:



At Boral we own and operate a diverse range of businesses in a number of countries and within many different ecosystems. We acknowledge that the very nature of our operations means there will be impacts on the environment.

We are committed to our goal of zero harm and work to eliminate adverse environmental impacts.

Where elimination is not possible, we seek to minimise any harmful effects from our operations which may mean we target better performance than environmental laws require. Wherever practicable, we will secure improved environmental outcomes.

Specifically, Boral will:

- Reduce waste in all its forms, by application of LEAN manufacturing principles, leading to:
 - efficient use of energy, including reuse of waste energy
 - conservation of water
 - minimisation and recycling of waste production materials and energy
 - prevention of pollution; and
 - effective use of virgin and recovered resources and supplemental materials.
- Reduce greenhouse gas emissions from our processes, operations and facilities, including appropriate use of alternative fuels
- Protect and where practicable enhance biodiversity values at and around our facilities.
- Openly and constructively engage with communities surrounding our operations.
- Through communication and training, encourage and assist our employees to enhance Boral's environmental performance.
- Comply with environmental legislation, regulations, standards and codes of practice relevant to the particular business, as a minimum, and
- Allocate sufficient resources to meet the commitments of this Policy:

This policy is delivered through the implementation of Boral's Integrated Health Safety Environment and Quality (HSEQ) Management System and related strategies, improvement plans and programs.

Zlatko Todorovski
CEO & Managing Director

Figure 1 Boral Environmental Policy

2. Project Description

2.1. Project Overview

Kiln 6 is currently fired with both coal sourced from an external coal supplier and a percentage Solid Waste Derived Fuels (SWDF) also sourced from external suppliers. This is in contrast to most kilns operating in the developed world which typically replace Kiln heat energy requirements with several types of waste derived fuels.

Boral is approved to replace up to 30% or 50% by weight (100,000 tpa) of the heat requirement in Kiln 6 with a combination of these fuels (WWDF, RDF and TDF) as part of Modification 9, approved on 5 October 2017. These fuels have been chosen for their low energy cost relative to coal, their availability in the local market, their proven nature as cement kiln fuels and their expected relative acceptability to the sites stakeholders.

The use of Solid Waste Derived Fuels (SWDF) also has value in terms of diversifying the supply and pricing basis of fuel sources for Berrima rather than relying on coal as a single heat energy source. The use of SWDF containing biomass also significantly reduce Berrima's carbon emissions and reduce the financial impact of any potential future carbon levies or taxes.

The identified SDWF currently approved for use in Kiln 6 are:

- Wood Waste Derived Fuel (WWDF) from commercial and industrial timber waste streams;
- Refuse Derived Fuels (RDF) (also known in the industry as Process Engineered Fuels (PEF) or Solid Recovered Fuel (SRF)); and
- Chipped used Tyre Derived Fuel (TDF).

The introduction of SWDF materials in the kiln system creates a higher concentration of volatile components such as chlorides, alkalis and sulphur within the kiln system, given the increased volume of volatile components naturally occurring in SWDF material.

Currently, the site can only operationally consume up to 55 000t per annum representing 55% of the existing consent consumption limit of SWDF materials. This limitation stems from the volatile components mainly arising in the RDF and SWDF material, occurring within the kiln.

To manage these components, the kiln uses a gas extraction system, located immediately after the kiln, in a position where volatile components (chloride, alkalides and sulphur) are in a high concentration in the combustion gases. This system then allows some of the gas to be extracted from the process, quickly cooled down, and for dust to be separated from the gas stream, with the remaining gas returned into the process. Dust is collected and used in cementitious products.

The introduction of a Chloride Bypass System (CBS) will allow for a more efficient and effective fuelling process for the kiln, which increases the site's ability to consume SWDF materials and reduce coal consumption.

Once the CBS is installed at the kiln, the site can then increase its consumption beyond the current process limitation of 55 000tpa, up to the currently approved 100,000tpa of SWDF consent limitation.

A cement kiln chloride bypass system is commonly used at numerous cement kilns worldwide, to address the concentration of volatile components such as chlorides, alkalis and Sulphur, by purging the system of these elements. These volatile components are naturally contained in the raw materials and fuels, especially when high levels of solid waste derived fuels are used to replace fossil fuels.

Chloride bypass technology has been used over a period of over 20 years since the increased use of alternative fuels for cement making process and is offered by numerous major cement kiln equipment suppliers. The chloride (gas) extraction equipment typically consists of:

- Gas extraction;
- Gas cooler;
- Bag Filter; and
- Equipment for dust handling and addition to Cement Milling process.

The gas extraction system is located immediately after the kiln in a position where volatile components (chloride, alkalides and sulphur) are in a high concentration in the combustion gases. The CBS process can be summarised as follows:

- A percentage of hot gas (10-15%) resulting from the kiln burning process is extracted from the duct connecting the kiln and the preheater system, and directed toward the CBS;
- Once within the CBS, the gas is quickly cooled down using an air dilution process, involving the introduction of external air at atmospheric temperatures, to reduce the gas temperature to approximately 400 degrees Celsius;
- The gas is then exposed to a second stage of cooling, involving a heat exchanger, which uses atmospheric temperature air to cool pipes within the system and thereby reduce the temperature of the gas to approximately 200 degrees Celsius;
- This cooling process allows the volatile components to condense on the dust present in the CBS gas stream;
- Once the optimum temperature is achieved, the gas is then passed through a bag filter which allows dust to be extracted from the gas, which is then used in cementitious products;
- The remaining gas is then released into the stack, to dilute with the remaining exhaust gasses which would have otherwise been released through the existing system;
- The process would result in an increase of air velocity at the stack (2m³ per second), a minor variation of emission temperatures (from 108 degrees currently to 125/130 degrees Celsius), however would maintain the existing gas emissions spectrum.

2.2. Site Description

The Berrima Cement Works is located south of New Berrima in the Southern Highlands of NSW in the Wingecarribee LGA (**Figure 2**). Access is via Taylor Avenue, which connects the facility with the Hume Highway, approximately 2.5km to the west.

The facility is located on Boral owned land, which comprises approximately 135 ha. The area to the south east of the Cement Works between New Berrima and Moss Vale is part of the Moss Vale Enterprise Corridor (MVEC) set aside for employment generating development under the Wingecarribee Local Environmental Plan 2010 (Wingecarribee LEP).

The closest residential zone to the works site is located in New Berrima, approximately 650m north of the No 6 kiln stack at the closest points. Residential zones are also located in New Berrima, approximately 2,150m north of the No. 6 kiln stack. New Berrima residential area is flanked to the south and east by "Private Recreation" areas.

The area subject to construction of the CBS is located towards the centre of the operations area as detailed in **Figure 3**. The layout of the CBS is shown in detail in **Figure 4**.



Figure 2 Berrima Cement Works Location Context

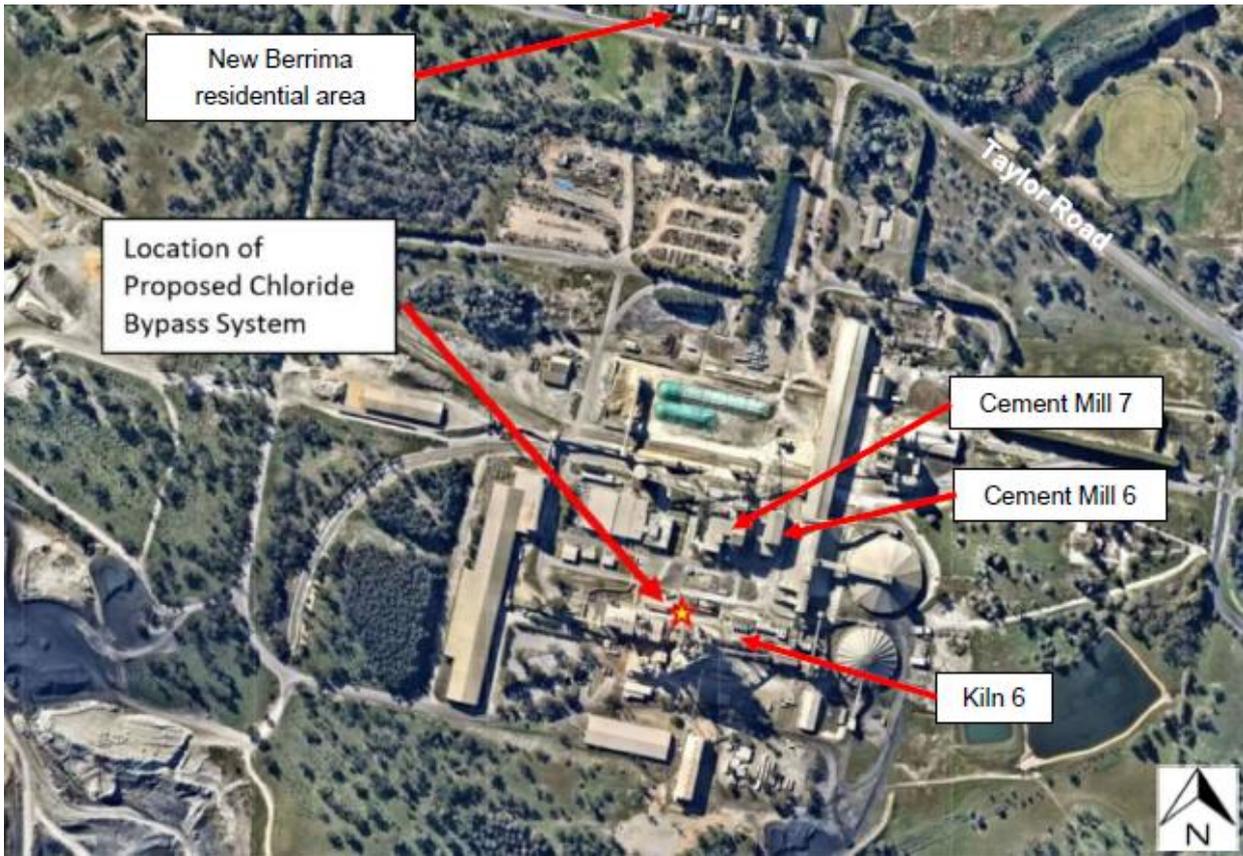


Figure 3 Berrima Cement Works Site Layout

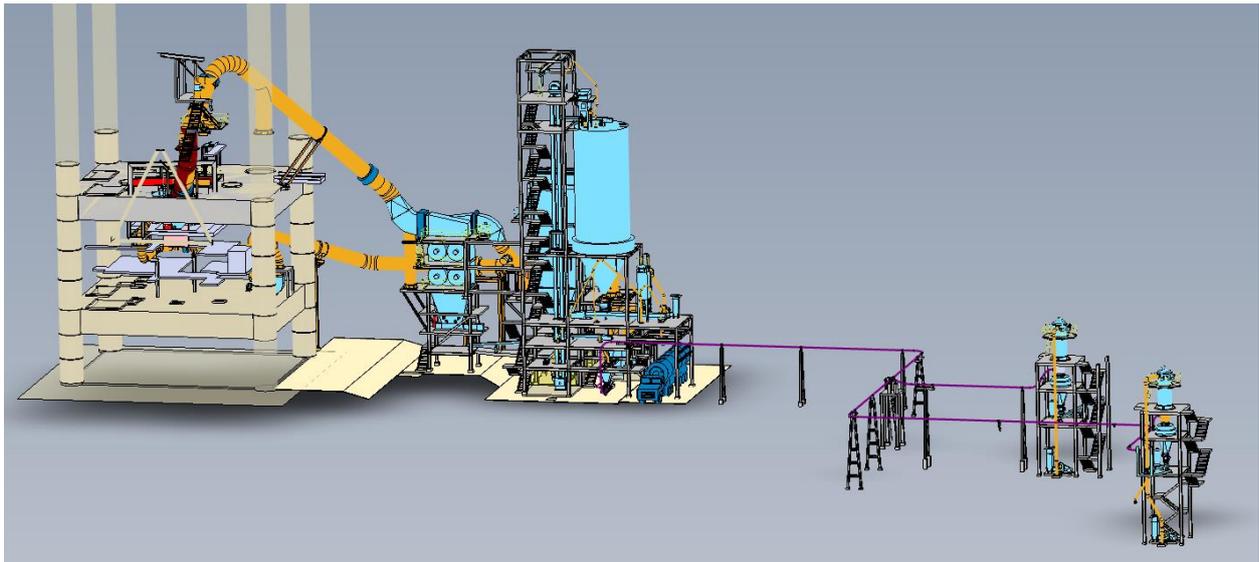


Figure 4 Chloride Bypass System Layout



3. Project Management

The applicant of the Project, as referred to in the consent, is Boral Cement. The Project will be managed and operated by Boral Cement and will include the use of various employees and contractors.

