Environmental Assessment Bulk Liquids And Fuel Storage Facility Greenleaf Road Kooragang Island

24 October 2007

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CERTIFICATION

Submission of Environmental Assessment (EA)
prepared under the Environmental Planning and Assessment Act 1979 Section 75F

EA prepared by name qualifications	Renae Gifford Bachelor of Environmental Science, University of Newcastle, 1995	Michael England Bachelor of Arts (Regional and Urban Planning)
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in respect of	Bulk Liquids and Fuel Storage Facility, Greenleaf Road Kooragang Island	
project application applicant name applicant address	HLA-Envirosciences Pty Ltd (HLA ENSR) PO Box 73 HRMC NSW 2310	
land to be developed lot no., DP/MPS, vol/fol etc proposed project	Lots 1-4 DP 234887 and Lot 7 DP 262783 Greenleaf Road, Kooragang Island, Newcastle Proposed construction and operation of a bulk liquid storage facility.	
	Map(s) attached	
Environmental Assessment	an Environmental Assessment (EA) is attached	
Certification	I certify that I have prepared the contents of this Environmental Assessment and to the best of my knowledge it is true in all material particulars and does not, by its presentation or omission of information, materially mislead.	
	Signature Name: Renae Gifford Date	Signature Name: Michael England Date

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GLOSSARY OF TERMS

AADT	Annual Average Daily Traffic
ABARE	Australian Bureau of Agriculture and Resource Economics
ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
AGO	Australian Greenhouse Office
AHIMS	Aboriginal Heritage Management Information System
ALARP	as low as reasonably practicable
ANZECC	Australian and New Zealand Environment and Conservation Council
ASL	Above Sea Level
ASAP	As soon as possible
ASS	Acid Sulphate Soils
BTEX	Benzene, Toluene, Ethanol and Xylene
BTRE	Bureau of Transport and Regional Economics
CCTV	Closed Circuit Television
Cd	Cadmium
CEMP	Construction Environmental Management Plan
CO_2	Carbon dioxide
$CO_{2\text{-}e}$	Carbon dioxide equivalent
Cr	Chromium
DCP	Development Control Plan
DECC	Department of Environment and Climate Change
DGRs	Director General's Requirements
DNR	Department of Natural Resources
DoP	Department of Planning
DP	Deposited Plan
DVM	Digital Video Monitoring
EA	Environmental Assessment
EARs	Environmental Assessment Requirements
EASR	Environmental Assessment Scoping Report
EE	Eraring Energy
e.g.	Example
EMP	Environmental Management Plan
EPA	NSW Environmental Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPI	Environmental Planning Instrument
EPL	Environment Protection Licence

ESA	Environmental Site Assessment
ESD	Ecologically Sustainable Development
Etc	Etcetera
FFCP	First Flush Containment Pit
GHG	Greenhouse Gas
Govt	Government
GPS	Global Positioning System
GW	Groundwater
Ha	Hectares
HIPAP	Hazardous Industry Planning Advisory Paper
HLA	HLA Envirosciences Pty Ltd
ID	Identification
i.e.	That is
INP	Industrial Noise Policy
ISO	International Organization for Standardization
Km	Kilometre
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
m	Metres
m^2	Square metre
m^3	Cubic metre
m bgs	metres below ground surface
m^3/sec	Cubic metre per second
m/day	Metres per day
ML	Mega litres
ML/day	Mega litres per day
MR	Main Road
MW	Monitoring wells
NCC	Newcastle City Council
NEMMC	National Electricity Market Management Company
NEPM	National Environment Protection Measure
NES	National Environmental Significance
NEPC	National Environment Protection Council ?
NP&W Act	The National Parks and Wildlife Act 1974
NPWS	National Parks and Wildlife Service
NSW	New South Wales
NV Act	Native Vegetation Act 2003
p.a	Per annum

PACIA	Plastics and Chemicals Industry Association
PAD	Potential Archaeological Deposits
PAHs	Polycyclic Aromatic Hydrocarbons
PASS	Potential Acid Sulphate Soils
Pb	Lead
pH	Measure of the acidity or alkalinity of a solution
PHA	Preliminary Hazard Analysis
pmpy	chances in a million per year
POCAS	Peroxide Oxidation Combined Acidity and Sulphate
POEO Act	The Protection of the Environment Operations Act 1997
Ref. No.	Reference number
REP	Regional Environmental Plan
RLMC	Regional Land Management Corporation
RTA	Roads and Traffic Authority
RTFS	Road Tanker Fill Stands
Sec	Second
SEPP	State Environmental Planning Policy
SKM	Sinclair Knight Merz
SoC	Statement of Commitments
SWMP	Stormwater management plan
TDS	Total Dissolved Solids
TF	Tank Farm
TPH	Total Petroleum Hydrocarbons
TSC Act	Threatened Species Conservation Act
UCL	Upper Confidence Limit
Vph	Peak Hour Volume
VOCs	Volatile Organic Compounds
VOP	Valved Outlet Pit
VRU	Vapour Recovery System
Zn	Zinc
°C	Degrees Celsius
%	Percent

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EXECUTIVE SUMMARY

Introduction

This Environmental Assessment has been prepared by HLA ENSR on behalf of Marstel Terminals Newcastle Pty Ltd for the proposed construction and operation of a bulk liquid storage facility on industrial land managed by the Regional Land Management Corporation at Kooragang Island, Newcastle, NSW. The proposed facility will be used to receive, store, blend and distribute high quality fuels and biofuels for customers throughout the Hunter Region.

Project Approval is being sought for the proposed bulk liquids storage facility. This also includes the delivery of the fuels via ship at K2 berth and a pipeline from the wharf to the facility. The Minister for Planning will be the approval authority for this application. HLA has prepared this EA in accordance with the provisions of Part 3A of the *Environmental Planning and Assessment Act* (EP&A Act) *1979*, *Environmental Planning and Assessment Regulation* (EP&A Regulation) *2000*, together with the Director-General's Environmental Assessment Requirements (EARs) which were issued to the Proponent on 4th May, 2007

Background

Fuel consumption is increasing throughout Australia and there is a strong shift to utilise biofuels as a renewable resource. Existing and proposed urban and industrial activity throughout the Hunter Valley has increased the demand for fuels, thus improved accessibility to biofuels is significant to the sustainable growth of the region.

Refining capabilities in Australia are operating at maximum production; therefore the increasing demand for fuel will need to be met through imports, which are received via ship freight. This will in turn require waterfront terminal facilities. The existing fuel terminal facilities in Newcastle receive fuel via truck or pipeline from Sydney.

The provision of terminal facilities at a shipping port, for the storage and distribution of fuels, including biofuels, within the Hunter region will assist in achieving sustainable economic growth in the region as well as assisting in delivering the national objectives for biofuels consumption.

Site and Context

The site of the proposed bulk liquids storage facility is approximately 3 km north of Newcastle CBD, located on Greenleaf Road, Kooragang Island. Kooragang Island is located within the Port of Newcastle, with the subject site located adjacent to Walsh Point, a designated public reserve area at the south eastern extremity of Kooragang Island.

The site is currently vacant, and is covered with a number of grass and weed species. It has a total area of approximately 3.04ha

Surrounding land uses are mostly industrial with the nearest residential areas are located at Fern Bay, Stockton and Carrington. The closest residents are approximately 500m from the proposed terminal site.

Project Description

The proposal involves the construction of a tank farm and pipeline to enable the following activities to occur at the Site:

- Fuel receival by ship;

- Fuel receival by road;
- Bulk storage;
- Fuel blending; and
- Fuel dispatch.

The proposed development comprises of the following elements:

Fuel pipeline
Fuels would be delivered to the site via an underground pipeline. This delivery line would be a 350 mm diameter carbon steel pipe consistent with all safety requirements. The pipeline would run east of the K2 berth to the road reserve adjacent to Herons Road, then travel south, turning east adjacent to Walsh Point reserve, then north, adjacent to Greenleaf Road prior to entering the site at the southern end. The pipeline would be laid to a minimum depth of 1200 mm.

The pipeline would be above ground from the wharf to the road reserve, supported by an existing pipe back. Once it reaches the road reserve of Herons Road it would be placed underground for the balance of the route, until it reaches the facility.

Tank Farm
Proposed site structures for the site include:

- 6 x 17 metre fuel storage tanks
- Office and amenities;
- Truck loading gantry;
- Workshop;
- Fire pump house; and
- Static water tank.

The fuel storage tanks would be constructed on reinforced concrete foundations, fitted with a tell-tale hole to detect under-floor leaks. The tank storage area would be surrounded by concrete bund walls some 2 to 2.4 m high, with intermediate bunds approximately 0.6 m high designed in accordance with AS 1940.

Transport Movements
Access to the site for both heavy and small vehicles would be via Greenleaf Road. Off street car parking facilities would be located at the entry of the site and a total of 6 car parks will be provided on the site.

The expected daily total number of vehicles trips to and from the site is 46 (not including shipping staff). An additional 12 vehicle trips is expected from shipping staff and would be spread over a 36 hour period. A ship docking would be an irregular activity, occurring approximately 10 times per year.

The proposed project is expected to generate an additional 5 vehicle trips during peak hours.

Hours of Operation
Usual operating hours will be 6am-4pm Monday to Friday and 6am–12 noon Saturday.

Marstel is seeking approval for 24-hour operations for shipping activities which would occur approximately 10 times a year. Shipping operations would be undertaken as required, which may be at any time or day of the week.

Statutory Planning

The site is located within the Newcastle City LGA where the relevant local environmental planning instrument is the Newcastle Local Environment Plan (LEP 2003). Under the LEP the proposed use is defined as a *'liquid fuel depot'* . The site is located within Zone 4(b) Port and Industry Zone. Liquid fuel depots are permissible within Zone 4(b).

The project is consistent with the provisions of local, regional and State planning instruments relevant to the proposal, including

- Newcastle Local Environment Plan, 2003
- Newcastle Development Control Plan 2005
- Lower Hunter Regional Strategy
- Hunter regional Environmental Plan
- State Environmental Planning Policy (Major projects) 2005
- State Environmental Planning Policy 11- Traffic Generating Development
- State Environmental Planning Policy 33 – Hazardous and Offensive Development
- State Environmental Planning Policy 55 – Remediation of Land
- State Environmental Planning Policy 71 – Coastal Protection

Schedule 1 of the *Protection of the Environment Operations Act 1997* (POEO) outlines activities that require an Environment Protection Licence (EPL). The proposed project will require an EPL for petroleum works as it has an intended petroleum storage capacity greater than the 2,000 tonne threshold specified in POEO.

The proposed project would be referred to the Roads and Traffic Authority (RTA) and Newcastle City Council (NCC) for involvement in accordance with the provisions of *SEPP 11 – Traffic Generating Development* and the *Roads Act 1993*.

Consultation with Stakeholders

As part of the environmental assessment process, consultation was undertaken with the following authorities:

- Department of Planning;
- Department of Environment and Climate Change (formerly DEC);
- Department of Lands;
- Newcastle Port Corporation;
- Regional Land Management Corporation;
- Newcastle City Council;
- Roads and Traffic Authority;
- NSW Maritime; and
- Department of State and Regional Development.

Marstel undertook consultation with neighbouring industries to identify potential issues or concerns that they may have had. The following organisations were consulted during the preparation of the EA:

- Orica;
- Incitec Pivot;
- P&O Ports;
- Boral Woodchip;
- Port Waratah Coal Services; and
- Cargill.

Community Consultation

Marstel has initiated a round of community meetings during the planning and EA phase of this project. Various community groups and their representatives have been invited to attend these sessions to provide for the dissemination of information to the public. The meetings provided information on the construction and operation of the proposal. Discussions were also undertaken regarding potential issues that have been addressed in the EA and proposed operational procedures to manage these issues. There have been three such rounds of consultation prior to the submission of the EA.

Aboriginal Community Consultation

Consultation with local Aboriginal Community Representatives was undertaken as part of the archaeological assessment of the site. A notice was placed in the Star Newspaper on the 24th of April 2007, inviting representative of local groups to be consulted as part of the assessment process. There were a total of five groups that registered their interest in the project and participated in the field survey of the site.

Environmental Issues Prioritisation

Consultation with the Department of Planning together with an Environmental Assessment Scoping Report (EASR) assisted in the identification of issues relating to the project. This information was used to identify the level of assessment required for this EA.

Where a high potential effect was identified, the attribute or issue was allocated a higher priority for assessment. The analysis assesses risk on the basis of the potential severity of environmental effects and the likely consequences of those potential effects if unmanaged.

The assessment identified that the prioritisation of environmental issues and therefore the focus of environmental assessment for the proposed project should be as follows:

- High - Hazard and Risk
- Medium – Surface Water Quality, Air Quality, Noise, Waste and Visual;
- Low - Soils, Groundwater, Indigenous Heritage, Traffic, Ecology, Community, Transport and Natural Resources.

Hazard and Risk

A Preliminary Hazard Analysis (PHA) was undertaken by Sinclair Knight Merz (SKM) to assess the potential risk of the proposal. This was undertaken in accordance with NSW Department of Planning (DoP) Multi Level Risk Assessment Guidelines. A Level 2 assessment (Partial Quantitative Analysis) was undertaken for the facility.

The assessment considered all those incidents that may have an off site impact. The multi level screening assessment methodology determines if identified incidents can be managed through appropriate measures or should be further assessed through to the risk assessment stage. The assessment concluded, that based on the criteria as provided in HIPAP No. 4, the predicted risks at the boundary of the site were well below the criteria stipulated for industrial land use. Therefore SEPP 33 does not apply to this development.

Surface Water Management

Surface water management will be undertaken during both construction and operation of the facility. A Construction Environmental Management Plan (CEMP) will be developed that will incorporate appropriate erosion and sediment control measures on the site. The operation of the facility will be in accordance with a Stormwater Management Plan (SWMP).

The stormwater system has been designed to provide the effective containment of stormwater from the site, to prevent leaks and spills which may occur from discharging to the river and to facilitate the discharge of only clean stormwater to the Hunter River under an EPL. Some captured stormwater may be used to irrigate the small amount of landscaped areas on the site.

The implementation of the CEMP and SWMP will protect surface water quality both on site and runoff to the Hunter River would be implemented. As such, residual impacts to surface water associated with the proposal are considered to be minimal.

Ground Water

Based on a report by RCA (2007), the local area is expected to be strongly effected by tidal influences. Groundwater flow rates are expected to vary significantly depending on tidal oscillations. Depth to groundwater on the site was encountered between 1.5 m and 2.3 m below ground surface.

Excavation during the construction of the facility is not anticipated to create interaction with groundwater on the site (excluding some excavation for pipeline). Pile driving activities may intersect the groundwater, however it is considered this does not pose a significant risk to the groundwater aquifer.

RCA (2007) identified low concentrations of organic and inorganic parameters with the exception of zinc which was exceeded by up to 3.9 times the criteria provided in ANZECC (2000). Ongoing sampling and analysis of groundwater will be routinely undertaken for pH, EC, meals, TPH, BTEX, PAHs and groundwater flow rates.

During both construction and operation, plant and machinery will be routinely inspected and any oil or fuel leaks will be identified and managed immediately. The site is to be overlain with a claymax liner and then sealed with bitumen. The claymax liner will create an impervious seal across the site and will run up the sides of the bund wall. In the event that there is spillage of any product on the site, it will be contained on the surface of the site and managed appropriately.

It is considered that the proposed development does not pose a risk to the existing groundwater at the site. In addition, the construction and ongoing management of the proposed development will not adversely impact the quality of the existing groundwater with the implementation of the identified control measures.

Soil

The site is described to be terrain disturbed by human activity and it is likely that the entire site has been filled following dredging of the Hunter River. Fill material encountered on the site comprises dredged sand to silty sand with gravel and clay lenses of variable density. The Potential Acid Sulphate Soils (PASS) Planning Map identifies the area as being Class 2 PASS.

A Construction Environmental Management Plan (CEMP) will be prepared which will address the excavation, classification, treatment and disposal of soils and PASS and heavy fraction TPH contamination.

The construction and ongoing management of the proposed development will not adversely impact the soil providing the identified control measures are implemented.

Air Quality

An air quality impact assessment was prepared by HLA ENSR for the proposed facility. The assessment considered impacts associated with construction and operations including potential odour emissions. Pollutants of concern were Benzene, Toluene, Ethanol and Xylene.

The assessment of the contaminants of concern was undertaken using the AUSPLUME v6.0 Gaussian plume dispersion model. Maximum pollutant ground level concentrations were determined at all sensitive receptor locations. Concentrations of all pollutants modelled for the area surrounding the proposed facility were predicted to fall below the assessment criteria at all modelled locations. Cumulative assessments of the volatile organic pollutants indicated that there were no cumulative impacts likely as a result of the operation of the facility.

Greenhouse Gas Emissions

An assessment of potential greenhouse gas emissions was undertaken in accordance with Australian Government Department of the Environment and Heritage Australian Greenhouse Office publication *AGO Factors and Methods Workbook*, Dec 2006. The assessment considered Scope 1,2 and 3 emissions associated with the facility.

- **Scope 1** covers direct emissions from sources within the boundary of an organisation such as fuel combustion and manufacturing;
- **Scope 2** covers indirect emissions from the consumption of purchased electricity, steam or heat produced by another organisation. Scope 2 does not include emissions associated with the production of fuel.
- **Scope 3** includes all other indirect emissions that are a consequence of organisation's activities but are not from sources owned or controlled by the organisation.

It was concluded that there were no Scope 1 emissions from the facility.

Scope 3 emissions considered both the electricity consumption predicted for the facility, and also calculated potential emissions from the combustion of all fuel that is to be stored at the site. Using Table 5 of the workbook, the indirect greenhouse gas emissions (electricity end-use) for the facility, are 35.8 t $CO_{2\text{-}e}$.

The assessment of greenhouse gas emissions the potential emissions through the combustion for all fuel stored at the facility annually was calculated at 837,000 t $CO_{2\text{-}e}$. This assessment does not however consider that this fuel will be consumed, regardless of the location of the facility. Furthermore it does not consider the potential benefits by locating the facility closer to the supply chain.

Noise and Vibration

A noise and vibration assessment was prepared by Spectrum Acoustics for the proposed facility. The assessment utilised acoustic measurements of residential areas in the vicinity of the proposal to determine the background noise levels. Noise modelling was undertaken for a number of atmospheric and operational scenarios.

It was concluded with there was a potential exceedences of 1 d(B)A on the western side of Stockton during ship unloading and pile driving during a north west wind, Pile driving will be only undertaken over a period of approximately 4 weeks during construction and conducted during day light hours. No noise mitigation measures have been proposed as such an exceedences would be extremely difficult to distinguish in light of the surrounding industrial environment.

Traffic and Transport

A traffic assessment of the proposed bulk fuel terminal was prepared by TPK and Associates. The site of the proposed terminal is located on the southern side of Greenleaf Road on Kooragang Island. Greenleaf Road is classified as a local road, providing one leg of a loop road on Walsh Point.

The construction period for the proposal is expected to take some 15 months which is to include site establishment, sub surface and surface preparation, transport and establishment of fuel storage tanks and associated infrastructure. Construction traffic trips will be spread rather than a short peak arrival/departure. At the peak staff demand level, the peak hour traffic increase is not expected to exceed 30 trips and will not have an adverse impact on the road network.

Traffic rates during operation were based on the assumption that hours for site operation are to be 6am to 4pm Monday to Friday and 6am to 12noon Saturday. Shipping times are random, and will be approximately 10 times annually. The expected project trip total is 46 trips daily with a peak of 5 trips an hour.

Six off street car parking spaces are proposed. It is considered that this capacity to be realistic given the normal site demands and the prevailing road environment.

It is unlikely that traffic generated from the facility will have an adverse impact on the road network. The existing traffic flow past the site allows for prolonged gaps, reducing the likely conflict with competing traffic requirements.

Visual

The overall character of the area surrounding the site is industrial. The site, similarly with the surrounding industrial area, is generally flat. The site is fenced off with 2.5m high wire security fencing. There are no trees within the site, although there are some tall shrubs (approximately 4m in height). Generally the site appears overgrown with grass and weeds.

The proposed facilities to be constructed at the site would visible from several key viewing areas, Stockton, Hunter River, Newcastle City, Walsh Point Reserve and Greenleaf Road. The most distinguishable component of the proposal would be the six, 17 metre high storage tanks. Generally, the Bulk Fuel Terminal would add industrial infrastructure – typical in character to the existing area - to the foreshore of the Hunter River at Kooragang Island.

The visual impact of the proposal is considered to be low due to the heavy industrialised area surrounding the proposal. A number of measures would be taken to ensure the visual impacts do not encroach on the amenity of the area. These would include keeping the site in neat and tidy during construction, completing construction within a reasonably short time frame, landscaping the carpark and office/workshop area with shrubs and trees.

The proposal is likely to have minimal impact on the visual amenity of the area. This facility is located in an area that is highly industrialised and subsequently is consistent with the surrounding

Waste Management

Wastes that will be generated during the construction of the facility will be primarily associated with materials used in the packaging of plant and equipment to the site. The site will not generate a significant amount of waste as a consequence of its operation. The site will generally have only two operators on site, with the exception of ship unloading events.

Waste strategies have been developed for the proposal in accordance with the principles of the Waste Avoidance and Resource Recovery Act 2001, which incorporate in order of priority: avoidance, reuse, recycling and then disposal.

With the implementation of the appropriate waste management strategies, and the low generation of waste associated with the operation of the facility, no significant impacts associated with waste are anticipated.

Remaining Issues.

Other issue that were considered included ecology, indigenous heritage and social/economic considerations. There were no endangered species or communities identified as being associated with the site. Any indigenous heritage assessment including consultation and site visit did not identify any potential archaeological deposits on the site. It was noted that in the event a natural soil profile is encountered monitoring may be required. It was also concluded that the proposal supported the sustainable development and growth of the Hunter region.

Statement of Commitments and Safeguards

The Statement of Commitments has been prepared in respect of the construction and operation of the proposed terminal facility and has been compiled on an issues basis, as informed by the EA and the environmental risk analysis. It is anticipated that this will form the basis of the approval conditions fort the facility.

Marstel commits to the preparation and implementation of the environmental management and monitoring plans and environmental mitigation measures detailed in the SoC for the proposed terminal facility. These include:

- Construction Environmental Management Plan (CEMP);
- Port Operation Management Plan (POMP);
- Wharf Emergency Response Plan (WERP); and

- Site Management Plan (SMP).

Routine monitoring of groundwater and surface water will form a component of the SMP.

Residual Risk

The Environmental Risk Analysis for the proposed project is based on a process adapted from *Australian Standard AS 4369:1999 Risk Management*, as well as environmental risk tools developed by other organisations.

Residual Environmental Risk is assessed on the basis of the significance of environmental effects of the proposed project and the ability to confidently manage those effects to minimise harm to the environment.

The analysis of residual environmental risk for issues related to the proposed project is shown in Table ES-This analysis indicates the environmental risk profile for the proposed project based on the assessment of environmental effects, the identification of appropriate safeguards, and the Statement of Commitments shown in this EA.

Table ES-1: Residual Risk Profile

Issue	Significance	Manageability	Residual Risk
Hazard and Risk	2	3	**6 (Medium)**
Surface Water Management	3	2	**5 (Low/Medium)**
Groundwater	2	1	**3 (Low)**
Soil	1	1	**2 (Low)**
Air Quality	2	2	**4 (Low/Medium)**
Greenhouse Gas Emissions	3	1	**4 (Low/ Medium)**
Noise and Vibration	2	1	**3 (Low)**
Traffic and Transport	2	2	**4 (Low/Medium)**
Visual	2	1	**3 (Low)**
Waste Management	1	1	**2 (Low)**
Terrestrial Ecology	1	1	**2 (Low)**
Indigenous Heritage			
Socio-Economic	1	1	**2 (Low)**

The above residual risk analysis indicates that the proposed Bulk Fuel Storage Facility, including appropriate safeguards as outlined in this EA, would give rise to predominantly a low to low/medium risk in relation to the identified environmental issues.

Proposal Justification

The assessment of the proposal undertaken in the preparation of this EA has incorporated biophysical, economic and social considerations. The potential biophysical impacts associated with the proposed project include examination of the following impacts:

- Surface water management;
- Soils
- Groundwater;
- Noise;
- Air quality;
- Terrestrial ecology; and
- Waste management.

The assessment of the impact of the proposed project on each of the biophysical elements of the environment has concluded that provided appropriate mitigation and management measures along with monitoring systems are implemented to mitigate potential impacts, the proposed development would not have a significant impact and is therefore justifiable on environmental grounds.

The potential effects of the proposed project on social and cultural aspects of the area were examined in this EA and included consideration of:

- hazards;
- heritage (indigenous and non-indigenous);
- traffic and transport; and
- landscape and visual amenity issues.

The assessments on each of these factors have shown that the proposed project would not have a significant impact provided the appropriate management and mitigation measures are implemented as identified in this EA, and the project is justifiable on social grounds. Furthermore, the proposed project is considered to be in accordance with both the current and future consumer demand for biofuels in the region.

The proposed development would provide economic benefits to the local, regional and state economies. While the construction phase of the development would provide local employment opportunities and subsequent income for the Newcastle area, the operational phase would provide economic benefit to consumers in the Hunter Region through introducing greater competition in the fuel market, which is expected to result in lower fuel prices.

The proposed project is, therefore, considered to be justifiable from the economic perspective.

1 INTRODUCTION

1.1 Purpose of this Report

This Environmental Assessment (EA) has been prepared by HLA ENSR on behalf of Marstel Terminals Newcastle Pty Ltd (Marstel) for the proposed construction and operation of a bulk liquid storage facility (terminal facility) on industrial land managed by the Regional Land Management Corporation (RLMC) at Kooragang Island, Newcastle, NSW. The proposed facility will be used to receive, store, blend and distribute high quality fuels and biofuels for customers throughout the Hunter Region. The capital cost of the proposed facility is approximately $47 million.

Marstel applied to the Department of Planning (DoP) on the 7 March 2007 seeking declaration as a Major Project under Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act). Notification was provided to Marstel on the 4 of May 2007 that the project will be considered by the Minister for Planning as a Part 3A Major Project. As such an EA is required to be submitted to the Minister for assessment. The Director General of the DoP has issued Environmental Assessment Requirements (EARs) for the proposal which provide the framework for this EA.

1.2 Background

Fuel consumption is increasing throughout Australia and there is a strong shift to utilise biofuels as a renewable resource. Existing and proposed urban and industrial activity throughout the Hunter Valley has increased the demand for fuels, thus improved accessibility to biofuels is significant to the sustainable growth of the region. Refining capabilities in Australia are operating at maximum production; therefore the increasing demand for fuel will need to be met through imports, which are received via ship freight. This will in turn require waterfront terminal facilities.

The existing fuel terminal facilities in Newcastle receive fuel via truck or pipeline from Sydney. Vehicle access from fuel refinery facilities in Sydney is via the F3 Freeway, and is limited by route restrictions for hazardous bulk liquids. The fuel pipeline from the facilities in Sydney is currently carrying capacity loads. The alternative mode of supply to Newcastle facilities is via ship.

