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Berrima Cement Works

Modification 9 – Use of Solid Waste Derived Fuels

Surface and Groundwater Assessment

Report Number 610.15875

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Boral Property Group

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Surface and Groundwater Assessment

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FIGURES

1 INTRODUCTION

This Surface Water and Groundwater Assessment has been prepared as part of the Response to Submissions for a modification to DA 401-11-2002-i (Mod 9) for the Boral Cement Works in New Berrima. During exhibition of the Environmental Assessment (EA) for the proposed modification, submissions were made by the Department of Planning and Environment (DP&E) and the Department of Primary Industries - Water (DPI Water) requesting the preparation of a surface and groundwater assessment in accordance with the Secretary's Environmental Assessment Requirements (SEARs).

SLR has undertaken this Surface Water and Groundwater Assessment to identify water related issues associated with the modification. The assessment involved a review of the Wingecarribee Local Environmental Plan (LEP), relevant government policies and guidelines as well as reputable technical manuals relating to surface water impact mitigation. The results of this assessment are summarised below.

1.1 Proposed Modification

Boral Cement Limited (Boral) operates the Boral Cement Works at New Berrima in the Wingecarribee Local Government Area (LGA) of New South Wales (NSW) (**Figure 1**). The Cement Works operate subject to two development consents issued by the DP&E (DA 401-11-2002-i (Kiln 6), and DA 85-4-2005 (Mill 7)). The development consent for Kiln 6 (DA 401-11-2002-i) has been modified eight times, and in July 2015 Boral submitted a ninth application, pursuant to Section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act), to modify the consent (Mod 9).

The proposed DA 401-11-2002-i Mod 9 seeks approval for the following:

- Use of Solid Waste Derived Fuel (SWDF) as an energy source;
- Changes to the air emission limits of particulate matter (PM), nitrous oxides (NOx) and volatile organic compounds (VOC); and
- Construction and operation of a fuel storage and kiln feeding system.

In addition, Boral wishes to surrender Mod 6 (June 2012) relating to the stockpiling of coal for sale and transport to Port Kembla. The modification is needed to maintain the viability of Boral as a cement manufacturer in an industry that is facing increasing pressure from less expensive imported products and rising energy costs. Up until recently coal from the Berrima Colliery at Medway was used to fire the cement kiln. In October 2013 the colliery ceased operation, and consequently Boral is pursuing other fuel sources to ensure its operation remains economically viable into the future. The modification would also have associated environmental benefits of reducing carbon emissions and diverting waste from landfill.

The proposed modification is considered to be minor in the context of the overall operations at New Berrima and would not significantly alter the operation of the Cement Works, other than to allow the use of different fuel sources in the manufacturing process. The project as modified would be substantially the same development as approved previously.

The fuel storage and kiln feeding system has the potential to impact surface and groundwater during construction and associated ground disturbance. These impacts have been addressed in this document. The use of SWDF as an energy source, and the changes to the air emission limits are not anticipated to have any impact on surface and groundwater, and have not been discussed further in this document.

The location of the proposed construction works within the overall site as well as the main water management features on site is shown in **Figure 2**.

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Site Location: Regional Context

FIGURE 1

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Site Location: Local Context

FIGURE 2

1.2 Agency Requirements

The agency requirements regarding surface and groundwater, and where these have been addressed in this document, have been provided in **Table 1**.

Table 1 Agency Requirements

Agency	Requirement	Response/Where Addressed
DP&E (SEARs)	Soil and Water- including the proposed erosion and sediment controls and	Section 4.2
	consideration of potential surface water,	Section 5.1
	groundwater,	Section 5.2
	contamination impacts that could result during construction.	Section 5.1
DP&E (Submission October 2015)	Insufficient information has been provided regarding the impacts to groundwater and surface water as a result of the construction and operation of the facility.	Section 5.1 Section 5.2
	Please provide further information regarding any dewatering,	Not applicable. There will be no groundwater interception or dewatering as part of the proposed works.
	interception of groundwater and	
	surface water management during operation and construction.	Section 4.1
DPI Water (Submission September 2015)	Based on the information provided it is unclear if the proposal is likely to intercept groundwater and require dewatering;	There will be no groundwater interception or dewatering as part of the proposed works.
	use surface water or groundwater as a water supply source;	There will be no use of groundwater as a water supply source. The Proposal is not expected to significantly impact on the amount of surface water reused at the site (refer Section 3).
	or pollute/degrade groundwater and surface water during construction etc.	Section 5
	Section 8 of the EA notes a Construction Environmental Management Plan would be prepared prior to commencement of construction and it would address "protocol to deal with identification of groundwater' but the EA provides no other details and it is unclear what is meant by this statement.	Section 4.3
	It is recommended the proponent provides an assessment of potential surface water and groundwater impacts in accordance with the SEARs.	This document

