



Request for Director General's Requirements

Resource Recovery Plants at Eraring Power Station

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Contents

1	Introduction	1	5.8	Bushfire	18
1.1	General	1	5.9	Heritage	19
1.2	Background	1	5.10	Social and Economic Impacts	20
1.3	The Applicant	2			
2	Site Details	3	6	Justification	21
2.1	Location	3	6.1	Strategic purpose for the site and context of the development	21
2.2	Site ownership	4	6.2	Considered alternatives	21
2.3	Site description	4	6.3	Justification of Preferred Option	22
3	Development Description	7	7	Consultation	23
3.1	Plant description	7	7.1	Community and Agency consultation	23
3.2	Proposed Operation	8			
3.3	Material supply	9	8	Conclusion	24
3.4	Chemical supply and storage	10			
3.5	Hours of operation	10			
3.6	Construction	10			
3.7	Capital investment value	11			
3.8	The need for the proposal	12			
4	Permissibility and Statutory Planning	13			
4.1	Environmental Planning and Assessment Act, 1979	13			
4.2	Lake Macquarie Local Environmental Plan 2004	13			
4.3	State Environmental Planning Policy (State and Regional Development) 2011	13			
4.4	State Environmental Planning Policy (Infrastructure) 2007	13			
4.5	State Environmental Planning Policy 14 – Coastal Wetlands	14			
4.6	State Environmental Planning Policy 33 – Hazardous and Offensive Development	14			
4.7	Environmental Protection and Biodiversity Conservation Act 1999 and Threatened Species Conservation Act 1995	14			
4.8	Lower Hunter Regional Strategy	14			
5	Impact Identification	15			
5.1	Chemical storage and Contamination	15			
5.2	Traffic	15			
5.3	Hydrology (including groundwater)	16			
5.4	Visual impact	17			
5.5	Flora and fauna	17			
5.6	Air Quality	17			
5.7	Noise impacts	18			

1 Introduction

1.1 General

Nu-Rock Technology seeks confirmation that the project is a State Significant Development and the requirements of the Director-General for an Environmental Impact Study (EIS) for two proposed resource recycling plants associated with the existing operations of Eraring Power Station, Lake Macquarie New South Wales.

The recycling plants would be constructed on an existing car park area of the power station. The plants will allow for the recycling of Coal Combustion Product (commonly referred to as fly-ash) produced by the power station into green building products (primarily blocks, sand and aggregates). Each plant would be fully automated and computer controlled and process 250,000 tonnes of mixed fly ash per year at the commencement of production and ultimately will have the capacity to produce up to 500,000 tonnes per annum subject to market demand.

This report provides a description of the development proposal; a list of relevant planning instruments, and an identification of the key environmental issues which may be produced by the proposal. This will assist the Director General of Planning NSW to determine appropriate environmental assessment requirements. The report is broken down into the following sections:

- **Section 1** Introduction – provides a background proposal and applicant.
- **Section 2** Site Details – describes the site and the local and regional context of the Project.
- **Section 3** Project Description–provides a clear and concise description of the Project, indicating the types of and activities that will be undertaken.
- **Section 4** Permissibility and Strategic Planning – describes the permissibility of the Project and applicable statutory planning instruments and strategic planning documents.
- **Section 5** Impact Identification – highlights the potential environmental impacts of the project.
- **Section 6** Justification – outlines the justifications of the project.

1.2 Background

Eraring Energy is one of Australia's largest electricity producers after an upgrade of its turbines in 2012. In 2012 Eraring Energy supplied approximately 15% of the electricity consumed in NSW, Victoria, Queensland, South Australia and the Australian Capital Territory. The Eraring Power Station is the largest coal fired power station in Australia with a generating capacity of 2800 MW.

Eraring Power Station has been operating since the mid 1980's and operates using coal from nearby coal mines. In the 2011/12 financial year, Eraring Power Station used 4,732,515 tonnes of coal and produced 1,063,933 tonnes of CCP (fly ash). The CCP produced by Eraring Power Station is currently stored onsite in a storage facility or ash dam (source: Eraring Energy Sustainability Report 2012).

The proposal allows for recycling of fly ash into materials used in the building and construction industry. The existing onsite storage facilities are filling up and Eraring Energy requires a new method of CCP placement that will allow the power station to reach its maximum life expectancy to beyond 2030.

Eraring Energy is an industry leader in coal ash recycling. In 2011/2012 494,835 tonnes of coal combustion product ash was reused, representing 47% of the ash produced at Eraring Power Station. Contracts for the reuse of ash during this time were Fly Ash Australia, Bulk Flyash Grout for the purposes of mine stabilisation and Boral Recycling for the purposes of road stabilisation.

Eraring Energy have set an ambitious target to increase the amount of ash to be recycled up to 80% by 2015 (up from 47% in 2011/2012). The proposal is critical for Eraring Energy to achieve its recycling target and to move towards a greener future.

1.3 The Applicant

The applicant is Nu-Rock Technology Pty. Nu-Rock Technology was formed in 1995 and is the Australian licensee with significant expertise in resource recycling technology. In order to progress the development, Nu-Rock Technology has formed Nu-Rock Australia Pty Ltd (NRA) which will hold the license for the two plants at Eraring NSW. NRA will finance, own and operate the proposed manufacturing plants and Nu-Rock will be contracted to construct the plants.

The technology for recycling coal ash was partly developed in Australia and NRA was formed for the purposes of commercialising Nu-Rock's proprietary technologies for ecologically sustainable Coal Combustion Products disposal and utilisation.