In preparing this CEMP, environmental aspects and significant impacts have been identified through:

- a site inspection;
- document/literature review;
- aspects and impacts studies;
- document preparation; and
- project approval.

This CEMP is for use by the employees and contractors engaged by Boral for the construction component of the Project or any environmental management issues arising from the construction of the Project. This CEMP establishes the responsibilities and demonstrates the systems and procedures to ensure that controls are implemented and maintained to manage potential environmental impacts during the construction of the Project. Consented requirements for the CEMP are addressed in each associated section of the plan.

4. CEMP Legislative Requirements and Objectives

Construction activities will be undertaken in accordance with all statutory and other obligations including key legislation and policies, approvals, licences and agreements. The legislative requirements considered by this CEMP are those in the EPL and development consent as well as other requirements, licenses and approvals under other relevant environmental legislation.

4.1. Berrima Cement Development Consent

The Berrima CBS Project received Development Consent on 31 May 2021. The consent and associated conditions specify obligations, consultation and other approvals that must be sought and/or are relevant to the Project construction and thereby to the Project team.

The facility operates subject to two development consents issued by the Department of Planning and Environment (DPE), namely; DA 401-11-2002 (Kiln 6, May 2003); and DA 85- 4-2005 (Mill 7, Aug 2005). The development consent for DA 401-11-2002 has been modified thirteen times as described in **Table 1**.

Table 1 Modifications of DA 401-11-2002

Date	Approval	Description
26 September 2005	MOD 2-1-2004 (MOD 1)	Use of non-standard fuels
22 September 2006	MOD 109-9-2006 (MOD 2)	Removal of hazardous waste prohibition
13 February 2007	MOD 12-2-2007 (MOD 3)	Trial use of tyre chips
24 April 2008	MOD 4	Varying usage of coke fines
31 August 2009	MOD 5	Coal deliveries by rail
20 June 2012	MOD 6	Stockpiling of coal for sale and transport
16 April 2012	MOD 7	Trial and use of blast furnace slag
5 August 2012	MOD 8	Administrative changes to align DA and EPL
5 October 2016	MOD 9	Receipt and use of up to 100,000 tpa of SWDFs
11 April 2019	MOD 10	Modification to SWDF storage shed dimensions
25 October 2019	MOD 11	HiCal50 Modification for Startup/Shutdown
7 April 2020	MOD 12	Isotainer Loading Operations and Site Wide Noise Limit
31 May 2021	MOD13	Chloride Bypass System and Use of Woodchips

The conditions of consent relevant to the CBS CEMP (MOD 13) are outlined in **Table 1**. A full version of the MOD 13 consent is available within Appendix A.

Table 1 details the objectives of this CEMP and indicates where each is addressed in this report.

Table 2 CEMP Objectives

Aspect	Ref	Objective	Where addressed in the CEMP
General	Condition 6.1 a)	be approved by the Planning Secretary prior to the commencement of construction;	N/A
	Condition 6.1 b)	identify the statutory approvals that apply to the development;	Section 4

Aspect	Ref	Objective	Where addressed in the CEMP
	Condition 6.1 c)	outline all environmental management practices and procedures to be followed during construction works associated with the development	Section 8
	Condition 6.1 d)	describe all activities to be undertaken on the site during construction of the development, including a clear indication of construction stages	Section 5
	Condition 6.1 e)	detail how the environmental performance of the construction works will be monitored, and what actions will be taken to address identified adverse environmental impacts;	Section 8.8 8.9 and 8.10
	Condition 6.1 f)	describe the roles and responsibilities for all relevant employees involved in construction works associated with the development;	Section 6.1
	Condition 6.1 g)	include the management plans required under condition 6.1A and 6.2 of this consent.	See condition 6.1A and 6.2
	Condition 6.1A	As part of the CEMP required under condition 6.1 of this consent, the Applicant shall include the following:	Section 4
Traffic Management	Condition 6.1A a)	Construction Traffic Management Plan;	Appendix D
Erosion and Sediment Control Plan	Condition 6.1A b)	Erosion and Sediment Plan	Section 8.6
Noise	Condition 6.1A c)	Construction Noise Management Plan	Section 8.4
Waste	Condition 6.1A d)	Construction and Demolition Waste Management Plan	Section 8.2
Groundwater and Soil	Condition 6.1A e)	a protocol to manage groundwater and contaminated soil	Section 8.3
Community Consultation	Condition 6.1A f)	a Community Consultation and Engagement Plan, including complaints management.	Section 6.4, 6.5 and Appendix C
Implementation of CEMP	Condition 6.1B	The Applicant shall carry out the construction of the development in accordance with the CEMP approved by the Planning Secretary (and as revised and approved by the Planning Secretary from time to time), unless otherwise agreed by the Planning Secretary.	Section 3
Kiln 6 upgrade works (Note)	Condition 6.2	As part of the CEMP for the cement works upgrade, required under condition 6.1 of this consent, the Applicant shall prepare and implement the following Management Plans: a) a Fire Safety Study for the cement works upgrade, covering all relevant aspects detailed in the Department's publication <i>Hazardous Industry Planning Advisory Paper No. 2 – Fire Safety Guidelines and the New South Wales Government's Best Practice Guidelines for Contaminated Water Retention and Treatment Systems</i> . The Study shall be submitted for the approval of the Commissioner of the NSW Fire Brigades prior to inclusion in the CEMP. b) a Hazard and Operability Study of the cement works upgrade chaired by an independent, qualified person or team	Appendix B

Aspect	Ref	Objective	Where addressed in the CEMP
		<p>approved by the Director-General. The Study shall be carried out in accordance with the Department's publication <i>Hazardous Industry Planning Advisory Paper No. 8 - HAZOP Guidelines</i>.</p> <p>c) a Construction Safety Study for the cement works upgrade, prepared in accordance with the Department's <i>Hazardous Industry Planning Advisory Paper No. 7 - Construction Safety Study Guidelines</i>.</p> <p>d) an Erosion and Sedimentation Management Protocol to detail measures to minimise erosion during construction of the cement works upgrade. The Plan shall address the requirements of the EPA and shall include, but not necessarily be limited to:</p> <p>i) details of erosion, sediment and surface water pollution control measures and practices to be implemented during construction of the cement works upgrade; and</p> <p>ii) demonstration that erosion and sediment control measures will conform with, or exceed, the relevant requirements and guidelines provided in the DLWC's publication <i>Urban Erosion and Sedimentation Handbook</i>, the EPA's publication <i>Pollution Control Manual for Urban Stormwater</i>, and the Department of Housing's publications <i>Soil and Water Management for Urban Development and Managing Urban Stormwater – Soils and Construction</i>.</p>	
Noise Mitigation	3.1A	<p>The Development shall be constructed with the aim of achieving the construction noise management levels detailed in the <i>Interim Construction Noise Guideline</i> (Department of Environment and Climate Change, 2009). All feasible and reasonable noise mitigation measures shall be implemented and any activities that could exceed the construction noise management levels shall be identified and managed in accordance with the CEMP.</p> <p>Note: The <i>Interim Construction Noise Guideline</i> identifies 'particularly annoying' activities that require the addition of 5dB(A) to the predicted level before comparing to the construction NML.</p>	Section 8.4
	3.1B	<p>Where Feasible and Reasonable, operation noise mitigation measures shall be implemented at the start of Construction (or at other times during construction) to minimise construction noise impacts.</p>	Section 8.4
Erosion and Sedimentation Controls	3.11	<p>Soil and water management measures consistent with <i>Managing Urban Stormwater – Soils and Construction Vol. 1</i> (Landcom, 2004) (the Blue Book) shall be employed during construction of the Development to minimise soil erosion and the discharge of sediment and other pollutants to land and/or waters.</p>	Section 8.6
	3.12	<p>All construction vehicles exiting the site, having had access to unpaved areas, shall depart via a wheel-wash facility.</p>	Section 8.6, Appendix D
	3.13	<p>All erosion and sedimentation controls required as part of this consent shall be maintained for the duration of the construction works, and until such time as all ground</p>	Section 8.6

Aspect	Ref	Objective	Where addressed in the CEMP
		disturbed by the construction works, has been stabilised and rehabilitated so that it no longer acts as a source of sediment.	

Note: Documents required under Condition 6.2 relate to the Kiln 6 upgrade CEMP within the initial development consent and remain as approved with that document. These documents were submitted to the then Planning NSW in 2003. For completeness these documents have been included in Appendix A as per the previously approved CEMP relating to the Solid Waste Derived Fuels Project (MOD 9).

4.2. Licencing and Other Approvals

The legislative framework within which the Project must be approved and will operate has been detailed in the consent document. **Table 3** provides a summary of the legislative requirements that are relevant to the construction phase of the Project. These legislative requirements will need to be considered by the Contractor, in collaboration with Boral Cement and other relevant stakeholders, prior to the commencement of the works. Construction works will not start before the necessary licences and approvals have been obtained.

Table 3 Relevant Licences and Approvals Relating to Construction of CBS

Legislation	Requirements / Comment
<i>Environmental Planning and Assessment Act 1979</i>	A Construction Certificate is required prior to the erection of any buildings commencing. An Occupation Certificate is required prior to the use of a new building.
<i>Protection of the Environment Operations Act 1997</i>	Boral holds Environmental Protection Licence (EPL) No. 1698 for the Berrima Cement Works. The currently applicable EPL No. 1698 is available online https://app.epa.nsw.gov.au/prpoeoapp/
<i>Occupational Health and Safety Act 2000</i>	Dangerous goods are now regulated under this act. There are no specific licensing or approval requirements for the management of dangerous goods under the OH&S Act and any dangerous goods at the facility will be managed within the Occupational Health and Safety management framework established by the OH&S Act.
<i>Environmentally Hazardous Chemicals Act 1985</i>	Under the EHC Act a licence is required for any storage, transport or use of prescribed chemicals. Should such a licence be required under this Act during the construction phase the Project will obtain a licence prior to the storage, transport or use of prescribed chemicals. As of the time of writing, no chemical which would trigger this requirement are proposed to be used.