2 EXISTING ENVIRONMENT

2.1 Surface Water

The Boral Cement Works site is located within the Hawkesbury-Nepean River catchment, which has an area of approximately 21,400 square kilometres. Stony Creek is located approximately 1km to the east of the site, which drains to the Wingecarribee River. The Wingecarribee River is a major tributary of the Hawkesbury River, and is located approximately 1.9 km north-west of the site. Specific water management issues for the Hawkesbury-Nepean catchment as noted by DPI Water (2015) include:

- Water quality: pollution, algae and weed growth;
- River bank management: urban and agricultural development, construction of 'instream' development;
- Environmental water: sufficient flows and freshness to maintain river health;
- Increasing demand for water: urban population and industry growth; and
- Water accounting: water meters to account for water extraction.

The topography of the site is flat, sloping to the east. The immediate surrounding area is characterised by gently rolling shallow hills and valleys. Two large dams (Lake Breed and Lake Quality) and a number of settling dams collect stormwater runoff, prevent uncontrolled discharges to the environment and provide a supply of process water for use on site.

There are no notable surface water bodies or tributaries within the bounds of the Berrima site. None of the site is mapped as “flood planning area” under the Wingecarribee LEP 2010 and the footprint of the proposed construction works does not contain any mapped water courses. The nearest mapped natural resource on the LEP Natural Resources Sensitivity Map – NRS_007, Stony Creek, is located over 1km from the site.

2.2 Groundwater

The site is located in the Sydney Basin – Nepean Sandstone groundwater management area, which is part of the “Greater Metropolitan Region Groundwater Sources 2011 Water Sharing Plan” (Bureau of Meteorology, 2015).

The NOW real time groundwater data shows that there are five groundwater bores in a 1.5km radius of the proposed works (GW075032, GW072401, GW028588, GW100370 and GW104642) which are used for monitoring and irrigation purposes. The depth to groundwater in these bores ranges from 3.6m to 45m.

The concrete foundations of the fuel storage shed will be dug to a depth up to 7 metres below the current ground surface. Geotechnical investigations were carried out early in 2015 within the proposed site footprint to inform design. A number of diamond drill holes were drilled to a depth up to 9 metres. No holes intercepted groundwater.

Additionally, the on-site shale pit, which is used to extract blue shale for the manufacture of clinker in Kiln 6 is located 450 metres to the south-west of where the fuel shed is proposed to be constructed. The shale pit has been extracted to a depth of 40 metres below ground surface, and has never intercepted groundwater since it was established in the late 1970’s.

2.3 Soils and Contamination

The eSPADE database (Office of Environment and Heritage, 2015) has mapped four soil profiles in the vicinity of the Boral Cement Works site. Soils in the area are described as a brown clay loam, grading to a yellow-brown light clay at depth. The soils present a moderate erosion hazard, with no salting evident.

Broad scale mapping in the Australian Soil Resource Information System (ASRIS, 2015) shows the area as having a low probability of acid sulfate soils.

A search of the Environment Protection Authority (EPA) contaminated land record shows that that the sites is not classified as a contaminated site, and there are no known contaminated sites in the vicinity of the Cement Works.

2.4 Existing Site Water Management System

As part of previous development approvals, a surface water management system has been constructed within the Project Site. Stormwater on site flows via surface drains into two settling ponds adjacent to Lake Breed and eventually released into that lake. The water is then pumped into Lake Quality, treated with a biocide, and used in production processes at the site.

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. Boral samples 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.

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

- solid contamination in the stormwater runoff from the site;
- oil and other liquid contamination due to spills and leaks; and
- process wastewater.

Solid contamination is 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.

3 PROPOSED CONSTRUCTION WORKS

The proposed modification will involve the construction of a fuel storage and kiln feeding system. The construction of the fuel storage and feeder system would involve the following sequence of activities:

- Pre-construction activities including survey and geotechnical investigations, relocation of existing shed, site office set up and fencing of construction area;
- Earthworks and civil, including site preparation, form work for storage building and enclosed conveyor, and new pavements and truck access;
- Installation of prefabricated receival and storage building, including lighting and electrical works;
- Installation of prefabricated moving floor system;
- Assembly and installation of modularised material handling and storage system including two weight belt feeders, enclosed conveyor and support trestles, transfer screw, chutes and air lock valves and gate valve;
- Configuration of electrical and control system; and
- Upgrade of internal rotating assembly of the existing electrostatic precipitator fan.

As noted in **Section 2.2**, the proposed works are located in an area that has a groundwater depth ranging from 3.6 m – 45 m.

The concrete foundations of the fuel storage shed will be dug to a depth up to 7 metres below the current ground surface. Geotechnical investigations were carried out early in 2015 within the proposed site footprint to inform design. A number of diamond drill holes were drilled to a depth up to 9 metres. No holes intercepted groundwater.

