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Prepared for:

Orica Australia Pty Ltd

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Kooragang NSW 2300

Environmental Assessment Scoping Report: Planning Approval for Uprating of Ammonium Nitrate Facility, Kooragang Island



ENSR Australia Pty Ltd (ENSR)

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Distribution

Environmental Assessment Scoping Report: Planning Approval for Uprating of Ammonium Nitrate Facility, Kooragang Island

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Contents

List of Tables

Body Report

List of Figures

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1.0 Introduction

1.1 Background

ENSR Australia Pty Ltd. (ENSR) was engaged by Orica Australia Pty Ltd. (Orica) to prepare this Environmental Assessment Scoping Report (EASR) for the proposed uprate of the existing Ammonium Nitrate Production Facility to some 750 ktpa of product. The project would involve the construction of an additional Nitric Acid Plant (NAP) and an additional Ammonium Nitrate Plant (AN Plant). The project would also involve modification of the upstream Ammonia Plant, additional storage facilities and other infrastructure and uprating of ammonium nitrate recovery/recycle systems.

The existing business located at Kooragang Island is an Ammonium Nitrate Production Facility with a current operational capacity of approximately 500 ktpa. The site, which commenced operation in 1969, is the location for a number of plants that manufacture ammonia, nitric acid and ammonium nitrate. The ammonium nitrate product is primarily used in the mining industry.

The uprating of the existing facilities production capacity is required to meet increasing demand (both local and international) for product, much of which is driven by the expansion of the mining industry. It has been forecast that demand is expected to exceed supply from 2010 and potentially earlier dependent on various scenarios.

1.2 Location

Kooragang Island is located within the Port of Newcastle, approximately 3 km north of Newcastle CBD. A location map is provided at **Figure 1** (figures are at the end of this report).

The Island was developed in 1951 as part of the Hunter River Islands Reclamation Scheme, which joined islands within the Hunter River with dredged sand and fill material. The development was completed in 1960, and was designated for industrial development and Port related activities. The manufacture of ammonia, nitric acid and ammonium nitrate has occurred at the site since the facility was commissioned in 1969. Today the Island is owned by the State Property Authority (SPA) and is managed by Newcastle Port Corporation (NPC) and/or Hunter Development Corporation. Existing industrial developments on the Island includes Port Waratah Coal Service, wharf facilities, coal and woodchip loaders, Incitec Pivot Ltd, Sims Metal Ltd, Cargill, BOC Gases, Cleanaway, Boral, A. J. Meyer and Transfield Pty Ltd. The Hunter Estuary National Park is located approximately 1.5 km north of the site.

The nearest residential premises are located at Stockton, approximately 800m east of the Orica property boundary. There are also residential properties to the west at Carrington and Mayfield, 1.5km and 2km respectively.

The land surrounding the Orica site is used for industrial and port related activities including the following:

- North, Incitec Pivot operates a fertiliser storage and despatch facility.
- West, Newcastle Port Corporation and its lessees P&O Ports Ltd, Sawmillers Exporters Pty Ltd, Cement Australia and Kooragang Bulk Facilities operate bulk goods importing/exporting operations on the western side of Heron Rd. Kooragang Bulk Facilities operates storage facilities for Hydro Aluminium on the eastern side of Heron Rd.
- South, Patricks and Bulk Grain Terminals operate storage and despatch facilities.

- East, whilst the land to the east of the site is currently vacant there is a proposed development for the storage of hydrocarbon products proposed on a portion of this land.

1.3 Approval Regime

The *Environmental Planning and Assessment Act 1979* (EP&A Act) outlines the development assessment process in New South Wales. If the development is a major project of state significance, it is assessed under the Part 3A of the EP& A Act.

This project has been declared as a Major Project listed under Schedule 2 of *State Environmental Planning Policy (Major Projects) 2005* (SEPP 2005) as:

Group 3, (10) (Chemical, manufacturing and related industries) of Schedule 1 includes:

> *1 'Development that employs 100 or more people or with a capital investment value of more than $20 million for the purpose of the manufacture or reprocessing of the following (excluding labelling or packaging):*
>
> *e) ammunition or explosives*

The project has also been declared under Schedule 2 of the SEPP (Major Projects) given its location within the Coastal Protection Zone:

1 Coastal areas

(1) Development within the coastal zone for any of the following purposes:

agricultural produce industries, bitumen pre-mix industries, breweries or distilleries, cement works, ceramic or glass industries, chemical industries or works, chemical storage facilities, composting facilities or works, contaminated soil treatment works, crushing, grinding or separating works, drum or container reconditioning works, electricity generating stations, livestock intensive industries, livestock processing industries, mineral processing or metallurgical works, paper, pulp or pulp products industries, petroleum works, wood or timber milling or processing works, or wood preservation works

The proposal is, therefore, a candidate for assessment under Part 3A of the EP&A Act, and, as such, a project approval is sought with the Minister as the decision-making authority

1.4 Purpose of this Environmental Assessment Scoping Report (EASR)

This EASR forms the preliminary environmental assessment of the proposed works. The purpose of the EASR is to provide the Minister with an outline of information and background environmental data on the site and the proposed project, sufficient to establish the key environmental issues of significance and the level of environmental assessment required for the application.

1.5 The Proponent

The proponent for the proposed project is Orica Australia Pty Ltd. Orica is an independent, Australian-owned company which operates through the following business platforms:

- Mining Services - offering commercial explosives, initiating systems and advanced mining solutions to the mining, quarrying and construction industries;
- Chemnet - imports, sources or manufactures over 20,000 chemical products;

- Minova - supplies specialist chemical products for underground mining and civil engineering activities;
- Chemical Services - supplies chemicals, services and technology to the water treatment, mining chemical and industrial chemical markets; and
- Orica Consumer Products – supplies a range of decorative paints, surface preparation products, and garden care products.

The Kooragang Island site is a part of Orica's Mining Services business platform primarily providing commercial explosives for the mining industry.

1.6 Structure of the Report

To inform relevant government agencies and the local council of the scope of the project, such that the level and detail of environmental assessment required is understood, this EASR has been structured to provide information on broad areas as follows:

- Section 1 – provides a background to the project, including information about the proponent;
- Section 2 – outlines a description and justification for the project;
- Section 3 – describes the planning context, including the approvals required;
- Section 4 – details stakeholder involvement in the process;
- Sections 5 and 6 – reports on the environmental implications in terms of physical and biological effects, including the baseline situation and anticipated impacts;
- Section 7 – examines the likely impacts of the project on resources (community, natural and transport);
- Section 8 – outlines the potential community effects, including the social, heritage and cultural, and economic implications;
- Section 9 – prioritises environmental issues for the EA; and
- Section 10 – presents a summary of the findings and recommendations.

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2.0 Project Description

2.1 Overview

The current Kooragang Island facility uses natural gas as primary feedstock and consists of:

- 1 Ammonia Plant;
- 3 Nitric Acid Plants; and
- 2 Ammonium Nitrate Plants (as Prill, granular and Solution).

The current Ammonium Nitrate (AN) production at Kooragang Island is 430 ktpa with capacity for 500 ktpa. The facility currently produces Nitropril® (270 kt), Opal™ (60 kt; primarily for export) and AN solution (100 kt) per annum.

Due to increased product demand and favourable market conditions, the proponent is seeking to increase AN capacity of the Kooragang Island facility to 750 ktpa. This would involve the modification of an existing Ammonia Plant, the construction of an additional Nitric Acid Plant (NAP) and a third AN Plant. A number of options relating to available technology/plant are further discussed in this chapter.

2.2 Process Description

A process flowchart demonstrating the steps in the operation of the proposed AN uprate is shown in **Figure 2.** In summary, the process includes three components.

Ammonia Manufacturing: In the Ammonia Plant, hydrogen gas is first produced from the steam reforming of natural gas. The impure hydrogen gas is mixed with air to supply the nitrogen for the conversion to ammonia and then goes through some purification and synthesis steps. The ammonia is then liquefied. Ammonia is used in the production of nitric acid and ammonium nitrate. Ammonia is also sold for use as an agricultural fertiliser or a refrigerant.

Nitric Acid Manufacturing: Nitric acid (NA) is produced by reacting vapourised ammonia with compressed air in the presence of a catalyst. The nitrogen oxides created in this process are then reacted with water to produce nitric acid. Nitric acid is used in the production of ammonium nitrate and also sold for use in other industrial applications.

Ammonium Nitrate Manufacturing: Ammonium nitrate (AN) is manufactured through the reaction of ammonia and nitric acid. Ammonium nitrate is utilised in the manufacture of explosives for the mining and quarry industries.

Each of these components is described in further detail below.

2.2.1 Ammonia Production

The Ammonia Plant uses natural gas to produce approximately 290,000 tonnes per annum of ammonia (NH_3). The ammonia is used in the manufacture of nitric acid and ammonium nitrate, and is also sold for use as an agricultural fertiliser or a refrigerant.