2 Site Details

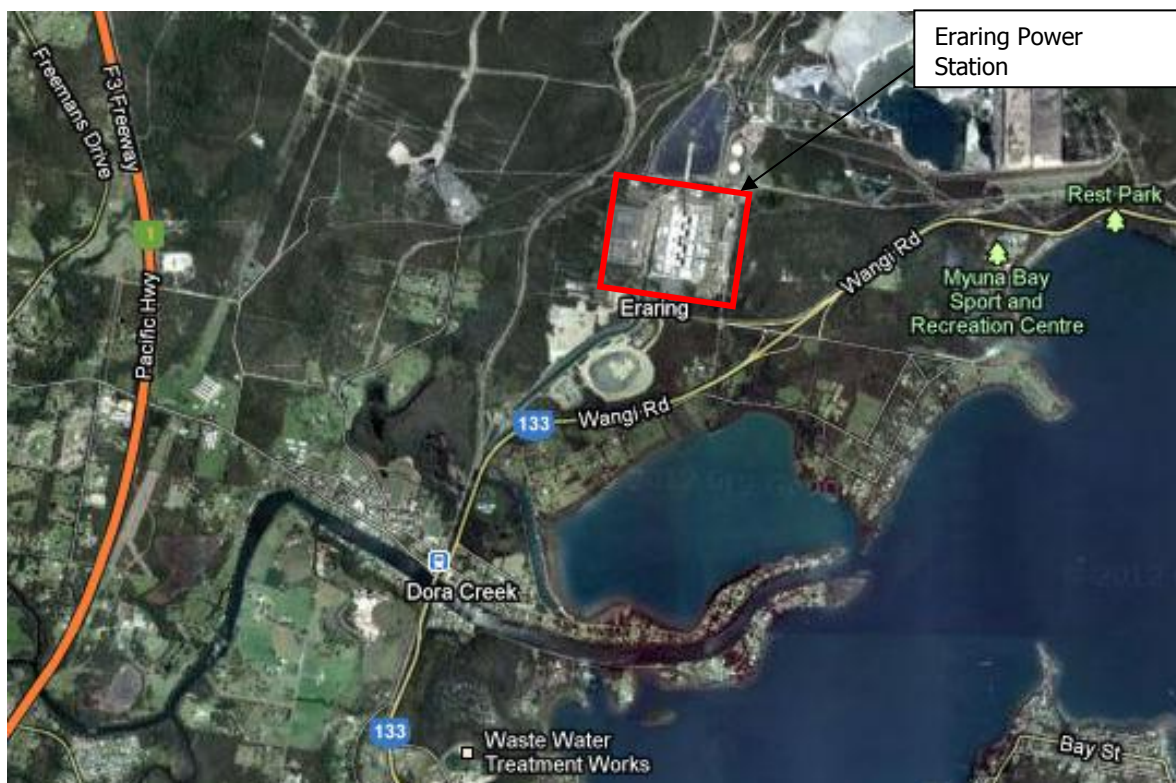
2.1 Location

The site is within the grounds of the Earing Power Station. The Earing Power Station is located on Rocky Point Road, Earing (see **figure 1**) approximately 5km north east of the township of Dora Creek and approximately 10km north east of Morisset.

Earing Power Station is surrounded by 9000 Ha of bushland which provides a significant barrier from other surrounding land uses. A ridge on the eastern side of the power station separates it from surrounding nearby residential and community land uses located some 2km away.

The power station is highly industrial in character characterised by plant buildings and equipment, significant coal storage areas, ash ponds and car parks.

Figure 1 – Locality Plan



Source: Google Maps

2.2 Site ownership

The subject site is owned by Eraring Energy. Eraring Energy is a NSW State Government owned corporation that manages a diverse set of electricity generating assets located throughout New South Wales, Australia.

Eraring Energy was established as a State Owned Corporation on 2nd August 2000 under the *State Owned Corporations Act 1989*, the *Energy Services Corporation Act 1995* and Energy Services Corporation (Eraring Energy) Regulations 2000.

NRA will lease 1 ha of land from Eraring Energy for the development of the resource recycling plants which will include a mixing, batching and curing plant with chemical and ash silos for the production plant.

Landowners consent to the lodgement of the development application is included in appendix 1.

2.3 Site description

The proposal site is located within a lot occupied by the existing Eraring Power Station (Lot 11, DP 1050120), on an existing sealed car park to the east of the existing power station (see **figure 2**). The power station operators now use a recently constructed car park located south of its plant buildings, leaving the existing parking area with a low level of usage.

The proposal site is accessed via Construction Road which connects with Rocky Point Road and separates the site from surrounding bushland (refer to **photographs 1 - 2**). North of the car park is currently occupied by Fly Ash Australia and 2 silos which store highly salinized water (refer to **photograph 3**). The existing operations of the Eraring Power Station ensure that there is no sensitive development surrounding the Eraring Power Station or the proposed portion of land on which the plants are to be located.

Figure 2 – Proposed Development Site



Source: SIX Spatial Information

Photograph 1: Proposal site – view south east of existing car park



Photograph 2: Existing access to the proposal site and bushland east of the site



Photograph 3: View north of the proposal site



Photograph 4: View west – power station including the CCP plant which will be the source of fly ash.



CCP plant



CCP plant

3 Development Description

Provided below is a detailed outline of the proposal including, plant descriptions and operations and construction patterns. The outline includes a breakdown of the main structures associated with the proposal and the key components required to undertake the recycling process from the initial input stage to the storage and distribution point.

Refer also to accompanying plans.

3.1 Plant description

The proposed recycling plants would comprise the following capacities:

Area	1500m ² plus an additional 5000m ² for storage of final products prior to distribution
Fly Ash Consumed/ Plant/ Year	250 000T (totalling 500,000T for 2 plants)
Required energy/manufacturing plant	Equivalent to 800kWh with a peak rating of 120 kW for startup via a 415V three phase connection
Required water/Plant	25,000L (totaling 50,000L for 2 plants) It is anticipated that the water (other than for the purposes of drinking) will be sourced from the ash dam adjacent to the location.