Biofuels are generated from renewable, organic sources. In Australia, the two primary sources of biofuels are ethanol and biodiesel. This is primarily due to availability of conversion technologies and proximity to feedstock availability. Biodiesel is produced through a process known as transesterification, where organically derived oils are combined with alcohol (usually ethanol or methanol), and are chemically altered to form fatty esters. When these esters are used for fuel, they are called biodiesel. Ethanol is an alcohol produced through the fermentation process. In Australia, ethanol is produced through the fermentation of either wheat starch or molasses from sugar cane.

The use of fuels blended with biofuels can result in environmental benefits, including reduced exhaust emissions of some toxic pollutants and reductions in greenhouse gas emissions. Biodiesel is biodegradable, requires minimal engine modification, and is cleaner burning than the diesel it replaces. There has been significant support from the Federal government to the biofuels industry with the introduction of an excise scheme and the establishment of a Biofuels Taskforce. The aim of the scheme is to increase consumer confidence with the products and improve distribution to customers.

The provision of terminal facilities for the storage and distribution of biofuels within the Hunter region will assist in delivering the national objectives for biofuels consumption.

1.3 Project Summary

The proposal is for the provision a bulk fuels terminal which will comprise:

- Use of an existing ship berthing facility to deliver fuels from bulk tankers;
- Storage of bulk fuels in above ground tanks, to be constructed at the proposed facility;
- Distribution of fuels from the ship berthing facility to storage tanks via a proposed underground pipeline;
- Delivery of fuels by road tanker for storage in bulk fuel tanks;
- Loading of fuels onto road tankers from the storage tanks via a road tanker gantry to be installed for the purpose (some fuels would be blended at this stage); and
- Daily truck movement for delivery and distribution by road of fuels to other storage facilities and retail outlets.

1.4 Location

The terminal facility is proposed to be developed on Kooragang Island, which is within the Port of Newcastle, NSW as indicated in **Figure 1**. The terminal facility is on Greenleaf Road, adjacent to Walsh Point, approximately 3 km north of the Newcastle Central Business District (CBD). The land on which the facilities are to be located will be leased from the RLMC.

The nearest residential areas are located at Fern Bay to the north, Stockton to the east and Carrington to the south (see **Figure 2**), with the closest receptors approximately 500m east from the proposed terminal site. Neighbouring industry includes Incitec, Orica, and the Boral woodchip mill as shown in **Figure 2**. Other industries which also operate on Kooragang Island include a coal loader, Alumina and wheat storage, waste management and oilseed pressing.

1.5 The Applicant

Marstel is an independent bulk liquids storage and handling company, specialising in handling hazardous bulk liquids and edible oils. Marstel has gained a reputation for excellence in the storage and handling of bulk liquids and is seeking to diversify into the fuel terminals sector in order to grow its business base. Marstel has been operating since 1987 and is a national leader in the business of bulk liquid storage, with a highly valued customer base, including numerous multi-national companies. Marstel currently operates six terminals in Australia and New Zealand.

Marstel places the highest priority on safety, operational integrity and good environmental practice. Documented work procedures and management systems have been developed for all of Marstel's terminals to ensure its operations are conducted safely. The Coode Island facility (Melbourne) has been recognised as a "World Best Practice" operation for safety and environmental protection, being awarded the Plastics and Chemicals Industry Association (PACIA) Award for Sustainability in 2006. Operator selection and training, emergency response procedures, risk management procedures and incident reporting are all key areas of emphasis in Marstel's management systems, which support the company's quality, safety and environmental objectives.

1.6 The Environmental Assessment Process

1.6.1 Major Projects

The EP&A Act and its Regulation provide a framework for the environmental planning process in NSW. Section 75B(2) of the EP&A Act makes provision for 'major projects' to be identified through various means, including by way of declaration of a listed project in State Environmental Planning Policy (Major Projects) 2005 (SEPP 2005).

Schedule 1 of SEPP 2005 identifies classes of development which are candidates for declaration as major projects. Schedule 1 includes works for the purpose of bulk storage facilities with a capital investment of more than $20 million. This proposal is to store bulk liquids on Kooragang Island, with a capital investment of approximately $47 million, and has been declared by the Minister as a 'major project' under SEPP 2005.

In accordance with the provisions of Part 3A of the EP&A Act, Marstel are seeking "Project Approval" for the proposed bulk liquids storage facility. This also includes the delivery of the fuels via ship at K2 berth and a pipeline from the wharf to the facility. The Minister for Planning will be the approval authority for this application.

1.6.2 Environmental Assessment Requirements

Requirements that are to be met for Project Approval are detailed under the provisions of Section 75F of the EP&A Act. These requirements include the preparation of an Environmental Assessment (EA) that must be prepared in accordance with the EARs of the Director General of the DoP.

An Environmental Assessment Scoping Report (EASR) was prepared by HLA ENSR in March 2007 and submitted to the DoP (**Appendix A**). The EASR identified the significant environmental issues that should be addressed by the assessment process. The Director General has since issued EARs to Marstel (see **Appendix B**), identifying the issues that are to be included in the EA for this proposal. The preparation of this EA has been underpinned by the analysis provided in the EASR, and the EARs.

1.6.3 EA Exhibition

The EP&A Act requires that the EA be placed on public exhibition for review for a minimum period of 30 days.

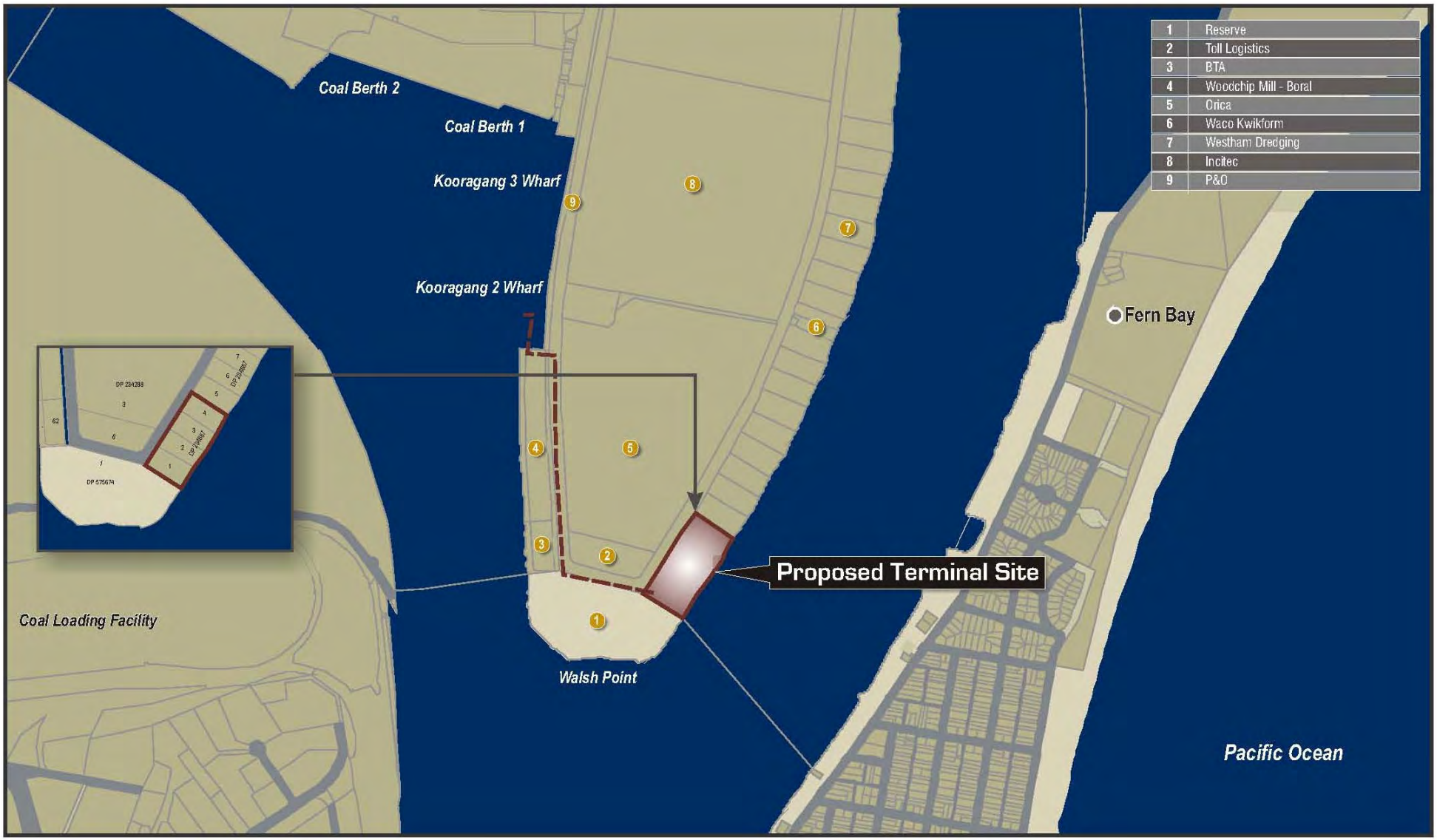
MARSTEL TERMINALS

Figure 1

Regional Context

Environmental Assessment - Bulk Liquids Storage Facility

Greenleaf Road Kooragang Island



MARSTEL TERMINALS

Figure 2

Location of Proposed Development

Environmental Assessment - Bulk Liquids Storage Facility

Greenleaf Road Kooragang Island

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2 THE SITE

2.1 Site Description

The site of the proposed bulk liquids storage facility is approximately 3 km north of Newcastle CBD, located on Greenleaf Road, Kooragang Island. As indicated in **Figure 2**. Kooragang Island is located within the Port of Newcastle, with the subject site located adjacent to Walsh Point, a designated public reserve area at the south eastern extremity of Kooragang Island.

The site is currently vacant, and is covered with a number of grass and weed species. It has a total area of approximately 3.04 ha

2.2 Site History

Kooragang Island was developed in 1951 as part of the Hunter River Islands Reclamation Scheme, which commenced in 1951 and joined the Walsh, Dempsey and Moscheto Islands with dredged sand and fill material. The development was completed in 1960, with the land being designated for industrial development and Port related activities.

2.3 Surrounding Land Use

The site is adjacent to industrial development (as shown in **Figure 2**) including:

- Chemical (ammonia) industries operated by Incitec & Orica,
- Boral woodchip mill,
- coal loading facilities,
- alumina and wheat storage

The nearest residential areas are located at Fern Bay, Stockton and Carrington (see **Figure 2**), with the closest receptors approximately 500m from the proposed terminal site.

In summary the surrounding land uses include:

- North – industrial land;
- South – public reserve and the Port of Newcastle;
- East – residential areas of Stockton and Fern Bay; and
- West – residential area of Carrington and industrial land.

2.4 Land Ownership and Legal Description

The land to which this proposal is associated is listed in **Table 2-1**.

Table 2-1: Land Description and Land Ownership

Land Description	Land Ownership
Lot 1-4 DP 234887	RLMC
Lot 7 DP 262783 Road Reserve Greenleaf/Heron Road (pipeline route)	RLMC
Land between the Wharf and Road reserve (pipeline route)	Newcastle Port Corp.

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3 PROJECT DESCRIPTION

3.1 Project Need

3.1.1 Purpose

The purpose of the project is to develop a world-class bulk fuels and biofuels terminal in Newcastle. The facility will assist industries in the Hunter Region to grow with more cost-competitive fuel, greater efficiencies and a stable fuel supply. Marstel's vision is to contribute towards a secure, thriving and vibrant Hunter community built on an economically, socially and environmentally sustainable industry base.

3.1.2 Australian Fuel Demand Trends

Australia is an energy rich nation, and one of the few Organisation for Economic Co-Operation and Development (OECD) countries that are a net energy exporter. This is with the exception of liquefied fuels, namely gasoline, diesel and fuel oils. Australia has numerous off shore and on shore refining capabilities in areas such as the Carnarvon Basin, Gippsland Basin and Bass Strait. There are seven major oil refineries in Australia operated by the four major oil companies BP, Caltex, Mobil and Shell. Distribution of bulk fuel from the refineries is typically by ship

Refinery production is anticipated to increase by some 1.3% per year whilst the consumption of crude oil and its products is expected to increase by around 1.4% per year (ABARE 2005). The net effect is that the share of locally sourced petroleum products is anticipated to fall from about 78% to 70% by 2029-30. Since the mid 1990s the imports of fuels from the Middle East to Australia has fallen, and has been replaced by fuel imports from the South East Asian region.

The transport sector consumes 72% of liquefied fuels in Australia. Assuming that fuel prices remain relatively consistent, it is predicted that this will continue to increase by some 1.2% a year over the next 25 years.

3.1.3 Demand for BioFuels

An important component of the proposed project is for the storage, blending and distribution of biofuels. Biofuels are generated from renewable, organic sources. In Australia, the two primary sources of biofuels are ethanol and biodiesel, due to availability of conversion technologies and proximity to feedstock availability. The use of fuels blended with biofuels can result in environmental benefits, including reduced exhaust emissions of some pollutants and reductions in greenhouse gas emissions. These environmental benefits will assist in achieving sustainable growth options in Australia.

The Australian Federal Government has commissioned a number of reports, into the biofuels industry since 2000. These have looked at the costs and benefits of biofuels to the consumer. In 2001, the Government announced a biofuel target of 350 million litres to be included in the Australian fuel mix by 2010. This announcement initiated an investigation in 2003 titled *Appropriateness of the 350 Million Litre Biofuels Target,* which was undertaken by CSIRO, the Australian Bureau of Agriculture and Resource Economics (ABARE) and the Bureau of Transport and Regional Economics (BTRE) (Commonwealth of Australia 2003).

Soon after the submission of this report, the Government presented new excise arrangements for biofuels in its Energy White Paper-*Securing Australia's Energy Future* (Commonwealth of Australia 2004). In light of these new arrangements, it was concluded by ABARE that there would be sufficient support for the viability of the biofuels industry.

A Biofuels Taskforce was established in 2005 by the Prime Minister, to ensure that public policy was aligned with existing scientific evidence. In summary the Biofuels Taskforce concluded that:

- There were potentially significantly greater health benefits from ethanol use (in biofuels) than previously thought; and
- Greenhouse and regional benefits from the use of biofuels were similar to previous research undertaken.

Nevertheless, it was also concluded that there were market barriers for biofuels and the target of 350 mega litres (ML) biofuel production by 2010 was unlikely to be achievable. In response to these findings, the Federal Government reaffirmed its commitment to biofuels production and announced a package of measures to address the identified market barriers. Consequently, a Biofuels Action Plan was developed in consultation with individual oil companies, setting the path forward to achieve the 350 ML target, which if implemented, should result in an even higher volume of biofuels.

The provision of terminal facilities with a clear goal to store, blend and distribute biofuels will improve the volume and accessibility to and volume of the product. Thus the project will aid in delivering the national objectives for improved viability of the biofuels industry.

3.1.4 Demand for Bulk Fuel Storage in the Hunter Region

Fuel demand in the Hunter region is unlikely to slow. Both population and industrial growth have been targeted for the region. The Lower Hunter is the sixth largest urban area in Australia and one of the State's major centres of economic activity indicating high demand for fuels. Similarly, strong mining and agricultural sectors in the upper Hunter region indicate increasing demand for transport and associated fuel consumption The NSW Government has produced a Lower Hunter Regional Strategy which has been prepared to ensure the region develops in a strong and sustainable way. The NSW Government's 25-year land use strategy for the region:

- Provides a projected population growth of 160,000 people.
- Plans for up to 66,000 new jobs and ensures an adequate supply of employment land.

Existing delivery of fuels to the region by road and pipeline from Sydney are limited by capacity and cost. Provision of storage and distribution facilities in Newcastle will enable links to free-flowing transport distribution in the region which offers importers and exporters a seamless delivery network to and from, the Port of Newcastle This meets the objectives of the NSW Premier’s State Infrastructure Strategy for the region.

It is anticipated that the proposed project would secure the availability of renewable and cost effective fuel for the region which would assist in meeting the objectives for a sustainable and strong region.

3.2 Alternatives Considered

3.2.1 Site Location

A successful bulk terminal facility for fuel requires the following site criteria

- Access to existing port infrastructure and availability of land close to international berthing facilities
- Wharfage to cater for ships up to 230 m long to berth and transfer the fuels/biofuels along a short pipeline into the tanks
- Easy and safe road transport access from the site for fuel delivery
- Large population base and predicted population and economic activity growth (strong market for fuel)
- Complementary surrounding landuse to limit hazard risk and impact
- Suitable physical site characteristics to limit construction costs and environmental risks
- A supportive business development environment.

The Sydney, Hunter and Illawarra regions have international berthing facilities. The Sydney region suffers from congested roads, limited transport routes for liquids with low flash points (such as fuels) and a lack of vacant land close to the port facilities. The Illawarra region faces similar road distribution problems and has a smaller population and industrial base. Newcastle was chosen as the location for the proposed facility due to commercial and access issues.

The proposed terminal facility at Kooragang Island is considered the most suitable for the following reasons:

- it is located close to existing international berthing facilities for ships greater than 230 m in length
- it can receive and distribute product directly from the ship via a short pipeline. (the wharf currently handles bulk liquids for other stakeholders)
- a vacant site surrounded by complementary industrial land uses and separated from residential areas is available
- physical constraints on the site are minimal
- support from State agencies and regional associations promoting regional development

3.2.2 Site Layout

Bulk Fuel Storage Facility
Tank Farm layout is dependent upon

- anticipated volume of delivery (hence tank size)
- road access
- site constraints
- visual impacts
- security

The proposed tank farm layout is considered optimum for the site and use. The tanks sizes are suitable for the fuel loads delivered by ships. The tanks will be used for both flammable liquids and combustible fuels The tank configuration on site has been designed so that the flammable liquids will be stored furthest from the public reserve of Walsh Point. Flammable liquids have a lower flash point than those of combustible (diesel/biodeisel) and therefore a higher propensity for ignition. Subsequently, only the combustible fuel storage tanks will be located closer to the southern boundary and reserve.

Fuel Pipeline

An option considered for the pipeline route was running the fuel pipeline across Herons Road, transecting Orica's property, and then crossing Greenleaf Road into the terminal. The advantage to this option was the pipeline would be constructed above ground which makes inspection of the pipeline easier. It also removes the pipeline from public access where it may be accidentally disturbed.

This option however was not pursued due to a number of reasons. Firstly, there was concern about the perceived risk associated with having a fuel pipeline on Orica's land and the nature of their operations. There were also concerns about the a potential visual impact and safety associated with a pipeline overpass on Herons Road and Greenleaf Road.

It was concluded that the current proposal of an underground pipeline within the road reserves was more appropriate.

3.3 Project Activities

3.3.1 Fuel receival by ship

Delivery of unleaded petrol and diesel would be by ship, which would be unloaded at the K2 wharf currently leased by P&O Ports. It is anticipated that there would be approximately 10 shipments per year. It is expected that biodiesel and ethanol will be delivered to the terminal by road (as well as ship), which would involve approximately two truck movements per day.

The common user berth K2 would be used for ship berthing and product discharge. Marstel proposes to use the southern end of the existing berth. It is anticipated that up to Panamax size ships would be received at the wharf for fuel discharge.

There would be a wharf tie up facility, with a fixed loading arm and four mooring dolphins. Newcastle Port Corporation is currently in the process of extending the K2 wharf which involves the construction of two more dolphins, one at each end of the wharf. This will provide K2 wharf with the capacity to allow two smaller vessels to unload simultaneously.

Ships would discharge at a rate of some 1000 t/hr through two 200 mm multi-product flexible hoses connected to a dedicated manifold on the wharf. The hoses would be rated for 14 bar working pressure. The current maximum pump pressure available from ships serviced is 9 bar, and the hose burst pressure is approximately five times the working pressure. The hoses would be handled using the ship's crane or shore-based mobile cranes. The 350 mm wharf manifold would consist of a pig breech and standpipe connected to the 350 mm carbon steel discharge line.

Fuels would be delivered to the site via an underground pipeline. The pipeline would run east of the K2 berth to the road reserve adjacent to Herons Road. It would then to travel south, turning east adjacent to Walsh Point reserve. Finally would turn north, adjacent to Greenleaf Road and connect to the site.

The pipeline would be 'pigged' clear after each product discharge. This involves passing a solid plug through a pipeline. The plug is small enough to pass through the pipeline but large enough to touch the inside wall, therefore ensuring that all product is cleared from the line once fuel unloading has ceased.

Shipping and truck loading operations would be managed by a computerised control system that would be pre-programmed to enable feasible concurrent operations. The tanks would be fitted with radar level gauging that would continually monitor the product level, as well as high and independent high level alarms to prevent the possibility of overfilling.

3.3.2 Fuel Deliveries by Road

Ethanol and biodiesel would be delivered by truck to the facility. It is anticipated this would involve approximately two truck movements per day. Ethanol and biodiesel would be unloaded from the tankers at the loading/unloading fuel facility. The control room would contain a computer control system that would monitor the tank levels and pipeline flows. Mimic screens would be installed in the control room to assist operators to monitor terminal operations.

3.3.3 Bulk fuel storage

Diesel and biodiesel fuel would be stored in one 25 ML and two 3 ML atmospheric steel storage tanks respectively, each fitted with standard pressure/vacuum protection, venting to atmosphere. As shown in **Figure 3**, these tanks would be located in the south western and southern corner of the terminal respectively.

Unleaded and premium unleaded petrol would be stored in separate 12 ML steel tanks with internal floating roofs that would minimise vapour emissions and retain petrol quality. Ethanol would be stored in a 3 ML steel tank, also fitted with an internal floating roof. All tanks would be designed to meet the requirements of the *Protection of the Environment Operations (Clean Air) Regulation* in relation to the control of volatile organic liquids and in accordance with *AS 1692: Tanks for flammable and combustible liquids*.

Each tank would have:

- Auto level gauging;
- High/high high/low level alarms;
- Multi-level temperature measurement;
- Multi-level sampling equipment;
- Water draining; and
- Low-level product drains for maintenance purposes.

Each tank would be placed on a reinforced concrete foundation. A tell-tale drain would also be installed under each of the tanks for leak detection. All tanks would be located within sealed bunds piped to stormwater collection systems. As shown in **Figure 3**, the site would be surrounded by a 2 to 2.4 m concrete bund wall, designed in accordance with *AS 1940: Storage and handling of flammable and combustible liquids* and is designed to hold the contents of the largest tank, a 1:20 yr 24 hr rain event and 20 minutes of fire water leaving 100 mm of freeboard simultaneously. There would also be a series of intermediate bunds within the main bund, designed to contain minor spills and stormwater (a 1:20 yr 24 hr rain event) in accordance with AS: 1940. The purpose of these intermediate bunds would be to prevent the whole site being affected in the event of a minor leak at the tank/pipework.

3.3.4 Fuel Blending

Blending is the continuous combining of two or more products to a pre-determined specification that meets Australian Fuel Standards. Fuel blending would be undertaken at the site and delivered directly to the trucks at the tanker loading gantries for dispatch to customers. The fuel blending process is described diagrammatically in **Figure 4**.

Diesel and Unleaded Petrol would be stored in the tanks and would be pumped through the delivery pipeline. This fuel stream is would then be injected with either the ethanol or biodiesel via a sidestream injector system. The blending ration for the two products is 90/10 unleaded petrol to ethanol and 80/20 diesel to biodiesel. Once the blending has been undertaken, the final product would pass through a meter and control valve into the road tanker.

3.3.5 Fuel dispatch

A three-bay road tanker gantry is proposed for the terminal site, with each bay capable of multi-product loading of a 50,000 litre B-double road tanker in 40 minutes. The gantry would be fed from the product tanks via dedicated pumps and lines. Each gantry bay would be fitted with three diesel, one unleaded petrol and one premium unleaded petrol bottom loading arms.

The facility would be operated by the vehicle driver using swipe card gantry access. The vehicles would fitted with overfill and static protection. A dead-man button requiring regular activation by the vehicle driver would be integrated into the gantry emergency shutdown system. Various component interlocks would ensure safe operation during each phase of the vehicle loading operation.

The truck fill stand would collect vapours via a Vapour Recovery System (VRU). Product from the VRU would be reclaimed and pumped back into the tanks, thereby removing atmospheric emissions.

3.4 Proposed Development

3.4.1 Fuel Pipeline

Fuels would be delivered to the site via an underground pipeline. This delivery line would be a 350 mm diameter yellow jacketed (protection system) schedule 40 carbon steel pipe with all joints fully welded and x-rayed. The pipeline would run east of the K2 berth to the road reserve adjacent to Herons Road. It would then travel south, turning east adjacent to Walsh Point reserve. Finally would it turn north, adjacent to Greenleaf Road and connect to the site. The pipeline would be laid to a minimum depth of 1200 mm. Generally the pipe would be laid on a 100 mm sand bedding and backfilled with fully compacted sand to a minimum cover of 150 mm. Above the trench would be backfilled with first class crushed rock fully compacted in 150 mm maximum thickness layers. Warning tapes would be fitted above the pipe approximately 200 mm below the finished surface level prior to replacing the top soil. Sections of this pipeline which may be subjected to vehicles crossing will be concrete encased to within 200 mm of the finished surface. The pipeline would enter the facility at the southern end (see **Figure 2)**.

The pipeline would be paced on the southern end of the K2 wharf, from which it would be placed on the top of the existing rock wall. The pipeline from the wharf to the road reserve would be above ground, supported by an existing pipe back. Once it reaches the road reserve of Herons Road it would be placed underground for the balance of the route, until it reaches the facility.

Signs would be placed along the length of the route with pipeline markers every 100 m, warning a pipeline is located below. Prior to the rehabilitation of the pipeline route there would also be evidence of disturbed ground.

3.4.2 Tank Farm

The site layout for the tank farm is shown in **Figure 3**. The primary elements of the terminal facility are the six 17 metre high storage tanks and the truck-loading gantry. Details of the main structures on site are provided in **Table 3-1**. Below-ground pipework would also be installed for the transfer of fuels from the K2 wharf to the terminal facility as described above.

The fuel storage tanks would be constructed on reinforced concrete foundations, fitted with a tell-tale hole to detect under-floor leaks. The tank storage area would be surrounded by concrete bund walls some 2 to 2.4 m high, with intermediate bunds approximately 0.6 m high designed in accordance with AS 1940. Details of the tank base construction and bund wall are provided in **Figure 5 and 6** respectively.

Table 3-1: Proposed Site Structures

Structure	Approximate Size	No.	Description
Diesel tanks	44 m diameter; 17 m high	1	Steel tank with white exterior
Unleaded Petrol	30 m diameter 17 m high	2	Steel tanks with white exterior
Ethanol/biodiesel tanks	16 m diameter; 17m high	3	Steel tanks with white exterior
Office and amenities	7 m x 4 m; 5 m high	1	Steel wall and roof cladding; colourbond finish
Truck-loading gantry	25 m x 16.5 m; 8 m high	1	Steel frame with colourbond cladding (wall and roof)
Workshop	7 m x 4 m; 5 m high	1	
Fire pump house	10 m x 5 m; 5 m high	1	
Static water tank	13 m diameter; 15 m high	2	Steel tank with galvanised finish

Access to the site for both heavy and small vehicles would be via Greenleaf Road. Off street car parking facilities would be located at the entry of the site, with access from Greenleaf Road. Provision would be made for 6 car parks on site, which conforms to the requirements of *Newcastle City Council Development Control Plan (DCP) 2005*, Element 4.1 Car Parking. Adjacent to the carpark there would be one workshop and one administration building, which would house facilities for employees on site.