The first stage of the process involves the removal of sulphur from the natural gas using a catalyst and adsorbent material. The natural gas is then mixed with steam and passed over a nickel-containing catalyst in the Primary Reformer, to produce hydrogen, carbon monoxide and carbon dioxide. The gas stream then passes to the Secondary Reformer where air is added to supply the nitrogen needed to

make ammonia. The mixture is then passed through a different nickel catalyst to complete the conversion of methane to hydrogen, carbon monoxide and carbon dioxide.

Two different catalysts in the Shift Converters are then used to convert carbon monoxide and water to carbon dioxide (CO_2) and hydrogen. Carbon oxides must be removed from the gas stream prior to the production of ammonia as they would otherwise poison the catalyst used to produce the ammonia. The CO_2 is removed from the process gas stream using an amine solution which circulates through a CO_2 Removal Tower. The carbon dioxide is then stripped from the amine solution and a portion is sold for use as a food preservative and to carbonate drinks.

The 3:1 mix of hydrogen and nitrogen gases is then compressed and fed to the Ammonia Converters, where, in the presence of an iron catalyst, the nitrogen and hydrogen combine to form ammonia. The gas from the Ammonia Converters is then refrigerated to –25˚C, liquefying the ammonia which is separated from the gas. This ammonia is then either used directly in the manufacture of nitric acid and ammonium nitrate, or stored in a 12,000 tonne refrigerated storage tank.

The proposed uprate would potentially involve modification / debottlenecking of the current Ammonia Plant with the addition of new / larger components. The process would remain fundamentally the same.

2.2.2 Nitric Acid Production

In the Nitric Acid Plants (NAP), ammonia is vapourised and then mixed with compressed air before being passed over a catalyst in a Converter, resulting in the formation of nitrogen oxides. Two of the plants use platinum as the catalyst, whilst a cobalt oxide catalyst is used in the third plant. The process gas is then cooled and the recovered heat is used either for heating of gas streams or for the generation of steam which is used to operate turbines. The turbines drive the compressors that produce the compressed air for use in the process.

The cooled process gas is then passed to an Absorption Column, where added water reacts with the nitrogen oxides in the gas to form 55 – 65% nitric acid. The nitric acid is stored in tanks for use in the manufacture of ammonium nitrate or sold for use in other industrial applications. The unused tail gases are then treated to further reduce the levels of nitrogen oxides (NO_x) prior to discharge to the atmosphere. Tail gas is continuously monitored to ensure it complies with the required emission standards.

The proposed new No.4 Nitric Acid Plant (NAP4) would be similar process to the existing Nitric Acid Plant (NAP3) utilising platinum as a catalyst. The location of the proposed new NAP4 is shown in **Figure 3**.

2.2.3 Ammonium Nitrate Production

Currently, ammonium nitrate is produced onsite as a precursor for use in the manufacture of explosives for the mining and quarry industries. Ammonium nitrate product is produced either in solution form or as one of three solid forms. The solid forms consist of a prilled product known as Nitropril® and two granulated products known as Opal™ and Chemically Pure Ammonium Nitrate (CPAN). The latter is used in the manufacture of medical gases.

The Nitropril process involves the acid-base reaction of a mixture of nitric acid and vapourised ammonia in a Neutraliser to produce an 83% ammonium nitrate solution. The solution strength is then increased to 96 - 98% in an Evaporator. This concentrated solution is sprayed into a Prill Tower where it forms 1-3mm diameter solid balls of ammonium nitrate, called prill. The prill is then dried with hot air and cooled in rotating drums before being screened and coated with an agent to improve the storage properties. Opal, CPAN and Ammonium Nitrate Solution are produced in a second plant, where nitric acid and vapourised ammonia are combined in a Pipe Reactor to produce a 92% ammonium nitrate solution. Some of this solution is despatched offsite for use in the manufacture of explosive emulsions. The remaining solution is then passed through an Evaporator to increase its ammonium nitrate concentration to 99%. The concentrated solution is then sprayed into a Fluidised Drum Granulator where small spheres of solid ammonium nitrate are formed. The material is then screened to recover the 4mm ammonium nitrate product. The granules are then coated with an agent to improve their storage properties. Undersized and oversized materials are returned to the granulator either directly or via a crusher.

Solid ammonium nitrate products are stored in bulk in an air-conditioned building. Products are then transferred for bulk despatch or transferred to the bagging facility, where AN is loaded into 1.2 or 1.05 tonne bulk bags prior to despatch.

The proposed additional Ammonium Nitrate plant would manufacture Ammonium Nitrate Solution and Nitropril. As an intermediate step, additional solution capacity may be provided by modification of the existing AN plant (AN2).

2.3 Product Quantities

Table 1 details the production capacity for the current operation and the proposed plant uprate.

Table 1: Capacity of Product Quantities for Current and Proposed AN Plant.

Product	Current Capacity (ktpa)	Proposed Capacity (ktpa)
Nitropril	330	640
Opal	60	60
AN Solution	100	250
Nitric Acid	350	610
Ammonia	300	360

2.4 Infrastructure Requirements

Figure 3 provides the proposed site layout of the proposed AN uprate and includes the following proposed additional/modified infrastructure:

2.4.1 Ammonia Plant

Two options are being considered to provide ammonia for the uprated AN capacity. The first is to uprate the existing Ammonia Plant through the replacement of a number of compressors with larger machines and the implementation of changes to the heat balance / recovery system. The other option is to import the additional ammonia requirements.

2.4.2 Nitric Acid Plant (NAP)

The site currently has three Nitric Acid plants capable of achieving 350 ktpa NA (430 ktpa AN equivalent). These are NAP1 (Cobalt catalyst (1969) with 460 tpd NA capacity), NAP2 (electric driven Weatherly high pressure (1986) with 250 tpd NA capacity) and NAP3 (steam driven Weatherly high pressure (2004) with 310 tpd NA capacity). The proposed uprate would require an additional NAP of up to 770 tpd capacity. The opportunity to increase the NA plant capacity to enable on of the existing plants to be retired will be further investigated in the EA. The new NAP would be designed to Best Available Technology (BAT), specifically associated with NO_x and N_2O abatement. Consideration would also be given to start-up venting control for both NO_x and NH_3, and the energy and raw material efficiencies.

2.4.3 Ammonium Nitrate Plant

The site currently has two Ammonium Nitrate Plants. AN1 utilises a prill tower to produce a solid product (Nitropril®), whilst AN2 produces AN solution and a granular solid product (Opal™). A new AN plant (AN3) would be required for the proposed AN uprate producing Ammonium Nitrate Solution and Nitropril®. A new prill tower would be required to meet the demand for Nitropril® and this tower would likely include emission controls such as scrubbing/recirculation. As an intermediate step additional solution capacity may be obtained through modification / de-bottlenecking of AN2 Plant.

2.4.4 Storage

Ammonia: Current on-site storage of Ammonia is a 12,000 tonne refrigerated tank and three pressurised bullets.

Nitric Acid: Current NA storage consists of three NA tanks with a total storage capacity of 3000 tonnes.

Solid Ammonium Nitrate: Current on-site storage of solid AN is 15,500 tonnes of bulk and 2,500 tonnes of bag. Currently operating load-out facilities are for road only although some rail-infrastructure exists. If rail is seen as a desired option then the rail and loading infrastructure would require review.

Ammonium Nitrate Solution: Current ANS site storage is 375 tonnes in a single tank.

It is anticipated that additional storage capacity will be required for pressurized ammonia, nitric acid, ammonium nitrate and ammonium nitrate solution. The required additional storage capacities will be determined as part of the proposed uprate.

2.4.5 Other Infrastructure

Steam: The current steam system would need to be integrated with the proposed uprate design.

Cooling Water: Additional cooling towers would be required for NAP4 and for AN3.

Instrument and Factory Air: Additional compressors would be required for instrument and factory air.

Distributed Control System (DCS) for plant control: Additional modules would be required for the existing Toshiba DCS.

AN Recycle / Recovery and Effluent Treatment System: The current systems for recovering and recycling ammonium nitrate would be expanded to manage the increase load of recoverable AN. A number of options are available which will be explored in the EA. Effluent Treatment processes would also be reviewed as required, with the intent being to minimise recoverable product in effluent through modern plant design and environmental philosophy.

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3.0 Statutory Planning

3.1 Introduction

There are several levels of legislation and environmental planning instruments that need to be considered for this project. These include:

- Commonwealth matters;
- State matters, including the EP&A Act as well as State Environmental Planning Policies;
- Regional matters; and
- Local matters.