The proposal includes the construction of the following components:

- a plant building which accommodates 2 plants: machinery for the production of construction blocks; as well as the machinery for the production of sand and aggregates and administration space
- a finished product storage area; and
- parking for loading and unloading bays; and
- ash silos

Each plant would have external walls comprised of 'sandwich' system with insulation up to 5 metres high with aluminium double glazed windows in a clear anodised finish with tinted louvered glass panels which would provide ventilation for each building.

The colourbond spandex roof and walls of each facility would be supported by a steel portal frame system. The floor would comprise of a raft concrete slab. The entire facility would be housed to facilitate a high level of control during the handling and production process. The maximum internal noise generated by the production plant and mixing system would be 85dB.

There would be an eight space car parking area at the front of the facility and three truck waiting bays on the opposite side of the road to the building. One of these truck bays would be used as a wash down area for the vehicles. The other bays would be used as the truck loading recesses for the finished product.

The main storage and processing equipment within the proposed plants would comprise:

- 2 x 50T capacity storage silos for the fly ash;
- handling systems for the fly ash ;
- 6 x 20T silos for chemical storage and handling;
- mixing equipment with batching for ash feedstock and chemicals;
- block machine and automated handling system to deliver the final product to the curing chamber; and
- palletising and storage of final product for loading the delivery trucks and dispatch to markets.

The plants would be designed to adopt strategies which embrace sustainable building design. Such solutions would include the implementation of:

- solar roof panels;
- rainwater storage capability and reuse provisions;
- water recycling;
- water efficient taps and fixtures.
- LED lighting to minimise power consumption
- R3 Insulation to walls and roof to the building
- Double glazing to the building.
- Controlled auto opening and shutting solar access to the curing chamber

3.2 Proposed Operation

3.2.1 Manufacturing process and storage procedure of final product

The operation of the plant equipment is to be computer automated and controlled. Plant malfunctions in the chemical handling system, mixing system or block plant production will be detected by the computer system and in response, would automatically shut down the necessary components of the plant. The plant would not resume operation until the fault had been resolved.

The manufacturing process would involve the sequential steps:

1. Fly ash feedstock and chemicals would be combined within a mixing tank at an ambient temperature. This mixing facility is also able to perform the pelletisation to produce the aggregates
2. Mixture would then be placed in moulds to create specifically shaped masonry products such as bricks and roof tiles;
3. Moulded products would be transported to the curing chamber via the automated handling system;
4. The products would remain in the curing chamber at 20-40°C for 8 hours; and
5. The cured products would be packed and placed on pallets in preparation for storage on the dedicated hardstand area.

The operation would initially reuse 250,000T of fly ash per year, allowing for the production of approximately 28 million blocks on an annual basis. When fully operational the operation will re-use approximately 500,000T of fly ash per year and produce 250,000 tonnes for blocks and 250,000 tonnes for sand and aggregate.

The principal attribute of the technology is the ability to transform the pozzolanic properties of the ash into cement. This is achieved through the chemical conversion of the blend to produce materials which have a compressive strength which is comparable too but can also exceed the traditional clay and cement based building products. As the technology was designed to harness exothermic processes that involve natural curing procedures at ambient temperature, additional energy to conglomerate the product is not required. The materials produced have satisfied the Australian Standard Masonry Code (AS 3700) and have fulfilled the requirements of an independent evaluation by the CSIRO (Commonwealth Scientific and Industrial Research Organisation).

The final product quality would have a strength, appearance and function which is equivalent to or an improvement on the traditional clay masonry products. The weight of a Nu Rock Technology brick however is lighter, with a weight of approximately 0.95-1.0T/m². The compressive strength of the product is 20-40MPa and typical bricks/blocks have leaching characteristics that meet the requirements of the NSW Environment Protection Authority (EPA).

3.2.2 Product Handling, loading and storage

An area of approximately 2000m² will be provided temporarily to store the finished material prior to distribution and facilitate the loading of trucks and parking for plant workers. This area would consist of either a bitumen or concrete surface to minimise dust generation.

After curing and cooling, the finished product would be strapped and placed on pallets in preparation for fork lift transportation to the storage area. Once stored, the products would remain on site until dispatch.

3.2.3 Transportation

The finished manufactured goods would be transported via Wangi Road, Macquarie Street, Dora Street and Mandalong Road to the F3 Freeway. The transportation of the products from each plant would result in 20 B-Double truck movements per day.

3.3 Material supply

3.3.1 Feedstock

The production of ash associated with Eraring's energy production is forecast to increase from approximately 1.1 million tonnes annually to 2 million tonnes per year as Eraring Energy's electricity production increases. When fully operational the operation will re-use approximately 500,000T of fly ash per year into masonry and building products.

Currently, the fly ash is pumped into a 1600T capacity silo prior to slurry transportation to the adjacent Pond Ash Dam. The proposal would involve the pneumatic pumping of the fly ash from the power station CCP plant to 50T silos for storage via a new pipeline which will follow the existing pipeline for Fly Ash Australia. From these silos, the feedstock is then pneumatically transported to the batching system under automated computer control.

3.3.2 Water

The Plant layout and immediate surrounds are configured in a way to ensure that storm water is channeled to the existing ash dam adjacent to Eraring Power Station. Storm water collected on the roof of the building would be used for irrigation of the surrounding landscaped areas. Water required to aid in the manufacturing operation would be sourced from the Pond Ash Dam. This quantity is anticipated to be approximately 50,000L per annum for the two manufacturing plants. Potable water would be drawn from the region's mains water supply.