3.4.3 Transport Movements

The following is a summary of the predicted road trips of trucks and transport to the site during operation:

Staff Vehicles - 6 trips per day

Road deliveries – Up to 40 heavy vehicles trips per day

It is anticipated that there will be 3 passenger vehicles and 20 truck movements per day which equates to a daily total number of trips of 46 (therefore entry and exit to the facility). Truck movements include the delivery of biofuel and dispatch of blended fuels. Shipping staff are not included in this number. An additional 12 trips is expected from shipping staff and would be spread over a 36 hour period on the occasion of ship docking would be an irregular activity, occurring approximately 10 times per year.

The proposed project is expected to generate an additional 5 trips during peak hours.

3.4.4 Hours of Operation

The terminal site would nominally be open for product dispatch between 6 am and 4 pm Monday to Friday and from 6 am to 12 noon on Saturdays when required. Marstel is seeking approval for 24 hour operations for shipping activities which would occur approximately 10 times a year. Shipping operations would be undertaken as required, which may be at any time or day of the week.

3.4.5 Interfaces

The terminal site would require servicing infrastructure such as potable water, electricity, communications and sewage/septic system. Electricity to service plant would be obtained from the local grid. Distribution boards would be supplied from an on-site transformer linked to the high voltage electricity supply. On-site backup capability (batteries and engine-driven generator) would be installed to feed key safety-related systems to ensure the safe operation of the tanks during power outages. The fire system would be powered by diesel. Potable water would be obtained from Hunter Water, and an on-site septic system that is to be pumped out by a licensed contractor would be required.

3.5 Proposed Construction Activities

Construction activities required for the project would include the following:

- Stripping of existing vegetation and top soil (which would be re-used in landscaped areas);
- Excavation of areas for tank foundations and pile driving;
- Construction of reinforced concrete tank foundations and bund walls;
- Preparation of the bund floor (excavation, backfilling with crushed rock, installation of claymax liner, additional backfilling with crushed rock and priming/sealing);
- Installation and diversion of services and infrastructure, including stormwater drainage lines;

- Construction of internal roadways (excavation, compacting of road base);
- Pouring of concrete pavement (reinforced) for main driveway;
- Construction of a pipeline to transfer liquids between the K2 berth and the terminal facility; and
- Construction vehicle movements.

Where practical, materials would be prefabricated off site and installed on site, particularly the fuel facility components, thereby minimising the construction activities required on site.

The tanks would be constructed on site and erected on their foundations. Following the welding and testing of the floor plates, the tank structures would be formed by welding together the rings in a staged approach, with temporary bracing added until the structure is completed and the roof is installed. The tanks would be tested by x-ray, then filled with water and pressure tested in accordance with API650 – 10th Edition.

The bunds would be lined with a claymax liner and crushed rock. Claymax is a commercially available bentonite product which is used in applications where an impermeable barrier is required, such as in lagoons or waste containment facilities. The bentonite is encapsulated between two layers of geofabric material. Claymax is supplied in sheets, which is rolled across the site. It is important that the material is installed correctly to maintain the integrity of the liner. Rolls of claymax would be delivered to the site in their original packaging to ensure integrity. The rolls are provided with an overlapping edge, so they may be joined to the next roll. The length of overlap depends on the thickness of liner used. The claymax would then run up the sides of the adjacent bund wall, which would the penetration of the seal.

Once the claymax has been installed the area would be sealed with a sprayed layer of non-combustible bituminous compound to create a barrier above the soil and groundwater and aid the collection of stormwater.

The target completion date for construction of the terminal facility is November 2008, following an anticipated construction period of approximately 15 months.

3.6 Environmental and Hazard Controls

3.6.1 Site Management Plan

Marstel has implemented an extensive suite of environmental controls at its other bulk terminal facilities where similar equipment to that proposed for the Kooragang terminal facility has been installed. These controls cover loading and unloading of road tankers, ship transfer operations, stormwater management, groundwater protection and fire management (as detailed in **Section 7**).

Marstel is an environmentally responsible company, and would develop a comprehensive site management plan (SMP) in consultation with key stakeholders including the community, neighbouring industry and regulators. Marstel would implement a program of continuous improvement for environmental performance, and would demonstrate management of the process through setting environmental objectives and measuring performance against those targets. Management would ensure that all team members are fully trained for their respective positions, with a full and clear understanding of their environmental responsibilities and the associated regulatory controls for the facility.

3.6.2 Construction Environmental Management Plan

Prior to construction of the terminal facility a Construction Environmental Management Plan (CEMP) would be developed. This plan would provide strategies to manage the construction activities occurring on the site. It would include measures to manage the following issues:

- Surface Water;
- Soils and groundwater;
- Air quality;
- Indigenous and Non-Indigenous Heritage;
- Flora and fauna;
- Noise; and
- Waste.

3.6.3 Maritime Safety and Traffic

It is proposed that approximately 10 ships per year will enter Newcastle Port to unload at the K2 Wharf. Bulk fuel would be transferred from the ship to the terminal facility via an underground pipeline. Newcastle Port has approximately 3000 ship movements per year (Newcastle Port Corporation website) which carry a variety of cargoes, the most significant being coal. The predicted increase of 10 movements per year represents an overall increase of approximately 0.3%. The ships would be prescheduled for entry to the port, therefore it is not predicted that the facility would have an impact on ship movements based on current movements.

Bulk liquid tankers would travel from other ports in Australia and overseas and enter the Hunter River directly on arrival at Newcastle port. Oil delivery planning would obviate the need for tankers to anchor off the port, avoiding the potential for a ship grounding hazard in heavy seas. Once the tanker approaches the port it would be met by a port pilot, who would assist with the navigation duties whilst entering and traversing the Newcastle Port entry and Hunter River environs. As the tanker approaches the wharf it would be met by tugs that would be used to assist the berthing of the vessel. Key hazard reduction and safety features of this method of harbour entry and berthing are:

- Tanker does not anchor offshore, avoiding the potential for the ship to be driven on the coast by heavy seas;
- Pilot assisted navigation entering and in the harbour, which eliminates the hazard of unfamiliarity with the harbour entry and port navigation requirements; and
- Tug assistance in berthing, which reduces the risk of striking the wharf and damaging the tanker hull leading to the potential for release of product.

All bulk fuel tankers would be operated in accordance with the International Safety Guide for Oil Tankers and Terminals (ISGOTT) and AS3846-2005 The Handling and Transport of Dangerous Cargoes in Port Areas. The ISGOTT standard was first developed in 1978 and is now in its 5th Edition. This is the definitive guide to the safe carriage and handling of crude oil and petroleum products on tankers and at terminals. This is a highly comprehensive document which provides significant detail on all safety standards that must be complied with by all tankers and terminals. Issues that are covered include:

- safety standards;
- pollution control;
- ship design;
- principles underlying the International Safety Management (ISM) Code and the International Ship and Port Facility Security (ISPS) Code;
- ship/shore Safety Check-List; and
- standard operating procedures.

In addition to this standard, Marstel in consultation with Newcastle Port Corporation would develop a Port Operations Management Plan. This would include but not necessarily be limited to:

- Navigation (including movement of barges and interaction with commercial shipping);
- Location and lighting of all floating plant and equipment;
- Movements within the Port;
- Details of tie-up facilities for floating plant and equipment;
- Communication (including communication with the Vessel Traffic Information Centre);
- Notification requirements; and
- Risk assessment of all activities.

Specifically any oil or chemical spills will be reported to Newcastle Port Corporation on their dedicated 24 hour phone line.

3.6.4 Ship Transfer Operations

The wharf transfer lines would be pressure-tested to ensure their integrity prior to the arrival of each ship and before products are transferred. All ship unloading operations would be undertaken initially under low flow conditions while additional checks are conducted to ensure the unloading operation is occurring appropriately. Hourly line walks and regular control room checks and wharf monitoring would also be implemented.

Line pigging would be undertaken at the completion of each load to ensure no product remains within the pipeline. Regular intelligent “pigging” would also be undertaken to determine the integrity of the pipeline.

3.6.5 Road Tanker Loading/Unloading

All loading and unloading activities would be undertaken by the road tanker driver under the control of the terminal operator. A dead-man button would be installed, with operations aborted if this button is not pushed every three minutes. Contractors, drivers and site visitors would undergo inductions in site safety, emergency systems, and environmental issues prior to being allowed on site. Procedures governing the types of tankers allowed on site and their proximity to other tankers would also be implemented. Loading and unloading operations would begin and end on low flow settings, with the product pumps starting once a feedback signal is received that indicates all the in-line valves are open. Valves would fully open to the receiving tank once a percentage volume of liquid has been transferred.

3.6.6 Stormwater Management

A Stormwater Management Plan has been developed for the facility and is included as **Appendix C**.

The stormwater system has been designed to ensure the effective containment of stormwater which falls on the site, to prevent leaks and spills which may occur from discharging to the river and to facilitate the discharge of only clean stormwater to the Hunter River under an Environmental Protection Licence (EPL). Some captured stormwater may be used to irrigate the small amount of landscaped areas on the site.

In order to ensure that only clean stormwater is discharged from the site, stormwater originating from different on site catchments would be segregated, tested and treated accordingly. The areas identified as potentially impacting on the quality of stormwater leaving the site are:

- Stormwater from the Tank Farm (TF);
- Stormwater from the concrete driveways trafficked by tankers;
- Stormwater from the Road Tanker Fill Stands (RTFS) and pump bay
- Stormwater from the emergency access roads; and
- Stormwater from building roofs and car park.

A plan for the site is presented in **Figure 3** showing the site layout, drainage plan, bunding and location of roadways.

The proposed monitoring and testing of stormwater prior to discharge is discussed in **Section 7.2.3**.

Tank Farm Stormwater System
Bunding would be provided around the Tank Farm (TF) to contain leaks or spills, and also to contain foam or contaminated fire water. This bunding would also contain stormwater which falls on the TF. The TF bunds would be designed in accordance with Australian Standard AS1940.2004 *The Storage and Handling of Flammable and Combustible Liquids.* The main bund would be designed to contain 100% of the capacity of the largest tank in the TF, stormwater from a 1 in 20 year 24 hour storm and 20 minutes of firewater.

The construction details of TF are as follows:

- A clay bund liner will be installed in the TF floor to prevent leaks of spills reaching the groundwater;
- The base of TF would be contoured away from the tanks (with a minimum of 1:100 fall) towards a valved collection pit;
- Reinforced concrete bund walls which surround the TF would be designed to withstand the hydrostatic pressure for the full height of the walls;
- Intermediate bund walls some 600 mm high would be constructed to separate internal areas of the TF; and
- Concrete paving would be provided at areas where there is the potential for minor spills or leaks, such as tank outlet valves and drain points. These are intended to ensure that any minor leaks, should they occur, will be visible to the operators.

API Separator (APIS)
The APIS, which would located in the eastern section of the site, provides final interceptor treatment and emergency isolation of stormwater from the TF. It consists of a three stage screen for the removal of litter and oil from bund water prior to discharge by pumping to the valved outlet pit (VOP) and then to the river. The APIS also acts as a final sediment trap, capturing solids that may be contained in the bundwater.

The APIS has a capacity of capacity of 12 cubic metres and the walls would be designed to prevent any possibility of overflow.

Driveways trafficked by Tankers Stormwater System
The main driveway on the site for the trafficking of tankers would be the concrete driveway off Greenleaf Road with a total area of around 1400 m^2. The driveway traffic would be controlled through two sliding security gates (one located at each end) with traffic entering from the northern gateway and exiting from the southern gateway.

The roadway would be bound by a 150mm concrete kerb with grate top drainage pits. Initial stormwater from the trafficked areas has the greatest potential to be contaminated by leaks from truck engines, and therefore a first flush collection pit (FFCP) would be provided for this driveway. The first flush of stormwater would be directed via grate top pits, sediment and litter traps to the FFCP.

First Flush Collection Pit (FFCP)
This system enables Marstel to effectively manage stormwater from hard surfaces by segregating potentially contaminated first flush stormwater from the subsequent rainfalls.

The FFCP would be located to the north eastern end of the RTFS (**Figure 7**) adjacent to the TSCP. This pit has a capacity of some 40 m3 which is capable of containing a first flush quantity for more than 20mm over the area of the driveways.

After the FFCP has reached its capacity, all subsequent flows would be diverted to discharge into the Hunter River via the Valved Outlet Pit (VOP). The stormwater retained in the FFCP will be tested and if it meets the Department of Environment and Climate Change (DECC) criteria, discharged by pumping to the river via the VOP. If contaminated, the stormwater would be collected by a licensed contractor and disposed of at an appropriate facility.

Road Tanker Fill Stand (RTFS) System
The rollover bunds and grade top pits at the RTFS would be designed to segregate and drain spills, stormwater under the RTFS roof and fire water to the TSCP.

Road tankers are typically constructed of five 9 m^3 compartments, with up to five compartments per tanker. Each compartment has its own connections and is individually filled.

The potential for rain ingress within the road tanker gantry is limited by roofing over the RTFS.

Truck Fill Area Spill Collection Pit (TSCP)
The TSCP services the RTFS area through the collection and containment of spills and stormwater ingress under the roof that may occur. Drain pipes located under the RTFS would transfer these materials to the truck fill area spill collection pit (**Figure 3**).

The TSCP would have a designed capacity to be the “size of the largest tanker of a B Double” plus 20 minutes of fire water, which equates to around 70 m^3. This capacity would allow for the simultaneous failure of all compartments on a tanker plus the water requirements for the fire containment sprinkler system for a period of 20 minutes.

Pump Bay System
The pump bay would be located externally to the TF for safety and accessibility. The pump bay would be kerbed (150 mm) and located on a concrete base. This bay would include protection against vehicle damage and would be roofed to minimise the accumulation of stormwater within the bays. The pump bay would drain via grate top pits to the TSCP for the retention of stormwater or spills.

Valved Outlet Pit (VOP)
The VOP would be located adjacent to the APIS in the eastern section of the site. The VOP would be normally open to discharge directly to the Hunter River. It would have an instrument air-driven isolation valve that is hard-wired to the site emergency shut down system and is capable of rapid closure. In the event of a site emergency, the isolation valve would be automatically closed to prevent potentially contaminated water leaving the site via the VOP.

Stormwater may enter the VOP from the following locations:

- Pumped from APIS after water has been tested and approved for discharge;
- Stormwater from driveway after FFCP has reached capacity; and
- Pumped from TSCP after water has been tested and approved for discharge.

Emergency Access Roadways
Emergency access roads would surround the site on three sides. These roadways would be used infrequently, primarily for fire fighting and emergency vehicles. They would also be used on an occasional basis for site inspections undertaken by Marstel personnel. These roadways are not included in the operational area of the site and would be unsealed due to their limited use.

These roads would be graded to allow stormwater to drain directly to the Hunter River.

Building Roofs and Car Park
Rainwater from the roofs of office and workshop buildings, the roof of the RTFS, and the office carpark, would be discharged directly to the stormwater drainage system in Greenleaf Road.

3.6.7 Fire Management

The terminal facilities would be designed to minimise safety risks and hazards associated with operations, and would also be fitted with extensive fixed and portable fire-fighting capability. Water would be stored on the terminal site in two tanks for fire-fighting purposes. These would be filled with town water as it is imperative that the tanks are full at all times in case of an emergency. Marstel have considered the use of stormwater, however rainfall events are too unpredictable to rely on for fire water supply.

Two diesel-driven fire pumps and a water ring main would provide firewater to tank and road gantry deluge systems, fixed monitors, fire hose reel sets and fire hydrant connections. The truckfill stand would have fixed automatic foam deluge protection activated by infrared flame detectors. The scope of the fire system would be determined by a fire safety study approved by the NSW Fire Brigade. The fire study would also identify risks of interactions with nearby industries and mitigation measures to minimise identified risks.

3.6.8 Security

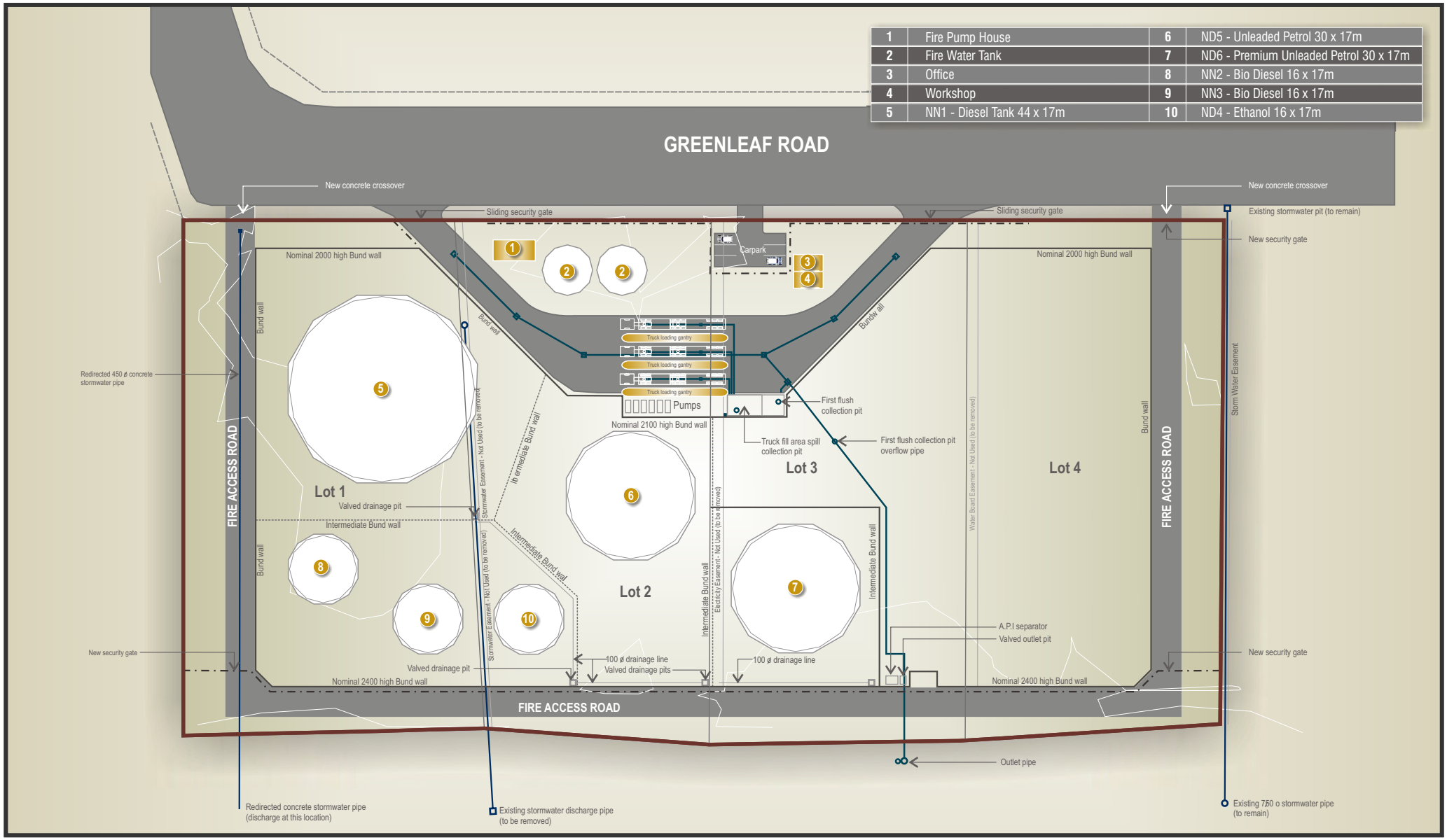
Marstel is aware of the security issues associated with the operation of such sites, and would implement a comprehensive security system to manage such risks. The site would be secured by a comprehensive security system that involves a number of components to provide the highest level of security practicable for the facility.

The site would be surrounded by security cyclone wire fencing, which would be topped with razor wire. This will be further protected by a Secure Fence perimeter protection system that emits a 9000 volt shock if contact is made, which is within the accepted standards. The installation of a Digital Video Monitoring (DVM) system would further enhance the security system on the site. This system provides state of the art video surveillance, involving the installation of Closed Circuit Television (CCTV) monitors at strategic locations across the site. These images are then captured and sent to a central security surveillance location. In the event that the fence is interfered with, the closest camera would focus on that spot and capture real time video footage of the event or person. Simultaneously, the alarm would be activated, initiating a dispatch from the security provider.

Access to the site would be via two automatic traffic gates that would be opened by terminal staff or access cards (issued to inducted contractors). An in-ground induction loop would trigger the gates to open for vehicles leaving the site. Emergency egress points would be located at manually-opened gates and the main traffic gates. The site would have low-level, inward-directed floodlighting at night in addition to operational task lighting. Tank outlet valves would be 'locked closed' at night.

Principles of Crime Prevention Through Environmental Design (CPTED) have been incorporated into the security system as follows:

- **Natural Access**: Both site entrances are secured with automatic gates. Access does not involve any dead ends, with employee carparks within easy access of the office and workshop. Employee access is separated from delivery entrances.
- **Natural Surveillance**: The entrance to the site will be well lit and will be clearly visible from Greenleaf Road. Parking areas are located at the from of the site and clearly visible to passing security personnel and the public.
- **Territorial Reinforcement**: Vehicle entrances for trucks and passenger vehicles are well defined and separated.
- **Target Hardening**: Operational hours are primarily during daylight hours which is complimentary to the surrounding industries, many of which operate 24 hours. Sliding security gates will operate at both entrance and exit of the fuel unloading bays.



MARSTEL TERMINALS

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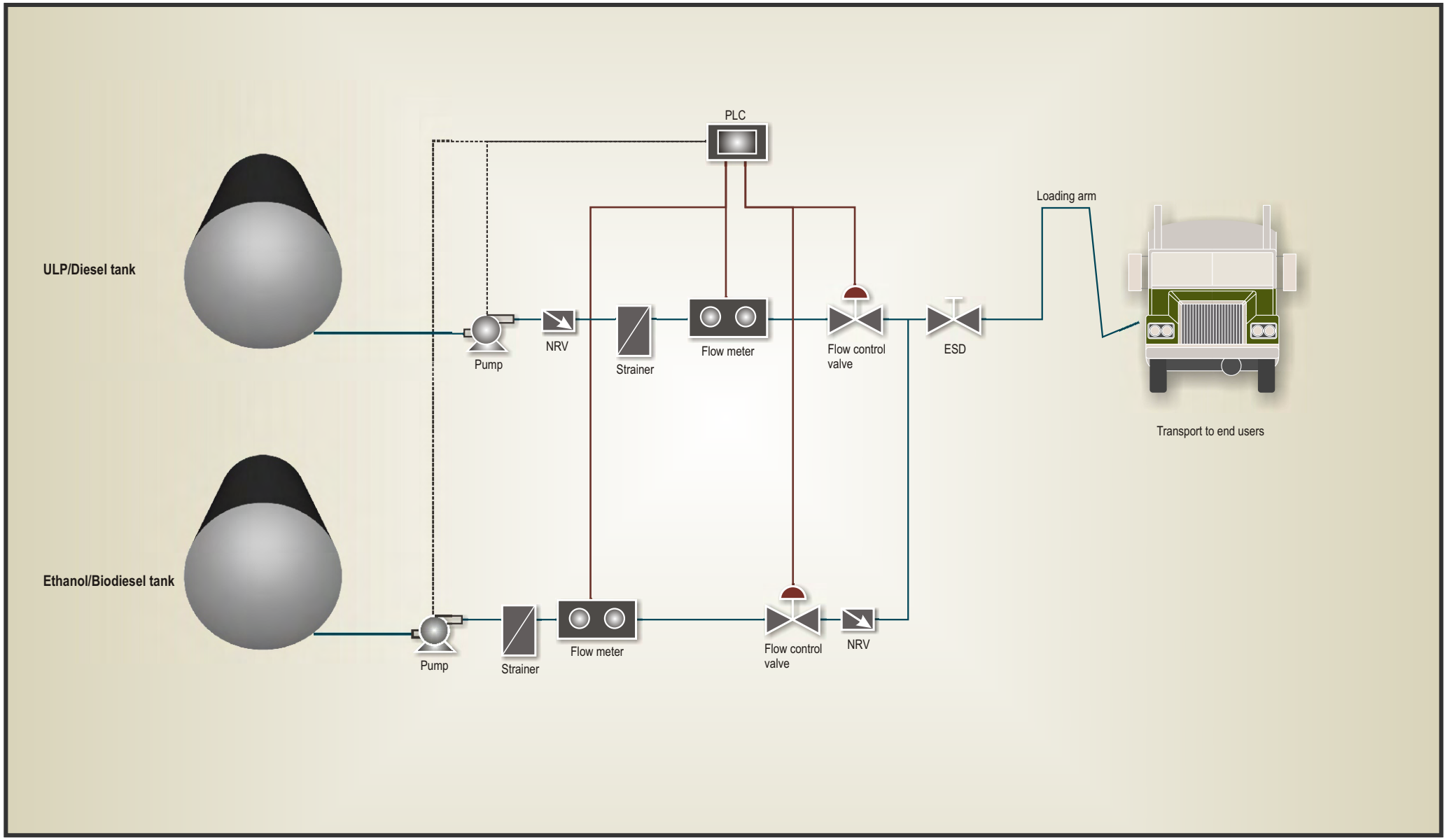
Figure 3