3.2 Commonwealth Matters

Actions that may significantly affect matters of National Environmental Significance (NES) require approval from the Commonwealth under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC). The EPBC Act lists seven matters of NES which are considered in the table below:

Table 2: Matters of NES considered in the EPBC Act

Matter of NES	Commentary
World Heritage properties	There are no World Heritage properties in the vicinity of the proposed project
National Heritage places	There are no National Heritage places in the vicinity of the proposed project
Ramsar wetlands of international significance	There is a Ramsar wetland within the vicinity of the proposal. However, the project is not anticipated to have a significant impact on the wetland
Threatened species and ecological communities	No threatened plant species have been identified at the site. Four threatened fauna species have been recorded in the area. However, the proposal site has been highly modified and has very little habitat value.
Migratory species	There are migratory species associated with the Ramsar wetland.
Commonwealth marine area	There are no Commonwealth marine areas in the vicinity of the proposed project
Nuclear actions (including uranium mining)	This matter is not applicable to the proposed project

Another relevant section of the EPBC Act requires Commonwealth approval for any activities that will, or are likely to have, a significant impact on Commonwealth land (Part 3, Division 2, section 26). The land on which the project will be constructed is not Commonwealth land. Nor is there any Commonwealth land within close proximity of the project which could be secondarily impacted by its construction or operation. As such, this section of the Act is not applicable.

3.3 State Matters

The guiding legislation in gaining approval for this project is the Environmental Planning and Assessment Act 1979 (EP&A Act). Within the planning framework however, there are a number of State Environmental Planning Policies (SEPPs) that are relevant to the proposed project. These SEPPS are discussed below.

3.3.1 State Environmental Planning Policy (Major Projects) 2005

SEPP 2005 identifies developments that are considered to be Major Projects under Part 3A of the EP&A Act 1979.

The primary aim of SEPP 2005 is:

> *To identify development of economic, social or environmental significance to the State or regions of the State so as to provide a consistent and comprehensive assessment and decision making process for that development.*

This project has been declared under SEPP 2005 under:

Group 3, (10) (Chemical, manufacturing and related industries) of Schedule 1 includes:

> 2 *'Development that employs 100 or more people or with a capital investment value of more than $20 million for the purpose of the manufacture or reprocessing of the following (excluding labelling or packaging):*
>
> *f) ammunition or explosives*

The project has also been declared under Schedule 2 of the SEPP (Major Projects) given its location within the Coastal Protection Zone:

> *1 Coastal areas*
>
> *(1) Development within the coastal zone for any of the following purposes:*
>
> *agricultural produce industries, bitumen pre-mix industries, breweries or distilleries, cement works, ceramic or glass industries, chemical industries or works, chemical storage facilities, composting facilities or works, contaminated soil treatment works, crushing, grinding or separating works, drum or container reconditioning works, electricity generating stations, livestock intensive industries, livestock processing industries, mineral processing or metallurgical works, paper, pulp or pulp products industries, petroleum works, wood or timber milling or processing works, or wood preservation works.*

As a declared project by the Minister under Part 3A of the EP&A Act, the EA would be undertaken in accordance with the Director-General's Environmental Assessment Requirements.

3.3.2 State Environmental Planning Policy (Infrastructure) 2007

Schedule 3 of this SEPP provides the Roads and Traffic Authority (RTA) with the opportunity to provide feedback on certain traffic-generating developments before a consent authority makes a determination about a development application.

Schedule 3 lists types of development to which this policy applies, including "industry" with a site size of 20,000 m^2 with access to any road or of 5,000 m^2 *"with access to classified road or to road that connects to classified road (if access within 90m of connection, measured along alignment of connecting road)".*

The AN facility is located on Greenleaf Road, which is owned by the State Property Authority and managed on their behalf by Newcastle Port Corporation. Nevertheless, other roads owned by the RTA occur within the vicinity and these would be used by vehicles transporting product from the AN facility.

The Environmental Assessment (EA) to be prepared for the proposed project would therefore assess the potential impacts of traffic on nearby RTA owned roads and the EA will be forwarded to the NSW RTA and Newcastle City Council (NCC) for comment.

3.3.3 State Environmental Planning Policy (SEPP) 33 - Hazardous and Offensive Development

SEPP 33 was designed to ensure that sufficient information is provided to consent authorities to determine whether a development is hazardous or offensive. Conditions can then be imposed on the development to reduce or minimise adverse impacts. Any development application for a potentially hazardous development must be supported by a Preliminary Hazard Analysis (PHA).

The document *Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines* was prepared by the Department of Urban Affairs and Planning in 1994 to provide assistance in implementing SEPP 33. As an industrial development requiring development consent and a pollution control licence, an assessment of SEPP 33's application to the project is required.

The project would be deemed permissible if the PHA:

- Demonstrates that the risk of the project as a potentially hazardous industry is not significant; and / or
- Demonstrates that as potentially offensive industry a pollution control licence can be obtained.

The facility meets the NOHSC standard requirements to be classified as a Major Hazard Facility (MHF) by virtue of the storage capacity of both ammonia and ammonium nitrate. These are different criteria to the definition of hazardous and offensive industries as discussed in SEPP 33. As the proposed development will be part of a MHF, it would be subject to planned State MHF Legislation under the Occupational Health and Safety Act (WorkCover).

SEPP 33 will be observed with a Preliminary Hazard Assessment (and utilising the Guidelines for Hazard Analysis and Multi-Level Risk Assessment). However, the PHA is expected to confirm that the risks of the facility are not significant. The other environmental studies (such as noise) is expected to confirm that the existing EPL can be obtained (i.e. amended in this case). As such, the project would not be deemed to be hazardous or offensive under the definitions of SEPP 33.

3.3.4 State Environmental Planning Policy (SEPP) 55 - Remediation of Land

SEPP 55 promotes the remediation of contaminated land to reduce the risk of harm to human health or other environmental systems. Clause 7 of SEPP 55 requires a consent authority to consider whether the land is contaminated and whether it is suitable (or can be made suitable) for the proposed development.

Minimal excavation is required for the proposed project, however, there may be some foundation work and driven piling. The EA will include a Phase 1 contamination assessment to ascertain the presence of any impacted material. This will support the Minister's requirement to assess the suitability of the site for the intended purpose.

Remediation works are being undertaken on the site to address historical contamination of soil and groundwater with arsenic and groundwater contaminated with ammonia. These works are being undertaken in accordance with a Voluntary Remediation Agreement with the DECC. The proposed development is outside these remediation areas.

3.3.5 State Environmental Planning Policy (SEPP) 71 – Coastal Protection

The aims of SEPP 71 revolve around the protection of the coastal values, attributes and amenities of the NSW coastal zone. In 2005, the Minister for Natural Resources gazetted a series of maps showing all land determined to be the NSW Coastal Zone. Kooragang Island lies wholly within the NSW Coastal Zone (Map 2, 2005).

The most relevant section of this SEPP to the current project are within Part 4 Development Control of the SEPP and include:

14 Public access

A consent authority must not consent to an application to carry out development on land to which this Policy applies if, in the opinion of the consent authority, the development will, or is likely to, result in the impeding or diminishing, to any extent, of the physical, land-based right of access of the public to or along the coastal foreshore.

15 Effluent disposal

The consent authority must not consent to a development application to carry out development on land to which this Policy applies in which effluent is proposed to be disposed of by means of a non-reticulated system if the consent authority is satisfied the proposal will, or is likely to, have a negative effect on the water quality of the sea or any nearby beach, or an estuary, a coastal lake, a coastal creek or other similar body of water, or a rock platform.

16 Stormwater

The consent authority must not grant consent to a development application to carry out development on land to which this Policy applies if the consent authority is of the opinion that the development will, or is likely to, discharge untreated stormwater into the sea, a beach, or an estuary, a coastal lake, a coastal creek or other similar body of water, or onto a rock platform.

These matters will be considered in the design of the proposed development.

3.4 Regional Matters

The Regional Environmental Plan (REP) of relevance to the subject site is Hunter REP 1989. The aims of the Hunter REP are:

a) to promote the balanced development of the region, the improvement of its urban and rural environments and the orderly and economic development and optimum use of its land and other resources, consistent with conservation of natural and man made features and so as to meet the needs and aspirations of the community,

b) to co-ordinate activities related to development in the region so there is optimum social and economic benefit to the community, and

c) to continue a regional planning process that will serve as a framework for identifying priorities for further investigations to be carried out by the Department and other agencies.

The objectives of the Hunter REP in relation to industrial development are:

a) to ensure that sufficient zoned and serviced industrial land is provided in locations appropriate to the needs of industry, while ensuring protection of the environment, and

b) to promote the distribution of employment in secondary industry in a manner compatible with the availability of services and distribution of population.

The objective of Part 7 (Division 1) of the Hunter REP is to control development such that air, noise and water pollution are minimised. Therefore, the proposed project would need to satisfy surrounding threshold limits for air, noise and water pollution. Given these limits are likely to be adequately met; the proposal is likely to be consistent with the relevant objectives and principles of the Hunter REP.