3.3.3 Electricity

Electricity that is required to power the manufacturing plant would be sourced from Eraring Generation's electrical infrastructure. Consideration would be given to the installation of solar panels on the roof of the building to assist in the production of energy to fuel the various operations performed on site.

3.4 Chemical supply and storage

The liquid and powdered chemicals required to undertake the manufacturing process would be delivered to the site by truck via the F3 Highway. It is anticipated that approximately 8 truck deliveries per week of chemicals would be required. These chemicals would be sourced from chemical distributors in the Sydney and/or Newcastle regions. Liquid chemicals used in the production would be pumped directly from the supply tanker through a controlled valve system into the chemical storage tanks within the plant building. The powdered chemicals would be pneumatically pumped directly from the supply tanker into the storage tanks inside the plant building. The liquid chemicals would be dosed into the mixer using a computer controlled batching system, while the dry chemicals would be fed into the mixer by an electronic weighing system and through a screw feeder. All the plant operations concerning the mixing, batching, production and handling of materials and goods would be fully automated and are computer controlled and monitored. Small quantities of additional chemicals, not directly involved in the manufacturing process would also be stored on site. Such substances may include:

- Lubricating oils and greases
- Industrial solvents
- Office supplies
- Cleaning chemicals

All the chemicals would be stored and transported in accordance with relevant Australian Standards and guidelines including the AS 3780 (1994) - The Storage and Handling of Corrosive Substances. In addition, all pertinent NSW Work Cover requirements and Codes of Practices will be observed. On-site personnel would be trained in all relevant aspects of safe storage, handling and emergency response measures of the chemicals stored on site.

3.5 Hours of operation

It is proposed the recycling plant would operate 24 hours a day 7 days a week and consist of 3 shifts operating during the following time periods:

- 7am-3pm: 6 people
- 3pm-11pm: 4 people
- 11pm-7am: 4 people

For each shift there would be a maximum of 4-5 employees per plant comprising of an administration officer, a foreman and 2 positions for general office and secretarial work.

All deliveries to the plant would take place during normal working hours; however, dispatches might occur at anytime during the 24hr plant operation.

3.6 Construction

The proposed plants are designed and constructed by the German company Masa. In addition, a German machine manufacturer has been contracted to supply the manufacturing equipment for sand and aggregate, bricks and blocks.

It is anticipated that the construction of the first plant would be completed by late 2013 and the second plant begun within 12 months of the completion of the first plant or as demand required.

The construction of a plant building would take a maximum of 12 weeks, excluding allowances for weather delays and other such impediments. The installation of the plant equipment is estimated to take a further 4-6 weeks after the construction period.

Construction activities are anticipated to take place during 7am-6pm seven days a week. All deliveries to the site including construction materials and equipment would occur during the normal working hours.

The sequence of events to enable the construction of the plant building is as follows:

- Site establishment
- The installation of environmental controls such as sediment and erosion management, dust suppression measures etc.
- Site works conducted and preparations for raft slab
- Placement of the raft slab and the construction of the road ingress and egress to the plant
- The steel portal frame system will be erected
- The roof plating and insulation system will be installed
- Walls constructed
- Glazing performed and panel lift door systems installed
- Installation of services and curing chamber
- Construction of Mezzanine for office and administration areas
- Installation of the storage tanks and handling system to bring the ash to the plant
- Electrical services and mechanical ventilation systems installed. All carpentry and tiling to be completed and computer systems fitted
- The plant equipment delivered and installation performed
- Commissioning of the plant and the final details of the building completed.

The construction phase of the development would employ approximately 25 persons who are to be drawn from the local region where possible. The construction equipment that would be utilised in the development will include:

- Excavators;
- Bulldozers;
- Cranes;
- Dump trucks;
- Cement trucks;
- Road grader; and
- Delivery trucks.

3.7 Capital investment value

The Proposal is expected to cost approximately \$9,052,577 including building costs and plant equipment.

3.8 The need for the proposal

Australian coal-fired power stations produce in excess of 12-13 million tonnes of CCP each year as a by-product of the coal combustion for the purposes of electricity production. Two types of ash are generally created through this process. These include fly-ash which is a fine grained ash collected from flue gases by electrostatic precipitators and bottom ash which is heavier and coarser and is collected in a wet hopper at the bottom of the boiler.

In 2008, only 31% of the fly ash produced in Australia was effectively re-used for a beneficial purpose, while the surplus was typically placed into storage ponds for a future reuse opportunity. The cement and concrete industry have slowly built significant markets for the beneficial use of fly ash but it remains a challenge to develop other high volume uses for this by-product. Ash is used for a variety of different applications, which include:

- in building materials such as cement (comprising up to 20–30% of the end product); sand-lime bricks; grouts; embankments and backfills;
- as an industrial mineral filler—the hollow spheres in fly ash are used in plastics, paints, varnishes and in refractory applications like the US Space Shuttle's heat shield;
- to stabilise industrial Coal Combustion Products; and
- as a growing medium/soil conditioner for plants.

Reusing coal fly ash has a number of advantages including:

- Reducing the need for costly disposal with its attendant environmental problems;
- Reducing energy demands in construction – each tonne of fly ash used to replace a tonne of cement saves the equivalent of nearly one barrel of imported oil (Fly Ash Resource Centre, 2001);and
- Reducing demand for typical pavement materials such as lime, cement and crushed stone.

Fly ash particles have a high mechanical strength and when added to concrete improve the strength and durability of the resulting product. The concrete is also less permeable and therefore more resistant to chemical attack.