Site Plan

Environmental Assessment - Bulk Liquids Storage Facility

Greenleaf Road Kooragang Island



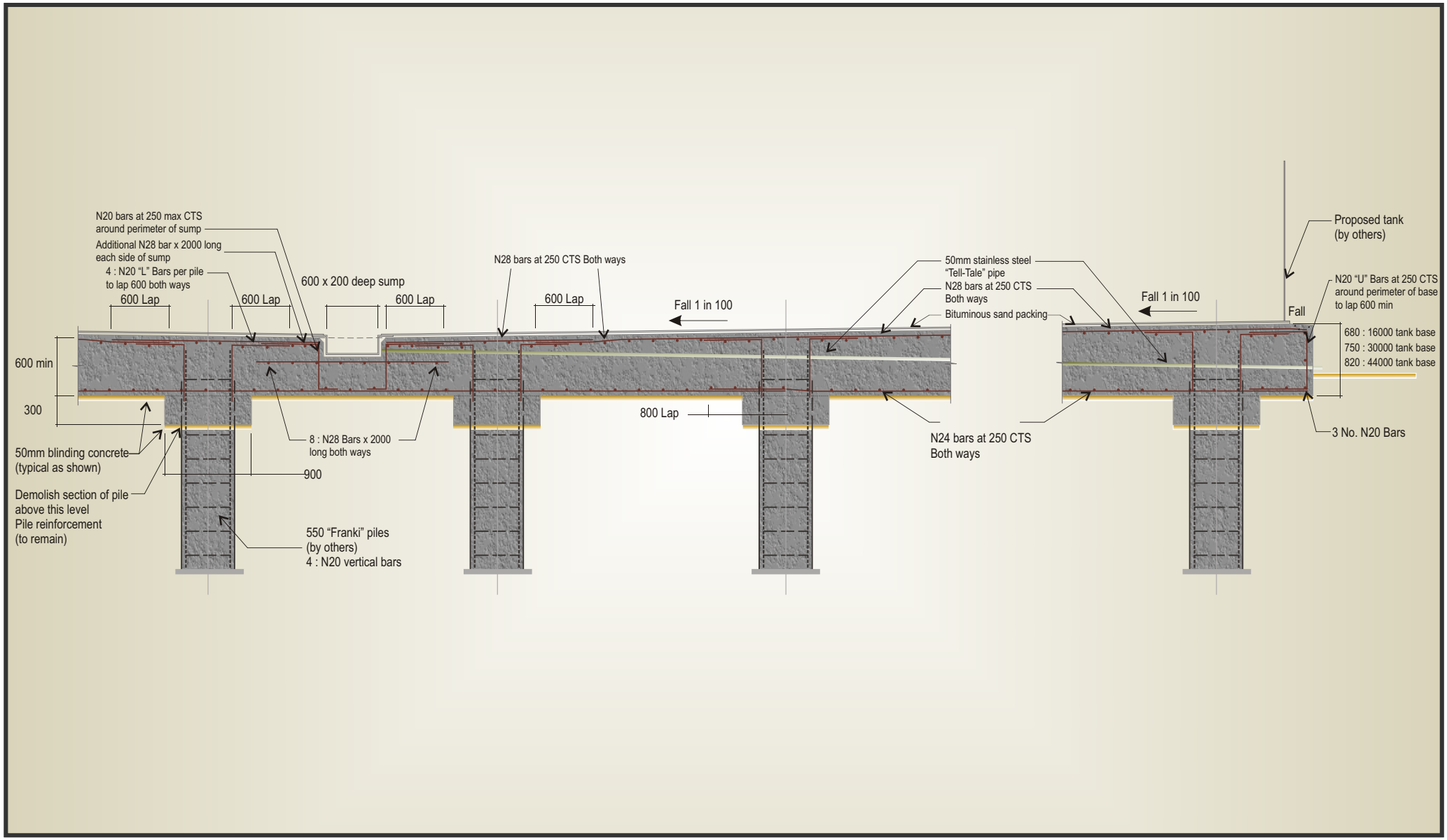
MARSTEL TERMINALS

Figure 4

Fuel Blending Process

Environmental Assessment - Bulk Liquids Storage Facility

Greenleaf Road Kooragang Island



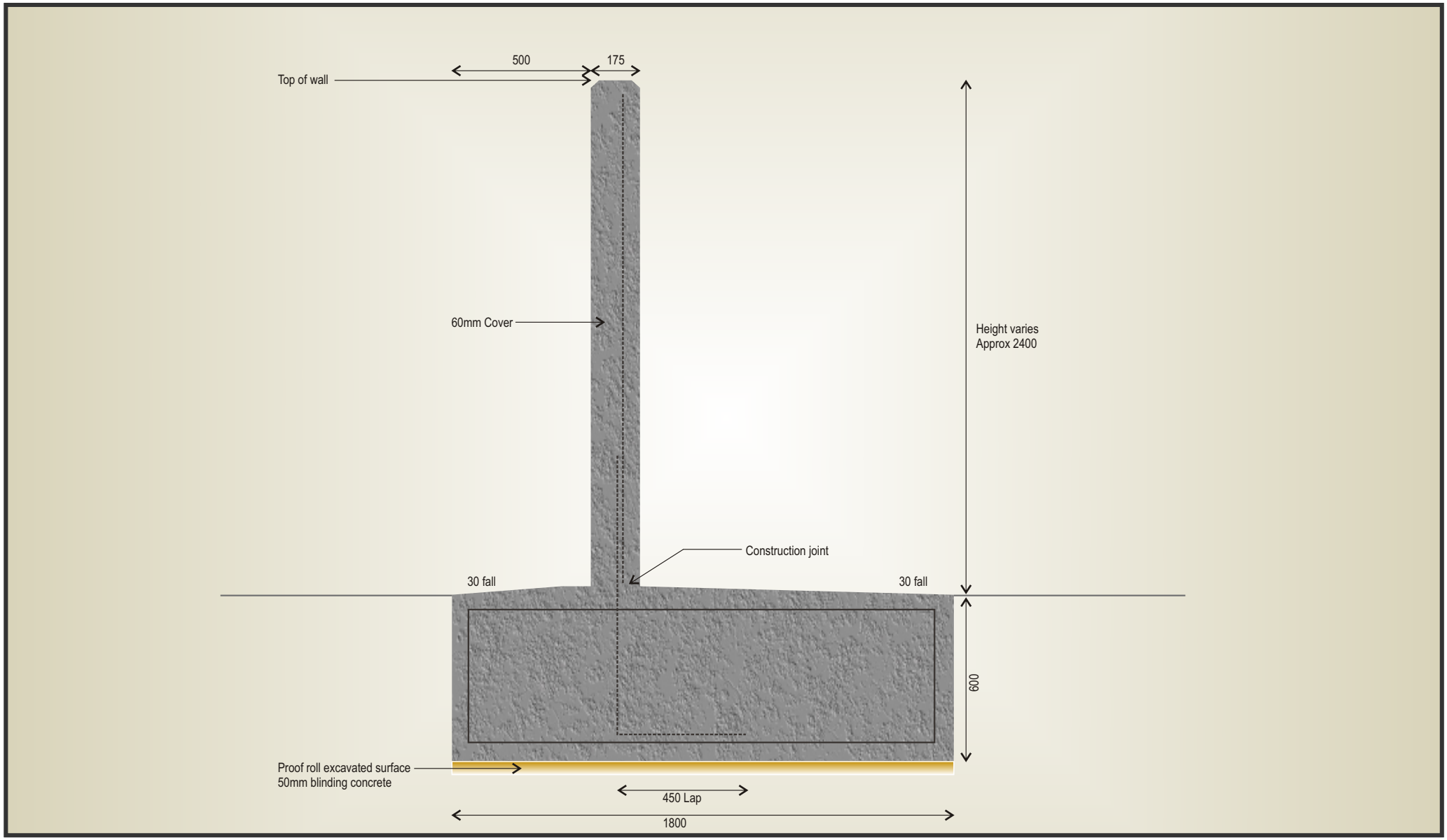
MARSTEL TERMINALS

Figure 5

Preliminary Tank Base Details

Environmental Assessment - Bulk Liquids Storage Facility

Greenleaf Road Kooragang Island



MARSTEL TERMINALS

Figure 6

Typical Bund Wall Detail

Environmental Assessment - Bulk Liquids Storage Facility

Greenleaf Road Kooragang Island

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4 STATUTORY PLANNING

4.1 Local Matters

4.1.1 Newcastle Local Environment Plan 2003

The site is located within the Newcastle City local government area (LGA) where the relevant local environmental planning instrument is the Newcastle Local Environment Plan (LEP 2003). Under the provisions of clause 37 of LEP 2003 the proposed uses is defined as a ***'liquid fuel depot'*** being a depot or place used for the bulk storage or wholesale distribution of petrol, oil, petroleum or other inflammable liquid.

Under the provisions of clause 16 of LEP 2003, the site is located within **Zone 4(b) Port and Industry Zone**. Liquid fuel depots are permissible within Zone 4(b). A '*hazardous storage establishment* 'is prohibited within the zone. The definition for that type of activity is prescribed under State Environmental Planning Policy 33 (see **Section 4.3.2** of this report). A Preliminary Hazardous Analysis undertaken by SKM for this proposal (see **Section 7.1** of this report) demonstrates that the proposed use is not defined as hazardous and can therefore continue to be considered as permissible.

The objectives of Zone 4(b) 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 use as a bulk liquids and fuel storage facility meets the zone objectives by:

- Accommodating bulk storage activities for petroleum fuels and biofuels which by their nature require separation from residential areas;
- Requiring a location adjacent to port facilities to receive bulk fuels for storage from ships;

- Supporting local and regional sustainable development through the storage and distribution of biofuels which are generated from renewable resources; and
- Complementing existing port related and industrial activities in the locality.

Other relevant matters prescribed within LEP 2003 include:

- **Clause 25 Acid Sulphate Soils** - identifies the location of "Potential Acid Sulphate Soils' and the nature of works requiring consideration of these soils in the development process.

Under the current mapping, the proposal is to be located on a site that is classed as Category 2 Potential Acid Sulphate Soil, which requires consent considerations for works below the ground surface or works where the water table is likely to be lowered. Proposed excavations on the site would be minimal with the exception of foundations and the laying of some underground pipes. An Acid Sulphate Soil plan will be included in a Construction Environmental Management Plan (CEMP) for the proposal, and all excavated soil will be treated as acid sulphate soil unless testing precludes it.

- **Clause 31 Development affecting places or sites of Aboriginal heritage significance** and **Clause 32 Development affecting archaeological sites or relics of non-Aboriginal heritage significance–** requires the consent authority to consider the likely impact of the proposal on a place or item of Aboriginal or non-Aboriginal heritage significance.

An archaeological study was undertaken for the site and as discussed in **Section 7.10** of this report there are no known items of Aboriginal Heritage or non Aboriginal Heritage significance that would be affected by this proposal. There is a moderate potential for disturbance of some unknown relics below the soil fill site of 2.5 m. The proposal does not intend to excavate below the fill layer so potential disturbance is considered unlikely. Safeguards will be implemented, as described in **Section 7.10** , to further minimise disturbance potential.

4.1.2 Newcastle Development Control Plan 2005

The relevant planning controls within the Newcastle Development Control Plan 2005 (DCP 2005) as they apply to the proposed development include:

- Element 4.1 Car Parking – a standard of 1 car parking space per 2 employees or 1 space per 100 m^2 Gross Floor Area (whichever is greater) is prescribed for all industrial development. The proposal provides 6 parking spaces. There is a total Office/workshop floor area of 56 m^2 (excluding tank storage) and there would usually be 2 operators on site, except at times when ship unloading events occur and maintenance is required. The parking provision is therefore compliant with the development control.
- Element 4.2 Contaminated land management –to reduce risk associated with the potential for, or existing, contaminated land. A preliminary soil contamination investigation undertaken for the site found that no soil remediation was necessary. Future contamination potential would be limited by appropriate on-site management including bunding and the implementation of an Environmental Management Plan.. The proposed development is therefore compliant with the development control.

- Element 4.3 Flood management - no specific studies have been undertaken regarding flooding on the site. Nevertheless the sea wall that has been constructed on the site and the tidal nature of the area would prevent flooding during major events. Recent flooding experienced in the Hunter River (June 2007) did not result in inundation of the site.
- Element 4.4 Landscaping - to incorporate landscaping as a critical element to a development proposal. The controls indicate that particular development activities, visually prominent sites and development adjacent to open space requires landscape planning. The proposal is visually prominent and adjacent to an open space reserve. Landscaping of the car parking area and office buildings is proposed and would be developed as part of the site management plan. Boundary planting would not be included as this would present a fire safety hazard risk. Weeds, including bitou bush, would be removed and managed. The development proposal is compliant with the control.
- Element 4.5 Water management - provides controls on drainage and stormwater management and aims to reduce pollutants from entering waterways and encourage the efficient use of water. The proposal includes a Stormwater Management Plan (**Appendix C**) to ensure compliance with the development control.
- Element 4.6 Waste management – provides controls to ensure minimisation and management of waste. The proposed development is unlikely to generate significant waste and will operate in accordance with the principles of the *Waste Avoidance and Recovery Act, 2001.* The proposal is compliant with the control
- Element 7.1 Industrial development – provides controls to ensure compatibility of industrial development with other industrial activities and the suitability of the site for industrial land-use. The proposal is compatible with the industrial nature of the locality and is compliant with the controls.
- Element 7.4 Kooragang Port & Industrial Area - makes special provisions for development on Kooragang industrial area to ensure facilitation of port–related development in the area and to ensure compatibility with surrounding uses and the environment. Specific provisions are provided for the following:
    - Strategic context - The proposed bulk liquids fuel storage facility is a port related activity that would provide a world class storage facility and is strategically appropriate for the site
    - Industrial ecology- The proposal would enable the storage and distribution of a renewable fuel source to the region
    - Water quality – a water management plan would be implemented for the proposal that would manage potential water quality impacts
    - Air quality - odour potential from the proposal would be reduced through the utilisation of sealed systems. Modelling studies undertaken for air pollutants have shown that there would be no exceedence of criteria. Greenhouse gas emissions were also considered negligible (see **section 7.5.5** of the report).
    - Buildings, structures and site layout – the proposed tanks would be the most visible element of the proposal and are consistent with the existing industrial landscape.

- Landscaping, habitat conservation and open space – where practical landscaping would be included. Weed and feral species management would be implemented
- Access and Parking -Appropriate driveway, circulation, loading and parking provisions are incorporated into the proposal.
- Noise and vibration – a noise study indicates that noise levels would not exceed relevant noise criteria and there would be no adverse vibrations (as detailed in **section 7.6**)
- Risk Assessment and Bulk Liquid Storage hazard minimisation - The proposal is compliant with the *Dangerous Goods Act, 2005.* A Preliminary Potential Hazard Assessment has been undertaken for the site (see **section 7.1** and **Appendix D**). Overall hazard and risk were well below the stipulated criteria for industrial land use, however safeguards would be implemented as part of the proposal to ensure risk minimisation is maintained.
- Pipelines – Pipelines are proposed to be incorporated in a manner to reduce risk and ensure compliance with easements and access and circulation of transport
- Fire Fighting – Appropriate fire extinguisher equipment is proposed for installation at the wharf within the bulk storage site. Fire monitoring, maintenance, testing and emergency plans would be implemented as part of the site activity.
- Lighting, Fencing – lighting for the proposal would be installed and maintained in accordance with AS 1680.1-002. Security would be the main criteria for lighting and fencing.

The proposal is considered to be consistent with the provisions of the DCP.

4.2 Regional Matters

4.2.1 Lower Hunter Regional Strategy

The NSW Government has produced a Lower Hunter Regional Strategy which applies to the local government areas of Newcastle, Lake Macquarie, Port Stephens, Maitland and Cessnock

The primary purpose of the regional strategy is to ensure that adequate land is available in appropriate locations to sustainably accommodate the projected population growth and associated housing, employment and environmental needs over the next 25 years.

The key features of the Lower Hunter Regional Strategy include:

- *Provides for 115,000 new homes to cater for a projected population growth of 160,000 people.*
- *Plans for up to 66,000 new jobs and ensures an adequate supply of employment land.*
- *Promotes growth in centres — a greater choice of housing and jobs in Newcastle's CBD and specified major centres.*

- *Creates important green corridors of land with high environmental value, which will be managed for conservation purposes. These corridors align with existing public reserves, some of which will be expanded.*
- *Protects high quality agricultural land, and natural resources such as water aquifers and extractive materials.*

The Lower Hunter is the sixth largest urban area in Australia and one of the State's major centres for economic activity indicating high demand for fuels. Similarly, strong mining and agricultural sectors in the upper Hunter region indicate increasing demand for transport and associated fuel consumption. It is anticipated that the proposed project will secure the availability of renewable and cost effective fuel for the region as well as providing economic and employment benefits consistent with the objectives of the Lower Hunter Regional Strategy.

4.2.2 Hunter Regional Environmental Plan

The Hunter Regional Environmental Plan (REP) applies to the subject site.

Part 7 (Division 1) of the Hunter REP applies to the proposal. The objective of this Part is to control development such that air, noise and water pollution are minimised. Specifically, clause 47 of the REP states:

A council should not grant consent to any development unless it is satisfied that:

(a) there is adequate provision for setbacks between the development and existing watercourses,

(b) an adequate vegetation cover is maintained or reinstated so as to minimise soil erosion,

(c) where necessary, adequate retardation basins, grassed floodways, sedimentation pits and trash collection facilities are established and maintained, and

(d) adequate measures are provided to control soil erosion during construction of the development.

As the potential environmental impacts of the proposed project are considered to be unlikely to significantly increase local pollution as discussed in **Section 7** of this report, the proposal is considered to be consistent with the relevant objectives and principles of the Hunter REP.

Part 7 (Division 4) applies to the proposal, as it concerns the erection of a building greater than 14 m in height. The objectives of this Part are:

to ensure that proposals for buildings over 14 metres are:

(a) subject to the opportunity for public comment, and

(b) assessed for their local impact and regional significance.

The proposed 17 metre high tanks are of regional significance as a provision for bulk fuel storage, of biofuels which will enhance the regional economy through the secure provision of a renewable fuel source.

4.3 State Matters

4.3.1 Environmental Planning and Assessment Act 1979 (EP&A Act)

The EP&A Act and the EP&A Regulation provide the framework for environmental planning in NSW and include provisions to ensure that proposals which have the potential to impact the environment are subject to detailed assessment, and provide opportunity for public involvement.

As outlined in **Section 1.6** of this EA, approval is required for the proposed project under of the EP&A Act, and the proposed project has been declared a major project under Part 3A of the Act. The Minister for Planning is the approval authority for the proposed project.

Under Part 3A, a proponent can seek a project approval or a concept approval. In accordance with the provisions of Part 3A of the EP&A Act, Marstel is seeking Project Approval for the receival, storage and dispatch of biofuels from the Kooragang Island facility.

Under the provisions of the EP&A Act there are a number of State Planning Policies that are relevant to the proposal. These are discussed below.

4.3.2 State Environmental Planning Polices

State Environmental Planning Policy (Major Projects) 2005
State Environmental Planning Policy (Major Projects) 2005 (Major Projects SEPP) identifies developments that are considered to be Major Projects under Part 3A of the Environmental Planning and Assessment Act 1979. The approval authority for a Major Project is the Minster for Planning.

The primary aim of the Major Projects SEPP 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.*

Schedule 1 of the Major Projects SEPP identifies the major development classifications. The proposed development falls into two categories of development that can be considered as a major project. They are:

Chemical, manufacturing and related industries

(2) Development with a Capital Investment value of more than$20 million for the purpose of:

(a) bulk liquid storage facilities

or

Coastal Areas

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

(e) the following types of industries (other than mining or extractive industries but only if they are

(i) designated development, and

(ii) chemical storage facilities….

(g) buildings or structures….that are

(ii) greater than 13 metres in height, in the case of buildings or structures…within a sensitive coastal location.

The capital cost of establishing the bulk storage facilities is estimated at $47 million. Additionally, the proposed development is designated development, is within the metropolitan coastal zone and in a sensitive coastal location as described under the EP&A Regulations and SEPP 2005. As such, the project was determined as a Major Project 26 April 2007, making the Minister the approval authority for the proposed project.

State Environmental Planning Policy 11 – Traffic Generating Development
The aim of SEPP 11 is to provide the traffic management authority with the opportunity to provide feedback on certain traffic-generating developments before a consent authority makes a determination about a development application.

Schedule 1 of the policy lists types of development to which this policy applies, including:

(j) transport terminals, bulk stores, container depots or liquid fuel depots.

The proposed project would therefore, be forwarded to the Roads and Traffic Authority (RTA and Newcastle City Council (NCC) for comment. The proponent intends to consult with the RTA and NCC prior to the submission of the EA to ensure relevant issues are addressed.

State Environmental Planning Policy 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. The Guidelines recommend a 'risk screening' method for determining whether a proposal is hazardous, and provide guidance on assessing potentially offensive development proposals.

The proposal is not defined as an industry and SEPP 33 does not therefore apply to the proposal. However, a Preliminary Hazard Analysis was undertaken by SKM (see **Appendix D**) which undertook a Partial Quantitative Level 2 assessment. The proposed activity is not considered to be a Hazardous or a Potentially Hazardous. Notwithstanding, safeguards are proposed to be implemented to reduce any potential risk.

State Environmental Planning Policy 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.

A contaminated site assessment was undertaken by RCA in February 2007. Results of this investigation are discussed in **Section 7.4.1**. It was concluded that there were no areas on site that would require remediation.

State Environmental Planning Policy 71 – Coastal Protection

The proposed development is located within the coastal zone as defined by SEPP 71 which makes provisions regarding protection of coastal attributes, protection of natural and cultural heritage elements, coastal environmental protection, and the retention of foreshore public access. Clause 8 of the SEPP provides matters for consideration to be taken into account by a consent authority when determining an application to carry out development. They include:

(a) ……

(b) existing public access to and along the coastal foreshore for pedestrians or persons with a disability should be retained and, where possible, public access to and along the coastal foreshore for pedestrians or persons with a disability should be improved,

(c) opportunities to provide new public access to and along the coastal foreshore for pedestrians or persons with a disability,

(d) the suitability of development given its type, location and design and its relationship with the surrounding area,

(e) any detrimental impact that development may have on the amenity of the coastal foreshore, including any significant overshadowing of the coastal foreshore and any significant loss of views from a public place to the coastal foreshore,

(f) the scenic qualities of the New South Wales coast, and means to protect and improve these qualities,

(g) measures to conserve animals (within the meaning of the Threatened Species Conservation Act 1995) and plants (within the meaning of that Act), and their habitats,

(h) measures to conserve fish (within the meaning of Part 7A of the Fisheries Management Act 1994) and marine vegetation (within the meaning of that Part), and their habitats

(i) existing wildlife corridors and the impact of development on these corridors,

(j) the likely impact of coastal processes and coastal hazards on development and any likely impacts of development on coastal processes and coastal hazards,

(k) measures to reduce the potential for conflict between land-based and water-based coastal activities,

(l) measures to protect the cultural places, values, customs, beliefs and traditional knowledge of Aboriginals,

(m) likely impacts of development on the water quality of coastal waterbodies,

(n) the conservation and preservation of items of heritage, archaeological or historic significance,

(o) ….

(p) only in cases in which a development application in relation to proposed development is determined.

(i) the cumulative impacts of the proposed development on the environment, and

(ii) measures to ensure that water and energy usage by the proposed development is efficient.

The proposal has been declared a major project under the provisions of Part 3A of the EP&A Act and SEPP 71 does not therefore apply to the proposal. Notwithstanding, in response to the matters for consideration, it is considered that the proposal it consisted with SEPP 71 as follows:

- Existing public access is not available to the site and new public access would be detrimental to the security of the site and pose a hazard risk. Public access along this section of the foreshore is not a priority given the industrial nature of the area;
- The proposed use is compatible with the industrial nature of the locality;
- There would be no detrimental impact on views to and from the foreshore;
- The scenic qualities of the coast in the proposed location have already been characterised by industrial buildings and port-related activities;
- Terrestrial ecology studies have shown limited presence of wildlife and native vegetation due to the highly disturbed nature of the locality. Weed management and feral species management is proposed and further environmental impacts to the site and surrounding waters would be ameliorated where possible through site management techniques;
- There are no existing wildlife corridors;
- Existing coastal processes would not be impeded by the proposal, nor is it considered that those processes would impact on the development of the site;
- The proposal is not expected to impact upon existing water borne activities. The port facilities are intended to be utilised some 10 times per year with lengthy scheduling. This would not impede other shipping or boating activities;
- An Aboriginal Archaeological assessment has been undertaken for the site and included in **Appendix E**. Consultation with local indigenous communities has been undertaken through that assessment process and the assessment has will consider the needs and concerns and existing cultural heritage of the local communities. It is unlikely that there would be disturbance to relics, heritage items or places of cultural significance;
- Water quality impacts would be minimised through the implementation of a Water Management Plan;
- No known heritage items would be affected by the proposal;
- The cumulative effects of the development have been considered as part of this EA and the attached potential hazard assessment and considered to be minimal; and
- Energy and water efficiency measures are proposed for the new facility.

4.3.3 Protection of the Environment Operations Act 1997

The POEO Act prohibits any person from causing pollution of waters or air, and provides penalties for pollution offences relating to water, air and noise.

The POEO Act provides a regulatory framework for the licensing of all activities listed in Schedule 1 to the Act that have the potential to impact on the environment.

The proposed project will require an Environmental Protection License (EPL) for petroleum works as it has an intended petroleum storage capacity greater than the 2,000 tonne threshold specified in Schedule 1 of the POEO Act. The proposed project may also meet the criteria for shipping facilities (bulk) as the planned throughput of the terminal is 300 ML per annum.

4.3.4 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NP&W Act) governs the establishment, preservation and management of national parks, historic sites and certain other areas, and the protection of certain fauna, native plants and Aboriginal relics.

The NP&W Act is relevant to the protection of Aboriginal artefacts and the protection of native flora and fauna. Section 86 of the NP&W Act identifies offences relating to Aboriginal objects, including disturbing land to discover an artefact. Section 87(1) of the NP&W Act requires a permit to be obtained to remove any artefacts, while section 90 (2) of the NP&W Act requires consent from the Director General of DEC to knowingly destroy, deface or damage a relic or Aboriginal place.

An assessment of the impact of the proposed works on Indigenous Archaeology is included in **Appendix D** of this EA. This assessment found that there are no known Aboriginal sites or objects within the area proposed for the facility. As the proposal is to be assessed under Part 3A of the EP&A Act, section 87 and section 90 of the NP&W Act do not apply to the proposed project.

4.3.5 Threatened Species Conservation Act 1995

The Threatened Species Conservation Act (TSC Act) provides for the conservation of threatened species, populations and ecological communities of animals and plants. The TSC Act provides a framework to ensure that the impact of an action affecting threatened species is assessed.

There is little existing vegetation on site, other than introduced weeds such as bitou bush.

No threatened species, populations or endangered ecological communities are present within the subject site, as discussed in **Section 7.10** and **Appendix F** of this EA. The site has extensive existing environmental disturbance. The assessment concludes that the residual ecological impact resulting from the proposed project is not considered to be significant and therefore there is unlikely to be any further impact on threatened species.

4.3.6 Native Vegetation Act 2003

The *Native Vegetation Act 2003* (NV Act) was assented to on 11 December 2003 and the accompanying regulations commenced on 1 December 2005. The *NV Act* aims to promote, protect and manage native vegetation.

As the project has been declared by the Minister as a project under Part 3A of the EP&A Act, the provisions of the NV Act do not apply to the proposed project.

4.3.7 Heritage Act 1977 (As Amended 1998)

The purpose of the *Heritage Act 1977* (as amended 1998) aims to protect and conserve non-Aboriginal cultural heritage, including scheduled heritage items, sites and relics. The Heritage Act is administered by the NSW Heritage Office.

The Heritage Act makes provision for a place, building, work, relic, moveable object, precinct, or land to be listed on the State Heritage Register. If an item is the subject of an interim listing, or is listed on the State Heritage Register, a person must obtain approval under section 58 of the Heritage Act for works or activities that may impact on these items.

There are no known items of heritage significance under the Heritage Act on the site subject of the proposed works.

As the project falls under Part 3A of the EP&A Act, approvals required under Part 4 of the Heritage Act do not apply to the proposed project.

4.3.8 Roads Act 1993

The *Roads Act 1993* regulates the carrying out of certain activities on public roads, provides classification of roads and establishes procedures for opening and closing public roads.

Section 138 of the *Roads Act 1993* requires consent to be obtained from the appropriate roads authority for the following works:

(a) erect a structure or carry out a work in, on or over a public road, or

(b) dig up or disturb the surface of a public road, or

(c) remove or interfere with a structure, work or tree on a public road, or

(d) connect a road (whether public or private) to a classified road,

The proposed project involves work within the existing road reserves of Heron Road and Greenleaf Road, for the installation of the buried fuel pipeline. The project would be referred to the RTA in conjunction with the assessment of the EA by the Department of Planning in accordance with Section 75(V) of the EP&A Act.