3.5 Local Matters

3.5.1 Newcastle Local Environmental Plan 2003

Kooragang Island is located within the Newcastle Local Government Area, and is subject to the provisions of the Newcastle Local Environmental Plan (LEP 2003). The map to LEP 2003 shows the area is located within the 4(b): Port and Industry zone. The objectives of the 4(b) zone are:

a) To accommodate port, industrial, maritime industrial, and bulk storage activities which by their nature or the scale of their operations require separation from residential areas and other sensitive land uses.

b) To require that development of land within 750 metres from the high-water mark of the shores of the Port of Newcastle, capable of docking ocean-going vessels, is used for purposes that:

   i) require a waterfront location that provides direct access to deep water, or

   ii) depend upon water-borne transport of raw materials or finished products, or

   iii) have a functional relationship that necessitates proximity to the activities described above.

c) To facilitate sustainable development through the application of industrial ecology.

d) To provide for other development which will not significantly detract from the operation of large scale industries or port-related activities, that is primarily intended to provide services to persons employed in such industries and activities.

The proposed project would be defined as a 'industry' under the provisions of Clause 37 of LEP 2003. This is permissible within the 4(b) zone with consent being a development not noted in sections 3 (development without consent) or 5 (prohibited development).

It should be noted here that a hazardous industry, hazardous storage establishment or an offensive industry are all prohibited under zone 4(b). As noted above, the project is currently deemed to be potentially hazardous and potentially offensive by virtue of both development consent and a pollution protection licence being required. The formal classification of non-hazardous and non-offensive would be confirmed on the basis of the PHA.

Under the provisions of SEPP 33, if the PHA determines this potentially hazardous industry as representing a non-significant risk and/or that a pollution control licence can be obtained for this project as a potentially offensive industry, then the project is permissible.

The EA will consider all local, regional and State Planning requirements. This includes the Newcastle Development Control Plan (2005), particularly in relation to element 7.1 (Industrial Development) and 7.4 (Kooragang Island and Industrial Port Area). However, these are design, compliance and assessment matters that will be received as part of the EA.

3.6 Other Approvals Required

3.6.1 Protection of the Environment Operations Act (POEO) 1997

Schedule 1 of the *Protection of the Environment Operations Act* (POEO) 1997 outlines activities that require an Environment Protection Licence. The proposed project will require an Environment Protection Licence as both a chemical storage facility and chemical industry.

Schedule 1 of the POEO Act has been amended recently and this project falls within Schedule 1 8 Chemical Production *(1) Ammonium nitrate production, meaning the commercial production of, or research into, ammonium nitrate for any purpose including fertilisers or explosives.*

4.0 Consultation

The EA would be prepared in accordance with Part 3A of the EP&A Act and the EP&A Regulation. Part 3A of the EP&A Act ensures that the potential environmental effects of a proposal are properly assessed and considered in the decision making process.

In preparing the EA, the requirements of the Director-General would be addressed as required by Clause 75F of the EP&A Act.

Consultation with the relevant government and non-government agencies and stakeholders as well as the local community would form part of the EA process. The following agencies and stakeholders would be included in the consultation process:

- Department of Planning;
- Department of Environment and Climate Change;
- Department of Water and Energy;
- Newcastle Port Corporation;
- Newcastle City Council;
- Roads and Traffic Authority, NSW;
- Workcover NSW; and
- Local Community / Industrial neighbours.

It is likely that further relevant agencies and stakeholders would be identified during the preparation of the EA and consultation would be undertaken accordingly.

The primary purpose of this consultation would be:

- to provide an overview of the project to relevant agencies, stakeholders and the community;
- to seek local knowledge to assist with community consultation in the area; and
- to seek input into matters stakeholders would like to see addressed in the EA.

The proposed project is classed as a 'major project' and therefore, written comments from relevant statutory agencies are likely to be requested by DoP to assist with the preparation of the Director-General's Environmental Assessment Requirements (EARs) and during public exhibition of the EA.

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5.0 Physical and Pollution Effects

This chapter assesses the potential physical and pollution effects that the proposed development may have on the environment. This includes potential impacts to air quality, noise and vibration, hazard and risk, water quality, groundwater and soils and geology.

5.1 Air Quality

The regional air quality within and surrounding Newcastle is dominated by motor vehicle emissions, and is also significantly affected by major industries located around the Lower Hunter. This includes emissions from power stations, aluminium smelters, general industry (e.g. oil storage and distribution) and Port related activities. The existing air quality environment surrounding the site is likely to be heavily influenced by such neighbouring industrial developments.

Primary sources of air emissions in the vicinity of the site include the existing site operations as well as a number of industries surrounding the site including Incitec Pivot fertiliser storage and despatch facility, the Tomago Aluminium Smelter situated to the north of Kooragang Island, and a number of fuel storage facilities (Carrington) in the vicinity of the site. In addition, a bulk liquids storage facility for the blending and distribution of fuels on Kooragang Island is proposed in the vicinity of the proposed site. Additional possible pollutant sources include dust emissions from nearby coal and grain terminals and odour from Cargill seed processing facility on Kooragang Island.

The site is classified as a scheduled premises under the POEO Act and operations are undertaken in accordance with EPL 828 applying to the site. The EPL specifies discharge limits for pollutants associated with existing operations, including emissions to air and water. Existing air emissions primarily include total suspended particulates and fine particulates less than 10 microns in diameter (PM_{10}) from prilling / granulation operations and NO_x emissions generated by the nitric acid plants.

The primary atmospheric emissions associated with the proposal are shown qualitatively in Table 3 and are likely to include the following:

- NO_x emissions (NO and NO_2) from the Acid Plant stack;
- CO_2 and NO_x emissions from the Ammonia Plant uprate;
- Particulates (PM_{10}, $PM_{2.5}$ and coarse particulates) from the prill tower stack and dry section scrubbing equipment;
- Ammonia, NO_x and natural gas from relief valves and other systems; and
- Nitric Acid from solution formation and concentration processes.

The scrubbing of relief valves and other systems that could result in atmospheric emissions from vent systems will be considered in the design of the plant. This includes atmospheric emissions of ammonia within the acid and ammonium nitrate plants and NO_x within the plant and proposed acid storage tank.

A quantitative air quality impact assessment would be prepared for the EA, which would identify sources of air emissions and assess the potential effects on sensitive receptors resulting from the proposed uprate. The air quality impact assessment would assess air quality parameters including particulates (PM_{10}, $PM_{2.5,}$), total suspended particulates, ammonia, nitric acid and NO_x.

The air quality impact assessment would consider air emissions in accordance with national ambient air quality guidelines detailed in the *National Environment Protection (Ambient Air Quality) Measure* and

DECC's *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*. Design measures would be incorporated into proposed plant to minimise and eliminate potential sources of air emissions in order to minimise potential impacts to local air quality.

Table 3: Types of air emissions and their point source

Source	Emission
Acid Plant Stack	N_2O and NO_x
Ammonia Plant uprate	CO_2, NO_x and CH_4
AN Plant Dry Section Scrubbing Equipment	Particulates (PM_{10}, $PM_{2.5}$ and coarse)
Relief vents (depending upon scrubbing system design	Ammonia, NO_x, natural gas
Potential boiler	CO_2
Vehicle emissions	CO, CO_2, NO_x and CH_4

5.1.1 Odour

The POEO Act requires that operations at the site must not result in the emission of any offensive odour from the premises unless it is allowed in accordance with conditions of the EPL. An offensive odour is one which, as a result of its concentration, character or duration is harmful to people or interferes with their comfort. The development will therefore be designed to minimise the potential for offensive odour discharge from the site. Potential sources of odour would be assessed in the air quality impact assessment to determine potential impacts associated with the development.

5.1.2 Greenhouse Gas Emissions

The proposed project would emit various greenhouse gases.

Nitric Acid Plants are a significant source of N_2O and there are technologies currently being, developed, trialled and operated to reduce N_2O emissions. The key potential greenhouse gas emissions from the proposed development that would need to be considered would be nitrous oxide (N_2O) and carbon dioxide (CO_2). Ammonia Plants by their nature convert natural gas to hydrogen then ammonia with resultant CO_2 gas as a byproduct. Hence, as ammonia production is increased, so will CO_2 emissions. The proponent is currently assessing options to reduce N_2O emissions for all existing NAPs and the proposed new Nitric Acid Plant. Current N_2O abatement technologies would be investigated with a view to installing on the new acid plant. Abatement techniques would be based on Best Available Techniques (BAT) for pollution prevention and control, developed by the European Union Commission and industry associations. Such technologies are in their infancy of commercially proven operation.

.Another source of greenhouse gas emissions from the proposed development would be from increased traffic for the transport of product. Potential impacts of greenhouse emissions generated from traffic will be further investigated in the EA.