5. Construction Staging and Planning

5.1. Construction Activities and Equipment

A construction methodology for equipment installation and commissioning planned for the execution of the project components is provided in summary below. The construction work shall be executed through specialist contractors, with technical specifications and commercial conditions defined within a contract document. The following construction stages are described below.

Pre-construction activities to be undertaken would include:

- Detailed survey and marking the layout at site.
- .Arrangement for construction power and other services.
- Construction area fencing erected and site access to construction area setup.

1. Civil and earthwork activities to be undertaken would include:

- Site preparation and earthworks.
- Trenching for electrical conduits and pipework.
- Levelling for concrete building slab.
- Form up and pour building concrete foundation and slab.
- New pavements

2. Gas Extraction equipment - this will be fabricated off site and erected at Berrima with activities to be undertaken which include:

- Support steelwork installation.
- Installation of CBS equipment and infrastructure

3. Gas Cooler (Heat Exchanger) will be fabricated off site and delivered for installation at Berrima with activities to be undertaken to include:

- Assembly of the major components (minor assembly will be completed off site)
- Installation and setup of the Heat Exchanger
- Installation of gas ducting, fans and valves.
- Installation of electrical panels in switch room
- Electrical connections to heat exchanger
- Commissioning and testing.

4. Dust Filtration and temporary storage equipment will be fabricated offsite and delivered in modular form for installation at Berrima with activities to include:

- Assembly and erection of bag filter.
- Erection of support steelwork, walkways and platforms.
- Installation of 429m³ dust bin.
- Erection and installation of the bucket elevator and screw conveyors.
- Install isolation slide gate and chutes.
- Installation mechanical services, pipework and valves.

5. Dust Handling and dosing

- Installation of Pneumatic conveying transfer system.
- Erection and construction Mill 6 and Mill 7 dosing structure and equipment

6. Electrical, Control and Instrumentation activities to be undertaken include:

- Installation electrical prefabricated switch room

- Running of electrical distribution cables
- Cable supports and brackets
- Installation of electrical switch room and Motor Control centre MCC.
- Light and power installation
- Control system installation
- Electrical instrumentation installation

The typical sizes, types and quantities of equipment and mobile plant envisaged to be used are indicated in **Table 4 and 5** respectively.

Table 4 Details of Required Construction Equipment

Equipment	Quantity	Comments
Elevated work platform (EWP)	3	Construction access
Mobile Cranes		Erection of steelwork and installation of equipment.
20t Franna	1	
80 t capacity	1	
150 t capacity	1	
6 tonne capacity Tele-handler	1	Material Handling
Diesel welder / generator	2	Some site work for Brackets and supports
Hand tools, drill, welder	Variable	Construction tools as needed
Hand tools, grinders, drill, welder, rattle gun	Variable	Construction tools as needed
Fork lift 2.5t	1	Material Handling

Table 5 Details of Required Mobile Plant

Equipment	Quantity	Comments
20t capacity Excavator	2	Earth works
Bobcat / Posi track	1	Pavements / earthworks
6 tonne Capacity Tele-handler	1	Material handling
15 tonne Tip truck	2	Material movement
Concrete Agitator truck – delivery of concrete.	Variable	Civil work- concrete placement
Concrete pump – truck mounted	1	Civil work
Road Roller 10t	1	Civil work
Hand tools, vibratory screed, float, grinders.	Variable	Civil work
Mobile welder	1	Civil Work

5.2. Plant and Equipment Records

The lead contractor will be required to produce and keep a record of all machinery and equipment to be brought and utilised on site for the Project. Equipment may be substituted as required due to availability and work requirements. All equipment will be subject to operability checks that will include an assessment of the maintenance of devices such as mufflers.

5.3. Construction hours

In accordance with the development consent, construction activities associated with the CBS shall only be carried out between:

- 7:00 am and 6:00 pm, Monday to Friday inclusive,
- 7:00 am and 1:00 pm on Saturdays,

No Construction on Sundays or public holidays, if construction noise is audible at the boundary of the site.

5.4. Construction Facilities

The construction facilities for the Project will consist of:

- Demountable sheds for a site office, contractor's office and lunchroom wash facility plus amenities. The site amenities will be connected into the existing site services.
- Contractors construction staff, car parking for up to 30 vehicles and a contractor's lay down area for the storage of construction materials.

A general site construction location plan is shown in **Figure 5** below.

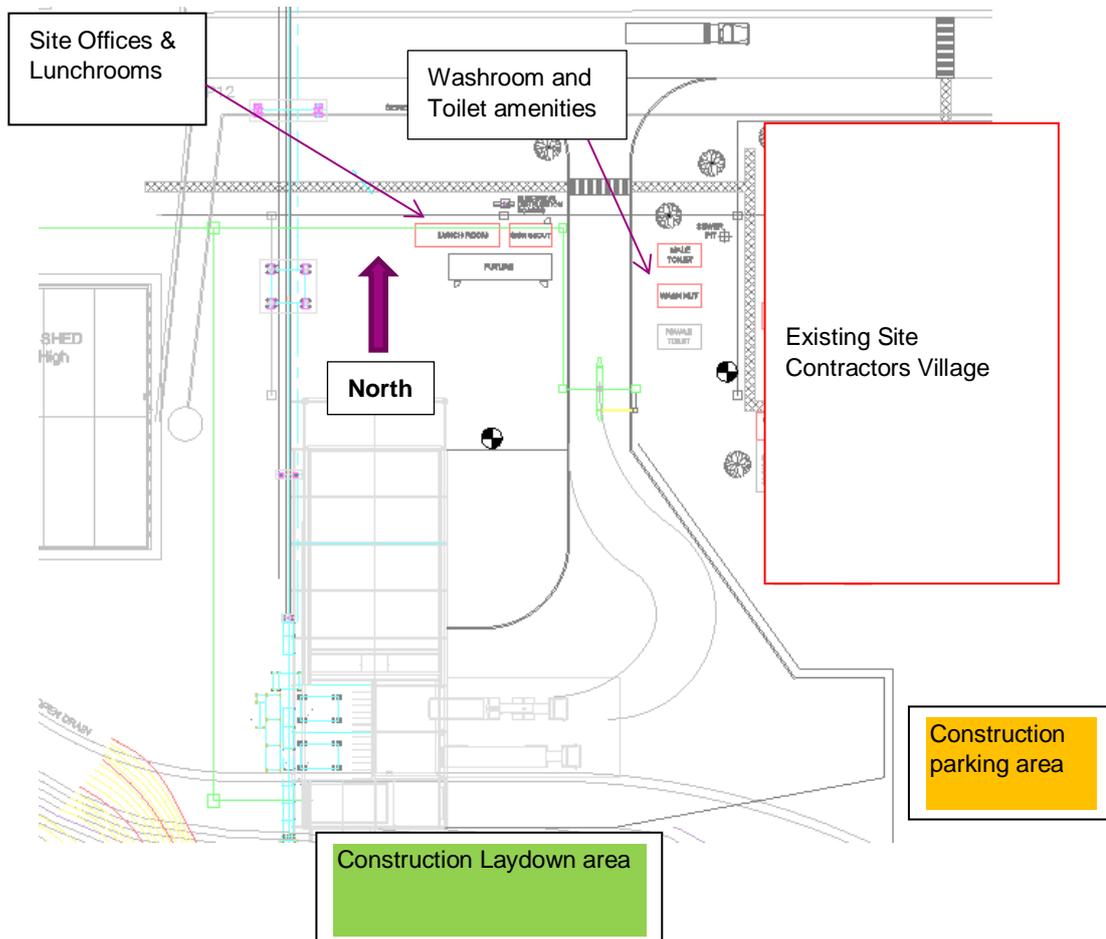


Figure 5 Construction Location Plan

6. Environmental Management Framework

6.1. Roles and Responsibilities

The duties and responsibilities of key stakeholders with respect to environmental management of the Project are described below. An organisational structure for the Project is shown in Figure 6.

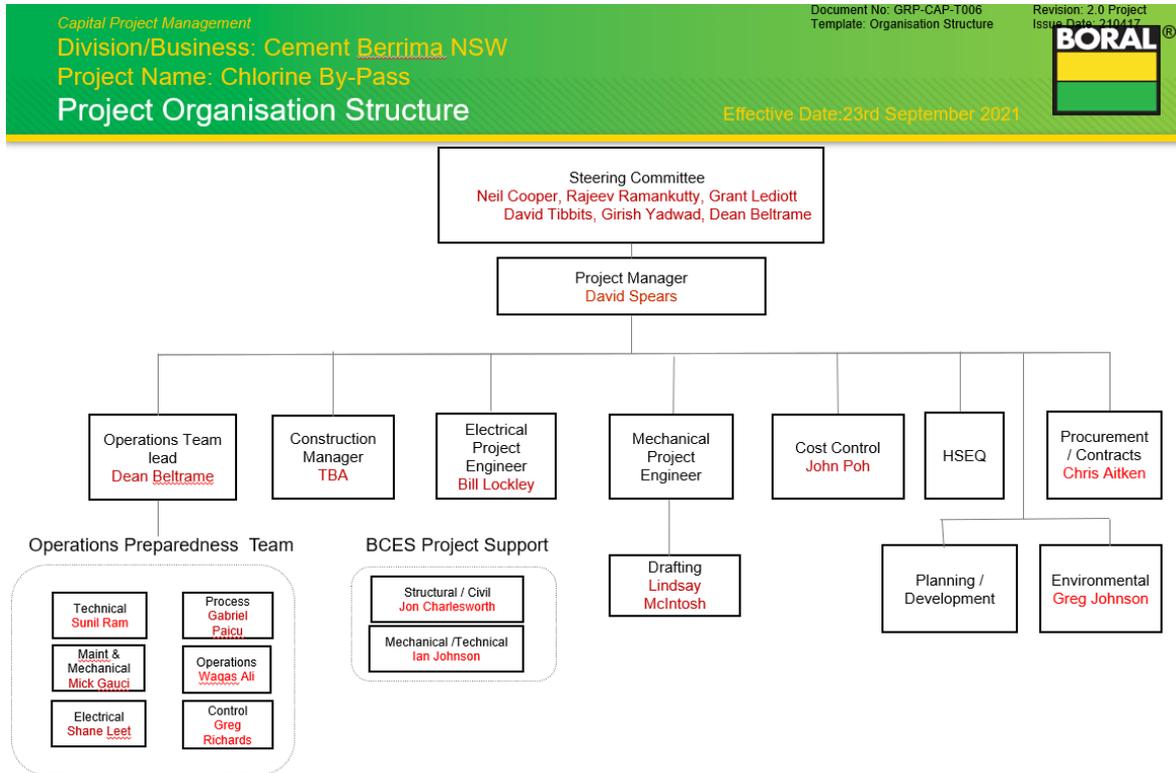


Figure 6 Organisational Chart for Construction of CBS

Ultimate responsibility for ensuring the environmental performance of the proposal complies with the development consent conditions and relevant environmental standards and regulations lies with Project Manager. The contractors are responsible for maintaining and implementing the requirements, sub-plans and procedures stipulated by this CEMP.