4.3.9 Waters Act 1912

The *Waters Act 1912* regulates both the use and management and water resources in NSW. The Act came into force at the turn of the Century, and is gradually being replaced by the Water *Management Act 2000*.

Part 5 of the Act makes provisions for the use, licensing and management of groundwater resources. In accordance with the Act, a license is required to be issued by the consent authority for the installation of groundwater wells and the extraction of groundwater.

Application has been made to the Department of Water and Energy (DWE) for the five monitoring wells installed on the site. In the event groundwater is to be pumped from the site, application will be made prior to dewatering.

4.4 Commonwealth Matters

4.5 Environment Protection and Biodiversity Conservation Act, 1999

The Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act, 1999 requires the approval of the Commonwealth Minister for the Environment and Heritage for actions that may have a significant impact on matters of National Environmental Significance (NES). Approval from the Commonwealth is in addition to any approvals under NSW legislation.

As of 1 January 2004 the EPBC Act also provides for the identification, conservation and protection of places of national heritage significance and provides for the management of Commonwealth heritage places and establishes the Australian Heritage Council.

The EPBC Act lists seven matters of NES which must be addressed when assessing the impacts of a proposal. A search of the EPBC Protected Matters database was undertaken on 9 April 2007. The following appraisal of matters of NES shows the proposed project would not have a significant impact on any of the matters and approval under the EPBC Act is not required. The following is a summary of WES matters and potential for impact on Commonwealth land.

- ***World Heritage Properties*:** There are no world heritage properties proximate to the proposed project, or that would potentially be affected by the proposal.
- ***National Heritage Places***: There are no National heritage properties proximate to the proposed project, or that would potentially be affected by the proposal.
- ***Wetlands of International Importance*:** The Kooragang Wetlands, some 4km from the site are Ramsar wetlands. However, the proposed project does not contribute surface water flows to the Kooragang Wetlands and is not expected to have an impact on the Ramsar Wetland.
- ***Commonwealth-listed Threatened Species*:** The proposed project has the potential to impact on certain threatened species listed within Commonwealth legislation. Environmental safeguards have been proposed to minimise the potential impacts and are outlined in **Section 7.10**. The residual impact is not considered to be significant.
- ***Commonwealth-listed Migratory Species***: The proposal is not expected to have an impact on listed migratory species.
- ***Nuclear Action:*** The proposal would not involve a nuclear action as defined under the EPBC Act.
- ***Commonwealth Marine Areas:*** There are no Commonwealth marine areas proximate to the proposed project, or that would potentially be affected by the proposal.
- ***Commonwealth Land:*** The proposed project site is not Commonwealth land, nor would Commonwealth land likely be affected by the proposal.

5 CONSULTATION AND IDENTIFICATION OF ISSUES

5.1 Formal Procedures for Consultation

5.1.1 New South Wales Formal Procedures

This EA has been prepared in accordance with Part 3A of the EP&A Act and its 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 this EA the Director General's EARs have been sought and have been addressed as required by Clause 75F of the EP&A Act. Each of the matters raised by the Director General for consideration in the EA is outlined in **Table 5-1** below, together with the relevant section of the EA which addresses that matter. A copy of the EARs issued by the Director General is provided in full in **Appendix B**.

Table 5-1: Environmental Assessment Requirements

Matter	Reference in EA
General Requirements	
The Environmental Assessment must include:	
• An executive summary;	Included
• A detailed description of the project including the: - Need for the project; - Alternatives considered; and - Various components and stages of the project.	Section 3
• Consideration of any relevant statutory provisions;	Section 4
• A general overview of the environmental impacts of the project identifying the key issues raised during consultation;	Section 5 & 6
• A detailed assessment of the key issues specified below, and any other significant issues identified in the general overview of environmental impacts of the project (see below), which includes: - A description of the existing environment; and - An assessment of the potential impacts of all components of the project (including the pipework) and potential cumulative impacts that may arise from the combined operation of the project and existing activities;	Section 7
• A description of the measures that would be implemented to avoid, minimise, mitigate, offset, manage and/or monitor the impacts of the project;	Section 7 and 8.2
• A draft Statement of Commitments, outlining environmental management, mitigation and monitoring measures;	Section 8
• A conclusion justifying the project, taking into consideration the environmental impacts of the proposal, the suitability of the site, and the benefits of the project; and	Section 10 & 11
A signed statement from the author of the Environmental Assessment certifying that the information contained in the report is neither false nor misleading.	Included

Matter	Reference in EA
Hazards and Risk	
Including an assessment of the potential hazards and risks associated with the proposed project. A preliminary risk screening must be completed in accordance with State *Environmental Planning Policy No.33 – Hazardous and Offensive Development* (SEPP 33) and *Applying SEPP 33* (DUAP, 1994), and where necessary, a Preliminary Hazard Analysis (PHA) undertaken.	Section 7.1
Water and Soils	
Including: • An assessment of the potential soil, groundwater and surface water impacts including impacts on Newcastle Harbour; • Proposed erosion and sediment controls (during construction) and the proposed stormwater management system (during operation); • Identification of the potential for spillage of contaminants on the site, the pipeline routes and at the shipping terminal, and mitigation measures; and • An assessment of contaminated groundwater and soils, and acid sulphate soils, and proposed mitigation and management measures.	 Section 7.4, 7.3 and 7.2 Section 7.2 & Appendix C Section 7.2 Section 7.4
Air Quality	
Including a comprehensive air quality assessment focussing on dust, odour and vapour.	Section 7.5
Greenhouse Gas Emissions	
Assessment of the predicted greenhouse gas emissions.	Section 7.5.5
Noise	
An assessment of potential impacts due to noise, including construction, operation and traffic noise.	Section 7.6
Traffic	
Including details of the traffic volumes likely to be generated during construction and operation, and an assessment of the predicted impacts of this traffic on the safety and capacity of the surrounding road network.	Section 7.7
Visual	
Particularly the proposed pipelines over the public road network. Landscaping proposed.	Section 7.8 (pipeline will now be underground and no longer a visual intrusion)
Waste Management	
An assessment of sources of both liquid and non liquid waste management practices during both construction and operation and identify reuse options where available.	Section 7.9

Matter	Reference in EA
Flora and Fauna	
Comprehensive description of the site's flora and fauna and assessment of any potential impacts to the identified communities.	Section 7.10
Aboriginal Heritage	
A preliminary assessment of the site in consultation with the local community and determine appropriate level of assessment.	Section 7.11
Consultation	
During the preparation of the Environmental Assessment, you should consult with the relevant local, State or Commonwealth government authorities, service providers, community groups or affected landowners. The consultation process and the issues raised must be described in the Environmental Assessment. In particular, you should consult with: • Department of Environment and Climate Change (DECC); • Newcastle Port Corporation; • NSW Waterways; • Roads and Traffic Authority; and • Newcastle City Council.	Section 5

5.2 Consultation with Stakeholders and Other Relevant Authorities

5.2.1 Statutory and Other Relevant Authorities

The proposed project is classed as a 'major project' and as such environmental requirements from relevant statutory authorities were requested by DoP as part of the formal procedures. In parallel with this, during the preparation of the EA, HLA ENSR and Marstel consulted with relevant authorities to further discuss pertinent issues.

Table 5-2 below provides a summary of project specific issues raised during consultation with agencies.

Table 5-2: Stakeholder Consultation

Agency	Issues	Reference in EA
Department of Planning	• Outlined development approval process.	Section 1.6
	• Information identifying how the project meets the criteria for state significant development will be required.	Appendix A
	• Consent from landowners for development application lodgement and the pipeline is required.	Noted

Agency	Issues	Reference in EA
Department of Environment and Climate Change	• Environmental assessment will need to address water quality (particularly stormwater management), air quality (Volatile Organic Compounds (VOCs) and greenhouse gases), noise (in accordance with the Industrial Noise Policy), and hazards, and provide a clear explanation of how the plant works, points of emission, and how emissions will be controlled.	Section 7.2, 7.3, Appendix C and Appendix H (Water Quality). Section 7.5 and Appendix I (Air Quality including Greenhouse Gases). Section 7.6 and Appendix J (Noise). Section 7.1 and Appendix D (Hazard and Risk).
	• Bunding is an issue of concern. Performance / manufacturer's guarantees will be required for proposed bund liner; details of intermediate bunding required.	Section 3.6.6
	• First flush capacity will need to be replenished ASAP after rainfall events.	Section 3.6.6
	• Widespread contamination exists under Kooragang Island.	Section 7.4.1
Department of Lands	• Expressions of interest for development on Walsh Point will be called for following potential rezoning of the area.	Noted
	• Security issues have been identified on Kooragang Island due to free public access to the area.	Section 3.6.8
Newcastle Port Corporation	• They are installing two new dolphins at K2 that will allow two small ships to use the berth at the same time.	Section 3.3.1
	• They are receptive to private industry constructing an additional berth on Walsh Point.	Noted
Regional Land Management Corporation	• Supportive of project.	Noted
Newcastle City Council	• Review of various issues raised in NCC letter to DoP.	Section 7
Roads and Traffic Authority	• Phone conservation with Dave Young 13 July 2007 indicated that all issues relevant to the project were covered in RTA's submission to DoP. No need currently to meet to discuss the project.	Section 7.7
NSW Maritime	• Confirmation via email on the 11 July that no further issues were of concern to NSW Maritime.	Noted
Department of State and Regional Development	• Letter of support for project.	Noted

5.2.2 Neighbouring Industries

Marstel undertook consultation with neighbouring industries to identify potential issues or concerns that they may have had. The following organisations were consulted during the preparation of the EA, and issues that were raised are detailed in **Table 5-3** below.

Table 5-3: Consultation with neighbouring industries

Industry	Issues Raised		Reference in EA
Orica	Sean Winstone	• Orica are installing new supports for a pipeline that will transfer materials from K2 to their plant; it is possible that the Marstel pipework could be included with this work.	Noted.
Incitec Pivot	Steve Quigley	• No significant issues of concern.	Noted.
P&O Ports	Mike Staff	• There is an existing culvert that can potentially accommodate the Marstel dockline from K2. • Would welcome a new user to the berth; the two additional dolphins at K2 will allow two ships to berth concurrently, which will largely alleviate current demurrage issues. • Ships of < 150 M and 40 – 50 KT would result in minimal delays. • No fire fighting system is currently installed at K2; fixed monitors will be required to discharge flammables.	Noted Section 3.3.1 Noted Section 3.6.7
Boral Woodchip	Dean Nelson	• Boral has around 10 ship movements per year. • The proposed Marstel pipeline route to K2 affects an easement on their north boundary. • Marstel's proposed 36 hour discharge period would not severely affect their operations. • No issues with the proposed project were foreseen	Section 3.6.3 Pipeline route relocated to within road reserve. Noted Noted.
Port Waratah Coal Services	Wayne Carman Warwick Cashmere Trevor Simmons Stephen Bragg	• Concerned about hydraulic interaction between passing ships and their loading of vessels. • Additional traffic at the intersection of Cormorant and Heron Road is a potential issue; alternative truck routes for Marstel vehicles would be preferable. • No major issues identified.	Noted Section 7.7.2 Noted.

Industry	Issues Raised		Reference in EA
Cargill	Daniel Flynn	• Cargill has approximately 8 ship docks at K2 per year; they have a small storage terminal there and a pipeline to their manufacturing plant.	Noted.
		• Considered Marstel's proposal would have little effect on their operations; were supportive of Marstel's plans.	Noted.

5.3 Community Consultation

Marstel is committed to acting as a responsible corporate citizen, and strongly believes that regular communication with residents and neighbouring industries is central to the creation of harmonious relationships. Marstel also supports community involvement in decision-making and forums, processes surrounding the environmental future of the Kooragang area.

Marstel has initiated a round of community meetings during the planning and EA phase of this project. Various community groups and their representatives have been invited to attend these sessions to provide for the dissemination of information to the public. There have been three such rounds of consultation prior to the submission of the EA. The nature of these meetings is summarised in **Table 5-4** below.

Table 5-4: Community Consultation Meetings

Date & Location	Representatives	Issues Raised	Reference in EA
Stockton Residents Group Stockton RSL 6 February 2007	Pat Keating Steven Allen Jan Collier	Issues raised were: • Truck movements (route; use of Tourle St Bridge; transport of fuel and ammonium nitrate using same transport corridor; cumulative impacts); • Construction noise; • Security measures (previous fires in the area were of concern); • Surface and groundwater protection measures; • Odour; and • PACIA award received by Marstel was of interest.	Section 7.7 Section 7.6 Section 3.6.8 Section 7.3.3 & 7.2.3 Section 7.5.2 – 7.5.4 Noted
Mayfield Residents Group 7 February 2007	Pat Flowers	Issues raised were: • Location of terminal; • Ship berthing arrangements; • Employment; • Truck route; and • Odour.	Section 3.4 Section 3.3.1 noted Section 7.7 Section 7.5

Date & Location	Representatives	Issues Raised	Reference in EA
Community Meeting Stockton RSL 27 March 2007	Pat Keating (Stockton's Resident Group) Fran Callaghan (Stockton's Resident Group) Fran Drizell (Mayfield Residents Group) Paul Bender (RLMC)	Minutes of the meeting are included in **Appendix G** Significant Issues raised included: • Transport and delivery of products; • Employment; • Security; • Hazards; and • Facility operating hours.	Section 3.3 noted Section 3.6.8 Section 7.1 Section 3.4.4
Community Meeting Stockton RSL 3 July 2007	Pat Keating (Stockton's Resident Group) Pat Callaghan (Stockton's Resident Group) Fran Drizell (Mayfield Residents Group) Peggy Svboda (Kooragang Wetlands Rehabilitation Project)	Minutes of the meeting are included in **Appendix G** Significant issues raised included: • Flooding; • Surface water management; • Biofuel blending; • Ship movements; • Timing of EA and construction.	Section 4.1.2 Section 3.6.6 & 7.2.4 Section 3.3.4 Section 3.6.3 Section 3.5

5.4 Aboriginal Community Consultation

Consultation with local Aboriginal Community Representatives was undertaken as part of the archaeological assessment of the site. A notice was placed in the Star Newspaper on the 24 April 2007, inviting representative of local groups to be consulted as part of the assessment process. There were a total of five groups that registered their interest, these being:

- Yarrawalk;
- Mur-Roo-Ma Inc;
- Nur Run Gee Pty Ltd;
- Awabakal Traditional Owner Group; and
- Awabakal Descendent Traditional Owner Group.

With the release of the EARs, it was determined that a preliminary assessment be undertaken to determine the sensitivity of the site to the local community, acknowledging that the site is located on reclaimed land. A letter was sent to each of the groups identified by DECC, asking for their response to this matter.

Responses were received from Mu-Roo-Ma and Awabakal Traditional Owners Aboriginal Corporation requesting that a field survey be undertaken, with their presence. The other groups previously identified were happy to assist if required but did not specifically request field work. Field work was undertaken on the 27 June 2007 and each group was provided with a copy of the draft report for comment.

6 PRIORITISATION OF ISSUES

6.1 Issue Identification

6.1.1 Methodology

Consultation with the DoP together with an EASR assisted in the identification of issues relating to the project. The EASR prepared in respect of the proposed project involved a desktop analysis and preliminary investigations to provide an outline of information and background environmental data on the site and the proposed project, sufficient to establish the key environmental issues. This information was used to identify the level of assessment required for this EA

6.1.2 The Issues

The key issues identified by HLA during the preparation of this EA and through the Director Generals EARs and other consultations as previously discussed in **Section 5.1** are shown in **Table 6-1**.

Table 6-1: Issues Identified by DoP and Community

Issue	Aspect
Environment	Hazard and Risk Water and Soils Air Quality Greenhouse Gas Emissions Flora and Fauna Waste Aboriginal Heritage
Social	Hazard and Risk Noise Traffic Visual Consultation
Project	Strategic Planning

6.2 Issues Prioritisation

6.2.1 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 possible consequences. **Table 6-2** 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 consequence 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.

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 cumulative 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 6-2: 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)

6.3 Assessment

The prioritisation of environmental issues related to the proposed project is provided in **Table 6-3**.

This environmental risk analysis prioritises environmental issues in the absence of appropriate safeguard measures to manage environmental effects. This analysis was then used to inform the environmental assessment and the engineering and environmental design of the project and in the identification of appropriate safeguards.

Table 6-3: Issues Prioritisation Matrix

Issue	Severity	Consequence	Priority
Hazards	2	3	**5 (High)**
Surface water quality	2	2	**4 (Medium)**
Air quality	2	2	**4 (Medium)**
Noise	2	2	**4 (Medium)**
Soils and stability	1	2	**3 (Low)**
Groundwater quality	1	2	**3 (Low)**
Indigenous heritage	1	2	**3 (Low)**
Traffic	1	2	**3 (Low)**

Issue	Severity	Consequence	Priority
Ecology	1	1	**2 (Low)**
Demand upon community, natural or transport resources	1	1	**2 (Low)**
Visual impacts	1	1	**2 (Low)**

6.4 Final Assessment

In addition to the prioritisation of environmental issues, consultation identified the following issues for consideration in the EA:

- Waste – medium priority; and
- Social and Economic – low priority.

The consultation also indicated that visual issues should be given a medium priority.

In summary therefore, the final prioritisation of issues identified for the proposed project is:

High

- Hazard and Risk

Medium

- Surface Water Quality;
- Air Quality;
- Noise;
- Waste; and
- Visual..

Low

- Soils;
- Groundwater Quality;
- Indigenous Heritage;
- Traffic;
- Ecology; and
- Demand upon community, natural or transport resources.

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7 ENVIRONMENTAL IMPACT ASSESSMENT

7.1 Hazard and Risk Assessment

A Preliminary Hazard Analysis (PHA) was undertaken by Sinclair Knight Merz (SKM) to assess the potential risk of the proposal. This was undertaken in accordance with NSW Department of Planning (DoP) Multi Level Risk Assessment Guidelines. These have been developed to assist proponents, consultants, authorities and associated stakeholders to carry out and evaluate risk assessments at an appropriate level for the facility being assessed. Provided below is a summary of the methodology adopted to prepare the PHA, and the findings of this assessment. The report is provided in full in **Appendix D**.

7.1.1 Methodology

The general methodology undertaken when preparing a PHA is clearly stated in the DoP Guidelines. A Level 2 assessment was undertaken for the Bulk Fuel Storage Facility. (see **Appendix D**) This was based on the following:

- The current site is in an area which is already heavily industrialised;
- Sensitive land users are well clear of the site; closest being over 500 m;
- Detailed technical and management safeguards are proposed for the facility; and
- The location of Orica's ammonium nitrate plant is located to the west of the Bulk Fuel Storage Facility.

The detailed study was undertaken in accordance with the Hazardous Industry Planning Advisory Paper No.6 "Guidelines for Hazard Analysis" (HIPAP No. 6) prepared by DoP. This is summarised below:

- **Hazard Analysis**: where an incident was identified to have potential off site impact, it was to be included in the hazard identification word diagram as suggested in HIPIP No.6. Where there was a potential off site impact, it was carried into the main body of the report where it was further analysed;
- **Consequence Analysis**: for those incidences identified in the hazard analysis, a detailed consequence analysis is undertaken. This models the various postulated hazardous incidents and determines the impact distances from the incident sources. Further analysis was undertaken on such incidents, with the results compared with Hazardous Industry Planning Advisory Paper No.4, "Risk Criteria for Land Use Safety Planning", (HIPAP No.4). These events were then assessed in terms of frequency analysis;
- **Frequency Analysis:** In the event a simple solution for managing consequence impacts was not evident, each incident identified to have potential off site impact was subjected to a frequency analysis. The results of the frequency analysis, were carried forward to the risk assessment.
- **Risk Assessment**: As the selected approach for this analysis was a Level 2 assessment, where incidents were identified to impact off site and where a consequence and frequency analysis was conducted, the consequence and frequency analysis for each incident was combined and compared to the risk criteria published in HIPAP No.4. Where the criteria was exceeded, a review of the major risk contributors would be performed. Recommendations would then be made regarding risk reduction measures.

7.1.2 Predicted Impacts

Hazard Analysis
A hazard identification table was developed for the PHA, and is included as Table A1 in **Appendix D.** Hazards which were identified as having an off site impact were assessed in detail and the safeguards to be implemented are described. Based on the proposed safeguard measures a determination was made whether the hazard would be brought forward to the next level of assessment (Consequence Analysis). This is summarised below.

Consequence Analysis
The following incidents were carried forward from the hazard analysis component of the study for consequence analysis:

- Flexible line rupture at the bulk liquids transfer wharf, fuel leak, ignition and subsequent pool fire at the wharf;
- Ignition of flammable liquid in the bulk liquids storage tank leading to storage tank roof fire;
- Leak of flammable liquid into the bulk liquids storage tank bund, ignition and full bund fire;
- Transfer pump leak (seal or flange) resulting in spill to the pump bund, ignition and fire; and
- Flammable liquid leak at the gantry, ignition and pool fire in the bunded area of the loading bay.

Each incident was assessed in detail in the PHA. All incidents assessed were for fire impacts at specific heat radiation levels. The distances to the specific levels of heat radiation were calculated to determine the impact at the site boundary from each incident. The results of the consequence analysis are included in **Table 7-1**.

Table 7-1: Summary of Consequence and Offsite Impacts

Incident	Distance to Specific Heat Radiation Levels (kW/m^2)						Closest Distance to Site Boundary	Comment on Offsite Impact
	15	12.5	8	6	4.7	2		
Wharf Fire – Hose Rupture	18.5	19.8	23.2	26	28.5	41	75	The heat radiation does not impact off site (4.7 kW/m^2) – incident not carried forward.
Tank Roof Fire (Large Tank)	24	26.2	32	37	41.7	62	42	The heat radiation does not impact off site (4.7 kW/m^2) – incident not carried forward.
Tank Roof Fire (Small Tank)	12.4	14.4	19.4	23	26.5	41	15	The heat radiation impacts off site (4.7 kW/m^2) – ***incident carried forward***.

Incident	Distance to Specific Heat Radiation Levels (kW/m^2)						Closest Distance to Site Boundary	Comment on Offsite Impact
	15	12.5	8	6	4.7	2		
Full Bund Fire (North)	82.5	87	101	114	124	179	7.5	The heat radiation impacts off site (4.7 kW/m^2) – ***incident carried forward***.
Full Bund Fire (South)	71.5	75.5	88	98	107	150	7.5	The heat radiation impacts off site (4.7 kW/m^2) – ***incident carried forward***.
Pump Bund Fire	19.4	20.5	24.2	27	29.5	42	35	The heat radiation does not impact off site (4.7 kW/m^2) – incident not carried forward.
Loading Bay/Gantry Fire	25	26.5	29	31.4	34.4	49	20	The heat radiation impacts off site (4.7 kW/m^2) – ***incident carried forward***.

7.1.3 Frequency Analysis

Each incident that was identified as potentially having impacts off site after the completion of the consequence analysis were assessed in terms of the frequency analysis. Three such events were assessed in the frequency analysis. These are further discussed below.

Bulk Tank Roof Fires
The frequency of fires in the bulk liquid tanks is a function of the material stored and the tank design. A review of tank fire incidents, indicates that the general fire frequency for a cone roofed tank is $1x10^{-4}$ p.a (per annum) which includes tanks that are not fitted with floating pans. To provide a more reasonable fire frequency for tanks with floating pans, one order of magnitude lower than that published for standard cone roof tanks has been estimated, therefore $1x10^{-5}$ p.a.

Marstel would also store diesel fuel in cone roof tanks that are not fitted with floating pans. However, diesel fuel has a much lower flash point than flammable liquids and its propensity to ignite is considerably lower. Based on this fuel characteristic, the frequency for a diesel fuel fire has been estimated to be one order of magnitude lower than the general fire frequency for flammable liquid tanks.

Hence, the fire frequency in a floating pan cone roof tank and diesel storage cone roof tank is estimated to be $1x10^{-6}$p.a.

Bund Fires
A review of the fire frequency for tank bund fires (full bund fire) was conducted. The general fire frequency for full bund fires was estimated to be $1x10^{-5}$ p.a. This frequency is a general value, including all tank types. Hence, it would be applicable to the tank bunds at the Marstel facility as there are both floating pan cone roof tanks and standard cone roof tanks at the site.
For the diesel fuel tanks, the fire frequency has been estimated to be one order of magnitude less than the published data, therefore $1x10^{-6}$p.a.

Gantry Fire Frequency
Gantry fires may occur as a result of a fuel leak from a pipe or flexible arm connection.

The fire frequency impacting off site was estimated using a fault tree (as detailed in **Appendix D)**. The estimated fire frequency was calculated as 9.43×10^{-6} p.a. This frequency includes the failure probability of all protection systems. Note that this result is conservative as fire fighting by the operators has not been considered in this analysis.

7.1.4 Risk Analysis

The three previous incidents that were assessed for frequency analysis and were subject to risk analysis are:

- Tank roof fire:
  - flammable liquids (large & small tanks) – $1x10^{-5}$ p.a.
  - combustible liquids (large & small tanks) – $1x10^{-6}$ p.a.
- Full bund fire:
  - flammable liquids – $1x10^{-5}$ p.a.
  - combustible liquid – $1x10^{-6}$ p.a.
- Gantry fire frequency – $9.43x10^{-6}$ p.a.

The values have been used in the risk analysis conducted for this proposal. To estimate the probability of a fatality, the probit methodology is used. This is a quantitative approach to determine the level of risk from fire exposure, considering the distance to the fire and the fire intensity. The values calculated from the probit equation are compared with the probability of fatality estimated. The overall fatality risk is then determined through considering the incident frequency and the fatality probability.

Tank Roof Fires
A review of the potential for impact at the site boundary from large (44 m diameter) and small (16 m diameter) tank fires was conducted. It was identified that heat radiation in excess of 4.7 kW/m^2 can only impact at the southern boundary and western boundary.

The highest fatality risk impact from tank fires, at the western boundary was determined to be from a fire in the diesel fuel tank at the closest point on the boundary to the tank (west). The fatality risk was calculated as 0.8 chances in a million per year (pmpy). Similarly, the highest fatality risk impact from tank fires, at the southern boundary, is from a fire in the diesel fuel tank at the closest point on the boundary to the tank (south), which was calculated at 0.25 pmpy. This is shown in **Figure 7**.

Full Bund Fire
A full bund fire would impact the site boundary at a level in excess of 20 kW/m2. Applying the probit analysis and frequency analysis, chances of fatality were determined at 0.8 pmpy.

The point of highest risk is where the two bunds (southwest and southeast) meet at the southern boundary. The risk at this point is therefore cumulative and the total risk is 1.6 pmpy.

Gantry Fire

The distance to the closest site boundary from the gantry bund is 25 m. At this distance, the heat radiation impact is 16 kW/m2. Applying the probit analysis and frequency analysis chances of fatality were determined at 4.7 pmpy.

There is also a cumulative risk impact as a result of bund fires, tank fires and gantry fires. The cumulative risk impact is assessed below.

Cumulative Risks

Cumulative risk impact is determined through the calculation of risks from all identified incidents at the site at any selected point. The assessment of cumulative risk at the site identified the highest risk locations occur at two points; at the southern boundary adjacent to where the two bunds meet and at the western boundary adjacent to the fire water tanks (117 m from the south-western corner of the site).