5.2 Noise and Vibration

The existing noise environment surrounding the site is dominated by industrial operations and land uses on Kooragang Island. The nearest sensitive residential receiver is located approximately 800 m east of the site on the Stockton peninsula. Residential receivers are also located in the suburbs of Fern Bay and Carrington, however these receivers are located approximately 1.5 km from the proposed site.

Residential receivers on the Stockton peninsula are therefore likely to be most affected by existing and proposed operations on the site. Noise levels at sensitive receivers located at Stockton, Fern Bay and Carrington have previously been attributed to industrial land uses on Kooragang Island.

Existing operations and plant at the site result in the generation of noise emissions from the premises. While the EPL applying to the site does not prescribe site specific noise limits, a programme is currently being undertaken with the DECC to assess noise emissions from the site and develop a strategy for the reduction of ambient noise levels.

Construction of the proposed facility has the potential to create noise impacts through the use of plant and equipment, as well as potential noise impacts associated with increased traffic (road and ship). Noise and vibration impacts may also occur as a result of pile-driving activities during the construction phase, should piling be required.

Noise generating plant associated with the proposed operation of the uprated facility includes the Acid Plant compressors and large fans and pumps mainly associated with cooling towers and the prill tower. Start-up and shutdown activities could also contribute significantly to noise levels surrounding the site, however, such events would occur relatively infrequently and the potential to minimise these sources will be considered in the design.

5.3 Hazard and Risk

The DoP guidelines *Applying SEPP 33 – Hazardous and Offensive Development Applications Guidelines* (DUAP, 1997) outline a risk screening procedure which can be used to assist in determining whether a proposed development is a 'potentially hazardous industry' or a 'potentially offensive industry' under SEPP 33 (refer **Section 3.0**). The procedure is generally described by the following steps:

- Consider whether the proposal falls within the definition of 'industry' adopted by the relevant planning instruments;
- Collate information – including a list of hazardous materials used in the proposed development and the quantities of each, dangerous goods classifications of each material, the mode of storage used and the maximum quantity held or stored on site, the distance of the stored material from the site boundary for the materials in dangerous goods classes 1.1, 2.1 and 3 and the average number of annual and weekly road movements of hazardous material to and from the facility;
- Identify hazardous materials and the type of hazard – determine the quantities of all classes of hazardous materials;
- Group and total by class, activity and location – total the quantities of hazardous materials by class and activity; and
- Compare with screening threshold – the SEPP 33 guidelines provide tables and graphs which can be used to determine screening thresholds. For quantities below these thresholds, it can be assumed that there is unlikely to be a significant off-site risk.

As discussed in **Section 3.3.3** , SEPP 33 is likely to apply to the proposed uprate. A Preliminary Hazard Analysis (PHA) would be prepared for the EA in accordance with the *Applying SEPP 33* guidelines to assess potential risks associated with the proposal. A Hazard and Risk Assessment for the operation would be undertaken with reference to DOP (then Department of Urban Affairs and Planning (DUAP)) guidelines including:

- Hazardous Industry Planning Advisory Paper: No. 3 Risk Assessment;

- Hazardous Industry Planning Advisory Paper: No. 4 Risk Criteria for Land Use Safety Planning;
- Hazardous Industry Planning Advisory Paper: No. 6 Guidelines for Hazard Analysis; and
- Multi-Level Risk Assessment.

5.4 Water Quality

5.4.1 Surface Water

The site is situated on Kooragang Island which forms part of the lower Hunter River Estuary. The Hunter River Estuary has been significantly modified by urban and industrial activity, but remains an important resource for recreation and industry. The main threats to water quality include erosion and sedimentation, weed infestation, and rubbish and other pollutants transferred in stormwater runoff (State of Environment Report 2004/2005, Newcastle City Council).

There are three potential contributors to surface water from the existing facility and proposed development, which are discussed below:

- Effluent;
- Stormwater; and
- Firewater

Effluent Management

The water management systems onsite are designed to maximise the recycling of liquids to minimise the generation of effluent, however a portion of the liquids are unable to be recycled and these are disposed of via the site's licensed effluent discharge system.

The effluent handled by the effluent system consists of process wastes, cooling water and some stormwater (collected in the flush systems). Approximately 2ML/day of effluent is currently discharged from the site as a result of existing operations, with approximately 60% of the water due to cooling tower blowdowns and Demineralised Water Plant regeneration requirements. The remaining water includes consumed water and evaporative losses.

The site has an effluent system that is designed to treat effluent that does not meet pH discharge criteria prior to discharge and has storage capacity for other off specification effluent.

The effluent is monitored for a range of parameters including pH, suspended solids, heavy metals, oil and grease, temperature and nutrients (nitrogen) prior to discharge from the site into the north arm of the Hunter River. There are concentration limits for each of these parameters and also a mass discharge limit for nitrogen if the effluent.

The site is currently undertaking projects to reduce the nitrogen concentration and temperature of effluent in accordance with the requirements of a DECC Pollution Reduction Programme. The aim of the projects has been to collect nitrogen (ammonium nitrate) containing solutions and either recycle them onsite or reuse them at another Orica facility offsite, thus minimising the discharge of nitrogen to the effluent system. Orica reports regularly to the DECC on the progress to implement these projects.

In addition, Orica is currently developing a project to reduce the temperature of the discharging effluent as periodically short duration elevated temperature events can be experienced.

The proposed AN plant design will be critical in minimising its contribution to nitrogen in effluent in normal operations, shut-down and start-up. Measures to reduce the quantity of nitrogen in effluent will be discussed in the EA. **Section 3.3.5** further discusses issues relating to SEPP 71 that will need to be considered in the EA.

Other effluents not suitable for discharge in the effluent management system would be contained and stored for appropriate disposal. These would include ammoniated oily waste (from blowdowns of ammonia systems), oily water (from Acid Plant compressors) and waste oils (from machine systems during routine maintenance). Management systems exist to appropriately handle and store such effluents minimising the risk of spillage and this would be further assessed in the EA.

Water quality impacts from the construction and operation of the proposed facilities will also be addressed in the EA and the effluent management system will be assessed to ensure it's capability in handling the increased capacity of effluent.

The proposed plant associated with the uprate would be designed to minimise the potential for spillages. Spill management systems would be installed to enable the recovery of material in the event of a spill, which would either be treated prior to disposal via the site effluent management system, or disposed of via an appropriately licensed waste management contractor. Operational areas would be fully bunded and sealed in accordance with operational requirements.

Stormwater

The Ammonia Plant area is typically unsealed gravel areas with a small quantity of sealed road areas. Much of the Nitrates Plant area surfaces have been sealed to provide hardstand for plant and equipment or as road base. Unsealed areas of the site are generally grassed, with some small landscaped gardens adjacent to some buildings, paths and roads.

The Nitrates Plant area is serviced by a first flush system, which is designed to capture the first 10mm of rain falling on the sealed surfaces in this area, including roads and rooves. This collected water is discharged from the site via the existing effluent discharge system.

New plants will require a review of their contribution to stormwater and whether upgrading of first flush capacity is required. Plant design measures would include roofing areas where potential contamination sources could be present to ensure that potentially contaminated stormwater is directed to the appropriate effluent management system. Systems would be implemented to minimise the tracking of ammonium nitrate from bulk storage and bagging areas by vehicles.

The proposed locations of the new plants are currently not connected to existing stormwater infrastructure and this would be installed as part of the development.

Monthly monitoring of stormwater discharge is undertaken. The stormwater is analysed for nitrogen, arsenic, phosphate, hexavalent chromium, zinc, suspended solids and pH. There are currently no concentration limits for stormwater discharge.

Firewater

Firewater for the proposed uprate would be supplied by increasing the reticulation of the existing firewater system. The new plant will be incorporated into the existing fire panel, monitored by the site security personnel to ensure a timely response to any issues.

In the event of a fire in one of the three catchment areas in the Nitrates Plants area, the first flush system would capture 110m^3 of the contaminated firewater.

5.4.2 Groundwater

Rainfall generally infiltrates to the groundwater in the areas of the site which have an unsealed ground surface. Groundwater is located about 2 m below the surface at the site, which is an elevation consistent with that of the adjacent tidal waters of the Hunter River. Groundwater quality testing in the vicinity of the site indicates that the groundwater is alkaline which is typical of groundwater in estuarine areas. Preliminary investigations of groundwater (1998-2003) indicated that groundwater limited to the north-western corner of the site was contaminated with ammonia and arsenic. Remediation activities in this area are currently being undertaken in accordance with a Voluntary Remediation Agreement (VRA) with the DECC.

Current remediation projects would not be affected by the proposed development and additional plant under the proposal would not be located in the areas of groundwater contamination on the site.

The proposed development would be designed to minimise the risk of contamination of soil and groundwater. Plant areas would be classified according to risks (AN, acid, etc) and appropriately sealed. The use of underground piping and pits would be minimised and, where unavoidable, secondary containment would be provided for systems that could impact on the environment in the event of a loss of containment. Appropriate use of sealed areas, bunding and double containment would be implemented to minimise the potential for failures that could result in soil and groundwater contamination. The proposed development would be required to demonstrate that suitable plant design and management strategies are in place to ensure that no additional contamination of groundwater could occur. This will be further investigated in the EA.