As outlined earlier, Eraring Power Station effectively recycles 47% of its fly-ash through the sale of the product to a number of companies that incorporate the ash into construction materials. Eraring Power Station, in conjunction with NRA and Nu-Rock Technology recognise that although 47% is a significant proportion of ash to be recycled, there is potential to effectively recycle more through the construction of a facility that develops construction products on-site.

It is believed that this proposal will significantly reduce the amount of ash being deposited in on-site ponds and it is also believed that the development will set a market leading example of just how much ash can be re-used. Reducing the amount of ash being deposited in on-site ponds will decrease the land requirements of the power station operation, the water demands and a number of financial costs. The proposed plants would create employment opportunities for the local community.

4 Permissibility and Statutory Planning

4.1 Environmental Planning and Assessment Act, 1979

Approval for the Project is sought under the State Significant Development provisions (Division 4.1) of Part 4 of the Environmental Planning & Assessment Act (EP&A Act). The EP&A Act and EP&A Regulation set the framework for planning and environmental assessment in NSW.

The proposal is a use that is defined in State Environmental Planning Policy (State and Regional Development) 2011. Refer to section 4.3 below.

4.2 Lake Macquarie Local Environmental Plan 2004

The Eraring Power Station and proposed waste (CCP) recycling system are located wholly within the Lake Macquarie Local Government Area and are zoned in 4(1) Industrial (Core) under the *Lake Macquarie Local Environmental Plan 2004*.

The Local Environmental Plan permits development with consent for the purpose of a **waste management and/or recycling facility** or **industry**.

4.3 State Environmental Planning Policy (State and Regional Development) 2011

Clause 8 of State Environmental Planning Policy (State and Regional Development) 2011 provides that the development is declared to be a State Significant Development for the purposes of the Act if:

- the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, and
- the development is specified in Schedule 1 or 2.

Following an initial meeting and subsequent discussion with DoP&I we understand that the agreed definition for the proposal is **Waste and Resource Management Facilities** (Clause 23). Schedule 1 of the SEPP at 23(3) specifies that **development for the purpose of resource recovery or recycling facilities that handle more than 100,000 tonnes per year** is a state significant development.

The proposal will initially use 250,000T of fly ash per year with the potential to use 500,000T of fly ash when fully operational.

Resource recovery facility in the Standard Template *means a facility for the recovery of resources from waste, including such works or activities as separating and sorting, processing or treating the waste, composting, temporary storage, transfer or sale of recovered resources, energy generation from waste gases and water treatment, but not including re-manufacture of material or goods or disposal of the material by landfill or incineration.*

It is our understanding that DoP&I interprets re-manufacturing as the refurbishment or repairing of waste products and as such that term does not include this proposal.

4.4 State Environmental Planning Policy (Infrastructure) 2007

This SEPP states that development for the purpose of waste or resource management facilities, other than development referred to in subclause (2), may be carried out by any person with consent on land in a prescribed zone.

The 4(1) Industrial (Core) is not listed as a prescribed zone however, this SEPP does not prohibit the use in any zone, it simply permits the use in certain zones.

4.5 State Environmental Planning Policy 14 – Coastal Wetlands

Eraring Wetland or 'Muddy Lake' is located on the power station land and is listed under SEPP 14. It is located to the west of the site and is within a separate catchment to that of the power station therefore, there would be minimal impact upon the wetland in accordance with the aims of SEPP 14.

4.6 State Environmental Planning Policy 33 – Hazardous and Offensive Development

The proposed works are not hazardous or offensive development under the provisions of SEPP 33.

4.7 Environmental Protection and Biodiversity Conservation Act 1999 and Threatened Species Conservation Act 1995

The proposed facility will be constructed over an existing hardstand car parking area in an industrial site and will have no direct or indirect impact in relation to the relevant matters listed under these Acts.

4.8 Lower Hunter Regional Strategy

The Strategy states that the Lower Hunter has a high level of employment self sufficiency and potential for continued strong employment growth. The proposal can continue to enable local employment growth creating a new industrial facility within land already zoned and developed for industry.

5 Impact Identification

5.1 Chemical storage and Contamination

Chemicals are required as part of the manufacturing process and these will be stored in silos located in a bunded area. Further investigation is required to ensure appropriate measures are implemented to reduce the risk of spill and contamination.

5.2 Traffic

- Access Roads

The Freeway 3 Highway is one of the two main road transport routes between Brisbane and Sydney. The Freeway 3 Highway has a strong tidal flow during the peak periods. During the morning peak period, there is a distinct bias towards traffic flow in the southbound direction, and this is reversed during the evening peak period where the bias is towards the northbound traffic.

The subject site is connected to the F3 via the interchange to Morisset from the F3 which is accessed by Mandalong Rd, which turns in to Dora St, which goes through the town ship of Morisset. After Morisset the road is named Macquarie St and when it crosses the Dora Creek it changes name to Wangi Rd.

Wangi Road, provides access to Lake Macquarie and Newcastle to the north. The annual average daily traffic (AADT) count on the Wangi Road sourced from the Roads and Maritime Services (RMS) shows an average daily traffic (seven-day average, AWDT) of 11,000 vpd (last count done 2009 and it was 10,873). This count was collected at the Dora Creek Bridge for a week in August/September 2009. From the 2009 data at Dora Creek Bridge, the two-way peak hour traffic for an average weekday day occurred from 0600 to 0700 and 1600 to 1700 during the morning and evening peak periods respectively. The peak hour volumes are summarised in Table 5.1 below.

Table 5.1 Peak hour volumes

	Northbound	Southbound	Total
Morning Peak (0600 to 0700)	634 (13.1%)	159 (4.5%)	793 (8.3%)
Evening Peak (1600 to 1700)	244 (5.0%)	530 (14.9%)	774 (8.1%)

Percentages in brackets indicate the peak hour traffic as a percentage of the daily traffic

- Projected Plant Traffic

During the morning peak, upto ten staff would be starting their shift and another six would be finishing their shift. However, during the evening peak there would no staff arriving for or leaving from work as the evening peak hour occurs in the middle of a shift. Assuming each staff equates to one vehicular trip there would be ten vehicles entering and six vehicles leaving in the morning peak.