Additionally, the on-site shale pit, which is used to extract blue shale for the manufacture of clinker in Kiln 6 is located 450 metres to the south-west of where the fuel shed is proposed to be constructed. The shale pit has been extracted to a depth of 40 metres below ground surface, and has never intercepted groundwater since it was established in the late 1970's.

The proposed works will not involve any ground disturbance works that would be undertaken at a depth that would intersect groundwater. Additionally there will be no dewatering associated with the proposed modification.

The proposed works will involve a minor increase in water use during construction activities, through the use of dust suppression on disturbed areas. Any additional water required for construction activities will be sourced from the existing water management system and is expected to be minor compared to the overall current amount of water reused on-site.

Construction is anticipated to take approximately 40 weeks, commencing in early 2016. Construction activities would be limited to normal working hours and the maximum number of construction staff on site at any one time would be approximately 36 personnel.

The disturbance area for construction would be relatively small, at approximately 0.6 ha. Although the proposed construction works would occur over 40 weeks, the time that the ground would be exposed would be likely less than this.

Ground disturbance activities will be required to dig the foundations of the fuel storage shed and kiln feeding system which have the potential to increase sediment in stormwater during the construction period. However, the existing water management system is more than capable of dealing with the small area of disturbance proposed during the construction activities. To minimise the potential impacts on the existing system, silt stop fences will be constructed downslope of ground disturbance activities to trap sediment at the source before entering the broader water management system.

4 PROPOSED WATER MANAGEMENT

In addition to the existing site water management system described in **Section 2.5**, the following would be implemented to manage potential impacts to surface and groundwater during construction.

4.1 Surface and Groundwater Contamination

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

- Placement of spill-risk facilities 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 hazardous substances are stored;
- Ensuring risky activities such as tank loading 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 utilizes universal 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.

4.2 Erosion and Sediment Control

The following measures would be implemented to manage erosion and sedimentation during construction:

- Development of an Erosion and Sediment Control (ESC) Plan prior to construction in accordance with the Blue Book Guidelines (*Managing Urban Stormwater: Soils and Construction*, Landcom, 2004);
- Conserve topsoil for late site rehabilitation/revegetation;
- Installation of sedimentation fencing downslope of ground disturbance areas;
- Construction of a sediment basin and associated water conveyance structures in accordance with Blue Book Guidelines if the site is estimated to produce greater than 150m^3/yr of soil loss on the site (to be confirmed prior to construction). If an existing basin is proposed to be used to treat sediment laden runoff then the sizing and maintenance of this dam will be reassessed for the changed catchment characteristics;
- Upslope diversion of clean water runoff around disturbed land;
- Dust suppression of disturbed areas (if required based on climatic conditions at the site);
- Routine monitoring and maintenance of the ESC measures implemented on site during construction; and
- Rehabilitation of disturbed area immediately after disturbance activities are completed.

4.3 Construction Environmental Management Plan

A Construction Environmental Management Plan (CEMP) would be prepared prior to the commencement of construction and would address:

- Dust management;
- Measures to minimise and manage soil erosion;
- Protocol to deal with identification of contaminated soil;
- Protocol to deal with identification of groundwater;
- Safe access to/from the construction site; and
- If required, noise management through temporary hoarding.

In addition to the CEMP, the existing site water management measures described in **Section 2.5** will continue to be implemented during construction.

5 IMPACT ASSESSMENT

5.1 Surface Water

Whilst the impact footprint of the proposed works is removed from any notable drainage features, construction activities could potentially impact upon water resources as a result of loss of ground cover and generation of sediment-laden runoff. Given that the impact footprint will be relatively small (approximately 0.6 Ha), changes to the existing runoff pattern are anticipated to be relatively minor. The proposed works will also require the use of hydrocarbons during construction which have the potential to result in a spill incident.

Given the existing site water management system and spill response procedure in place, as well as the proposed management measures to be implemented, and the controlled environment in which the Project will operate, the proposed modification poses a low risk to local water resources with no detectable impact expected.

5.2 Groundwater

The proposed modification does not propose the installation of any groundwater bores, the intersection of groundwater through construction, or the use of groundwater in any of its onsite processes. There will also be no potential sources of leakage to the groundwater; no underground fuel storages, no onsite stockpiling of waste (all waste will be stored in bins), and no wastewater treatment ponds are proposed.

Given that groundwater was not intercepted to a depth of 9 metres within the area of the proposed fuel storage shed, and the nearby shale pit has not intercepted groundwater to a depth of 40 metres, it is submitted that the construction of the fuel shed and it foundations will not impact on or contaminate local groundwater.

As a result, no impacts to groundwater flows or quality are anticipated as a result of the Project.

6 REFERENCES

Boral (2014) *Boral Cement Limited, Berrima Works, Water Management Plan*.

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