5.5 Geology and Soils

Kooragang Island was originally a series of low-lying islands that were progressively infilled with sediment dredged from the harbour. Given the area was formed by reclamation activities and the subsequent industrial uses on Kooragang Island, soil contamination has been reported throughout some parts of the Island, however, soil on areas of the proposed development has been shown to not be contaminated.

5.5.1 Soil Contamination and Acid Sulfate Soils

The proposed uprate would be located on part of the original Walsh Island, one of the islands incorporated into Kooragang Island as part of reclamation works. The Department of Public Works and Services undertook drilling on Walsh Island in 1964 which showed sand to a depth of 65 m followed by bedrock (Coffey and Hollingsworth 1966). The sand is Quaternary age and the bedrock consists of Permian sediments. A soft organic clay, probably deposited by the Hunter River during flooding has been found at 2 m depth on some parts of Walsh Point. Reclaimed parts of Walsh Point have been filled with a grey brown shelly sand. Currently, few areas of exposed soil occur on the site as much of the surface on the site has been sealed to provide hardstand areas for plant and equipment or as road base. Unsealed areas of the site are generally grassed, with some small landscaped gardens adjacent to some buildings, paths and roads.

Preliminary investigations of soil on the site (1998-2003) indicated that arsenic contamination of soil occurred in the north-western corner of the site. Remediation activities in this area are currently being undertaken in accordance with a Voluntary Remediation Agreement with the DECC. Current remediation projects would not be affected by the proposed development and additional plant under the proposal would not be located in the areas of identified soil contamination on the site.

Soil excavations and the use of underground piping and pits would be minimised for the proposed development and where unavoidable, secondary containment would be provided for systems that could impact on the environment in the event of a loss of containment. The plant would be designed to minimise the risk of contamination of soil and this will be further investigated in the EA.

Acid Sulfate Soils are not likely to be present in the proposed areas of development as Kooragang Island consists of fill material used for land reclamation. This will be further investigated in the EA.

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6.0 Biological Effects

This chapter assesses the potential effects the proposed development may have on the existing flora and fauna in the area of Kooragang Island.

6.1 Introduction

The site is located on reclaimed land and as such there are no remnant areas of native vegetation. Since reclamation has occurred, the area has been subject to extensive industrial development and land use. The site is located approximately 1.5 km south of the Hunter Estuary National Park, sections of which are a RAMSAR site. The environmental assessment will consider any possible impact of the proposed development on the national park.

6.2 Flora and Fauna

A report on the flora and fauna on the site was done as part of the Ammonium Nitrate Uprate Environmental Impact Statement in 1997 (Kinhill, 1997). Vegetation that now occurs on the peninsula primarily comprised grasses and weeds such as Common couch (*Cynodon dactylon)* and Paspalum (*Paspalum dilatatum*). There are some areas of the peninsula, particularly along main roads and borders to some properties, that have been landscaped with native trees and shrubs. These include *Acacia* spp., *Casuarina* spp., *Leptospernum* spp. and *Melaleuca* spp.. None of these are considered indigenous to the area.

In low-lying areas of the peninsula, *Juncus* spp. and Common reed (*Phragmites australis*) are prevalent, while along the South Arm of the Hunter River, a narrow fringe of Grey Mangrove *(Avicennia marina)* is dominant.

Vegetated areas of the site comprise mainly grasses and weeds. There are some small landscaped gardens adjacent to some buildings and roads within the site. These generally contain exotic species such as herbaceous annuals and have little ecological value. Areas of grass and gardens are regularly maintained.

The DECC Wildlife Atlas lists a number of threatened fauna species that have been recorded in the area, including the:

- Australasian Bittern (*Botaurus poiciloptilus*);
- Green and Golden Bell Frog (*Litoria aurea*);
- Eastern Bent-wing Bat (*Miniopteris shreibersii*); and
- Grey-headed Flying Fox (*Pteropus poliocephalus*).

The industrial area is located approximately 1.5 km from of the Hunter Estuary National Park, which forms part of the RAMSAR-listed Hunter Estuary Wetlands. The wetlands are an important area for migratory and Australasian wetland species, including species protected under the Agreement Between the Government of Japan and the Australian Government for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment (JAMBA) and the Agreement Between Australia and the People's Republic of China for the Protection of Migratory Birds and their Environment (CAMBA).

Overall, the proposed project is unlikely to have a significant effect on fauna or flora. The site is already highly modified and, as such, contains little habitat value for native species. The proposal would not displace or disturb fauna movement, nor affect bushfire risk level of the site. The proposal would not

likely affect biologically sensitive areas. In addition, the Hunter River represents a degraded environment at that location. Nevertheless, the potential impact of the proposed development will be further analysed in the EA, in view of the emissions of the facility to air and water.

7.0 Resource Implications

This chapter assesses the potential resource implications that the proposed development may have on the environment, such as water demand, electricity demand, gas supply and increased traffic generation.

7.1 Introduction

This section identifies the likely resources required to undertake the proposed works and the subsequent implications of resource consumption.

7.2 Water

The proposed development would generate an increased demand on townswater.

- Current site requirements on townswater are as follows:
  - Demin Water plant 2.7 Ml/day
  - NAP1 cooling water tower 1.2 Ml/day
  - NAP2 cooling water tower 0.8 Ml/day
  - NAP3 cooling water tower 1.0 Ml/day
  - Ammonia Plant cooling water tower 3.6 Ml/day
  - Ammonia storage cooling water tower 0.35 Ml/day
- The additional demand would be from:
  - NAP4 Cooling Water Tower;
  - Demin Water Plant uprate; and
  - Washwater for general plant activities.

The townswater line / and ring-main are supplied by Hunter Water into the site and this is close to capacity. Opportunities to use recycled water supplied by Hunter Water are currently being considered by the facility. The impact of increased demand on townswater for the proposed AN uprate will be further assessed in the EA.

7.3 Electricity

The proposed development would result in an increased electricity demand. The site is currently supplied via two 33KV feeders off the island ring-main. Current site load is approximately 13MW peaking at approximately14.5MW during plant start-up.

The EA would need to consider the load limitations of the current transformers and would assess a number of options relating to the existing assets and utilisation of these assets.

7.4 Natural Gas

Natural gas is a major requirement for the Ammonia Plant and consequently the AN production process. The proposed development would generate an increased demand on gas supply. This would be further assessed in the EA.

7.5 Traffic

Increased ammonium nitrate production has the potential to increase traffic volumes from the site. The main through roads on Kooragang Island are Cormorant Road and Teal Street. They carry industrial traffic to the island and peak hour traffic to and from Newcastle and to the major residential areas to the north (Stockton peninsula and through to Port Stephens and Nelson Bay). The Island has two vehicular access points: from the south via the Tourle Street bridge (a two lane bridge); and from the north via Stockton Bridge (a four lane bridge).

Tourle Street Bridge has for some time been a potentially sensitive issue due to traffic volumes that access the two lane bridge. Road works are currently occurring to replace the existing bridge. There are also existing plans to upgrade the road system to four lanes by 2015.

There would be an increase in traffic movements associated with the project during the construction and the operational phases. During construction this would include transport of materials to the site, removal of waste from the site and transport of construction personnel to and from the site.

Internal traffic would also increase and whilst the new western bypass road would minimise the impact on the northern end of the site a traffic study will be undertaken, in particular to assess the impact of increased traffic movements in the Nitrates area. During operation, increases in traffic would be associated with heavy vehicles for distribution of end products.

A traffic assessment would form part of the EA. Issues including road capacity and volumes, road safety, intersection performance, traffic generation and movements, potential impacts associated with the proposed AN uprate along with mitigation measures would be assessed in the EA.

8.0 Community Effects

This chapter assesses the potential impacts that the proposed development may have on the community. This includes an assessment of potential social and economic, heritage and cultural, land use, visual and cumulative impacts.

8.1 Introduction

Kooragang Island, approximately 3 km north of Newcastle CBD is zoned for Port and Industry use. Since reclamation occurred in 1951 as part of the Hunter River Islands Reclamation Scheme, the area has been subject to extensive industrial development and land use.

The land surrounding the Orica site is used for industrial and port related activities including the following:

- North, Incitec Pivot operates a fertiliser storage and despatch facility.
- West, Newcastle Port Corporation and its lessees P&O Ports Ltd, Sawmillers Exporters Pty Ltd, Cement Australia and Kooragang Bulk Facilities operate bulk goods importing/exporting operations on the western side of Heron Rd. Kooragang Bulk Facilities operates storage facilities for Hydro Aluminium on the eastern side of Heron Rd.
- South, Patricks and Bulk Grain Terminals operate storage and despatch facilities.
- East, whilst the land to the east of the site is currently vacant there is a development proposal for the storage of hydrocarbon products.