There would be 1.14 truck movements per day or eight truck movements per week transporting the inputs to the proposed plant. Therefore, it is assumed there would be one truck movement entering the proposed site during the morning peak.

Finished product would be transported to destinations in Sydney and Newcastle using B-Double vehicles along the F3. The B-Doubles would operate 24 hours a day, 365 days a year. There would be 280 loads per week or 40 outward loads per day, which equates to approximate two B-Double movements during either peak period. Therefore, it is assumed that two B-Doubles would be entering and another two leaving the proposed site in each peak period. All B-Double traffic transporting the finished products would be travelling southbound on the New England Highway. B-Double vehicle is a Class 10 vehicle.

- Traffic Impact and Analysis

It is anticipated that given the minimal number of traffic movements generated the proposed traffic leaving Rocky Point Rd onto Wangi Rd would not experience any capacity problem or delays therefore capacity analysis of intersections would not be required.

5.3 Hydrology (including groundwater)

The main hydrological features in the region include:

- Lake Macquarie which provides cooling water to the Eraring Power Stations is situated to the east of the Proposal at an approximate distance of 5km.
- A freshwater dam, which is situated to the west of the Power Station and supplies the domestic water requirements as well as the fire protection water for the Eraring Power Stations.
- Pond Ash Dam.
- Dora Creek collects all the storm water runoff from the Eraring Station and coal plant area and drains into Lake Macquarie.

5.3.1 Groundwater

Groundwater flows in the region would be relatively high as a result of the jointing, folding and faulting disturbance to the lithology. However, due to the prospects of high weathering in the region, the joints may be in -filled with clays. In such instances, groundwater recovery would be low.

A hydrology study of the area however is considered unnecessary as the proposal is limited to surface construction. Deep excavations would not be required as part of the site establishment. In addition, there are limited water bodies in the immediate area of the Proposal which would have the potential to be affected by the construction activities performed on site.

Any potential impacts to groundwater quality associated with the proposal would be primarily associated with the seepage and migration of surface contaminated water into the local groundwater, which could ultimately impact the local groundwater quality, as well as the water quality of receiving water bodies such as Lake Macquarie.

Given the scale of works and the locality of the proposal with respect to water bodies, the potential for any significant amounts of pollutants to reach local streams overland or through groundwater networks is low.

During construction, there is a slight potential for stored chemicals or fuels to spill or leak. This however, will not have any localised implications for groundwater and soils because they would be stored on a sealed surface, ie the existing car park tarmac or the slab constructed for the plant.

During operation, the activities performed on site would occur on paved surfaces which would mitigate vertical migration of any potential pollutants. All chemicals used on the premises would be contained in accordance with NSW EPA guidelines and relevant spill mitigation measures would be in force during operation. The impacts to water quality during operation would be minimal.

5.3.2 Surface Water

The Plant layout and immediate surrounds are configured in a way to ensure that storm water will be channelled to the existing ash dam adjacent to Eraring Power Station. Storm water collected on the roof of the building would be used for irrigation of the surrounding landscaped areas or connected to the existing stormwater infrastructure. Water required to aid in the manufacturing operation would be sourced from the Pond Ash Dam. This quantity is anticipated to be approximately 50,000L per annum for the two manufacturing plants.

Further investigation is required into the design and management of surface water.

5.4 Visual impact

The proposed building is only single storey, which is significantly less than many of the structure related to the power station.

The site is within the power station land and will only be visible to persons using Construction Road. This road only serves a particular part of the power station and Fly Ash Australia operations north of the proposal site. As such only those needing to access these facilities would see the proposal and therefore no visual impact study is required.

5.5 Flora and fauna

Existing vegetation on the site is primarily characterised by a combination of introduced and native grasses and sedges. Existing vegetation is growing on a thin substrate of topsoil (approximately 100mm) which was introduced to the site to cover a deposit of ash approximately 5 metres in depth. It is not known if the existing vegetation was planted or whether it naturally regenerated from seed stock contained in the topsoil.

The plant will be located on an existing sealed car park on an industrial site and as such will have no impact on flora or fauna. As such no further investigations are required.

The applicant is willing to include native vegetation into the garden areas around the plant building to soften its impact on the surrounding environment. All species used in revegetation initiatives will be representative of local indigenous flora. Where possible seed would be collected from existing native vegetation remnants in the surrounding area. A range of species including ground covers, under storey species and trees would be used in rehabilitation to increase the diversity of flora.

Establishment of native flora species will be followed-up with an extensive maintenance and monitoring program to ensure maximum survival rates and to eradicate invasions of pest plants and exotic species.

5.6 Air Quality

- Construction

Potential effects on air quality in the area during the construction phase would be limited to the generation of dust associated with earthworks and soil stockpiles during dry and windy conditions and emissions from diesel powered equipment. These impacts, however, would be short-term lasting no longer than 1 to 2 weeks during the 12 week construction period. It is not considered that these would have any direct impacts on residents or the general public due to the distance of the proposed sites from the nearest residential property. Potential impacts from dust generated during construction would generally be confined to the immediate vicinity of the construction site and can be mitigated through implementation of a construction management plan.