The roles and responsibilities that apply to the CEMP, are the same as those within the sites EMS. They are outlined in **Table 6** below.

Table 6 Roles and Responsibilities for Construction Personnel

Position	Responsibilities
Site Operations Manager	<p>Responsible for ensuring the operation of the works' environmental management system (EMS). This includes:</p> <ul style="list-style-type: none"> ✓ Implementing the Boral Environmental Policy on site; ✓ Ensuring site environment performance objectives and targets are established, monitored and achieved; ✓ Defining responsibilities for the EMS; ✓ Ensuring availability of the resources; ✓ Communicating the importance of the EMS and meeting statutory and regulatory requirements;

	<ul style="list-style-type: none"> ✓ Conducting management reviews of the EMS; ✓ Ensuring that material environmental incidents are immediately reported to 5 compulsory Government Authorities listed in Section 6.3.2; ✓ Verifying the implementation of corrective and preventive actions; ✓ Recognising and responding to community concerns.
<i>Project Manager</i>	<p>Responsibility and authority to ensure that the site environmental objectives are achieved. This includes:</p> <ul style="list-style-type: none"> ✓ Ensuring staff are trained and updated on environmental awareness, responsibilities, instructions and procedures; ✓ Ensuring environmental incidents are investigated and corrective and preventative action taken; ✓ Ensuring operations comply with the conditions of Development Approval, Environmental Protection Licence and relevant legislation; ✓ Developing and implementing plans to respond to incidents and minimise environmental harm; ✓ Ensuring that material environmental incidents are immediately reported to 5 compulsory Government Authorities listed in Section 6.3.2; ✓ Ensuring proper management of waste and chemical products for careful handling, storage or removal.
<i>Environmental Manager/ Environmental Business Partner</i>	<p>Responsibility and authority to ensure the effectiveness of the EMS. This includes:</p> <ul style="list-style-type: none"> ✓ Immediately reporting material environmental incidents to 5 compulsory Government Authorities listed in Section 6.3.2 in accordance with the Berrima Cement Works SOP CMT-ENV-015; ✓ Ensuring the site-specific EMS components are established, implemented and maintained; ✓ Ensuring all personnel are aware of the Licence, DAs and other regulatory requirements relating to the operations and environmental performance; ✓ Reporting on the performance of the EMS and need for improvements; ✓ Reporting non-compliances with the Licence, DAs and other relevant regulatory requirements; ✓ Promoting the awareness of environmental performance and requirements in the organisation; ✓ Coordinating verification of the implementation of corrective and preventive actions. ✓ Monitoring the tracking procedures and ensuring compliance with procedures. ✓ Coordinating the development and maintenance of systems for the collection, analysis and reporting of emission data and environmental performance; ✓ Assuring that environmental monitoring data are published monthly on the Boral Berrima website. ✓ Assisting in the development, implementation and maintenance of programs to review and improve the environmental performance of the Works.
<i>Team Leaders / Front Line Supervisors</i>	<p>Responsible for the prevention of poor environmental performance arising from work methods and work environment. This includes:</p> <ul style="list-style-type: none"> ✓ Identifying, reducing and preventing environmental problems; ✓ Immediately reporting environmental incidents to the Operations Manager or

	<p>HSE Advisor;</p> <ul style="list-style-type: none"> ✓ Monitoring operations and maintenance work to ensure emissions are maintained within approved levels; ✓ Initiating preventive actions to minimise frequency and recurrence of environmental incidents; ✓ Investigating and reporting of environmental incidents; ✓ Initiating corrective actions to repair harm caused by environmental incidents.
<i>Employees</i>	<p>Responsible for ensuring that the environmental standards for their work are achieved. This includes:</p> <ul style="list-style-type: none"> ✓ Following any environmental instructions and procedures that apply to their work or operations and products; ✓ Taking action to halt or prevent environmental incidents; ✓ Identifying and immediately reporting environmental incidents to their supervisors; ✓ Monitoring and controlling emissions to keep within approved levels.

6.2. Environmental Awareness Training and Induction

Training will be structured to enable all employees to understand their obligation to exercise due diligence in relation to environmental matters. This training aligns with Boral HSEQ training requirement and items to be covered include but may not be limited to:

- Health and Safety;
- Relevant environmental legislation;
- Reporting procedures;
- General site issues (including security and access);
- Traffic and access;
- Noise;
- Air quality and dust control;
- Water quality management;
- Soil and sediment management;
- Dangerous goods and chemicals / hazardous materials;
- Waste management; and
- Emergency response and spill contingency procedures.

Tailored training will be given as necessary to site personnel who are required to implement, monitor and report on the effectiveness of the environmental controls. The training will be developed, scheduled and conducted by the Contractor and shall include, as necessary:

- Proper and efficient use of environmental controls;
- Relevant inspections;
- Environmental records;
- Non-conformances, penalties and infringement notices;
- Corrective and preventive actions;
- Incident reporting and investigation; and
- Complaints reporting.

In addition to formal training procedures, informal Toolbox talks will also be conducted at the start of every shift and before any unusual activity is carried out as a means of reminding employees of their safety obligations and/or updating previously provided information as necessary.

Records of all persons that undergo environmental training are to be maintained by the in the Site's Training Register. All induction and site specific training will be recorded to include:

- Dates of the induction, training or meeting was conducted;
- Subject matter;
- Names of personnel trained; and
- Trainer details.

6.3. Emergency Contacts and Response

In the event of an environmental incident, the first priority shall be the safety of all personnel and site workers in the immediate vicinity. Following this, all practical steps will be taken to minimise the risk of further environmental damage as soon as possible after the event. The situation will be stabilised following the appropriate incident management or contingency plan procedures.

In the event of a serious emergency at the site, the following procedure will be followed:

- a) Stop work;
- b) If safe to do so, make immediate arrangements to minimise further environmental impact;
- c) All personnel shall leave the work zone via established entry/exit routes and in accordance with an approved site evacuation plan if the Project Manager considers the conditions require; and
- d) Leave the site and assemble at the designated emergency assembly area/s (to be specified by Project Manager/Contractor);
- e) If emergency services are required, contact them for assistance.

No project relevant personnel are to leave the assembly area unless safe to do so and advised to do so by the Project Manager/Contract Manager.

The Central Control Room will notify the relevant service as to the details regarding any emergency:

- Fire Brigade;
- Ambulance;
- Police; and
- Notification of other regulatory or government bodies shall be done after consultation with the Environmental Manager. As soon as practicable after the incident occurred, the Project Manager notify the Environmental Manager in accordance with the Berrima Cement Works Incident Management Matrix, who in turn will enact the site PIRMP if necessary and notify the Secretary and any other relevant agencies as per Condition 6 Schedule 5 of the development consent.

All environmental hazards, near misses and incidents are to be immediately reported to the Project Manager and Environmental Manager as well as recorded in the Boral incident management software SEQUENCE for tracking of investigations and corrective actions. This software is available on the Boral intranet. The Project Manager will ensure a timely investigation is conducted for all events as per the Berrima Cement Works Incident Management Matrix

6.3.1. Project Contacts

Table 7 provides the contact details of the key construction project personnel including the persons responsible for the management and maintenance of this CEMP. In the event that an emergency event does occur, the contacts on the list shall be contacted in the sequence below;

Table 7 Key Project Contacts

Description	Contact Details
Proponent Name	Boral Cement Limited A.B.N. 008 528 523

Address	Level 3, 40 Mount Street, North Sydney NSW 2060	
Boral Cement Phone (Berrima Cement Works Operations Office)	02 48 602 268	
Emergency Contact	Central Control Room	02 48 602 262
Berrima First Aid Room	Site Super	02 48 602 333
Project Manager	David Spears	02 48 602 302 / 0401 897087
Construction Manager	TBC	
Project Supervisor	Ian Johnson	02 48 602 326 / 0401 893 356
Environmental Sustainability Manager	Greg Johnson	0401 893 420
Environmental Business Partner	Ben Williams	0401 895 478
Head of WHSE Cementr	Bruce Latham	0401 893 358
Construction Contractor – Environmental Representatives	TBC	TBC
Stakeholder and Community Advisor	Kate Woodbridge	0401 893 815

6.3.2. Emergency Contacts

The contact names of offsite emergency services phone numbers are shown in **Table 8**. Emergency procedures and contact telephone numbers will be displayed in a prominent position within each site working area.

Table 8 Emergency Contacts

Government Authority - compulsory notifications	Emergency notification phone number
EPA – Environment Line	0 – 131 555
Fire & Rescue NSW	0 - 1300 729 579
Wingecarribee Shire Council	0 – 4868 0888
Public Health Unit (Sydney South West) – Camperdown Office	BH: 0 - 9515 9420 AH: 0 – 9515 6111 Ask for Public Health Officer on call
Safe Work NSW	0 – 131050 Company ABN asked: 62 008 528 523
Government Authority - ring if relevant	Emergency notification phone number
Roads and Maritime Services (road spills)	0 – 132 701
NSW Office of Water	0 - 8838 7885

Bush Fire Control Officer	0 - 1800 049933
Poisons Information Centre	0 – 131 126
Endeavour Energy (power line emergencies)	0 – 131 003
OtisLine (lift emergencies)	0 – 1800 626847

6.3.3. Emergency Response Equipment

Emergency Response Equipment and material will be located in prominent positions and available in all work areas. Specific locations will be detailed in site inductions for constructor's employees.

6.4. Community Consultation and Complaints Handling

Community consultation and complaint handling in relation to the project will be undertaken by the Project Manager after consultation with the Berrima Cement Works Site Operations Manager, the site HSE Advisor and the Cement Environmental Manager.

In the event of a contractor or employee directly receiving a complaint, they will be required to immediately notify the supervisor and the site HSE Advisor. All complaints will be recorded in SEQUENCE. The complaints recording process is detailed in **Appendix C**, specifically **Section 10**.

6.5. Community Engagement and Consultation Plan

The Boral Berrima Cement Works has a long tradition of arranging community meetings to share information about the operations, review their performance with neighbours and stakeholders, and to gather feedback.

The Cement Works operates a Community Liaison Group (CLG) as a requirement of the site's planning approval. The CLG, which re-formed in June 2019 to replace a series of regular open community meetings held between 2011-18, meets bi-annually as a primary communication channel between the site and local residents.

As described in the planning approval, the CLG consists of community representatives, an appointed representative of Wingecarribee Shire Council, and Boral personnel.

The details of the CBS project was discussed at length during the CLG meetings (specifically 10 December 2020 and September 2020) and informal letter drops relating to the project was undertaken.

To ensure the wider community remains connected to the Cement Works, Boral Cement also organise annual Whole of Community (WoC) Meetings. These sessions are usually held at the end of each financial year and act as a 'report back' on the previous year's activities. WoC meetings are also organised if any significant changes are planned at the Cement Works, or if there has been a major issue or topic needing broad communication.

Minutes from these meetings are available on the Berrima Operations website under the communications tab.