The nearest residential premises to the Site are located at Stockton, approximately 800 m east of the Orica property boundary. There are also residential properties to the west at Carrington and Mayfield, 1.5km and 2km respectively.

8.2 Social and Economic

The population of the Newcastle region in 2006 census was 493 465. Of the 224 093 people in the workforce, 56% are in full time employment and 30% work part time. The most common occupations in the region include professionals (18.3%), technicians and trades workers (16.8%) and clerical and administrative workers (14.4%) (ABS 2006 census).

The social impacts of the proposed project are associated with amenity impacts and include potential noise impacts during construction and operation and air quality impacts (dust) during construction. These potential impacts will be further investigated in the EA including mitigation measures.

The proposed ammonia and AN uprates may have potential noise impact on the nearby residential areas, especially in the Stockton area. A detailed noise assessment would be conducted in the EA, along with potential noise mitigation measures. Further details can be found in **Section 5.2**.

Economic impacts are related to the direct and indirect employment opportunities that would be created during construction and operation of the facility. The construction phase would create short term employment opportunities and, where possible, Orica would employ personnel from the local region. The proposed development would also provide long term employment opportunities for up to approximately 20 staff during its operation.

The social and economic impacts of the proposed project would be further examined in the EA.

8.3 Heritage and Cultural

There are no known items of heritage significance on the proposed project sites that have been listed by local government or state agencies. However, recent archaeological investigations in the area have identified the potential for archaeological deposits to be present on other parts of Kooragang Island. Artefacts have a high rate of survival around the margins of the harbour (State of Environment Report 2004/2005, Newcastle City Council) and there is some potential for isolated artefacts to have survived the infilling during reclamation.

Kooragang Island was formed through reclamation activities. While it is unlikely that there would be archaeological deposits, or artefacts at the site, heritage and cultural issues would be considered in the EA and consultation would be undertaken with appropriate local Aboriginal communities in accordance with DECC guidelines.

8.4 Land Use

The proposed project would be located on land designated as suitable for port and industrial facilities under the Newcastle LEP 2003. There is already an operational AN facility within an operating transport network demonstrating that the site is suitable for this ongoing land use. In addition, industrial developments surround the proposed site and it is well separated from residential and community uses.

8.5 Visual

Kooragang Island is essentially flat and low-lying. It has an industrial character which features large tanks, stacks, pipe work, buildings and port facilities. Scattered vegetation on Kooragang Island and the rock revetment walls which define and protect the island can be seen from areas such as Stockton. These features are visually insignificant compared to the overall industrial appearance of the Island.

The appearance of the proposed project would be situated within the existing industrial environment and would be consistent with existing facilities in the area.

The proposed infrastructure would be of the equivalent height or shorter than the existing infrastructure, so visual impacts would be minimised. A colour scheme that complements the existing building colours would be applied to the proposed infrastructure in order to integrate the development into the existing site skyline.

The site will continue to operate on a 24hr/day, 7 day per week basis. No significant increases in the intensity of lighting on the site at night are expected.

Overall, the visual impacts of the proposed development are not likely to significantly alter the existing visual nature of the area.

8.6 Cumulative Impacts

While the proposed project is an uprate consisting of the modification of existing plant and the addition of new plant, the cumulative effect of the whole of site operation will need to be assessed. This will be evaluated using the current baseline emissions to air (including noise) and water and contributions to transport and resource demand. It would also include assessment of the contribution of the new uprates to the risk contours for the site.

The EA will also evaluate the cumulative impacts within the context of Kooragang Island.

9.0 Prioritisation of Potential Environmental Issues

9.1 Issue Identification

As identified in Section 5.0, 6.0, 7.0 and 8.0, the environmental issues associated with the project have been identified as:

- Air Quality;
- Hazard and Risk;
- Effluent Management;
- Noise;
- Water Quality;
- Geology and Soils;
- Resource Implications;
- Traffic and Transport;
- Biological Effects;
- Social and Economic;
- Heritage;
- Land Use; and
- Visual

9.2 Prioritisation of Issues

9.2.1 Approach

The prioritisation of issues for the proposed project was based on the need to recognise that a higher degree of assessment is required for the issues with the highest severity and greatest consequences. **Table 3** shows the issues prioritisation matrix used to identify priorities. Each issue was given a ranking between one and three for the severity of effects and the perceived consequences of those effects if left unmanaged. These two numbers were added together to provide a numerical ranking for the issue that was used to categorise each issue into high, medium and low priorities.

Table 4: Issues Prioritisation Matrix

Severity of Effects	Consequence of Unmanaged Effects		
	3 High	2 Medium	1 Low
1 Low	4 (Medium)	3 (Low)	2 (Low)
2 Medium	5 (High)	4 (Medium)	3 (Low)
3 High	6 (High)	5 (High)	4 (Medium)

9.2.2 Assessment

The prioritisation of environmental issues related to the proposed project is shown in **Table 4**. This assessment aims to allow the prioritisation of issues for assessment and does not consider the application of mitigation measures to manage environmental effects. In all cases, appropriate and proven mitigation measures, chosen based upon the experience of regulators and other similar projects, would be used to minimise potential impacts. These measures would be described in detail in the EA prepared for the proposed project.

The allocation of risk is based upon the following considerations:

Severity of Risk

Low: localised implications; imperceptible or short term cumulative impacts.

Medium: regional implications; modest or medium term cumulation of impacts.

High: inter-regional implications: serious or long term cumulation of impacts.

Consequences of Unmanaged Effects

Low: minor environmental change; offsets readily available.

Medium: moderate adverse environmental change; offsets available.

High: important adverse environmental change, offsets not readily available.

Table 5: Prioritisation of Environmental Issues

Issue	Severity	Consequence	Priority
Aspect: Air Quality			
Air emissions	3	3	6 (High)
Odour	1	1	2 (Low)
Emissions of greenhouse gases	3	3	6 (High)
Construction related impacts on air quality	1	2	3 (Low)
Aspect: Hazard and Risk			
Exposure of surrounding land uses/population to hazards and risks	2	2	4 (Medium)
Exposure of employees to hazards and risks	2	2	4 (Medium)
Aspect: Noise and Vibration			
Potential noise impacts	2	3	5 (High)
Aspect: Water Quality			
Stormwater management	1	1	2 (Low)
Firewater availability and on-site storage	1	1	2 (Low)
Water management (cooling water and effluent)	2	2	4 (Medium)
Aspect: Geology and Soils			
Erosion and sedimentation during construction	1	1	2 (Low)
Spread of contaminants off-site during construction/operation	1	2	3 (Low)
Exposure of Acid Sulfate Soils during construction	1	1	2 (Low)
Aspect: Biological Effects			
Loss of habitat due to clearing	1	1	2 (Low)
Impact upon threatened species	1	1	2 (Low)
Aspect: Resource Implications			
Demand upon resources (water, gas and electricity)	2	2	4 (Medium)
Aspect: Traffic and Transport			
Increase in traffic on local road network	2	2	4 (Medium)
Aspect: Social and Economic			
Impacts upon amenity such as noise, visual, etc	2	1	3 (Low)

Issue	Severity	Consequence	Priority
Impacts upon demand for community resources	2	1	3 (Low)
Job creation	1	1	2 (Low)
Aspect: Heritage			
Damage or removal of Aboriginal artefacts or places	1	1	2 (Low)
Detrimental impact upon items of non-indigenous heritage significance	1	1	2 (Low)
Aspect: Land Use			
Inappropriate use of land	1	1	2 (Low)
Incompatibility of land use with surrounding environment	1	1	2 (Low)
Aspect: Visual			
Impacts of development on visual landscape	1	1	2 (Low)

Table 6 identifies that the prioritisation of environmental issues, and therefore the focus of assessment for the proposed project should be as follows:

Table 6: Prioritisation of Issues

Low	Medium	High
Odour	Hazard and Risk	Air emissions
Air quality during construction	Resource implications	Greenhouse gas emissions
Stormwater management	Traffic and Transport	Noise and Vibration
Firewater management	Water management	
Geology and Soils		
Biological effects		
Social and Economic		
Heritage		
Visual		

10.0 Findings

The environmental assessment for the proposed project would focus on the key impacts of the environmental factors addressed in **Sections 5, 6, 7** and **8.** The key issues identified in this EASR are:

- Air Quality (emissions and greenhouse gases);
- Water management;
- Hazard and Risk;
- Noise and Vibration;
- Resource implications; and
- Traffic and Transport.

10.1 Air Quality

There is the potential for impacts to air quality to occur during the operation of the proposed uprated AN facility. This would include the emission of particulates (PM_{10}, $PM_{2.5}$ and coarse particulates) from the prill tower stack and dry section scrubbing equipment, ammonia, NO_x and natural gas from relief valves and other systems and nitric acid and NO_x emissions (NO and NO_2) from the Acid Plant Stack and Ammonia Plant Reformer Stack.