The applicant will ensure the following during construction:

- The area of unsealed surface around the development site will be minimised to ensure minimal dust disturbance
- Unsealed areas will be dampened down on dry and windy days to minimise dust movement.
- Stockpiles and soil heaps will be covered over.
- Ensuring all construction equipment operates in accordance with the Clean Air, (motor vehicles, and motor vehicle fuels) Regulation 1997.
- All equipment will be maintained and operated in an efficient manner to reduce exhaust emissions.
- Disturbed areas will be revegetated as soon as possible after construction completion to minimise on-going dust problems.

- Operation

The proposed plant would produce zero emissions in relation to the batching and curing process.

All incoming and outgoing traffic would operate on sealed roads, thus minimising dust generating potential. A wash down bay would also be provided on site to ensure any localised ash and dust is not transported and deposited on the local road network.

The proposed plant would operate as an enclosed system with no fly ash being exposed. Fly ash from the power station would be transported pneumatically along a pipeline to a 100 tonne sealed silo located within the facility.

Based on the above no further investigation is required in relation to this matter.

5.7 Noise impacts

Some noise will be generated during the construction of the plants however the noise associated with the construction of the plants is unlikely to be heard over the back ground noise of the Eraring Power Station.

Noise emissions associated with the operation of the plant itself would be approximately 85dBa. The plant equipment is located within a facility constructed predominantly of insulated panel system (walls), which would act to significantly decrease this noise level. The 85dBa would only escape through the open doors to the plant and would not be heard over the back ground noise of Eraring Power Station. Other likely noise generating activities include:

- Trucks accessing and egressing the site
- Staff vehicles accessing and egressing the site
- Loading and unloading of trucks

The closest sensitive receptors are residential or community uses more than 2km away separated from the proposed facility by dense vegetation and a rise in the topography. As such the impact on any existing residential amenity or intrusiveness would be negligible and no further assessment against the criteria for construction noise set out in the Environmental Noise Control Manual ENCM (EPA, 1994) or the NSW Government Industrial Noise Policy (2000) is required.

5.8 Bushfire

Eraring Energy has developed and implemented a Land Management Plan (LMP) that coordinates onsite activities to enhance site biodiversity. The LMP consists of a number of individual plans that address specific areas, one of these being Bushfire Management.

The proposal will benefit from the Bushfire Management Plan (BMP) implemented by the Power Station.

Bushfire Management is an important consideration for Eraring Energy as the Power Station is surrounded by large areas of native bushland. The Bushfire Management Plan (BMP) was developed in consultation with the Rural Fire Service and local stakeholders. It outlines the schedule of fire management activities necessary to minimise the risk of uncontrolled bushfires on Eraring Power Station land.

Fire management activities described in the BMP are designed to reduce the available fuel load and provide access for fire fighting operations. This is achieved by:

- Clearing activities (such as mowing and slashing)
- Maintenance of fire trails
- Performing controlled burns.

Controlled burn activities at Eraring Power Station maintaining low fuel loads minimises the risks to the power station, surrounding communities and the environment as any subsequent bushfire will:

- Generate less heat

- Travel more slowly
- Have a lower flame height
- Be less likely to produce embers that can cause spot fires.

Due to the size of the land holdings and access difficulties, it is necessary to perform controlled burns at Eraring Power Station.

All controlled burns at Eraring Power Station are approved and performed by the Rural Fire Service. Controlled burns are performed on management zones (excluding the natural heritage management zones) on a rotating basis. Fuel loads are monitored on each of the zones and burns are performed every five to eight years as required. The frequency of controlled burns is kept to a minimum to conserve the biodiversity of the management area.

5.9 Heritage

5.9.1 Non Indigenous

The Lake Macquarie Local Environment Plan sets out items of local heritage significance. It includes the following listing:

	268 Rocky Point Rd, Eraring	Lot 11, DP 1050120
	294 Rocky Point Rd, Eraring	Lot 10, DP 1050120
Eraring Power Station	115 Construction Rd, Myuna Bay	Lot 50, DP 840671
	215 Construction Rd, Myuna Bay	Lot 20, DP 840668
	235 Construction Rd, Myuna Bay	Lot 211, DP 840670
	260 Construction Rd, Myuna Bay	Lot 51, DP 840671

The proposed site is within Lot 11, DP 1050120.

A review of the heritage inventory sheet indicates that the power station is of high State, regional and local significance as it was the biggest industrial undertaking around the Lake, and one of the biggest in the Hunter region. It represents the "State of the Art" in its technology, and is one of the biggest power stations in the State.

The physical characteristics described in the inventory relate to the building, switchyard, cooling water canal, turbine hall, auxiliary bay, boilers, ash filters, stacks and cooling water outlet tunnel and canal ending in Myuna Bay. It also described the 2 stacks being 200 metres high and visible from far across the lake.

The car park is not included in the description and unlikely to contribute to the heritage significance of the item.

5.9.2 Indigenous

The NSW National Parks and Wildlife Service maintains a register of all the Aboriginal sites reported in NSW. Previous studies conducted in the area revealed that artefacts may be located on the banks of Tinker Creek, adjacent to Eraring Power Station (National Environmental Consulting Services, 2001). Previous, industrial disturbance to the site however, has resulted in removal or burial of the original land surfaces. The study concluded that there was little potential for such artefacts surviving this process.

As a result of the past disturbance to the proposed site including cut and fill to create a level car park, it is highly unlikely that the site is constrained for development.

5.10 Social and Economic Impacts

The Proposal would have positive long term benefits on the social and economic environment in the Lake Macquarie area. While construction is in the order of \$9-10m, many of the construction materials and equipment will be sourced within the Hunter Region and NSW, thus contributing to the local economy.

The proposal will have a positive economic impact as construction of the two plants will increase employment opportunities during construction and operation of the plants. This in turn will provide a cash flow to local businesses and could possibly assist in retaining local residents and decreasing unemployment levels in the local area.