The highest cumulative fatality risks location at the southern boundary is estimated using probit from the summation of risks associated with incidents at the southwestern/southeastern bunds and tanks NN1 (Diesel) and NN2 (Biodiesel). The total cumulative risk was calculated at 1.85 pmpy as depicted in **Figure 7**.

The highest cumulative fatality risks location at the western boundary is estimated from the summation of risks associated with incidents at the southwestern bund, Tank NN1 (Diesel) and the fuel transfer gantry area. The analysis identified that the highest risk occurs 117 m north, along the Greenfield Road boundary, from the southwest corner of the site. The risk was assessed to be 0.8 pmpy.

Further consideration has also been provided regarding the cumulative impact as a result of catastrophic event from activities in the broader area, including the unloading of fuels and transfer of ammonia nitrate from wharves K2 and K3. To ensure that the current risk profile for the proposal is to remain below the criteria, the unloading of bulk fuel and loading of ammonia nitrate will not occur concurrently. Further assessment these issues, particularly the risk of fire at adjacent sites, will be specifically addressed as part of the Fire Safety Studies that will be undertaken in consultation with relevant stakeholders following approval.

7.1.5 Environmental Safeguards

Based on the outcome of the PHA, a number of specific measures would be undertaken, to ensure the risks are maintained within the as low as reasonably practicable (ALARP) range. These are:

- Installation of a 50 kg wheeled dry powder extinguisher at the K2 wharf to address fires prior to the arrival of the main fire fighting equipment;
- Preparation of a separate wharf emergency plan including spills, and potential environmental impact. The plan should be held in a waterproof container at the wharf and be available as part of the wharf operations. The plan should also contain spill response procedures and emergency drills/exercises to be conducted at regular intervals as part of safety preparedness;
- Identification of the pipeline with a marker tape over the top of the line (i.e. between the surface and pipeline) indicating “FUEL LINE UNDER”. Pipeline surface markers would also be installed at every 100 m to indicate the presence of the pipeline under the footpath location;

- As part of the fuel transfer procedure, an inspection of the pipeline route would be conducted to identify whether there has been unidentified ground disturbance in the area of the pipeline since the previous transfer. This may indicate to the terminal staff that the line could be impacted;
- Installation of a fire monitor located at a minimum of 29 m from the wharf hose connection point, to detect fire incidence from the flexible hose connection;
- Plant maintenance schedules would include requirements for the testing of fire detectors at the site annually and weekly tests of the fire pump systems and foam activation valves; and
- There will be no simultaneous unloading of fuel and loading of ammonia nitrate at the K2 and K3 wharves.

7.1.6 Residual Impacts

The risk assessment that was completed in the PHA concluded that those events that may have an off site impact were determined to be within the criteria as provided in HIPAP No.4. In accordance with this criteria, the assessed risk at the site boundary should be less than 50 pmpy based on the surrounding industrial land use.

Those risks that were brought forward to the risk analysis stage and the corresponding results were:

- Tank roof fire; Maximum of 0.8 pmpy
- Full bund fire: Maximum of 1.6 pmpy; and
- Gantry fire frequency: Maximum of 4.7 pmpy.

The cumulative risk of all events was calculated at a maximum of 0.8 pmpy at the southern boundary.

The proposed safeguards that would be implemented both at the K2 wharf and the terminal facility would ensure that these identified risks remain low. Based on the above analysis of the identified risks, it is determined that the residual risk of the proposal is minimal.

Cumulative risks associated with the proposal, particularly the potential for fires on site and interaction with adjacent industries will be further assessed as part of the post approval fire safety studies. These are to be undertaken in consultation with appropriate stakeholders.

7.1.7 Conclusion

In accordance with the requirements of SEPP 33 facilities that are to store combustible or flammable liquids are to demonstrate that they are neither hazardous and/or offensive. Consequently, a PHA was prepared for the facility, which undertook a Partial Quantitative Level 2 assessment.

The assessment concluded, that based on the criteria as provided in HIPAP No. 4, the predicted risks at the boundary of the site were well below the criteria stipulated for industrial land use. Therefore SEPP 33 does not apply to this development. Nevertheless, a number of safeguard measures are to be implemented to ensure these risks remain low over the life of the operation of the facility.

7.2 Surface Water Management

A Stormwater Management Plan (SWMP) has been prepared for the facility and is included as **Appendix C.** The stormwater management system is also described in **Section 3.6.3**.

7.2.1 Existing Conditions

The site is currently vegetated with various grass species and weed species, namely bitou bush. The area does not have an on site stormwater system, with run off from the site generally considered clean. Stormwater would either infiltrate through the sandy soil profile, or in the case of run-off would flow to the Hunter River.

Currently, there are stormwater pits on either side of Greenleaf Road which connect to a 750 mm concrete stormwater pipe. This collects run-off from Greenleaf Road which discharges directly to the Hunter River. There are no other stormwater controls in place. There is no data on stormwater quality available for the site, however typically untreated stormwater is known to be high in nutrients and suspended solids.

7.2.2 Predicted Impacts

Construction
The site is relatively flat, with a slope of <3% from Greenleaf Road to the Hunter River. It is anticipated that runoff from the site would be minimal due to the sandy substrate and high infiltration. Nevertheless, runoff from disturbed areas has the potential to cause erosion, sedimentation, siltation and contamination.

Surface water may be impacted during construction as a result of the following activities:

- Vegetation removal and stripping of topsoil;
- Working in areas where soils and substrate have not been stabilised;
- Storage and operation of machinery including backhoes, excavators, cranes and pile drivers; and
- Stockpiling of excavated material.

Operational
Contaminated stormwater may potentially leave the site and result in impacts to the nearby Hunter River in the event that stormwater is not controlled from the site. Minor spills both within the bunded areas, truck loading gantry and roadways may result in contaminated stormwater runoff in a rain event.

The areas identified as potentially impacting on the quality of stormwater leaving the site are:

- Stormwater from the Tank Farm (TF);
- Stormwater from the concrete driveways trafficked by tankers;
- Stormwater from the Road Tanker Fill Stands (RTFS) and pump bay;
- Stormwater from the emergency access roads; and
- Stormwater from building roofs and car park.

The proposed stormwater management system as described in the SWMP (**Appendix C**) and is designed to prevent pollution of the Hunter River from on site stormwater through effective design of stormwater controls, appropriate staff training and suitable water quality monitoring and testing. These measures are discussed in detail in **Section 3.6.3.**

7.2.3 Environmental Safeguards

Construction

Surface water from Greenleaf Road would continue to be discharged via the existing stormwater system. To ensure that run-off from the road does not contain a high level of suspended sediments or nutrients, straw bales would be placed upstream of the stormwater grates. Roadways will also be routinely cleaned to ensure no sediment is not tracked onto the road.

Prior to the construction phase of the proposal, a CEMP would be developed. This plan would provide details on the strategies to be implemented on site during the construction phase to mitigate potential impacts to the environment. The CEMP would include a detailed erosion and sediment control plan, that would be put in place prior to the disturbance of the site. The plan would ensure that clean water is diverted around the site, whilst surface water on disturbed areas would pass through appropriate sediment control devices. Consequently sediment control fencing would be fixed to the security fencing around the perimeter of the site. This is to ensure site run-off is not high in suspended sediments or other contaminants.

Operational

The stormwater system has been designed to provide the effective containment of stormwater from the site, to prevent leaks and spills which may occur from discharging to the river and to facilitate the discharge of only clean stormwater to the Hunter River under an EPL. Some captured stormwater may be used to irrigate the small amount of landscaped areas on the site.

In order to ensure that only clean stormwater is discharged from the site, stormwater originating from different on site catchments would be segregated, tested and treated accordingly.

Key aspects of the stormwater management system would include:

- containment of stormwater from TF;
- containment of stormwater and spills from RTFS and pump bay;
- first flush system for stormwater from driveways;
- prevention of spills;
- testing of water quality prior to release to the Hunter River of contained stormwater;
- water quality monitoring;
- handling and disposal of potentially contaminated stormwater and fire water;
- segregation of water drained from petrol tanks for off site disposal;
- system maintenance;
- contingency plans for the management of potentially contaminated stormwater; and
- staff training.

The proposed layout of the stormwater system on the site is provided in **Figure 3.** The system comprises numerous containment areas which are described in **Table 7-2** each with its own specific procedure and testing regime. This has been developed in accordance with the Marstel Business Management System which incorporates all procedures and work instructions.

Table 7-2: Stormwater Containment Components

Area	Description	Inspection	Testing

Area	Description	Inspection	Testing
Tank Farm (TF)	Water accumulated within each tank bunded area	Routine inspection prior to release to API. Visual inspection for suspended solids hydrocarbons, grease, foam, visible floating oil, litter.	Insitu testing for: • pH; • Dissolved oxygen; • Electrical conductivity
API Separator	Final treatment and emergency stop release from TF.	Routine inspection and testing prior to release to VOP. Visual inspection for suspended solids hydrocarbons, grease, foam, visible floating oil, litter	Insitu testing for: • pH; • Dissolved oxygen; • Electrical conductivity Laboratory testing for: • pH • Electrical conductivity • Total Organic Carbon; • Suspended Solids.
First Flush Containment Pit (FFCP)	Collects first flush water from concrete driveways	Routine inspection prior to reaching capacity and release to VOP	Laboratory testing for: • pH • Electrical Conductivity • Total Organic Carbon; • Suspended Solids.
Truck Fill Spill Collection Pit (TSCP)	Collection of accidental spills, fire water and Pump Bay	Routine inspection prior to reaching capacity and release to VOP. Contaminated water disposed off site. Clean water to VOP	Insitu testing for: • pH; • Dissolved oxygen; • Electrical conductivity Laboratory testing for: • pH • Electrical conductivity • Total Organic Carbon; • Suspended Solids.
Valved Outlet Pit (VOP)	Final discharge point to the Hunter River.	Routine visual inspection to ensure water is free of visual contaminants.	No testing required. All water released to the VOP has previously been tested and meets criteria.

In the event that stormwater is not suitable for release to the Hunter River, the contaminants would be separated and disposed of off site by a licensed contractor. The remaining water would be retested and, if clean, discharged to the river via the VOP.

Off site disposal would be undertaken by a licensed liquid waste contractor who would pump contaminated stormwater out of the containment area and transport the water off site for appropriate disposal.

7.2.4 Residual Impacts

The residual impacts determined for surface water quality, based on the proposed measures to be implemented during construction and operation is predicted to be minimal. The SWMP for the facility is based on previous SWMPs developed for other Marstel operational sites. This system has proved to be extremely effective in managing stormwater, with no reportable incidents recorded.

7.2.5 Conclusion

The management of surface water during operation has been addressed through the preparation of a SWMP, which would provide the framework to effectively manage the potential pollution of receiving waters from on site stormwater through effective design of stormwater controls, appropriate staff training and suitable water quality monitoring and testing. In addition a CEMP would be developed prior to the initiation of construction, which would detail all on site control measures to protect surface water quality and runoff to the Hunter River. As such, impacts to surface water associated with the proposal are considered acceptable.

7.3 Groundwater

7.3.1 Existing Conditions

Groundwater at the site was considered as part of an Environmental Site Assessment (ESA) report produced by RCA in February 2007 (RCA 2007) and is included in **Appendix H**. The intent of the report was to produce the findings of a limited Phase 1 and Phase 2 ESA on the environmental conditions and provide an assessment of the suitability of the site for the proposed project.

This involved the sampling and analysis of seven groundwater wells, five of which were installed by RCA (BH01 to BH05) with two others previously existing on Lot 5 (BH06 and BH07). Samples were analysed for:

- Total Petroleum Hydrocarbons (TPH),
- Benzene, Toluene, Ethyl Benzene and Xylene (BTEX),
- Polycyclic Aromatic Hydrocarbons (PAHs), and
- 8 Metals Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Nickel (Ni), Lead (Pb), Zinc (Zn) and Mercury (Hg)).

Each of these wells was surveyed in order to determine the direction of groundwater flow.

The assessment also comprised:

- A limited assessment of site conditions and surrounding environment, and
- A review of site history using aerial photography.

Lithology
Table 7-3 summarises the lithology encountered at the site as reported by RCA (2007).

Table 7-3: Encountered Lithology

Well Site	Geology	Total Bore Depth (m)
BH1, BH2	Sandy fill with shell fragments and gravel, loose, brown, dry. Natural not encountered	4.0 m
BH3	Silty sandy fill with shell fragments (to 1.0 m) and gravel with silty clay lenses	4.0 m
BH4 to BH5	Sandy fill with shell fragments (to 2 - 2.9m) underlain by clayey/silty sand (dark grey, estuarine)	3.5 m to 4.0 m

Hydrogeology
Based on RCA (2007), the local area is expected to be strongly affected by tidal influences. Groundwater flow rates are expected to vary significantly depending on tidal oscillations.

Regionally, there are two aquifers that are in proximity to the site on Kooragang Island, known as fill and estuarine. In some areas, the fill aquifer is separated from the estuarine aquifer by a clay layer and is present at between 0.4 to 1.2 m. The fill aquifer comprises predominantly dredged sand from the Hunter River or in some cases various waste materials. The flow direction is generally to the nearest surface water with some minor vertical flow through the low permeable clay lens into the estuarine aquifer. The estuarine aquifer comprises moderate to highly permeable sands.

It is possible that the Kooragang Island groundwater system is hydraulically connected to other groundwater sources such as Tomago, Fullerton Cove and Stockton in addition to the local Kooragang Wetlands and Hunter Estuary.

Groundwater search information of groundwater wells in the region was not available.

Groundwater Flow (Direction and Rate of Flow)
Depth to groundwater on the site was encountered between 1.5 m and 2.3 m below ground surface (m bgs). Groundwater flow was determined to be to the south and east of the site, towards the Stockton Channel (Hunter River) and Walsh Point Reserve. It is anticipated that groundwater in this region is affected by tidal influences due to its proximity to the Hunter River. No indication was provided of the predicted groundwater flow rate, however information from other sites indicates an approximate flow rate of 0.5 m/yr at a comparable distance from the estuary.

Groundwater Quality
RCA (2007) identified low concentrations of organic and inorganic parameters with the exception of zinc which was exceeded by up to 3.9 times the criteria provided in Australian and New Zealand Environment Conservation Council (ANZECC 2000), *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* for 90% species protection level for marine ecosystems. The origin of the elevated zinc could not be determined, however there are numerous industrial sites on Kooragang Island with long operating histories which may have impacted on existing groundwater quality.

7.3.2 Predicted Impacts

Previous groundwater investigations undertaken at the site indicate depth to groundwater is between 1.5 m and 2.3 m. Excavation during the construction of the tank farm facility is not anticipated to exceed 0.6 m, hence there would be no interaction with groundwater on the site. Pile driving activities may intersect the groundwater, however it is considered this does not pose a significant risk to the groundwater aquifer. The pipeline will be placed at a minimum depth of 1200 mm, which may encounter groundwater on occasions, particularly during high tides and higher rainfall.

Based on the information provided in the RCA 2007 report and other available information, it is unlikely that adverse impacts would be generated by the proposed development. It has been identified that the ESA did not test for potential organic contaminants, therefore additional testing will be undertaken Nevertheless, safeguards have been proposed to prevent the release of potentially contaminated groundwater being released from the site.

7.3.3 Environmental Safeguards

During both construction and operation, plant and machinery would be routinely inspected and oil or fuel leaks would be identified and managed immediately. Spill equipment would also be stored on site in the event of fuel spills.

Dewatering may be required if groundwater is encountered during excavation of the pipeline or the stormwater pit. This is considered unlikely considering the minimum depth to groundwater previously encountered, and may depend on the seasonal fluctuation and tidal movements.

It is planned to continue to monitor the groundwater on site prior to the initiation of construction. Analytes previously invested by RCA (**Appendix H**) will be tested, and these shall also be supplemented by other organics including nitrogen (ammonia).

If dewatering is to be undertaken, the water will be tested for the range of analytes previously stipulated. In the event that contaminants prove to exceed site criteria, water will be removed off-site by a licensed contractor. This will involve a suction tanker sucking the contaminated groundwater and removing to an off site facility for appropriate disposal.

If groundwater is below the criteria, it is proposed to dispose directly by pumping to the existing stormwater system with prior consultation with Newcastle City Council. Disposal via the existing stormwater system will not result in any potential erosion or scouring due to water release.

In the event groundwater in encountered and dewatering is required, priot application will be made to the Department of Water and Energy (DWE) for a license in accordance with Part 5 of the Water Act 1912.

Groundwater on site will be protected through the installation of the claymax liner as described in **Section 3.4.3.** The claymax liner would create an impervious seal across the site and would run up the sides of the bund wall. In the event that there is spillage of any product on the site, it would be contained within of the site and managed appropriately.

Ongoing sampling and analysis of groundwater will be routinely undertaken for pH, EC, metals, TPH, BTEX, PAHs, organics (incl. nitrogen) and groundwater flow rates.

Groundwater management is also to be undertaken in accordance with *NSW Groundwater Quality Protection Policy, DLWC 1998*, in which the objectives are to protect the groundwater resource in NSW. The implementation of these safeguards will ensure the protection of the existing groundwater aquifer on site.

7.3.4 Residual Impacts

As control measures such as the implementation of ongoing monitoring and construction of an engineered liner, form part of the proposal, it is unlikely that there would be residual impacts from the proposed facility. Any groundwater that is intercepted and dewatering is needed, works will be carried out in accordance with **Section 7.3.3**.

7.3.5 Conclusions

Based on the review of the available information for the site, it is considered that the existing groundwater at the site does not pose a risk to the proposed project. Additionally, the construction and ongoing management of the proposal would not adversely impact the quality of the existing groundwater with the implementation of the identified control measures.

7.4 Soil

7.4.1 Existing Conditions

The site is described by the Soil Landscapes Map[1] to be terrain disturbed by human activity. RCA (2007) indicates the likelihood that the entire site has been filled from dredging activities of the Hunter River. This is reflected in the test pit and borehole logs in the RCA (2007) report which encounter fill to depths for the most of between 2 and 2.5 m. A geotechnical study of the site was also undertaken by Coffey Geotechnics in April 2007. Subsurface profiles encountered during this study were consistent with the investigation undertaken by RCA (2007).

[1] Matthei, L.E. (1995). *Soil Landscapes of the Newcastle 1:100 000 Sheet* Report, Department of Land and Water Conservation, Sydney.

Fill material encountered on the site comprises dredged sand to silty sand with gravel and clay lenses of variable density. Regionally, the natural soils of Kooragang Island that occur below fill materials are described as an upper clay layer consisting of soft silty sandy clay, a sandy layer (loose to dense sand), a lower clay layer (stiff to very stiff sandy silty clay), soft rock layers (siltstone and mudstone) and hard rock layers (sandstone). Due to the presence of the various fill materials and the historical flow paths of the Hunter River and its tributaries, the depth of each of the soil layers varies significantly over the island (Newcastle Coal Infrastructure Group)[2].

Soil Contamination

The preliminary site investigation undertaken by RCA involved the excavation of 37 test pits across the site. One soil sample was obtained from each testpit and submitted for analysis. Contaminants assessed included metals, PAHs, TPHs, BTEX compounds and pesticides.

Two near surface samples obtained by RCA of the 37 test pits identified concentrations above the site guidelines (NSW EPA, 1994 *Guidelines for Assessing Service Station Sites*). These samples reported results that were 1.2 and 2.0 times the criteria respectively. No remediation is considered necessary due to the 95% Upper Confidence Limit (UCL) statistical analysis showing that overall the results were well below the site criteria.

Acid Sulphate Soils

The presence of Potential Acid Sulphate Soils (PASS) was noted during the site investigation with the PASS Planning Map identifying the area as being Class 2. It is noted that PASS therefore may occur on the site and would require specific management in the event they are disturbed during construction works.

7.4.2 Predicted Impacts

Soil Contamination

Predicted impacts relate primarily to the excavation of soils. Predicted impacts would vary depending on the proposed destination of spoil material and the potential for undetected hotspots. Excavation across the site would be minimal, with the exception of the foundations for the tanks. It is anticipated that soil material is more likely to be imported to the site. In the event that soil is imported, it would be tested and classified to ensure it is free of contaminants.

The Environmental Site Assessment report prepared by RCA (Appendix H) identified two areas of contamination of TPH C10-C36 to a maximum depth of around 0.3m. This area of surface contamination is located below the proposed roadway for the facility. It is considered that this area may be disturbed during site preparation for the roadway.

Acid Sulphate Soils

a broad range assessment of the site for PASS suggests the potential for PASS to occur on the site and/or along the route of the proposed pipeline.

The disturbance of PASS has the potential to degrade the local environment. Harmful reaction products can be transferred from the site of acid generation by surface and/or ground waters that move from the disturbed area. The generation of acidic surface or ground waters presents a potential hazard in itself and a medium through which environmental degradation takes place.

[2] Newcastle Coal Infrastructure Group Coal Export Terminal – Environmental Assessment.

7.4.3 Environmental Safeguards

The soil can be appropriately managed during excavation by the implementation of a CEMP. The CEMP would need to address the excavation, classification, treatment and disposal of PASS and heavy fraction TPH contamination.

Spoil material to be transported off site would require sampling for waste classification and should be carried out in accordance with DEC (June 2004)[3]. These guidelines outline the classification protocol and the criteria thresholds that would eventually determine the final disposal options. Material to be imported to the site must be classified in accordance with NSW EPA (December 1994) prior to receipt.[4]

Acid Sulphate Soils
As previously identified, the site is classified on the PASS Planning Map as Class 2. PASS typically do not occur consistently across an area and can remain undetected despite a comprehensive sampling program of the site.

As such, it is proposed that all soil that is to be excavated and handled on site be assumed to be PASS. As material is excavated either on site or along the pipeline, in-situ testing of the soil would be undertaken to determine if PASS is present.

A PASS management plan would be developed as part of the CEMP. This plan would provide methodology on field sampling and testing of materials, handling and management of identified PASS. This plan would be produced prior to any work is initiated on site.

Soil Contamination
Prior to the preparation of the CEMP, further sampling in the vicinity of the soil contamination will be undertaken to determine the extent and potential volume to be removed from site. Sampling will be undertaken at locations of the previously identified contamination, to a depth of 0.3 m, and will be analysed for TPH C10-C36. From this, the extent of contamination will be determined. Based on preliminary information provided in the ESA, the surface contamination is potentially located within an area of 700m^2. Considering excavation in the area will be to 0.3m it is conservatively estimated there would be 210 m^3.of contaminated soil.

The report prepared by RCA determined that the identified contamination was localised and not considered to be a hotspot. The RCA report also concluded the contaminants 95%ile UCL was below the soils criteria adopted for the site.

Once surface sampling has been completed, the material will be stockpiled on site and classified in accordance with *NSWEPA Assessment, Classification and Management of Liquid and Non Liquid Wastes, May 1999.* Based on this assessment the material will be disposed off site to an appropriate facility.

7.4.4 Residual Impacts

Analysis of soil currently on site has indicated that there are no issues associated with contamination, with the exception of some minor hotspot areas associated with TPHs. With the implementation of control measures such as construction of an engineered liner to prevent future contamination and implementation of a CEMP, it is unlikely that there would be residual impacts from the proposed project.

[3] DEC 2004, Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-liquid Wastes

[4] NSW EPA 1994, Contaminated Sites: Guidelines for Assessing Service Station Sites.

7.4.5 Conclusions

Based on the review of the available information for the site, it is considered that the existing soil at the site does not pose a risk to the proposed project. The presence of PASS on site has been identified and appropriate measures have been proposed to classify and manage PASS material if they are present.. The construction and ongoing management of the proposed project would not adversely impact the soil providing the identified control measures are implemented.

7.5 Air Quality

An air quality impact assessment (AQIA) was prepared by HLA ENSR for the Bulk Fuel Storage Facility. This is included as **Appendix I**, with the assessment summarised in the following sections.

7.5.1 Existing Conditions

Air quality in Newcastle is dominated by motor vehicle emissions, but is also affected by the major industry located around the port area. Sources of air emissions include the neighbouring Orica and Incitec plants, the Delta Electrolytic Manganese Dioxide (EMD) facility at Mayfield West, and the Tomago Aluminium smelter. Additional pollutant sources include dust emissions from the coal and grain terminals, and odour from seed processing (Cargill).

The pollutants of prime concern in NSW are ozone and particulates, with levels of these pollutants approaching or exceeding the national standards prescribed in the National Environment Protection Measure (NEPM) for Ambient Air Quality on occasion. Pollutant levels in Newcastle, however, are generally acceptable, with few exceedences noted (NSW State of the Environment 2006, DEC).

Specific compounds including Benzene, Toluene, Xylene have been measured for the Newcastle region between 1996 and 2001 as part of the NSW EPA *Ambient Air Quality Research Project* (NSW EPA, 2002). Results showed that Benzene concentrations were approximately 0.8 ppb (2.6 $\mu g/m^3$). These results suggest that at present the Benzene concentrations in Newcastle are less than 10% of the ambient assessment criteria for Benzene. In addition, since this study, the Benzene concentration in fuel (the most significant source of Benzene) has been reduced by a factor of five which would be expected to beneficially impact the background concentration significantly. On this basis the background Benzene concentration is expected to be approximately 0.5 $\mu g/m^3$. This level has been adopted as the background concentration for all areas surrounding the Marstel facility and has been included in all modelling results.

Toluene and Xylene concentrations have been found to be approximately 1.1 ppb (4.1 $\mu g/m^3$) and 0.8 ppb (3.9 $\mu g/m^3$) respectively. This represents approximately 1% of the ambient assessment criteria for Toluene and 2% of the assessment criteria for Xylene. Whilst reductions in Toluene and Xylene concentrations in fuel have not been as significant as for Benzene, an overall reduction in Aromatic content in fuels suggests that these levels would have fallen since the completion of the 2002 EPA study. To ensure this AQIA is conservative, 4.1 $\mu g/m^3$ and 3.9 $\mu g/m^3$ have been assumed as background levels for Toluene and Xylene respectively.

No data was found that related to ambient Ethanol concentrations in air. As the Ethanol industry is only relatively new and car emissions would be the predominant source, it has been assumed that the existing levels of Ethanol in air are negligible.

7.5.2 Predicted Impacts

Construction

Dust emissions from the construction of the terminal facility may result from typical land preparation practices such as excavation of soil, movement of scrapers and graders and the formation of stockpiles. As these emissions would be short-term and episodic in nature, they may be managed through the implementation of standard dust management practices, such as wetting down roadways and stockpiles and minimising exposed areas to road traffic. The control of dust emissions during construction would be managed by procedures outlined in the CEMP prepared for the facility. Dispersion modelling was not, therefore, warranted for this aspect of operations, and no further discussion of dust impacts is provided in the AQIA.

Operations

The air quality impact assessment was undertaken using the AUSPLUME v6.0 Gaussian plume dispersion model. All dispersion modelling was undertaken in accordance with the guidelines published by Australian regulatory authorities (DEC, 2005a). These documents prescribe calculation modes to account for terrain effects, building wake effects, horizontal and vertical dispersion curves, buoyancy effects, surface roughness, plume rise, wind speed categories and wind profile exponents.