<https://www.boral.com.au/locations/boral-cement-works-berrima>

Further details relating to community engagement, notifications and the processing of complaints are detailed in the Community Engagement and Consultation Plan required under Condition 6.1A (f) is included as **Appendix C**,

7. Environmental Risk Assessment

7.1. General

The site will be fully secured via fencing and shall incorporate additional fencing around individual work areas (as applicable and practicable) to assist in the safety of both onsite personnel and the public. Appropriate signs will be placed at the entry, and throughout the site and along the boundary of the exclusion zone warning workers, visitors and neighbours of the hazards associated with the Project.

All project related personnel and visitors must 'sign in and out' of construction site via a site register to ensure there is strict control on access to the exclusion zone.

Copies of this document must be made available for review by staff members at any time, and be readily available at the Project site for reference.

7.2. Environmental Hazards Identification

An environmental risk assessment was undertaken as part of the project change management process. The Boral risk assessment tool was used to rank the potential environmental risks associated with the Project.

The results of this preliminary risk assessment are summarised in **Table 9**. Preventative measures for environmental hazards are detailed in the relevant operational sub-plans (refer to **Section 8**).

Table 9 Environmental Hazard Identification

Aspect	Potential Impact	Initial Risk	Controls	Residual Risk
European Heritage	Disturbance of sites of European Heritage Significance during earthworks activities / civil works.	Low	Impacts were assessed as part of the Statement of Environmental Effects (SEE). Construction works are located within the project boundary of approved works which is previously disturbed land. Disturbance areas are surveyed and clearly defined as per internal document <i>BA-HSEQ-8-02 Quarry & Mining Ground Disturbance Standards</i> .	Low
Cultural Heritage	Disturbance of Aboriginal Places or Objects during earthworks activities / civil works	Low	Impacts were assessed as part of the Statement of Environmental Effects (SEE). Construction works are located within the project boundary of approved works which is previously disturbed land. Disturbance areas are surveyed and clearly defined as per internal document <i>BA-HSEQ-8-02 Quarry & Mining Ground Disturbance Standards</i> .	Low
Ecology	Loss of native flora and fauna and loss of Habitat resulting from clearing activities.	Low	Impacts were assessed as part of the Statement of Environmental Effects (SEE). Construction works are located within the project boundary of approved works which is previously disturbed land.	Low

Aspect	Potential Impact	Initial Risk	Controls	Residual Risk
			<p>No native vegetation is required to be removed as part of construction works.</p> <p>Disturbance areas are surveyed and clearly defined as per internal document <i>BA-HSEQ-8-02 Quarry & Mining Ground Disturbance Standards</i>.</p> <p>Prestart checks and inspection as detailed in Section 8.8 and Appendix E.</p>	
Erosion and Sedimentation	<p>Erosion of surrounding lands</p> <p>Sedimentation of local waterways due to:</p> <ul style="list-style-type: none"> - Earthworks - Stockpiling of materials 	Low	Controls will be as described in the Erosion and Sediment Control Protocol in Section 8.6 .	Low
Clean Water Management	<p>Contamination of clean water by:</p> <ul style="list-style-type: none"> - Sediments from stockpiles / earthworks activities - Effluent release from construction facilities - Oil/fuel/chemical leak from plant and equipment 	Low	Controls will be as described in the Erosion and Sediment Control Protocol in Section 8.6 .	Low
Groundwater	Degradation of natural groundwater flow and quality (including depressurisation).	Low	Controls will be as described in the Groundwater and Contaminated Soils Protocol detailed in Section 8.3 .	Low
Air quality and Dust	<p>Degradation of air quality from:</p> <ul style="list-style-type: none"> - Dust generation from construction activities and ground disturbance - Hazardous substances emissions - Greenhouse gas emissions 	High	Controls will be as described as per Section 8.5 .	Medium
Noise	Degradation of noise amenity resulting from	Medium	Noise mitigation and controls are detailed in Section 8.4	Low

Aspect	Potential Impact	Initial Risk	Controls	Residual Risk
	construction activities, including road development.			
Visual Amenity	Aesthetics of exposed earthworks and construction works.	Low	Construction works are located towards the centre of the plant to facilitate visual screening. Construction fencing will be installed.	Low
	Visual Impacts of Lighting of construction activities.	Medium	Lighting will be installed as per Condition 3.18 and shall be the minimum level of illumination necessary and shall comply with AS 4282(INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting.	Low
Land Capability and agricultural suitability	Loss / deterioration of land capability and agricultural suitability.	Low	Construction works are located within project boundary of approved works. The CBS system is located towards the centre of the plant away from productive agricultural land	Low
Soils	Loss of productive topsoil Unexpected contaminated soils being unearthed during excavations	Medium	Construction works are not located in agricultural land. Any topsoil waste generated will be reused as per Section 8.2 If unexpected contamination is uncovered contaminated soil protocol will be enacted as per Section 8.3 . Disposal of contaminated soil will be as per waste management protocols listed in Section 8.2	Low
Traffic	Increased local traffic caused by: - Supply of materials for construction Project; - Increase in staff/construction workers coming to the area.	Medium	Construction activities of the proposed CBS area would generate no construction traffic beyond the limits of the site. The delivery of prefabricated plant equipment to the site, to facilitate the construction of the CBS, will be limited to only materials necessary for the CBS structure. The introduction of the CBS system will not alter traffic volumes or rates at the site. All drivers are to follow the traffic management plan and code of conduct to minimise noise and dust emissions	Low
Waste	Waste and litter generation from operations and office/staff/admin facilities	Low	Construction waste management procedures are detailed in Section 8.2 .	Low



7.3. Environmental and Personal Hazards Key Performance Indicators

Key Performance Indicators (KPI's) are used to assess the impact and effectiveness of the Incident and Safety Management Plans. **Table 10** details the KPI's applicable to hazard and risk management during the construction of the Project.

Table 10 Project Key Performance Indicators

Project Key Performance Indicators	Target
Zero Injuries	0
Zero High Risk Incidents	0
Zero Environmental Incidents	0
Zero Community Complaints	0

8. Environmental Management and Procedures

As detailed in **Section 4 and Table 2**, a series of environmental management plans are required under Condition 6.1A to form a part of the CEMP.

8.1. Construction Traffic Management Plan

The delivery of plant equipment to the site, to facilitate the construction of the CBS, will be limited to only materials necessary for the CBS structure. No construction traffic works will be required outside the site boundary. The Traffic Management Plan has been appended to this report in **Appendix D** and will be applicable to construction works and all site visitors and contractors.

8.2. Construction and Demolition Waste Management Plan

8.2.1. Introduction

This Plan applies to all waste materials or by-products generated during the construction phase of the works. This document has been based on the Boral Group Standard GRP-HSEQ-8-02. EPL1698 does not allow provisions for disposal of waste materials on site.

The Construction and Demolition Waste Management Plan (CDWMP) does not apply to Non-Standard Fuels or external waste materials bought into the works as recovered resources for use in clinker and cement manufacture. The management of these materials is governed by the Berrima Waste Management Plan, a sub-plan to the Operational Environmental Management Plan.

8.2.2. Mandatory Requirements

Any waste material that cannot be reused or recycled must be sent to offsite disposal via the licenced waste contractor. In order to manage waste during the construction phase, the current waste contractor will supply additional facilities for waste collection and additional resources for removal. A waste register details with the volumes of collected waste streams and associated waste routes as part of the waste collection contract. The minimum mandatory requirements for compliance with the CDWMP is outlined in **Table 11**.

Table 11 Details of Mandatory Requirements

Requirement	Examples of Evidence/Verification
Maintain a register of the main types of waste on site and their reuse/recycle/disposal methods.	Documented register of waste types and their offsite disposal/ onsite reuse or recycle methods.

8.2.3. Waste Management Hierarchy

Construction and Demolition Waste will be managed as per the waste management hierarchy shown in **Figure 7** which summarises the objectives of the Waste Avoidance and Resource Recovery Act 2001.

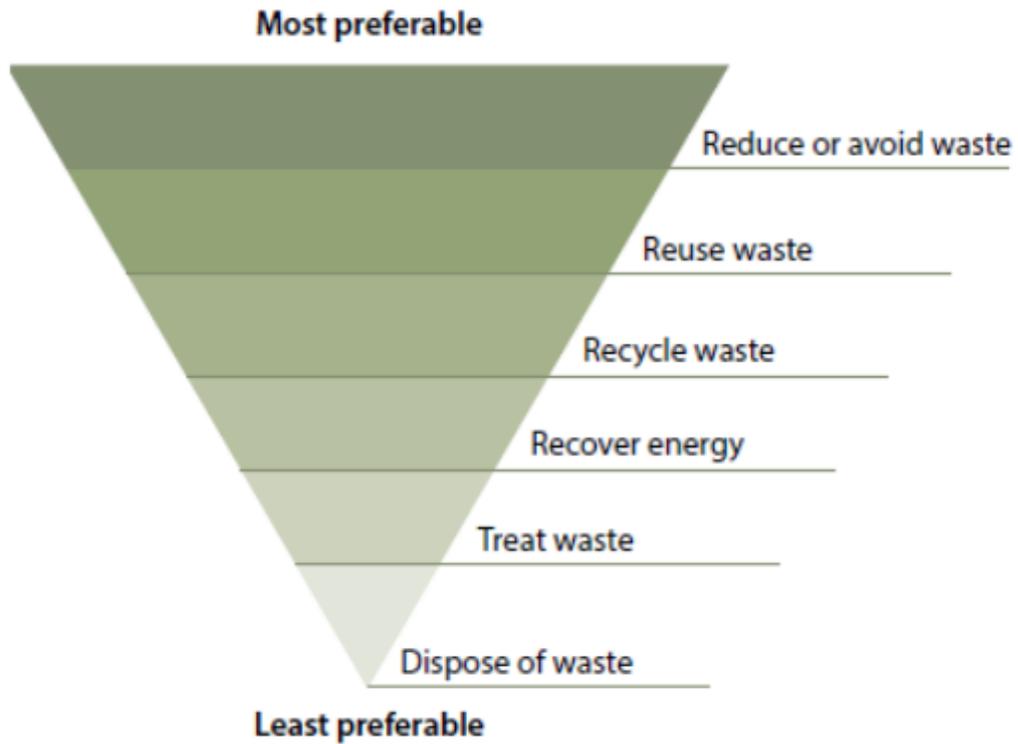


Figure 7 Waste Management Hierarchy

The majority of the construction of the CBS utilises prefabricated parts which are transported to site. As such the site is able to avoid a large volume of construction waste.

8.2.4. Construction Waste Classification and Management

The site preparation and construction of the Project is likely to generate the following broad waste streams:

- Construction, demolition and civil earthworks waste,
- Plant operation and packaging waste, and
- Work compound waste from on-site employees.

A summary of likely waste types generated from site preparation and construction activities, along with their waste classifications and proposed management methods, is provided in **Table 12** below.