Eraring Energy and NRA endeavour to engage in on-going liaison and communication with key stakeholders and the community to build a constructive and collaborative working relationship. This communication will take the form of regular meetings concerning developments within the zone as well as other key issues raised by stakeholders.

- As part of environmental management procedures, an environmental monitoring program will be implemented to ensure that any environmental issues arising from the construction and operation of the Proposal are dealt with promptly and efficiently.
- A Risk Management Plan will be prepared prior to the commencement of construction for both the construction and operation phases of the proposal. This Plan would establish procedures to be implemented in the event of the accidental spillage or leakage of chemicals outside and within the plant.

6 Justification

6.1 Strategic purpose for the site and context of the development

The existing operation of Eraring Power Station makes the subject site an ideally suited location for the development of a facility that can re-use a by-product of coal combustion for incorporation into a building product. The development of the plant minimises the amount of CCP that is placed into ash ponds on site and provides a foundation for a commercially viable product. The development of the proposed plant is economically viable and will create employment within the local area.

6.2 Considered alternatives

6.2.1 Option 1 – Do not undertake any changes to the existing management of CCP

This option would involve continuing the present practice of disposing the majority of the ash into the pond ash dam onsite.

The **advantages** of continuing with the present ash disposal methods are:

- infrastructure is currently in place and no additional costs would result in the continuing present regime; and
- no new construction is required on Eraring Energy property.

There are several **constraints** related to the continued operation of ash disposal:

- The potential for ground and surface water contamination resulting from disposal in ash dams;
- long term sustainability is not viable;
- land usage – in order to store or dispose of ash, large areas of land are required;
- visual impact associated with the large expanse of ash landfills; and
- the potential for dust escaping during ash handling and placement.

A lack of alternate waste recovery will jeopardise the ability of the power station to operate to its maximum potential over its lifetime.

6.2.2 Option 2 – Development of 8 plant facilities

This option would involve the construction and operation of eight plants fully utilising all ash produced from Eraring Power Station.

The **advantages** with developing eight plants would be:

- all future ash from Eraring Power Station would be utilised resulting in no more ash being stockpiled at the Ash Dam;
- decreased ash management costs and exposure to environmental risk by Eraring Energy and
- up to 200 new jobs in the local area.

There are several **constraints** related to the operation of eight plants:

- it would contribute up to 160 extra truck movements per day along the F3 Motor Highway, and would more than likely require rail transportation access;
- they would require considerable initial investment of capital from NRA. This would present unnecessary risk until such time as supply and demand can be more accurately forecast.

6.2.3 Option 3 – Development of 2 plants

The third option would involve the development of two plants capable of processing a combined total of 500,000 tonnes of ash per year (at full operation).

The **advantages** of developing two plants are:

- one quarter of all future ash from Eraring Power Station would be utilised, significantly reducing the quantity of ash going to landfill;
- up to 50 jobs would be created in the local area and the project would contribute roll on economic benefits annually to the local economy; and

There are several **constraints** related to this option:

- there would be an increase of 40 truck movements per day along the F3 Highway to facilitate the distribution of the finished product; and
- the option does not utilise all ash produced from Eraring Power Station.

6.3 Justification of Preferred Option

Following an assessment and comparison of the three options it was decided that Option three, the development of two plants will provide the most sustainable option at this time. The selection of this option was based on:

- the environmental and cost benefits associated with decreasing the amount of ash going to landfill;
- the ability of the proposal to satisfy NRA's and Eraring Energy's objectives and recycling targets;
- the efficiency of the proposal to meet present demand and the flexibility to meet future demands;
- the lower impact of traffic on the New England Highway compared to the eight plant option.

6.3.1 Environmental leadership and sustainability

The recovery and re-use of CCPs into identified applications can have substantial environmental benefits. Some of the most prevalent examples of the environmental benefits gained from the re-use of CCPs include the following.

- The reduction in waste stream and associated reductions in requirements for landfill.
- The conservation of resources such as gypsum, limestone and natural gas when fly-ash is used as a replacement in cement production.
- The reduction of greenhouse gas emissions when used as a cement replacement (saving up to one tonne of carbon dioxide per tonne of cement).

7 Consultation

7.1 Community and Agency consultation

Consultation will be in accordance with statutory requirements.

As the site is within the boundaries of the existing power station separated from any residential and community uses by a distance of at least 2 kilometres of which much is dense vegetation, community consultation has not been undertaken as part of preparing the proposal.

The applicant has met with the Council to discuss the proposal, which was well received as it reuses a large waste product and offers opportunities for carbon credits.

8 Conclusion

This report sets out the proposed project and provides an overview of potential key issues. The proposal is for 2 waste recovery plants in a single building, which will work symbiotically with the power station to reduce its waste stream. This will enable the power station to operate to its maximum life span. The proposal will be located on a disused sealed car park within the boundary of the power station land, well away from any sensitive receivers.

In summary the key environmental considerations identified in this preliminary assessment for the proposed facility:

- surface water management and water supply
- management and storage of chemicals.

These issues will therefore be addressed in greater detail in the EIS. The potential impacts of the proposed facility on infrastructure, traffic and noise issues will be addressed to a lesser extent in the EIS.

APPENDIX 1: Landowners consent

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11th March, 2013

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Dear Mr Ritchie

LANDOWNERS CONSENT FOR NU ROCK DEVELOPMENT APPLICATION

On behalf of the landowner of Lot 11, DP 1050120, we hereby provide consent to Nu Rock Technology Pty Ltd to lodge a development application for a resource recovery plant at Eraring Power Station.

Yours faithfully

A handwritten signature in black ink, appearing to read 'J Hogan' with a long horizontal flourish extending to the right.

JEFF HOGAN
EXECUTIVE MANAGER ERARING OPERATIONS