There would also be greenhouse gas emissions from the proposed development and from transport emissions. This would primarily be nitrous oxide (N_2O) from the Acid Plant and CO_2 from the Ammonia Plant.

Design measures to treat potential sources of air emissions and greenhouse gas emissions would minimise impacts to local air quality resulting from the proposal. These would likely include scrubbers and other BAT abatement. However, as the control of air emissions is a vital component of the project, a full air quality assessment would be undertaken as part of the EA to fully describe and assess the potential impacts.

10.2 Water Management

A result of this project will be increased volumes of effluent. Effluent sources would include nitric acid solutions, AN solutions, cooling water, plant blowdowns and process condensate. Maximising reclaim systems can reduce the amount of effluent produced. The impact and appropriate mitigation measures for potential increases in effluent discharge and the capacity of the effluent system will be further investigated in the EA.

10.3 Hazard and Risk

Hazards and risks are a potential issue for the proposed development due to the hazardous substances that would be used, manufactured and stored on-site. A PHA would be prepared for the EA in accordance with the requirements of SEPP 33 in addition to HIPAP No. 6 and approaches recommended in “Multi Level Risk Assessment” (DoP, 1994).

10.4 Noise and Vibration

The proposed development would result in potential impacts to the surrounding noise environment during construction and operation. Noise impacts during construction are expected to be temporary.

During operation, noise impacts may result from the operation of equipment at the site. The potential for increased noise emissions during shutdown and start-up times will be considered and minimised.

Due to the nature of the surrounding environment and the proximity of sensitive receptors, an assessment of potential noise impacts would be undertaken during preparation of the EA.

10.5 Resource Implications

The proposed development would generate demand on resources including water, electricity, natural gas and fuel. The availability of these resources and potential impacts that the proposed development may have on resources will be further investigated in the EA.

10.6 Traffic and Transportation

Construction and operation of the proposed development would result in an increase to traffic movements on the surrounding road networks. In particular, heavy vehicle movements associated with dispatch of AN products would increase during operation. This would have the potential to impact on the surrounding road network and as such, a traffic impact assessment would be undertaken as part of the EA. This will assess in detail the traffic and transport impacts associated with the construction and operation of the proposed development and outline appropriate mitigation measures.

10.7 Other Environmental Issues

Additional environmental impacts have been identified, however, the potential impacts associated with these are expected to be minimal.

Each of these issues would require a lower level of assessment than the key environmental issues listed above, however, each would be discussed in the EA and appropriate mitigation measures and environmental safeguards would be identified in the Statement of Commitments to ensure potential impacts are minimised and properly managed.

10.8 Level of Assessment

This EASR has undertaken an initial appraisal of potential impacts associated with the proposed development, and has identified the key environmental issues as being air quality (emissions and greenhouse gas emissions) and noise. Additionally, due to the nature of the proposed development, a PHA for Hazard and Risk will be undertaken.

These issues would be considered in detail in the environmental assessment to be undertaken, which would be determined by the Minister.

10.9 Approvals Process

As discussed in **Section 3.3.1**, the proposed project meets the criteria of a 'Major Project' under SEPP 2005 and is therefore eligible for declaration by the Minister under Part 3A of the EP&A Act as a Major Project.

Approval would be required from the Minister and project approval under section 75J of the EP&A Act would be sought.

EASR has identified a number of key environmental issues for which a comprehensive environmental assessment would be required. These issues, along with those requiring a lower level of assessment would be addressed in the EA for the project.

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11.0 References

Australian Bureau of Statistics. 2006. 2006 Census Quickstats for Newcastle. http://www.censusdata.abs.gov.au/ABSNavigation/prenav/ViewData?producttype=QuickStats&subaction=-1&areacode=1003&action=401&collection=Census&textversion=true&breadcrumb=LP&period=2006&navmapdisplayed=true&

Coffey and Hollingsworth. 1966. *Soil Investigation for Nitrogenous Fertilizer Complex at Walsh Island, Newcastle.* Prepared for Eastern Nitrogen Ltd.

Department of Environment and Climate Change. 2004. *NSW National Parks and Wildlife Service: Atlas of NSW Wildlife*. Retrieved 5 April 2007 from http://wildlifeatlas.nationalparks.nsw.gov.au/wildlifeatlas/watlas.jsp

Kinhill Engineers Pty Ltd. 1997. *Ammonium Nitrate Upgrade, Kooragang Island: Environmental Impact Statement*. Prepared for Incitec Ltd.

URS. 2008. "Orica Kooragang Island Stage 2 Voluntary Remediation Agreement Completion Report" URS Australia Pty Ltd, 27 March 2008.

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Figures

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ENSR | AECOM

0 1km

Figure 1 | **Site Location**

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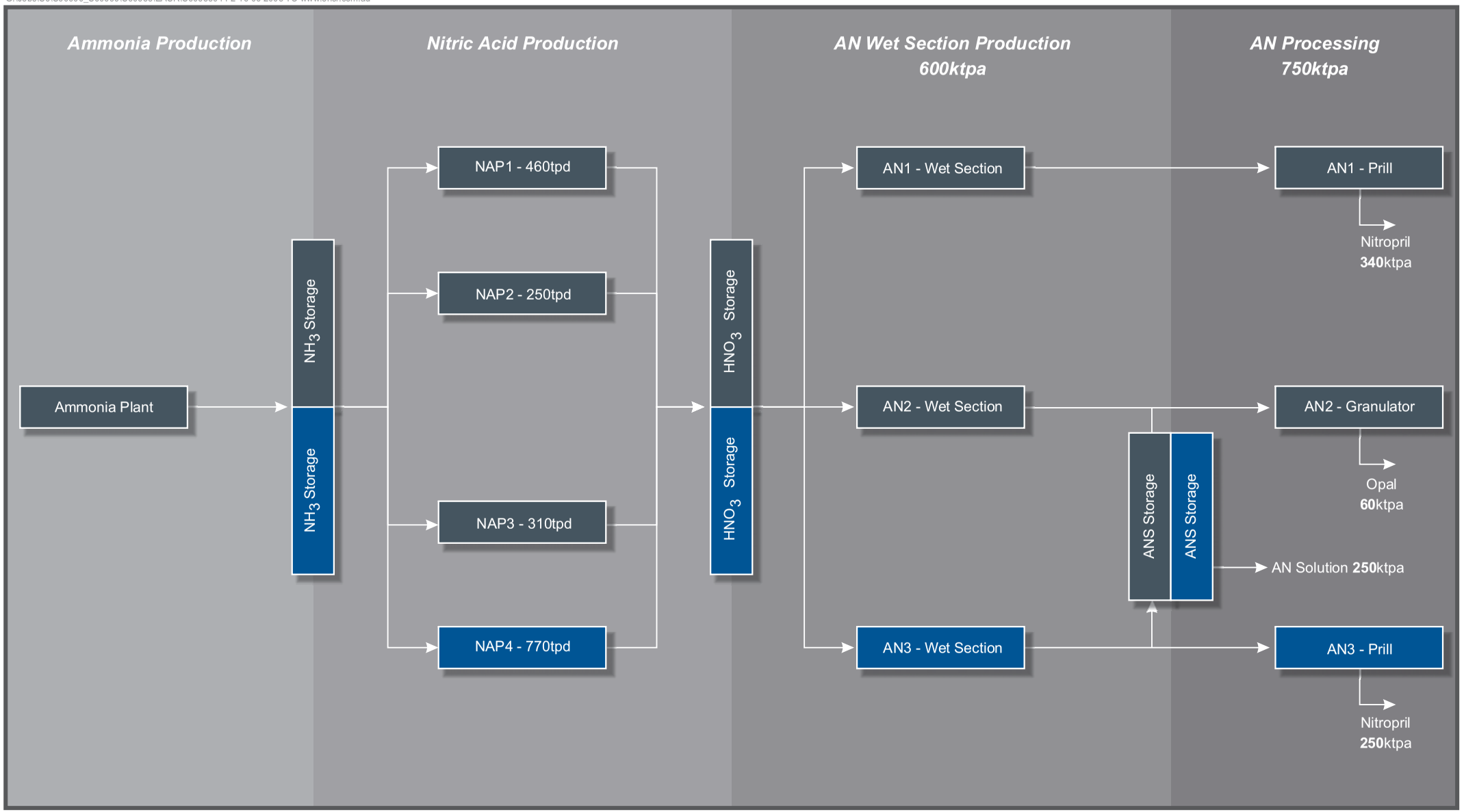

ENSR | AECOM

Existing infrastructure
Proposed infrastructure

Figure 2 **Proposed Process Flow Chart**

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0 100m

Proposed infrastructure location
Existing infrastructure location

Figure 3 | **Proposed Site Layout**

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