The modelling scenario examined assumed the operation of the plant at full capacity with the following operational characteristics:

- Operation of the facility 24 hours per day, 7 days per week. The operating hours are expected to be roughly daylight hours, however, approval has been sought for the plant to operate for up to 24 hours per day during fuel unloading from ships, hence this assessment has considered the worst case operational scenario (emissions occurring 24 hours a day).
- Stack emission rates are assumed to be constant over a 24 hour time period for the VRU. This assumption is likely to be a significant over estimate as the VRU would only be emitting VOCs during filling of a truck.
- VOC emissions have only been modelled for the tanks containing volatile fuels. Emissions from the non-volatile diesel and biodiesel fuels are not expected to be significant and have not been considered further by this study.

7.5.3 Assessment Criteria

The compounds which have the potential to affect the surrounding environment from both a toxicity and odour perspective associated with the proposal include Benzene, Toluene, Ethanol and Xylene. As the odour thresholds for Ethanol, Toluene and Xylene are lower than the toxicity thresholds (the levels at which they cause damage), the odour guideline levels were utilised in this assessment. As benzene is a known carcinogen, it was assessed against its toxicity threshold. The DEC criteria (DEC, 2005) and averaging periods are shown in **Table 7-4**.

Table 7-4: Air Pollutant Assessment Criteria

Pollutant	Assessment Criteria ($\mu g/m^3$)	Averaging Period
Benzene	29 (toxicity)	1 hour average, 99.9th percentile concentration
Toluene	360 (odour)	
Ethanol	2,100 (odour)	
Xylene	190 (odour)	

DECC considers sensitive receptors to be areas where people are likely to either live or work, or engage in recreational activities. On this basis, representative receptors were placed at various locations surrounding the proposed Marstel facility to supplement the arbitrary receptor grid developed for the modelling domain. These locations are identified in **Figure 8.**

7.5.4 Modelling Results

Maximum pollutant ground level concentrations were determined at all sensitive receptor and modelling grid locations. It was determined that concentrations of all pollutants modelled for the area surrounding the proposed facility were predicted to fall below the assessment criteria at all modelled locations. Cumulative assessments of the volatile organic pollutants indicated that there were no cumulative impacts likely as a result of the operation of the facility.

Results of the modelling for the facility, showing the highest potential pollutant receptor, is provided in **Table 7.5**. Further details of all receptors are found in **Appendix I.**

Table 7-5: Air Pollutant Modelling; highest potential receptor

Receptor No.	Benzene		Toluene		Xylene		Ethanol
	Conc.	Cumulative	Conc.	Cumulative	Conc.	Cumulative	Conc.
38	2.4	5.0	35.5	39.6	47.4	51.3	23.8
Criteria	**29**		**360**		**190**		**2100**

7.5.5 Greenhouse Gas Emissions

Operation of the facility is unlikely to generate a significant quantity of greenhouse gases. Operations likely to generate greenhouse gas at the facility include:

- Electricity to run plant operations such as administration buildings, fuel transportation pumps, VRU and plant lighting; and
- Small vehicles travelling to and from the site for plant workers.
- Tankers delivery and dispatching fuel from the facility; and
- Emissions from ship delivering bulk fuel to the K2 wharf.

The calculation methods for determining greenhouse gas emissions have been sourced from the Australian Government Department of the Environment and Heritage Australian Greenhouse Office publication *AGO Factors and Methods Workbook*, Dec 2006. The workbook adopts emission categories which are consistent with the international reporting framework. Three “scopes” of emissions categories are included which are:

- **Scope 1** covers direct emissions from sources within the boundary of an organisation such as fuel combustion and manufacturing;
- **Scope 2** covers indirect emissions from the consumption of purchased electricity, steam or heat produced by another organisation. Scope 2 does not include emissions associated with the production of fuel.
- **Scope 3** includes all other indirect emissions that are a consequence of organisation’s activities but are not from sources owned or controlled by the organisation.

The facility would not produce any Scope 1 emissions as a consequence of operating the facility. Fuels which will be stored on site will not be combusted as part of the operations.

Scope 3 greenhouse gas emissions created from the electricity end-use for the facility were determined using Table 5 of the workbook. The total Scope 3 greenhouse gas emissions were calculated as 35.8 t $CO_{2\text{-}e}$. The AGO Workbook defines Scope 3 emissions as associated with the production of fuel and all other indirect emissions that are a consequence of an organisation's activities but are not from sources owned or controlled by the organisation. The greenhouse gas emission relates to approximately 204,000 kWh of electricity used per year for the operation of the facility.

The calculation methods for determining greenhouse gas emissions have been sourced from the Australian Government Department of the Environment and Heritage Australian Greenhouse Office publication *AGO Factors and Methods Workbook*, Dec 2006. Using Table 5 of the workbook, the indirect greenhouse gas emissions (electricity end-use) for the facility, defined as Scope 3 emissions are 35.8 t $CO_{2\text{-}e}$. The AGO Workbook defines Scope 3 emissions as those associated with the production of fuel and all other indirect emissions that are a consequence of an organisation's activities but are not from sources owned or controlled by the organisation. The greenhouse gas emission relates to approximately 204,000 kWh of electricity used per year for the operation of the facility.

Other activities that may contribute to the generation of greenhouse gas are related to the transportation and combustion of the fuels stored on the site. As the Marstel terminal only serves as a distribution point, and does not actually produce greenhouse gases from combustion of its stored fuels, it is arguable that these emissions should not be considered as part of this GHG emission assessment.

However, to allow a full fuel storage and combustion cycle assessment of the GHG released as a result of the combustion of fuels passing through the facility, the following information is provided.

The quantities of fuels to be stored (and potentially used per year from the facility is assumed as follows:

- 150 ML Unleaded or premium Unleaded fuel (automotive gasoline)
- 120 ML Diesel fuel (Automotive diesel oil)
- 30 ML Biodiesel

Using Table 3 of the AGO Workbook, the direct greenhouse gas emissions (expressed as equivalent CO_2) for the facility is 837,000 t $CO_{2\text{-}e}$ released into the atmosphere. This quantity relates to approximately 0.7% of the overall transportation contribution to greenhouse gas emissions (transportation emissions from liquid fuels in 2005 was 113,616,000 t compared with 837,000 t expected to be emitted from fuel passing through this terminal). The terminal faciliy project has the potential to decrease net GHG transportation emissions by locating the Marstel terminal closer to end user markets, thereby reducing the truck transportation distance required to supply fuel to service stations. A significant amount of bulk fuel to the Hunter Region is transported via road from refineries located in Sydney. The proposed facility will enable bulk fuel to be delivered to the Hunter Region via ship and significantly reduce the number of truck movements between fuel refineries in Sydney and the consumers in the Hunter Region. Bulk fuel transportation via ships allows efficient fuel transport to the Port of Newcastle and shorter distribution supply chains from Kooragang Island.

7.5.6 Environmental Safeguards

A number of design features and control mechanisms are to be implemented on site to mitigate potential impacts to air quality. These include:

- storage tanks with internal floating roofs for petrol tanks to reduce emissions; and
- a VRU for the truck filling process and potentially for the biodiesel tanks.

The VRU would be designed to emit less than 1 - 10 milligrams of VOC release per litre of product loaded. The VRU has no supplemental fuel requirements or trade-off pollutants. The units are accepted worldwide as standard for evaporative hydrocarbon vapour control, with proven reliability and easy operation and maintenance. The US EPA has recognised VRU technology as being both the Best Demonstrated Technology and Maximum Available Control Technology, and use of these systems, therefore, represents best practice. The atmospheric emissions are continuously monitored using a Continuous Emissions Monitor (CEM), such that breach of a pre-determined emissions level, will generate an electronic signal causing an alarm to be raised and safe termination of tanker loading operations.

The proposed VRU for the Marstel Facility is a pressure swing carbon adsorption (PSA) VRU, supplied by Jordan Technologies, as utilised in the majority of petroleum loading facilities throughout the world. Previous analysis of commercially available vapour control technologies has shown pressure swing carbon adsorption (PSA) systems to be the most suitable technology, and are at this time the predominant recovery technology used in fuel loading terminals, worldwide. As specified above, the VRU unit is to emit less than 1-10 milligrams of VOC released, achieving emission controls of 99% or better. The VRU unit will be installed at the truck loading gantry adjacent to the eastern side, where it may be used for vapoury recovery for the three truck unloading areas.

Dust emissions generated as a result of construction would be addressed as part of the CEMP. Measures that would be implemented, particularly during times of high wind (> 50 km/hr) combined with dry conditions are to include:

- Wetting down of exposed areas and stockpiles with water sprays;
- Minimisation of exposed areas through structured construction phases and covering of stockpiled material;
- Revegetation of appropriate areas as soon as practical; and
- No tracking of dirt to Greenleaf Road.

7.5.7 Residual Impacts

There are not likely to be significant residual impacts in relation to air quality as a result of the construction and operation of the proposed project. The dispersion modelling indicated there would be no exceedence of toxicity or odour criteria for all potential pollutants assessed.

The assessment of greenhouse gas emissions considered emissions from both the facility and the potential emissions through the combustion for all fuel stored at the facility annually. The greenhouse gas assessment also noted the benefits that are achieved by locating terminalling facilities closer to the source of use or the benefits of transporting bulk fuel via ship rather than via road. The future demand for fuel as discussed in **Section 3.1** is predicted to increase. Hence the facility is satisfying the demand and is not increasing the demand for fossil fuels.

7.5.8 Conclusion

An AQIA was undertaken for the proposed facility, which assessed impacts associated with construction, and operational emissions. Specifically pollutants of concern included Benzene, Toluene, Ethanol and Xylene. The assessment included both the impacts to sensitive receivers in terms of toxicity and odour. Modelling of the pollutants indicated that there would be no exceedance of the criteria.

An assessment of greenhouse gas emissions was undertaken for emissions from both the facility and the potential emissions through the combustion for all fuel stored at the facility annually. This was an extremely conservative assessment as the emissions are not a result of the proposal and would be generated regardless of this development. The greenhouse gas assessment did not quantify the benefits that are achieved by locating terminalling facilities closer to the source of use or the benefits of transporting bulk fuel via ship rather than via road. The future demand for fuel as discussed in **Section 3.2**, is predicted to increase. Hence the facility is satisfying the demand and is by no way increasing the demand for fossil fuels.

7.6 Noise and Vibration

A noise and vibration assessment was prepared by Spectrum Acoustics for the proposed development on behalf of HLA ENSR and Marstel (**Appendix J)**.

7.6.1 Existing Environment

Background noise levels were calculated from the measured data from previous investigations using the median of each assessment period's (day/evening/night) daily tenth percentile levels, after exclusion of invalid data in accordance with Section 3 of the Industrial Noise Policy (INP). **Table 7-6** lists the relevant measured ambient noise levels at each location.

The estimated industrial noise shown in **Table 7-6** is the combined noise level for the existing industrial noise (from the third coal loader EA) and the predicted worst case noise from the operation of the coal loader under the worst case atmospheric conditions in that EA.

Table 7-6: Measured Ambient Noise Levels

Location	Ln dB(A)	Day	Evening	Night
Fern Bay	L90	40	44	42
	Leq	48	46	46
	Est industrial noise Leq	<54	42	44
Stockton	L90	41	43	43
	Leq	55	50	49
	Est industrial noise Leq	<54	43	45
Carrington	L90	42	41	37
	Leq	62	67	57
	Est industrial noise Leq	46	45	42

7.6.2 Project Specific Noise Goals

Industrial noise emissions are assessed against the requirements of the INP. In relation to residential receivers, the INP specifies two noise criteria: an *intrusiveness criterion* which limits Leq noise levels from the industrial source to a value of 'background plus 5dB' and an *amenity criterion* which aims to protect against excessive noise levels where an area is becoming increasingly developed.

The actual project specific noise goals are the lower of the intrusiveness and amenity criteria, in each of the time periods 'day', 'evening' and 'night'. Using data presented in **Table 7-6**, noise criteria were derived as shown **Table 7-7**. These criteria apply under prevailing atmospheric conditions.

Table 7-7: Planning Noise Goals

Location	Criterion	Day (7am-6pm)	Evening (6pm-10pm)	Night (10pm-7am)
Fern Bay	Intrusiveness dB(A),Leq(15-min.)	45	49	47
	Amenity dB(A),Leq(period)	60	39	35
	Project-Specific Noise Goals	**45(15-min)**	**39 (15-min)**	**35 (period)**
Stockton	Intrusiveness dB(A),Leq(15-min.)	46	48	48
	Amenity dB(A),Leq(period)	60	38	36
	Project-Specific Noise Goals	**46 (15-min.)**	**38 (15-min.)**	**36 (period)**
Carrington	Intrusiveness dB(A),Leq(15-min.)	47	46	42
	Amenity dB(A),Leq(period)	60	48	41
	Project-Specific Noise Goals	**47 (15-min.)**	**46 (15-min.)**	**41 (15-min.)**

As the terminal facility may operate at any time throughout a twenty four hour period due to ship unloading, the remainder of this assessment considers only potential noise impacts against the most restrictive (in this case night time) criterion at each receiver location.

Sleep Disturbance

Based on the night time background noise levels, the following criteria applies to each of the residential areas:

- Fern Bay criterion is set at **57 dB(A) L1 (1 min)**;
- Stockton criterion is set at **58 dB(A) L1 (1 min)**;and
- Carrington criterion is set at **52 dB(A) L1 (1 min).**

It must be noted that industrial noise and sleep disturbance criteria are not applicable to vehicles travelling on public roads.

Road Traffic Noise

The proposed facility would generate additional heavy vehicle traffic en route to distribution. In an acoustic sense roads that will be used are classified as "arterial". The traffic noise goals are summarised in **Table 7-8** below. It is proposed that trucking movements may take place at any time throughout both day and night time assessment periods.

Table 7-8: Criteria for Road Traffic Noise

	Day dB(A),Leq (15hr)	Night dB(A),Leq (9hr)
Criteria (from ECRTN)	60	55
Measured Leq (traffic)	72	69
Noise Goal for traffic arising from this development	70.5	67.5
Leq (traffic) including this development	74	71

Construction Noise

Recommended construction criteria vary depending on construction time, as outlined in DECC's Environmental Noise Control Manual (ENCM) and reproduced below:

Up to 4 weeks: Background + 20 dB

4 to 26 weeks: Background + 10 dB

More than 26 weeks: Background + 5 dB

The DECC specifies that construction activity is allowed during the period 7.00 am to 6.00 pm Monday to Friday and 8.00 am to 1.00 pm Saturday, with no work on Sundays or public holidays.

Total construction time for the terminal facility is anticipated to be in the order of 15 months and therefore the criterion of 'background + 5dB(A)' will apply, resulting in a construction noise planning level of **45dB(A) L10** in Fern Bay, **46dB(A) L10** in Stockton and **47dB(A) L10** in Carrington.

One of the major potential sources of noise during the construction phase, however, is expected to be that of pile driving. It is envisaged that this activity will take approximately 4 weeks to complete.

Vibration

In relation to human comfort, floor vibration levels in habitable rooms should comply with the criteria in The DECC's guideline "*Assessing vibration: a technical guideline*". The applicable levels for continuous daytime activities are shown below in **Table 7-9**.

Table 7-9: Acceptable Vibration Levels (in mm/s 1Hz to 80 Hz)

Building Type	Peak Floor Vibration	Peak Floor Vibration (Z axis)
Residential	0.8 – 1.6	0.3 – 0.6
Offices	1.6	0.6
Workshops	3.2	1.2

Using the most stringent of the damage criteria for residential buildings, an allowable peak particle velocity of 5 mm/s has been adopted as the criterion for this assessment.

7.6.3 Predicted Impacts

Meteorological Environment
The atmospheric conditions most relevant to noise assessments are temperature inversions, gentle winds (indicative of possible wind shear) and relative humidity. The INP states that wind effects need to be assessed where source to receiver winds (at 10 m height) of 3m/s or below occur for 30% of the time in any season, in any assessment period.

Weather patterns in the lower Hunter Valley are well documented and have been studied extensively as part of several other noise assessments carried out in the Kooragang Island area. In general terms winds that persist for greater than 30% of the time are from the south east in summer and the north west in winter.

Terminal Facility Operational Noise
From an acoustic point of view the significant noise producing items or activities that will be associated with the operation of the facility will be;

- Pumps to be used at the wharf and at the terminal;
- Ship, or shore based cranes;
- Ships auxiliary power unit (APU); and
- Truck movements on site.

The sound power level spectra of each of the major operational noise sources are included in the Noise Assessment report in **Appendix J**.

The operation of the terminal facility is planned for the hours between 6 am and 4 pm weekdays and 6 am to 12 pm Saturdays. The facility may, however, operate 24 hours per day during ship unloading.

Noise modelling was, therefore, undertaken for the following operational scenarios;

- ***Scenario 1*** - $+3^0$C/100 m vertical temperature gradient, ship unloading and terminal operating;
- ***Scenario 2*** – 3 m/s north west wind, ship unloading and terminal operating;
- ***Scenario 3*** – 3 m/s south east wind, ship unloading and terminal operating;
- ***Scenario 4*** - $+3^0$C/100m vertical temperature gradient, terminal operating;
- ***Scenario 5*** – 3 m/s north west wind, terminal operating, and
- ***Scenario 6*** – 3 m/s south east wind, terminal operating.

Sleep Disturbance

The major potential for sleep disturbance would come from impacts during the ship unloading process or crane movements at the ship unloading facility and/or the maximum noise from trucks leaving (or entering) the terminal facility prior to 7 am. To determine potential sleep disturbance impacts the ENM noise model was utilised in point calculation mode to determine the predicted noise level at the three representative receiver locations corresponding to unattended noise logging locations (Figure 4 of **Appendix J**). Noise modelling was carried out for the following scenarios:

- ***Scenario 7*** - +3^{0}C/100 m vertical temperature gradient, ship unloading,
- ***Scenario 8*** – 3 m/s north west wind, ship unloading,
- ***Scenario 9*** - +3^{0}C/100 m vertical temperature gradient, truck leaving, and
- ***Scenario 10*** – 3 m/s north west wind, truck leaving.

Additional traffic noise generated by the project would be of a discrete rather than constant nature. At maximum production there would be up to 20 B-Double trucks accessing the site per day (nominally 6 am and 4 pm, i.e. 10 hrs). A scenario where four trucks accessed the terminal between 6 am and 7 am (i.e. at night) and another where all 20 trucks arrived after 7 am (during the day) was assessed.

Modelling Results

Noise contours for each of the various modelled operating scenarios are included in **Appendix J**.

The results show that received noise as a result of emissions from the proposed terminal facility and ship unloading would be well below the relevant night time criteria in Fern Bay and Carrington under all of the modelled conditions.

Figure 9 shows the worst case predicted noise level in Stockton would occur under a north west wind whilst the terminal is operating and a ship is unloading. The 35 dB(A) contour crosses the western edge of the Stockton peninsula.

It should be noted that the project specific noise goal for Stockton is established on the amenity criterion and is, therefore, based on the Leq noise level over the entire night time period. The noises level shown in the contours in **Figure 9** represent a 15 minute Leq. For determination of the worst case it was considered that this noise was consistent over the entire night time period (i.e. 10 pm to 7 am).

The figures show that the predicted noise level be exceeded by 1 dB(A) whilst the ship was unloading over an entire night time period (between 10 pm and 7 am) when there is a 3m/s wind blowing from the north west. The ship unloading will occur approximately 10 times per year.

The most significant noise source is from the APU on the ship, at approximately 10 to 13m above water level (modelled at 13m). Due to the transient nature, it is not possible to apply noise control to each ship which may be used at the terminal facility. At a source height of 10m it is not considered reasonable to erect any sort of acoustic barrier to attenuate the noise from the APU.

That is, noise 1 dB(A) above a criterion is typically considered to be a marginal exceedance. In addition, a change in noise level of 1 dB(A) is not perceptible to the average human ear. That is, reducing the received noise from 37 dB(A) to 36 dB(A) Leq (night) would not be audible, even if that were the only noise in the area. In this instance the noise will be 6 dB(A) below the existing measured background (L90) for the area.

Figure 10 also show that with the terminal only operating (i.e. without a ship being unloaded) received noise levels would be significantly below the relevant noise goals at all residential receivers.

Sleep Disturbance

The results of the point calculations for the four modelled scenarios are shown in **Table 7-10**. The sleep disturbance noise criterion for each location is shown in brackets, indicating there is no exceedence of the criteria.

Table 7-10: Sleep Disturbance Impacts dB(A) L1 (1 min)

Scenario	Location		
	Fern Bay (57)	Stockton (58)	Carrington (52)
7	33	43	35
8	29	43	35
9	27	41	34
10	26	42	31

Road Traffic Noise

Noise levels from increased traffic were calculated for the receiver most sensitive to project generated increased traffic volumes, with results summarised in **Table 7-11**. These results show that traffic noise is well below the criteria.

Table 7-11: Road Traffic Noise Calculations

	dB(A),Leq(9hr) Night[1]	dB(A),Leq(15hr) Day[2]
Existing traffic noise level	69	72
Road traffic Noise Goal (existing –1.5dB)	67.5	70.5
Project generated noise from Equation 1	43	46
Impact	Nil	Nil

1. Although the applicable criterion is for the entire night the calculation was carried out for the worst case 1 hour period between 6 and 7 am.

Although the applicable criterion is for the entire day the calculation was carried out for the worst case 9 hour period between 7 am and 4 pm.

Construction Noise

The results of the point calculations of the typical construction noise scenario indicated there would be no exceedence, with the exception of pile driving.

The results of the point calculations of the typical construction noise scenario for pile driving was modelled separately as shown below in **Table 7-12**. As construction would be carried out during the day, only the north westerly and south easterly wind atmospheric conditions were modelled.

Table 7-12: Results of Pile Driving Noise Modelling (L10)

Location	Received Noise		Criterion dB(A) L10	Impact
	NW wind	SE wind		
Fern Bay	31	35	45	Nil
Stockton	50	47	46	**3/1**
Carrington	39	40	47	Nil

The results in **Table 7-12** show that noise impacts from piling activities would exceed the criterion at the closest residential receivers in Stockton under the modelled conditions. These exceedances would be of a short term nature and would be associated with the initial phase of construction involving pile driving only. This is expected to take approximately 4 weeks to complete. The criterion used in this assessment is based on the entire construction period of the project being approximately 15 months. If the shorter term criteria of less than 4 weeks was adopted, the criteria would be 51 dB(A), and therefore no exceedence would be predicted.

Cumulative Noise Impacts

The results of the cumulative noise assessment indicated that the proposed terminal facility would add a maximum of 0.5 dB(A) to the overall industrial noise level under the worst case modelled scenario at the most affected receivers in Stockton. Cumulative impacts at other receiver locations range from 0 to 0.3 dB(A). This is not considered to be significant and would not be noticeable to the majority of people.

Vibration

It was assumed that vibration levels as a result of on site machinery is inversely proportional to distance. That is, at double the distance from the source the vibration level will be halved.

Based on the typical vibration levels received vibration levels will be less than a peak particle velocity of 5 mm/s at distances of approximately 15 m from a 15 tonne vibrating roller, 12m from a 7 tonne compactor and 5m from an excavator. Based on the adopted vibration levels for pile driving, the building damage criterion would be met at distances of greater than approximately 40m. There are no potentially affected buildings within any of these distances from the site.

7.6.4 Environmental Safeguards

Based on the noise and vibration assessment, it was concluded that the proposed operation of the bulk fuel storage terminal facility would not adversely impact upon the acoustic amenity of any residential receiver. Consequently, no specific mitigation measures were proposed for the facility

7.6.5 Residual Impacts

The noise impact assessment undertaken for the proposed bulk fuel storage facility indicated that there would no exceedences of criteria at any of the nearby residents under worst case scenario. This is with the exception of pile driving under certain meteorological conditions and assuming a construction period of greater than 4 weeks.

Pile driving is anticipated to be undertaken over a period of 4 weeks. If a less conservative approach was undertaken during the modelling, exceedence would not be predicted. As such, based on the acoustic assessment and modelling outcomes a medium to low residual impact is anticipated.

7.6.6 Conclusion

The results of noise assessment have shown that, under the worst case operational and atmospheric conditions, received noise levels would not exceed the relevant noise criteria at any residential locations considered.

The most stringent of the noise goals set in this assessment are for residences in the Stockton area at 37 dB(A) Leq at night. The results of the current assessment have shown that, under the worst case, received noise in Stockton would not exceed these most stringent noise goals. Similarly there would be no adverse vibration impacts to either human comfort or potential building damage as a result of typical construction or pile driving activities.

7.7 Traffic and Transport

A traffic assessment of the proposed bulk fuel terminal was prepared by TPK and Associates in May 2007. This report assessed the existing traffic conditions on the road network and predicted impacts from the proposal and is included as **Appendix K**.

7.7.1 Existing Conditions

The site of the proposed terminal facility is located on the eastern side of Greenleaf Road on Kooragang Island. Greenleaf Road is classified as a local road, providing one leg of a loop road on Walsh Point. Greenleaf Road connects to Stockton Bridge (MR108) along the eastern side of the road loop and connects into the western side of the loop, Heron Road then on to the Teal Street (MR 108) roundabout via Cormorant Road. The traffic route is shown in **Figure 11**.

MR 108, to which this road loop connects, provides links to Newcastle, the F3 Freeway and Nelson Bay.

MR 108 on Stockton Bridge had a 2004 AADT of 18,966vpd based on data contained in RTA's Traffic Volume Data 2004 publication; with growth trends from the permanent counting station the 2007 AADT is likely to be approaching 20,000vpd.

Peak hour traffic volumes past the site frontage taken in May 2007 are shown below in **Table 7-13**.

Table 7-13: Peak hour traffic volumes

	North Bound	South Bound
PM Peak	15 Min Totals	15 Min Totals
3.30-3.45	1	10
3.45-4.00	3	3
4.00-4.15	2	2
4.15-4.30	0	3
Hour Total	6	18
AM Peak	15 Min Totals	15 Min Totals
7.30-7.45	5	3
7.45-8.00	3	6
8.00-8.15	5	4
8.15-8.30	3	3
Hour Total	16	16

The current road environment is a 22.9 m wide carriageway, bitumen sealed with kerb and guttering on both sides.

7.7.2 Predicted Impacts

Construction Traffic Impacts

The construction period for the proposal is expected to take some 15 months which is to include site establishment, subsurface and surface preparation, transport and establishment of fuel storage tanks and associated infrastructure. The nature and intensity of activities affecting the road network would be limited to the delivery of plant and equipment to site. This would be sporadic during the construction period and would depend on the activity. Activities that would generate traffic may include:

- Trucks of various sizes for the delivery of plant and equipment, ranging in sizes up to semi trailers;
- Concrete trucks and pumps associated with the construction of the tank footings and bund wall;
- Construction traffic along the pipeline route;
- Light vehicles associated with construction personnel; and
- Transport of tank components to the site.

The construction phase would require construction staff ranging from 10 and peaking for a short period at around 50.

Construction traffic trips would be spread rather than being concentrated on a short peak arrival/departure. Given the site location there is potential for car pooling by some staff. At the peak staff demand level, the peak hour traffic increase is not expected to exceed 30 trips and will not have an adverse impact on the road network.

Operational Traffic Impacts

The RTA Guide to Traffic Generating Developments suggests traffic generating rates for a range of land use activities. The proposed operation for this proposal project is not reflected in the standard rates contained in that document. **Table 7-14** sets out the rates adopted for this project as provided by Marstel from the proposed operations. This is based on the assumption that hours for site operation are to be 6 am to 4 pm Monday to Friday and 6 am to 12 noon Saturday. Shipping times are random, and will be approximately 10 times annually.