Table 12 Potential Construction Waste Streams and Management

Waste type	NSW EPA Waste Classification	Proposed Management Method
Construction, Demolition and Civil Earthworks		
Clean fill	General solid waste (non-putrescible)	On-site re-use for existing stockpile area pads or unsealed roads
Contaminated fill	To be classified subject to the results of testing	Off-site treatment and disposal to licenced facility via a licenced contractor as per Section 8.3
Excavated natural material (ENM) or virgin excavated natural material (VENM)	General solid waste (non-putrescible)	On-site re-use of topsoil for landscaping of the site or as fill material

Sediment fencing, geotextile materials	General solid waste (non-putrescible)	On-site reuse where possible or disposal to landfill
Concrete	General solid waste (non-putrescible)	Offsite resource recovery
Bricks and pavers	General solid waste (non-putrescible)	Off-site recycling
Metals such as fittings, appliances and cabling, including copper and aluminium	General solid waste (non-putrescible)	Reuse or offsite resource recovery
Conduits and pipes	General solid waste (non-putrescible)	On-site reuse or offsite disposal
Timber	General solid waste (non-putrescible)	Treated: offsite resource recovery or landfill Untreated: offsite resource recovery
Ceramics including tiles	General solid waste (non-putrescible)	Off-site recycling at a licenced recycling facility
Gyprock or plasterboard	General solid waste (non-putrescible)	Off-site resource recovery
Plant Operation and Packaging of Goods		
Empty oil and other drums or containers, such as fuel, chemicals, paints, spill clean ups	Hazardous waste: Containers were previously used to store Dangerous Goods (Class 1, 3, 4, 5 or 8) and residues have not been removed by washing or vacuuming. General solid waste (non-putrescible): Containers have been cleaned by washing or vacuuming	Transport to comply with the transport of Dangerous Goods Code applies in preparation for off-site recycling or disposal at licensed facility. Contact Waste Collection Contractor for further advice.
Air filters and rags	General solid waste (non-putrescible)	Off-site disposal
Oil filters	Hazardous waste	Off-site recycling
Batteries	Hazardous waste	Off-site recycling,
Packaging materials, including wood, plastic, including stretch wrap or LLPE, cardboard and metals	General solid waste (non-putrescible)	Off-site recycling
Wooden or plastic crates and pallets	General solid waste (non-putrescible)	Reused for similar projects on-site, returned to suppliers, or off-site recycling.
Work Compound and Offices		
Food Waste	General solid (putrescible) waste	Dispose to off-site landfill waste facility
Recyclable beverage containers including glass and plastic bottles, aluminium cans and steel cans	General solid waste (non-putrescible)	Co-mingled recycling at off-site licensed facility

Clean paper and cardboard	General solid waste (non-putrescible)	Paper and cardboard recycling at off-site licensed facility
General domestic waste generated by workers such as soiled paper and cardboard and polystyrene	General solid waste (non-putrescible) mixed with putrescible waste	Disposal at off-site landfill facility

Note an appropriately licenced contractor will be engaged in all instance of waste collection for disposal offsite

8.2.5. Record Keeping

The records indicated below should be captured as a minimum to provide evidence of complying with the CDWMP:

- Waste Register
- Records of onsite reuse or recycling of materials

8.2.6. Implementation and Training

Implementation and training will be as per Section 6.2 of the CEMP. The Environmental Business Partner and the Site Operations Manager will determine the level of training required by site personnel for any changes to this and other procedures and will develop a training program.

All training conducted will be recorded in the Training Records System. Audits and checks will verify compliance with procedures such as the site inspection checklist contained in **Appendix E**.

8.3. Groundwater and Contaminated Soil Protocol

8.3.1. Introduction

Civil works and excavation during construction have the potential to contaminate groundwater and soils with hydrocarbons through accidental spills. The following protocol will be implemented to minimise the risk of contaminated soils being spread by stormwater and polluting the receiving environment.

Groundwater is unlikely to be encountered during excavation for the Project. Geotechnical drilling investigations were conducted within the Project area to a depth of 9 metres and did not intercept groundwater. Additionally, the cement works blue shale pit, which is located 400 metres to the south-west of the Project area has been mined to a depth of 40 metres and has not intercepted groundwater.

8.3.2. Potential Sources of Contamination

The main sources of potential contamination of soils on the site include:

- solid contamination (suspended solids) in the stormwater runoff from the site;
- Any unexpected contaminated soil unearthed during ground disturbance;
- oil and other liquid contamination due to spills and leaks; and
- Process wastewater.

Solid contamination will be minimised by regular and routine site cleaning and by the use of settling ponds and weirs. Existing emergency procedures are used to contain and clean up oil and other liquid spills and leaks.

If unexpected contamination is encountered during earthworks work will stop and the Project Manager and Environmental Manager will be immediately notified. Any contaminated soils will be managed in accordance with Boral Cement Pollution Incident Response Management Plan (PIRMP) and the *SOP CEM-ENV-014 Spill Prevention and Control*.

Spill prevention and control during construction will be managed in accordance with the Boral Cement Pollution Incident Response Management Plan (PIRMP) and the *SOP CEM-ENV-014 Spill Prevention and Control*. Spill prevention equipment and measures aim to eliminate or reduce the probability of spills occurring and reduce the degree of damage that could occur to the surrounding environment.

The currently applicable PIRMP for Berrima Cement EPL 1698 is available via the website:

<https://www.boral.com.au/what-we-do/environmental->

[reporting#:~:text=Environmental%20Reporting%20Boral%E2%80%99s%20policy%20is%20to%20comply%20with,each%20of%20the%20communities%20in%20which%20we%20operate.](#)

8.3.3. Groundwater and Contaminated Soil Management Measures

In places or situations where a spill risk exists, the following measures will be implemented:

- Placement of spill-risk activities (where possible) away from sensitive environments (sufficient to allow for effective intervention prior to pollution occurring in the event of a spill);
- Use of secondary spill containment facilities such as bunding around all storage tanks and other areas where hydrocarbons are stored;
- Ensuring risky activities such as refuelling are undertaken on bunded, hardstand areas;
- Avoiding risky activities at times when weather events may magnify the harm caused by a spill;
- Ensuring drainage structures can be sealed to halt passage of spilt fluids;
- Training of employees and contractors in good environmental practice.

The site uses spill kit wheelie bins that are audited and stocked regularly by a specialised local supplier. Spill kits are registered and mapped; personnel are trained in the proper use of spill kits.

The site's hazardous substances storage areas, oil and fuel storage tanks, bunds and compounds comply with the requirements of *Australian Standard AS 1940:2004*.

8.3.4. Monitoring and Response

The Project site lies within the existing water management system for the cement works. Stormwater on site flows via surface drains into two settling ponds adjacent to Lake Breed and eventually released into that lake (see **Figure 8**). The water is then pumped into Lake Quality, treated with a biocide, and used in production processes at the site.

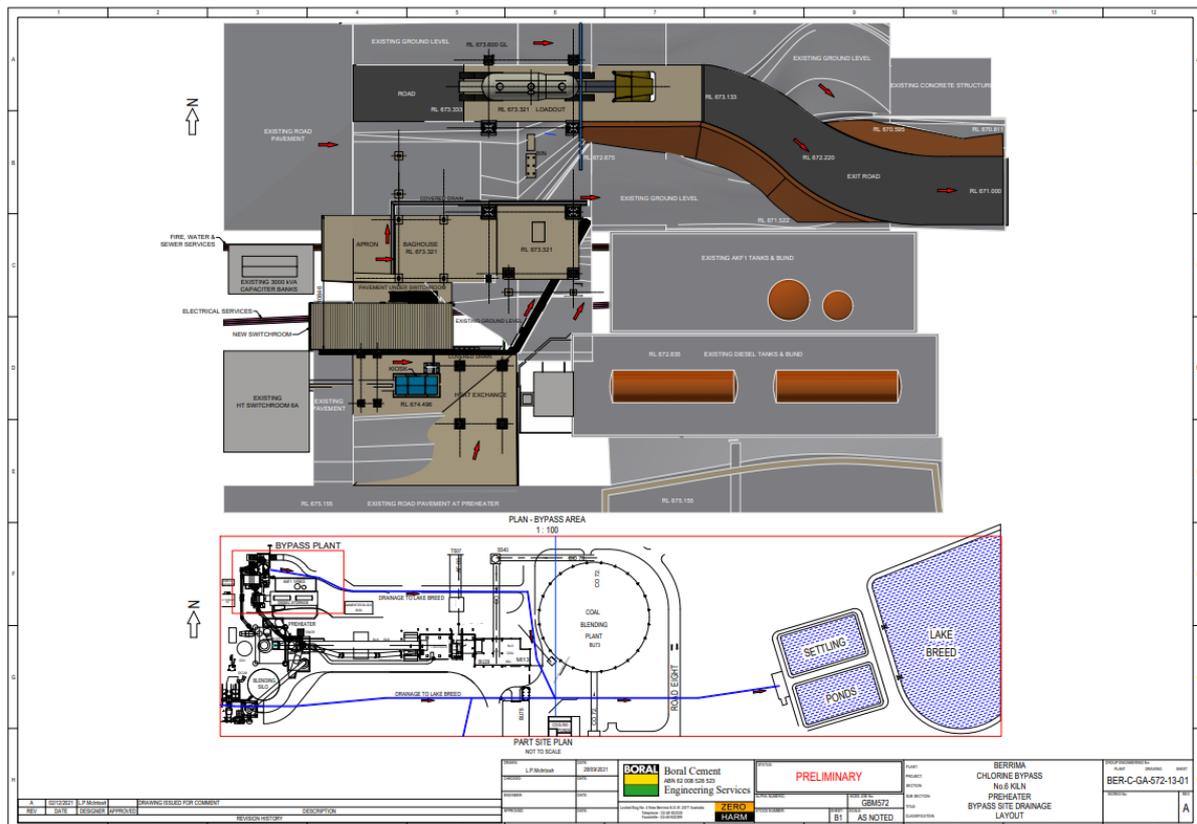


Figure 8 CBS Site Drainage Layout

During heavy rainfall, Lake Quality can fill and overflow into Stony Creek. Overflows have historically occurred only a few times per year. Water levels in the dams are monitored electronically and used to determine when a

discharge to the water course occurs. Several oil collecting booms fitted to the licensed discharge point (LDP) prevent the discharge of oil from the dam in the rare event that such oil contamination reaches the dam.

Grab sampling is conducted at the LDP when discharge is occurring from Lake Quality into Stony Creek in accordance with the requirements of EPL 1698. Water is also tested monthly from the LDP within Lake Quality even in the absence of overflow, and quarterly from the Wingecarribee River.

Grab samples are tested for the following parameters:

- Biological Oxygen Demand (BOD);
- Oil and Grease;
- Total suspended solids;
- pH;
- Chemical Oxygen Demand (COD);
- Total Phosphorus;
- Metals (Aluminium, Barium, Calcium, Copper, Lead, Magnesium, Manganese, Nickel, Potassium, Sodium, Total Iron, Zinc);
- Boron;
- Chloride;
- Cyanide;
- Fluoride;
- Sulphate; and
- Total Coliforms, Thermotolerant (Faecal) coliforms, Enterococcus.

If contaminants such as oil and grease are detected in the above water testing, an investigation will be made into the potential source, including whether it was caused by the Project, and whether any corrective actions need to be made to construction activities.

8.4. Construction Noise Management Plan

8.4.1. Introduction

An operational and Construction Noise Assessment formed an attachment to the Statement of Environmental Effects (SEE) appending the modification application. This document can be accessed via the Major Projects Portal

<https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=DA401-11-2002-I-MOD-13%2120210323T064735.314%20GMT>

This assessed the predicted construction noise impacts at the locations shown below in Figure 9.

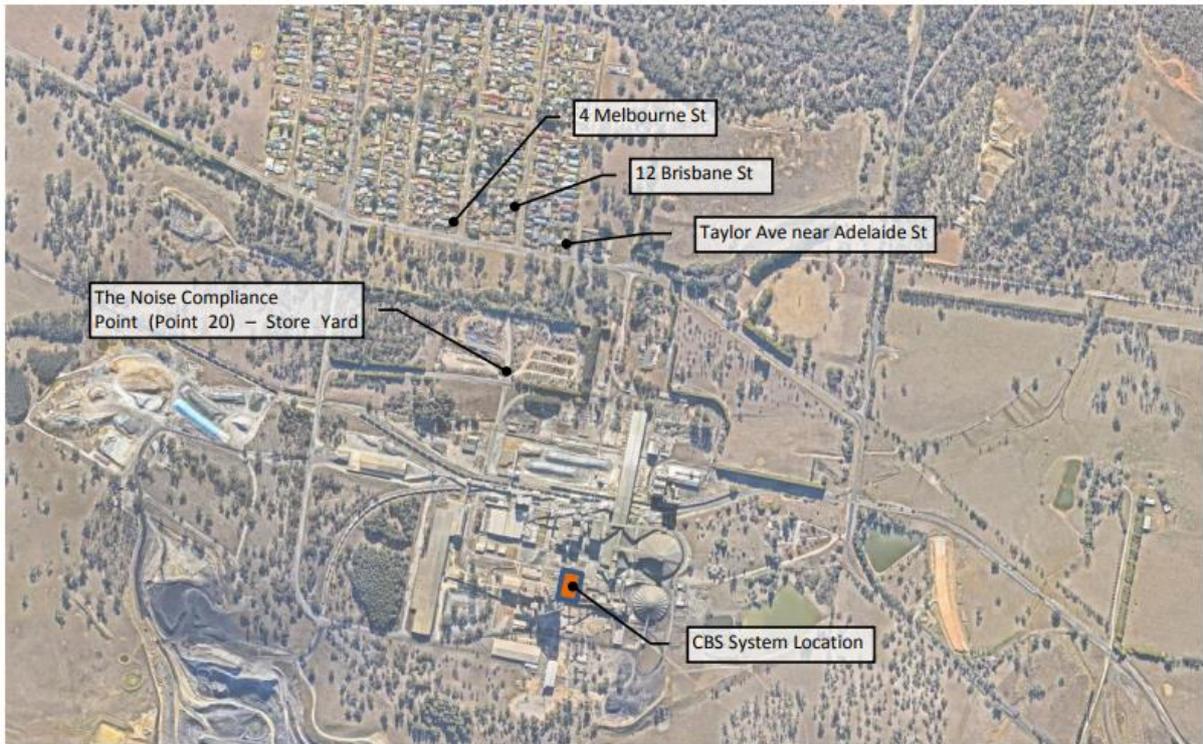


Figure 9 Construction Noise Assessment Locations

The Project site is located on the centre part of the cement works, away from sensitive receivers in New Berrima village. Construction activities will also be shielded by existing site buildings and the pre-heater tower.

8.4.2. Construction Noise Management Levels

The NSW EPA’s Interim Construction Noise Guideline (ICNG) (EPA, 2009) recommends a Construction Noise Management Level (CNML) equivalent to the daytime RBL plus 10 dBA within standard hours (ie daytime) and RBL plus 5 dBA outside standard hours (ie evening and night-time). The ICNG also contains “highly noise affected” daytime CNMLs which are set at 75 dBA LAeq(15minute).

As the CBS construction works would be limited to daytime only, the ICNG construction noise management levels are as presented in the **Table 13**.

Table 13 Intrusive Construction Noise Management Levels at Receiver Locations

Location	Daytime CNML (noise affected) RBL plus 10 dBA ¹	Daytime CNML (highly noise affected)
Taylor Avenue near Adelaide St	57	75
4 Melbourne Street	55	
12 Brisbane Street	54	

Notes: 1. ICNG - Recommended standard working hours: Monday to Friday: 7:00 am to 6:00 pm, Saturday 8:00 am to 1:00, no work on Sundays and Public Holidays. These are identical to the construction hours detailed in **Section 5.3** for the CBS construction

As outlined in **Section 5**, construction works would involve civil works for site preparation followed by the erection of structures and installation of plant. The significant stages or scenarios are summarised as follows:

- Scenario 1 - Civil works – Foundations and Concrete pads
- Scenario 2 - Structure steel erection
- Scenario 3 - Bag Filter / Dust Silo erection and installation
- Scenario 4 - Dust transfer installation

8.4.3. Construction Equipment Sound Power Ratings

The following equipment utilised in **Section 5.1**, during the construction of the CBS and has the following sound ratings. Wherever feasible, construction equipment will be selected to meet the sound power levels detailed in Table 12.

Table 14 Equipment Sound Power Levels

Construction Equipment	Overall SWL LAeq(15minute)
Semitrailer / Tipper truck	108
Concrete Pump	106
Concrete Saw	115
Concrete Truck / Agitator	108
Concrete Vibrator	110
Franna Crane	99
Mobile Crane 50t	100
Mobile Crane 80t	101
Hand tools	94
Elevated Work Platform (EWP)	97
Generator (small)	95

8.4.4. Predicted Construction Noise Levels

As a result the predicted noise level during construction is shown below in Table 13.

Table 15 Predicted Construction Noise Level at Receiver Locations

Receiver	LAeq Noise Level				
	Target	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Taylor Avenue near Adelaide St	57	41	34	34	32
4 Melbourne Street	55	37	31	31	29
12 Brisbane Street	54	38	32	32	30

The predicted noise levels presented indicate compliance for the four construction scenarios considered. This is consistent with the proposed construction activities and distances to the receivers. Boral will employ a range of measures to minimise the impacts of construction noise on these sensitive receivers.

8.4.5. Noise Management and Mitigation

Construction activities will comply with the construction hours outlined in **Section 5.3** to protect local amenity. Construction noise control options include time restrictions, level restrictions and other feasible and reasonable mitigation measures.

Specific mitigation measures which will be implemented for the construction works are:

- Scheduling of the higher noise management level exceedance activities to be undertaken during less noise-sensitive periods, where possible.
- Avoiding the coincidence of noisy plant working simultaneously.
- Briefing of the work team in order to create awareness of the locality of sensitive receivers and the importance of minimising noise emissions.
- Using of less noise intensive equipment, where reasonable and feasible.

- Use of non-tonal reversing alarms fitted to all construction vehicles.
- Conducting loading and unloading away from sensitive receivers, where practical.

8.4.6. Community notification

Boral will ensure that the local community is kept informed of construction activities on the site. Community notification of works and temporary impacts during the construction period will be used as a primary tool in managing disruption to residents.

The details of community notification are included in the Community Consultation and Engagement Plan in **Appendix B**.

8.5. Air Quality Management

8.5.1. Introduction

To assess the air quality impact potential of the proposed construction phase of the pipeline, a qualitative impact assessment was undertaken by EMM as an attachment to the Statement of Environmental Effects (SEE) appending the modification application. This document can be accessed via the Major Projects Portal

<https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=DA401-11-2002-I-MOD-13%2120210323T064735.314%20GMT>

While no specific methodology for such an assessment is available in Australia, the UK-based Institute of Air Quality Management (IAQM) has prepared the Guidance on the Assessment of Dust from Demolition and Construction (hereafter GADDC, IAQM 2014). The GADDC has been applied for construction projects in NSW and accepted by the NSW EPA as a progressive approach to assessing the particulate matter impact risk associated with short term construction and demolition projects.

Screening criteria for a detailed assessment is presented in Box 1 of Section 6 of the GADDC. The IAQM specify that if a human receptor is located within 350 m of the boundary of a site, or within 50 m of a route used by construction vehicles up to 500 m from the site entrance, then a detailed construction dust assessment should be undertaken.

The closest surrounding residential properties to the proposed chloride bypass system construction area are located more than 600 m to the north. Consequently, the proposed construction activities do not trigger the GADDC criteria to undertake a more detailed assessment of associated dust impacts.

It is therefore concluded that the likelihood of construction dust impacts to the surrounding environment will be low. Regardless, ongoing air quality management procedures will be undertaken to maintain compliance with site operational consent and EPL dust limits.

The Project will be constructed to ensure compliance with the air quality impact assessment criteria in the development consent and EPL and minimise fugitive dust for nearby sensitive receivers.

8.5.2. Air Quality Management Measures

Boral will ensure that all its construction facilities erected for the Project are designed and operated to minimise the emission of smoke, dust, cement dust and other substances into the atmosphere.

Boral will employ construction methods that will keep the air pollution to a minimum and apply measures including those listed below, as required, to ensure that airborne pollutants from their activities do not cause undue disruption or inconvenience in the vicinity of the cement works:

- the spraying of earthwork formations and roads with water or other suitable liquids approved by the Project Manager,
- the removal of mud from the wheels and bodies of haulage equipment before it enters public roads or other sealed pavements by means of facilities such as truck washdowns and wheel washes,
- the removal of mud spilt by construction equipment on to public roads or other sealed pavements,
- cease dust generating activities which cannot be adequately controlled by water or other means, and,
- maintaining dust control equipment so that this equipment is available when required including periods of dust generating activities or high wind speed.

If dust control measures are not adequately restricting the generation of dust under the prevailing conditions at any time, the Project will re-programme the work activities, which are causing the dust.

8.6. Erosion and Sediment Control Plan

8.6.1. Stormwater Management System

The existing water management system forms part of the site water management plan as approved by DPIE and operated under EPL 1698. An overview of the site water management system is described in **Figure 10**.

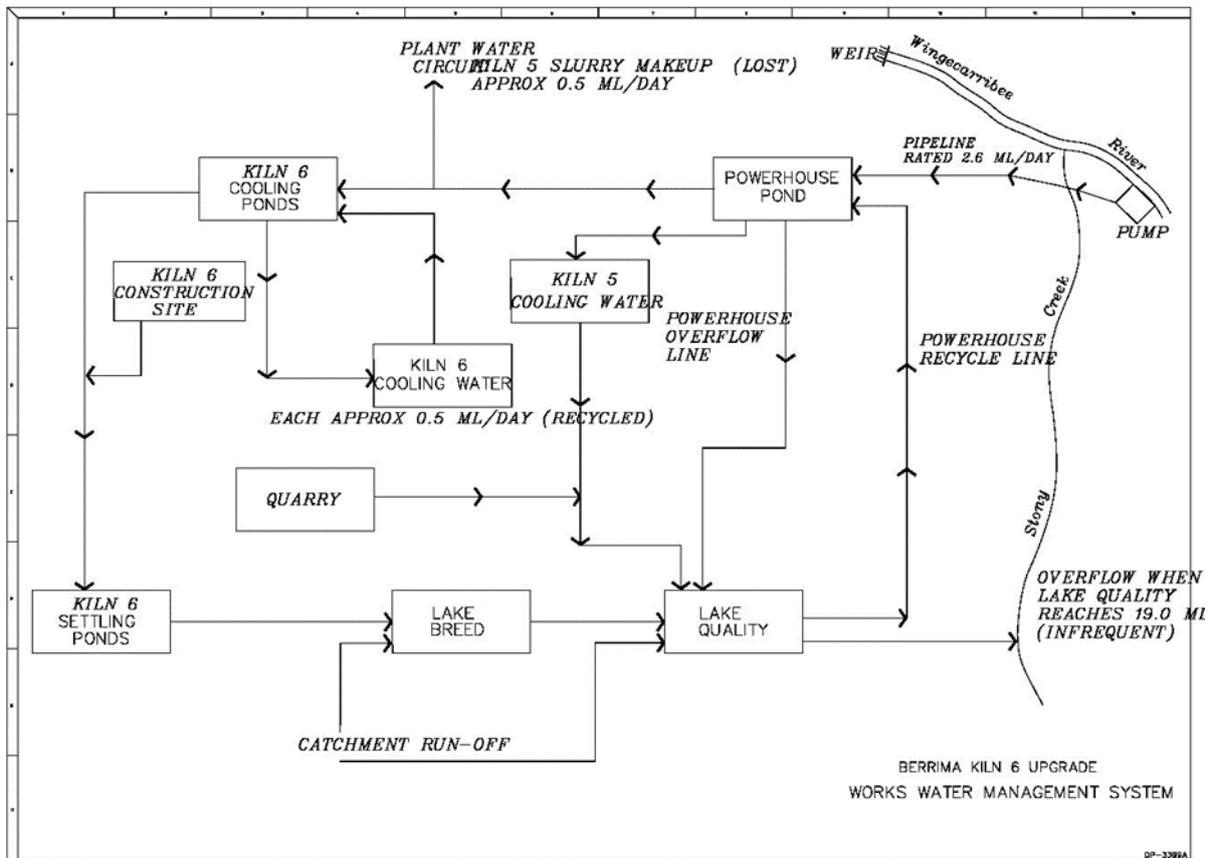


Figure 10 Berrima Cement Works Water Management System

The proposed construction activities will all occur within the existing catchment area of the water management system that eventually drains into the Kiln 6 settling ponds. A schematic of the CBS drainage is shown in **Figure 11**. Consequently, there will be no additional runoff generated as a result of construction. This area is very flat with a slight gradient (<1%) towards the surface drainage system.

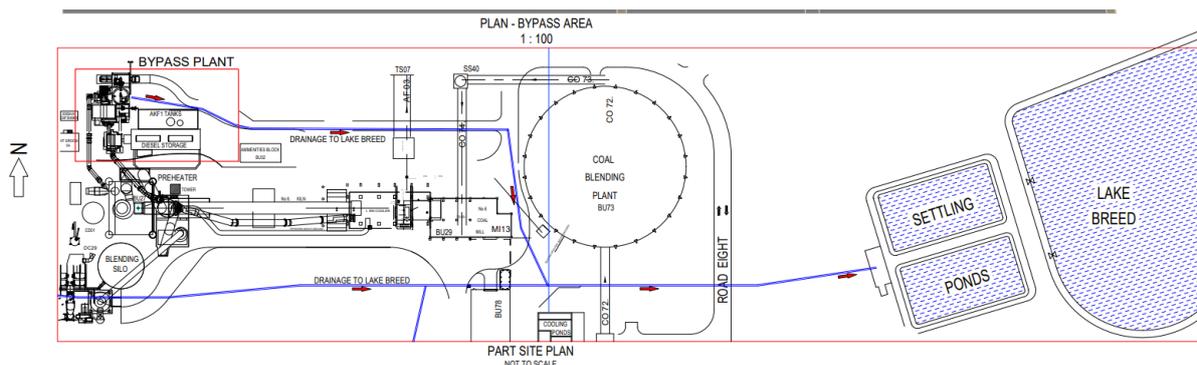


Figure 11 CBS Water Drainage

Site procedures are as per Condition 3.11, Condition 3.12 and Condition 3.13 of the development consent and conform to relevant requirements and guidelines provided in the DLWC's publication such as *Urban Erosion and Sedimentation Handbook*, the EPA's publication *Pollution Control Manual for Urban Stormwater*, and the

Department of Housing's publications *Soil and Water Management for Urban Development* and *Managing Urban Stormwater – Soils and Construction*.

Surface water runoff from the Kiln 6 upgrade construction site (which includes the CBS construction area) flows to the Kiln 6 Settling Ponds, and from there overflows to a detention basin known as Lake Breed. Lake Breed is a long and shallow (1 –1.5 m deep) basin and is fully populated by aquatic plants. Hence it provides detention, filtration and biological water treatment functions.

Lake Breed overflows to Lake Quality, which is a large storage and settling basin with a 19ML capacity. Water may occasionally spill from Lake Quality into Stony Creek when local rainfall is relatively high for a sustained period or there is a large storm event.

Stony Creek flows north into Wingecarribee River, entering the River below the point of extraction of Works makeup water but above the Weir that provides an impoundment for the makeup water pumps.

8.6.2. Erosion and Sediment Control Management

Soil and water management measures employed on site are consistent with *Managing Urban Stormwater – Soils and Construction Vol.1* (Landcom, 2004) (the Blue Book) and shall be employed during construction of the CBS to minimise soil erosion and the discharge of sediment and other pollutants to land and/or waters. The measures include:

- Diversion of overland flows to bypass construction works during high rainfall events;
- Erection of earth berms, silt fencing, coir logs, straw bale barriers on the downslope of construction work areas.
- Minimising the area of excavations left open for extended periods;
- Limiting earthwork activities in wet weather where practicable ;
- Keeping construction areas clear and tidy;
- Site dust suppression;
- Utilisation of the site wheel washes and;
- Monitoring and maintenance of stormwater management structures.

Any Erosion and Sediment Control (ESC) structures will be selected as per Appendix F of *Managing Urban Stormwater: Soils and Construction Volume 2E*.

At the completion of construction, temporary buildings will be removed and the site area will be returned to its original condition.

8.6.3. Monitoring of Erosion and Sediment Controls

ESC structures are periodically checked via the site inspection checklist which is completed as per **Section 8.8**. If ESC are ineffective or damaged then a corrective action will be logged into the site incident register (SEQUENCE) and repaired or replaced. This checklist is reproduced in **Appendix E**.

The water in Lake Breed and Lake Quality is sampled and tested monthly and the water in the Wingecarribee River is sampled and tested three monthly for trend analysis and Boral Cement environmental policy purposes and to determine the effectiveness of the Erosion and Sediment Control Plan. The monitoring suite is described in **Section 8.3.4** with the relevant water parameter for erosion and sediment control performance being Total Suspended Solids (TSS).

8.7. Environmental Schedules

Environmental Schedules are forms, reports and registers that are used during the day to day management of the project. **Table 16** contains a list of the Environmental Schedules which for part of this CEMP, their location and details.

Table 16 Environmental Schedules

Schedule	Comment	Location
Site Inspection Checklist	<i>Record In and Report from SEQUENCE</i>	<i>Hard copy with the HSE Advisor</i>

Schedule	Comment	Location
Complaints Register	<i>Record In and Report from SEQUENCE</i>	<i>SEQUENCE Database</i>
Environmental Incident Report	<i>Record In and Report from SEQUENCE Low risk incidents SEQUENCE report only Short Form Investigation for medium risk incidents ICAM for high risk incidents</i>	<i>SEQUENCE database Short form and ICAM investigation documents attached to SEQUENCE report and originals with HSE Advisor</i>
Environmental Training Register.		<i>Sharepoint AUS_HSE_ECement</i>
Waste Register		<i>Sharepoint AUS_HSE_ECement</i>

8.8. Periodic Review

8.8.1. Routine Site Inspections

For the purpose of ensuring compliance with relevant regulatory requirements the Project will rely heavily upon regular inspections and supervision. Inspections of Project’s activities will be undertaken as detailed in **Table 15** and will ensure that the recommendations in this CEMP are adhered to and responsibilities are met, and identify opportunities for improvement.

Inspections will be conducted weekly by project team members and Environment representatives. All inspection findings will be recorded and documented on the appropriate forms and copies of inspection records will be collated.

Inspections will be documented and any instructions provided to work teams will be recorded as will actions taken in relation to air quality management. It will also be the responsibility of all personnel on site to continuously assess the construction activities environmental performance with regards to dust and noise, and notify their area supervisor if non-conformances are detected.

More details are provided within the management sub-plans with regards to monitoring and inspection requirements for specific environmental aspects.

The site inspection checklist is detailed in **Appendix E**

Table 17 Environmental Auditing Requirements

Objective	Criteria	Frequency
Pre-construction		
Confirm controls are set-up correctly	Inspect controls against pre-construction requirements of the CEMP, sub-plans, and other relevant environmental documents.	Prior to start of construction
	Confirm pre-construction permits, approvals, licences, certifications etc.	Prior to start of construction
Construction		
Confirm mitigation criteria are met and management measures are effective	Environmental inspections of work sites to confirm effectiveness of controls.	Daily
Avoid sediment release from site	Inspect sediment and erosion controls and ensure maintained.	Daily and after storm events
Avoid visible dust generation	Visual inspections of visual dust generation	Continuously
Avoid obtrusive lighting impacts on adjacent roads	Visual inspection of operations	Upon installation of management

Objective	Criteria	Frequency
		control and on an as needs basis
Post-construction		
Confirm compliance with all requirements prior to completion	Review environmental performance to ensure all requirements have been meet. To be built into commissioning plan	Prior to start of operation

More frequent inspections may be required during the following periods to be undertaken at the discretion of the Project Manager.

- Prior to the commencement of the works (during site establishment);
- At the commencement of the works;
- Large storm events, during times of high wind or other significant metrological event the parameters of which are detailed in the respective management plans;
- Critical stages of the construction program; and
- On completion of the works.

More frequent inspections will also be conducted following incidents or complaints as relevant to that incident or complaint. When requested the Site Inspection Report (**Appendix E**) shall be completed, and performance reviewed against the requirements of this CEMP.

8.9. Environmental Monitoring

Monitoring for EPL requirements will be performed by the Berrima Cement Works as part of the existing site monitoring protocols.

If Boral Berrima Cement team detects a non-compliance with one or several approval conditions, and determines after investigation that the non-conformance was caused by the construction activities, Berrima Cement will notify and liaise with the Project Manager.

8.10. Reporting

Boral will be responsible for all external reporting in relation to environmental performance monitoring and through the ongoing monitoring protocols and processes management detailed in **Section 8.8 and 8.9**.

8.11. CEMP Review

This CEMP may be reviewed and updated at any stage during construction to ensure that it addresses ongoing environmental issues and any changes in legislation, policies or guidelines. In particular, environmental incidents, non-conformances should be considered when undertaking a review, and may trigger a review or amendment.

The outcomes of the management review process will be incorporated as improvements to the CEMP, Management Sub Plans, and procedures, to facilitate regulatory and policy compliance and continuous improvement. Revisions may be directly incorporated into this CEMP and documented in the amendment register, or may be documented as an addendum to the CEMP where this is more appropriate.

Reviewing and updating the CEMP is the responsibility of the Berrima Cement project team, as the Proponent for the Project. Once updated, a copy should be provided to all holders of controlled copies and stored on Boral Sharepoint drive AUS_HSE_ECement.



Construction Environmental Management Plan v2
Chloride Bypass System

A. Appendices