Table 7-14: Potential Traffic Generation

USE – Bulk Fuel Storage Facility	Adopted Rates and Trips
Road Delivery Trips	Up to 40 heavy vehicle trips per day; no defined peak hour
Staff Trips	Site: 6 trips per day, 3 trips in the peak Shipping: up to 12 trips spread over 36 hours on 10 occasion each year
Project Trip Total	Daily 46 trips Peak 5 trips (allowing for 1 truck arrival and departure, no shipping staff)

The traffic would converge from and disperse to the broad road network at potentially 2 locations:

- Cormorant & Teal Streets roundabout; and
- Stockton Bridge on load and off load routes.

The distribution would be via the following gateways:

- Tourle Street Bridge for southern destinations, New England Highway & F3 corridors; and
- Stockton Bridge for Pacific Highway north of Hexham.

The proportion of each leg would be driven by product demand at the time. Typically trucks would travel via Tourle Street Bridge to the New England Highway, as it is anticipated the majority of customers would be in the Hunter Valley coal fields and industrial areas. This is the most direct route to the area. Alternatively trucks may travel via Stockton Bridge and Pacific Highway, however this is a significant diversion from the preferred route.

The Traffic Assessment considered the need for intersection analysis based on the existing traffic and predicted traffic generated by the proposal. However due to the relatively low increase in traffic movements when compared with the existing traffic load it was considered unnecessary.

Traffic Criteria

A project summation of key site elements is provided in **Table 7-15**.

Table 7-15: Parking and Access Assessment

Criteria	Clause	Assessment or Requirement	Provided	Complies
Classification of Use	(AS) Table 1.1	Class 1	NA	NA
Road Frontage type	(AS) Table 3.1	Local	NA	NA
Number of Parking spaces	(AS) Table 3.1	<25 range	6	See report
Parking Bays	(AS) Figure 2.2	90 Degree, 5.4m x 2.6m	5.5m x 2.6m	Yes
Parking Aisle	(AS) Figure 2.2	Staff Car Park – 6.2m	6.6m	Yes
Driveway Category	(AS) Table 3.1 (AS2) Figure 3.	Category 1 AV	NA NA	NA NA
Driveway Design	(AS) Table 3.2 (AS2) Figure 3.1	3.0 to 5.0m combined. 12.5m wide at kerb	Car Park 6.6m comb. Trucks flow One Way	Yes Yes
Driveway location	(AS) Clause 3.2.3	Figure 3.1	Not at an intersection	NA
Sight distances		65m	Unlimited to the north, 65m through bend to the south	Yes

Ref. AS/NZS 2890.1-2004 (AS), AS2890.2 (AS2)-2002 and/or NCC DCP 2005

The proposal would generate little demand for parking as staff levels are low. There would be random increases in demand when a ship has docked. At this time the 6 proposed off street spaces would be maximised and where site and shipping staff times coincide, some short term use of on street parking may eventuate. It is considered that the proposed off street capacity of 6 spaces is realistic given the normal site demands and the prevailing road environment.

It is proposed to provide the staff parking area outside the proposed security fencing and have a separate driveway to move to/from the parking area. This results the removal of potential conflict with truck movements on site, as there is little pedestrian movement past the site and adequate footway space is retained.

The heavy vehicle traffic will flow one way south through the site; entering left in from the north and exiting left out to the south. The staff car park is separated from the truck lane which would avoid potential issues with traffic flow on site.

The office and workshop area are located adjacent to the staff car park. Gated access from the car park would be provided to minimise pedestrian trip distance. The movement of pedestrians around the site including the pump areas is not seen as a matter that can be controlled by specific pedestrian movement paths. Pedestrian activity would be of a roaming style and a matter seen to be controlled by on-site work practice and OH & S strategies.

7.7.3 Residual Impacts

The traffic and car parking impacts as a result of the proposed facility comply with all relevant guidelines and standards. Upon consideration of the number of vehicle movements each day and the current road configuration, it is concluded that the proposal will have a low residual impact to the local road network and other users.

7.7.4 Conclusions

The proposal would generate minimal traffic in terms of impact on intersection or road network capacity; allowing for 1 heavy vehicle arrival and departure in the peak period the development would only generate an additional 5 trips per hour.

Heavy vehicle trips would utilise the Stockton Bridge off road ramp to access Greenleaf Road and approach the site. The departure trip would be left from the site and travel on Herons Road to continue on to MR 108, Cormorant Road. All intersections traversed provide adequate geometric layouts, as part of their design to cater for heavy vehicles.

It is concluded that it is unlikely that traffic generated from the facility would have an adverse impact on the road network. The existing traffic flow past the site allows for prolonged gaps, reducing the likely conflict with competing traffic requirements, such as Toll Logistics opposite the Bulk Fuel facility.

7.8 Visual

A visual impact assessment was prepared by HLA ENSR for the proposed terminal facility. The assessment describes the existing environment where the facility would be located; the visual change likely to result from the facility; and makes recommendations to mitigate potential adverse impact. The visual impact assessment is included as **Appendix L**.

7.8.1 Existing Conditions

The overall character of the vicinity of the facility site is industrial. In the immediate area are large sheds, storage tanks, stacks, security fencing, and conveyer lines. There are also heavy trucks using Greenleaf Road and freight ships travelling along the Hunter River to the south of the site.

Kooragang Island is reclaimed land. The site, similarly with the surrounding industrial area, is generally flat. There is a maximum fall of some 0.5 m across the site from Greenleaf Road to the site's eastern boundary near the Hunter River. An unformed access road (approximately 3 m wide) runs between the site and the river. East of the access road is a stone constructed embankment that flanks the river and falls approximately two metres below the ground level of the site to the water level.

The site is fenced off with 2.5 m high wire security fencing. There are no trees within the site, although there are some tall shrubs (approximately 4 m in height). Generally the site appears overgrown with grass and weeds. There are areas of tall shrubs and trees that occur outside of the site along the site boundary, particularly along the boundary with Walsh Point Reserve.

7.8.2 Predicted Impacts

The proposed facility to be constructed at the site would be visible from several key viewing areas being:

- Stockton
- Hunter River
- Newcastle City
- Walsh Point Reserve
- Greenleaf Road

Each of these is discussed below.

Stockton
Views of the site are possible from a residential area along Fullerton Road, Stockton. At its closest point, Fullerton Road is approximately 550 m from the site. The road runs parallel to the Hunter River, and is set back from the river by public open space. An artist's impression of the proposed project viewed from Stockton is shown at **Figure 12.** The view is taken from the Stockton foreshore directly opposite the site which is considered to be the closest with direct views of the site

As shown in the artist's impression, the most distinguishable component of the proposal would be the six, 17 m high storage tanks. The white painted tanks would be visible against the green/khaki coloured sheds of the neighbouring industrial site (Orica), and general industry in the background. The proposed storage tanks, at 17 m high, would appear smaller than the Orica shed to the left in the background which is 21 m high.

It is likely the bund wall along the Hunter River boundary would be visible, but that it would not be an intrusive feature in the context of the broad view to Kooragang Island. Most of the activities that would occur on the site (truck unloading, office activities, car movement) would not be visible from Stockton.

Generally, the proposed facility would add industrial infrastructure – typical in character to the existing area - to the foreshore of the Hunter River at Kooragang Island. Further along the Hunter River, and else where within Kooragang Island industrial area, are existing storage tanks of similar height and diameter.

Views across to Kooragang Island from Fullerton Road locations would remain as views of an industrial landscape. The storage tanks and bund walls proposed would be visible, however, overall, the proposal would be consistent in character with the industrial character of the island, and would be similar in scale to the industrial infrastructure in the background and further north along the riverbank. Views to Kooragang Island would be broadly similar to the general industrial views of the island available already.

Hunter River
Views to the site are possible from the Hunter River. The river is used recreationally and also for industrial purposes. Views of the site would be transient given they are usually on moving craft, or temporarily stationed in a location where the site is visible. Current views of Kooragang Island are generally industrial. The site would not be a focal point, but would comprise part of the industrial scene that views of Kooragang Island afford to users of the river.

Newcastle City
From elevated areas within Newcastle City (such as The Hill and tall city buildings) there are views to Walsh Point Reserve. The proposal site can be seen behind the Reserve to the north. Although elevated and often from permanent viewing locations (such as from offices or residences), the viewing locations from Newcastle City are at a minimum of 2.5 km from the site. It is considered there would be little change in views toward Kooragang Island from Newcastle City locations. An artist's impression of the plan view of the proposed project is shown in **Figure 13.**

Walsh Point Reserve
Walsh Point Reserve has been identified in the Hunter River Estuary Management Study as a valued site for open space and harbour estuary views. There are several tall shrubs within the reserve that line the site boundary. Beyond the shrubs, there are views of the industrial infrastructure typical of the Island. For the most part, however, users of the reserve are looking out toward the Hunter River, rather than inland toward the industry.

The proposed storage tanks (at 17 metres high) would be visible from within Walsh Point Reserve looking north toward the site. The bund walls and site activities would generally be hidden from view by the tall shrubs along the reserve boundary. However, given users of the reserve would be able to get very close to the site, from a close range the bund walls and security fencing would also be visible.

The proposal, generally, would be a continuation of the industrial character and scale of the neighbouring infrastructure in the background. It would have little impact upon on the Walsh Point Reserve "view corridor". The proposed infrastructure of the proposal site would be contained wholly within the site, and its scale is in keeping with the surrounding industrial infrastructure.

Greenleaf Road
Greenleaf Road and its industrial properties provide the closest viewing locations to the site. Views of the site from Greenleaf Road would be of an industry similar in nature and scale to the surrounding industry on the Island. The proposed bund wall surrounding the site would be visible from the road, as well as the truck loading gantries, security fencing, and lighting. Greenleaf Road and its industrial residents are not sensitive viewing locations and, themselves, form part of the industrial landscape of Kooragang Island.

7.8.3 Environmental Safeguards

The visual impact of the proposal is considered to be low due to the heavy industrialised area surrounding the proposal. Nevertheless, a number of initiatives would be undertaken to mitigate potential for visual impacts to encroach on the amenity of the area:

- The site would be kept neat and tidy during construction, with all equipment and materials stored in a designated area and not on public land or roadways;
- Construction of the proposal would be completed within the shortest timeframe that is reasonable;
- Waste materials would be segregated at site and stored in appropriate receptacles prior to the removal from site. Waste would be routinely removed to avoid build-up of waste products and overflow;

- The office and workshop would be constructed in accordance with the appropriate specifications and would be constructed of colourbond (externally) with a steel frame;
- Lighting on the site would be directed inwards and installed and maintained in accordance with AS 1680.1 – 2002 as a minimum; and
- Landscaping is proposed in the vicinity of the carpark and office/workshop area. Proposed planting is shown in **Figure 14**. This would be developed as part of the site management plan and would include a combination of native grasses, shrubs and trees. Any further planting along the boundary of the site is not proposed as it is considered to be a fire and safety risk;

7.8.4 Residual Impact

This EA has identified that the proposed project would add more industrial infrastructure to the existing industrially zoned island – the most visible of which, at sensitive viewing locations, would be six 17 metre high fuel storage tanks. The proposal would be seen from several viewing locations, the most sensitive of which would be Fullerton Road, and the Stockton, residential area.

The storage tanks would be slightly smaller than the existing (Orica) sheds which would be in the background, and the general appearance of the proposed project would be similar in appearance to the existing visual environment of the industrial area. The visual impact of the Proposal, located in this industrial area, is consistent in character with its surroundings, and does not reduce the visual amenity of the area.

7.8.5 Conclusions

The visual impact assessment concludes that the facility would have minimal adverse impact on the visual amenity of the area. The proposed facility is to be located in an area that is highly industrialised and the proposal is consistent with the surrounding environment.

7.9 Waste Management

The appropriate management of waste has been identified as a key issue, for both the construction and operational phases of the proposal. This section identifies the various waste streams that would be generated by the facility during both construction and operation. The handling and final disposal of these wastes has been determined based on regulatory guidelines and industry best practice.

7.9.1 Predicted Impacts

Construction
Wastes that would be generated during the construction of the facility would be primarily associated with materials used in the packaging of plant and equipment to the site. The sources of waste and likely quantities are provided in **Table 7-16**.

Table 7-16: Construction Waste

Source	Estimated Quantity (tonnes)
Vegetation and weed removal including Bitou Bush	0.5
Surplus construction waste such as: • Scrap metal;	<0.1

Source	Estimated Quantity (tonnes)
• Asphalt; • Timber formwork; • Spent Erosion and Sediment control materials; • Fencing; • soil	<0.1 <0.1 <0.1 <0.1 100
Wastes from toilets and bathrooms.	50
Office wastes such as paper, ink cartridges, toner and cardboard.	15.6
Domestic waste from construction personnel including putrescibles and recyclable wastes.	15.6
Packaging Waste including: • Plastics • Timber pallets; • Metal wires • Cardboard	312

Operation

The site would not generate a significant amount of waste as a consequence of its operation. The site would generally have only two operators on site, with the exception of ship unloading events. Materials that would be handled on site would primarily be those in the tanks or transported via pipeline. Waste streams that would be generated as part of the operation of the site are indicated in **Table 7-17**.

Table 7-17: Operation Waste Streams

Stream	Classification	Estimated Quantities (tonnes)
Oily water within retention pits	Solid	Depend on rain events and water quality criteria. Storage provided for 70 m^3 from gantry and 40m^3 from roadways
Sludge from stormwater retention pits.	Solid	~ 1 tonne p.a
Adsorbents used to clean small spills	Industrial	Dependent on number of clean-up events undertaken.
Ablutions waste	Solid	1.3
Domestic and putrescibles waste	Inert Waste	< 1 per quarter
Vegetation from landscaping maintenance	Inert Waste	< 1 per quarter

7.9.2 Environmental Safeguards

Waste Strategies

The waste strategies for the proposal have been developed in accordance with the principles of the Waste Avoidance and Resource Recovery Act 2001, which includes:

- efficient use of resources;

- ensuring that resource management options are considered against a hierarchy of the following order:
  - avoidance of unnecessary resource consumption;
  - resource recovery (including reuse, reprocessing, recycling and energy recovery); and
  - disposal.

Marstel is committed to operating the facility within these principles. Waste management strategies to be adopted on the site are discussed in the following sections.

Avoidance
The generation of wastes from the site would be avoided through the adoption of responsible purchasing procedures. This is to ensure that products purchased for the site would align with site demands and avoid wastage of unwanted products. This would be imperative particularly during the construction phase, with the need for close alignment with procurement and construction specifications.

ReUse
Where feasible materials would be reused on site, however due to the limited waste streams generated on site, reuse options may be limited.

Recycling
A Vapour Recovery Unit will be used during the filling of trucks at the terminal facility. The VRU is designed to capture vapour emissions that may have otherwise been lost to the atmosphere during the truck filling operation. These vapours are then returned to the system, consequently avoiding the waste of potential saleable product.

Paper, cardboard, glass and plastics would be available for recycling. A bin would be placed adjacent to the office which would be collected by a waste management contractor on a regular basis.

Disposal
Disposal of wastes would be minimised where possible. Putrescibles wastes from the office would be sent to landfill, with other wastes generally diverted for recycling.

Effluent from the facility would be treated via an onsite septic system. This would be sufficient to manage demands from the peak number of employees during operation.

Bitou Bush is present as small infestations and isolated plants, generally around the perimeters of the site (proposed for vehicular access and security set back). Seed sources also exist outside the site boundaries on adjacent lands.

On site, Bitou Bush will be controlled using a staged approach involving a combination of spot spraying and cut and paint methodologies, as appropriate, in accordance with the *NSW Threat Abatement Plan Invasion of native plant communities by bitou bush/boneseed*. Control will be undertaken during winter with follow up to kill regrowth and seedlings, taking place within 12 months of the initial control exercise or prior to plants setting seed.

7.9.3 Continued on site monitoring and necessary subsequent follow up control will occur on an annual basis.Residual Impacts

With the implementation of the waste strategies as discussed above, it is predicted that there would not be significant residual impacts associated with wastes generated from the site. Disposal of

materials would be undertaken by a licensed contractor and Marstel would ensure appropriate final disposal is undertaken.

7.9.4 Conclusion

The low generation of waste associated with the operation of the facility, together with the identified safeguards, are not expected to result in significant impacts associated with the proposal are anticipated.

7.10 Other Environmental Issues

Additional environmental issues have been assessed, however, these issues have been identified as having less significant potential for adverse impacts. These additional issues include:

- Terrestrial ecology;
- Indigenous heritage;
- Social; and
- Economic.

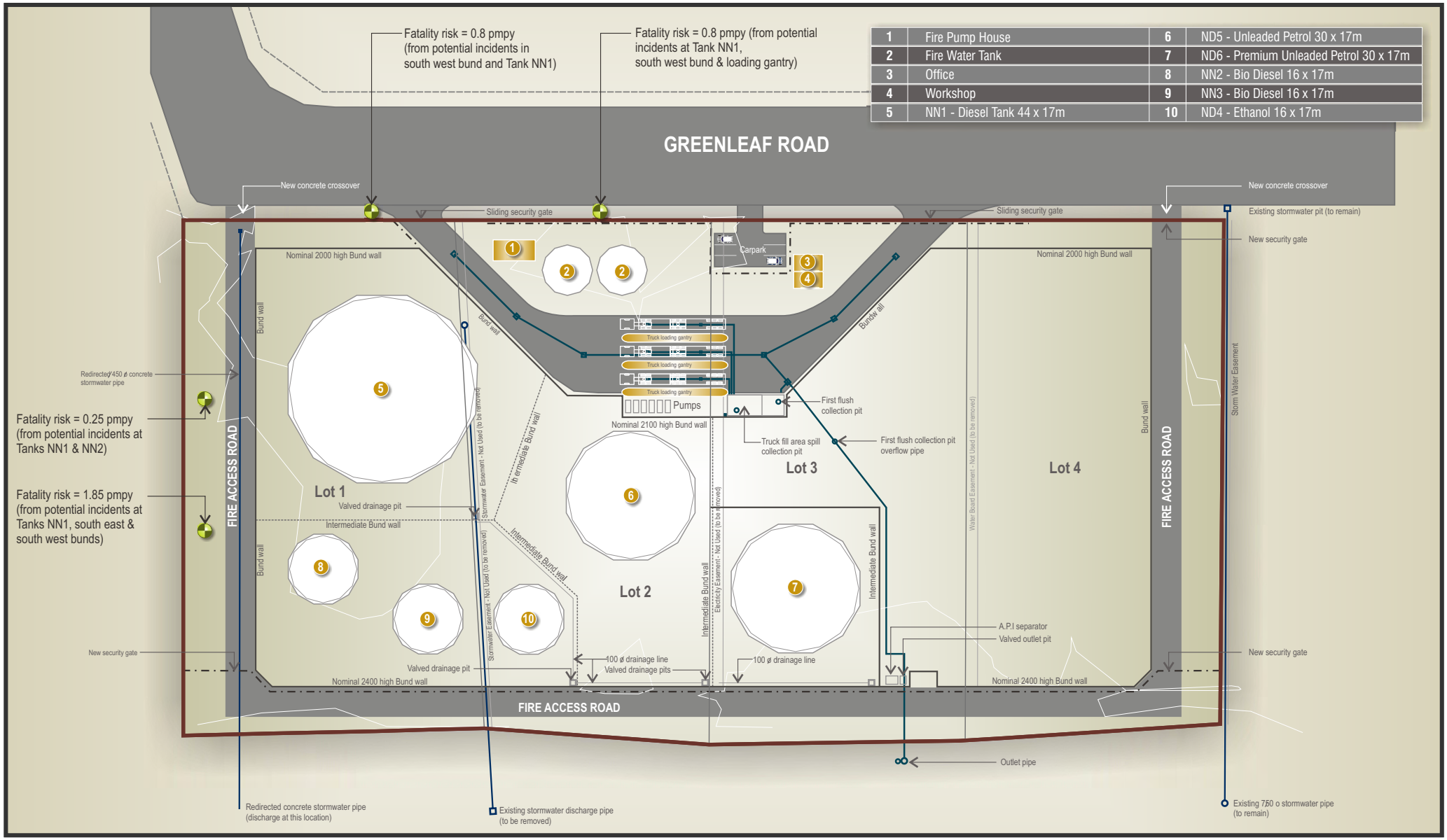
Each of these issues is addressed in **Table 7-18** together with the identification of environmental safeguards.

Table 7-18: Other Environmental Issues

Issue	Consideration	Safeguards	Residual Impact
Terrestrial Ecology	No threatened species, populations and endangered ecological communities are present within the site. A Seven Part Test of Significance was undertaken for those species that may potentially be associated with the site. Due to the lack of habitat currently present on the site and the nature of the proposal, there were no predicted impacts to potentially occurring threatened species previously recorded in the vicinity of the site.	Bitou Bush would be totally removed from the subject site and disposed of in accordance with Newcastle City Council's weed disposal policies. Removal is to ensure that seed propagules of the Bitou Bush are not accidentally dispersed from the site during clearing operations. Weed removal would also eradicate habitat for feral species of fox and rabbit currently on site. The Ecological Assessment and seven Part Test of Significance are provided in **Appendix F**.	Low

Issue	Consideration	Safeguards	Residual Impact
Indigenous Heritage	AHIMS search confirmed no deposits on site. Field survey conducted on 27 June 2007 did not identify any items Potential for subsurface archaeological deposits identified below the existing fill which is to a depth of approximately 2.5 m	• Ensure representatives of Aboriginal communities and an archaeologist are present to monitor the subsurface activities below fill, and to document any archaeological material uncovered; or • Undertake initial exploration (and subsequent investigation as required) of the soil profile to depth and extent of impact for archaeological materials prior to development.	
		• Should archaeological material be found discussions with the proponent and the Aboriginal communities will be undertaken prior to the collection of any artefacts unearthed to identify appropriate storage for the artefacts; • Should Aboriginal skeletal remains be found, work will cease immediately and consultation with the DECC, NSW Police, NSW Coroners Office and the Aboriginal communities must be undertaken to come to agreement on the most appropriate course of action. Actions might include either 1) the preservation of the remains *in situ*, or 2) the detailed recording and recovery of the remains by qualified personnel in conjunction with Aboriginal community representatives. The latter should also seek agreement on the subsequent location and/or re-burial of the remains prior to their removal; and • All contractors should be made aware of these safeguards prior to commencing site works The Aboriginal Heritage Assessment is provided in **Appendix D**.	Low

Issue	Consideration	Safeguards	Residual Impact
Social/ Economic	The proposed project would generate positive economic benefits for Newcastle and the Hunter Region through the significant capital investment and establishment of port infrastructure. The facility would support the development and growth of the Hunter region, and fits with the Regional Economic Development Strategy Regional industries would directly benefit from access to competitive fuel prices, which would also provide indirect benefits to the Hunter in the form of increased investment in infrastructure and services.	The number of permanent staff required to operate the facility is minimal, with 2 - 3 employees on site during operation plus tanker drivers, and approximately 12 additional staff required when ship unloading operations are underway. The facility would, however, indirectly generate employment in the region through increased economic activity (driven by the flow-on benefits for industry of a cost-effective fuel supply) and the ready access to an independent bulk liquids terminal.	Low



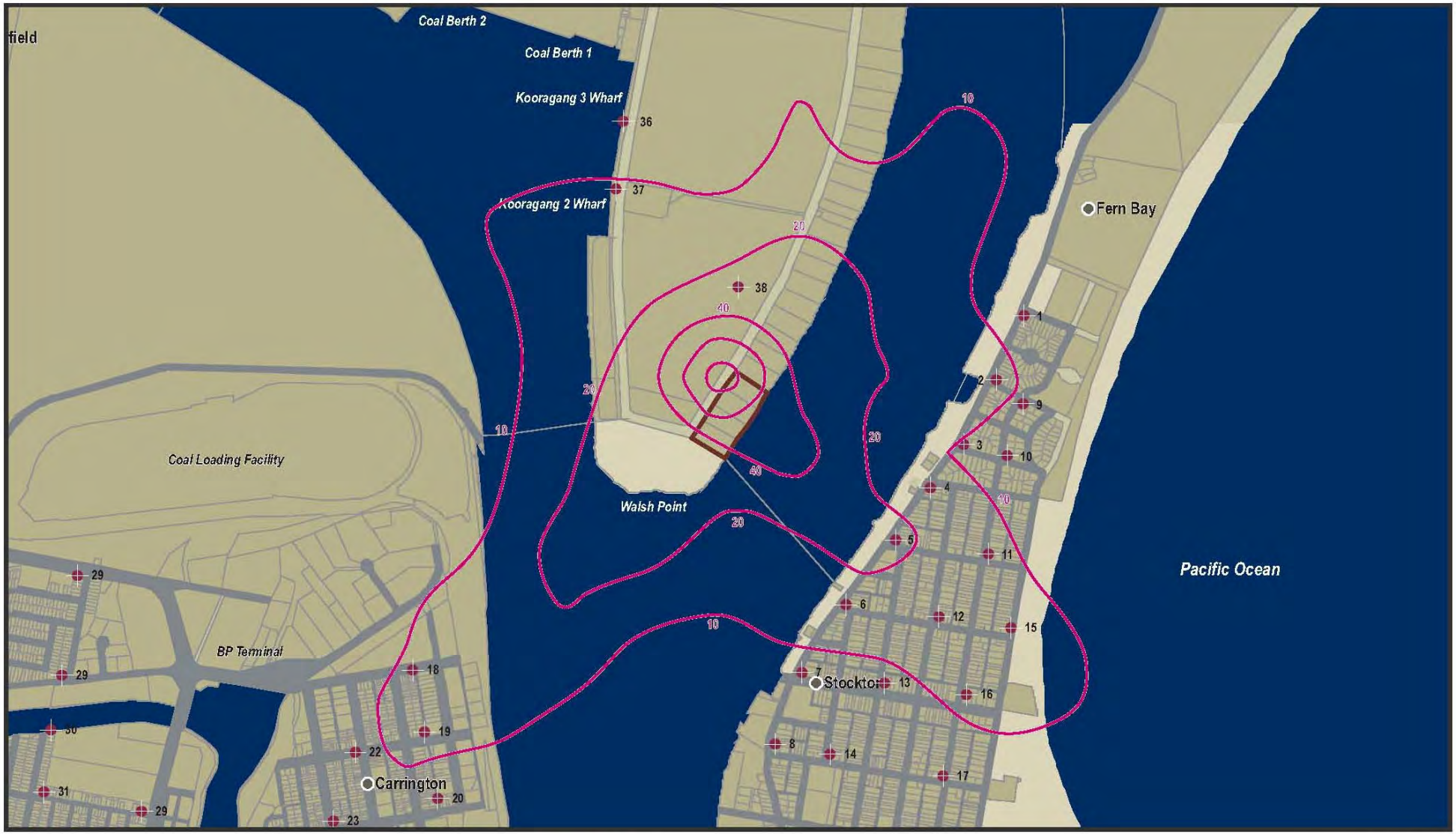
MARSTEL TERMINALS

Figure 7

Summary of High Risk Impacts

Environmental Assessment - Bulk Liquids Storage Facility

Greenleaf Road Kooragang Island



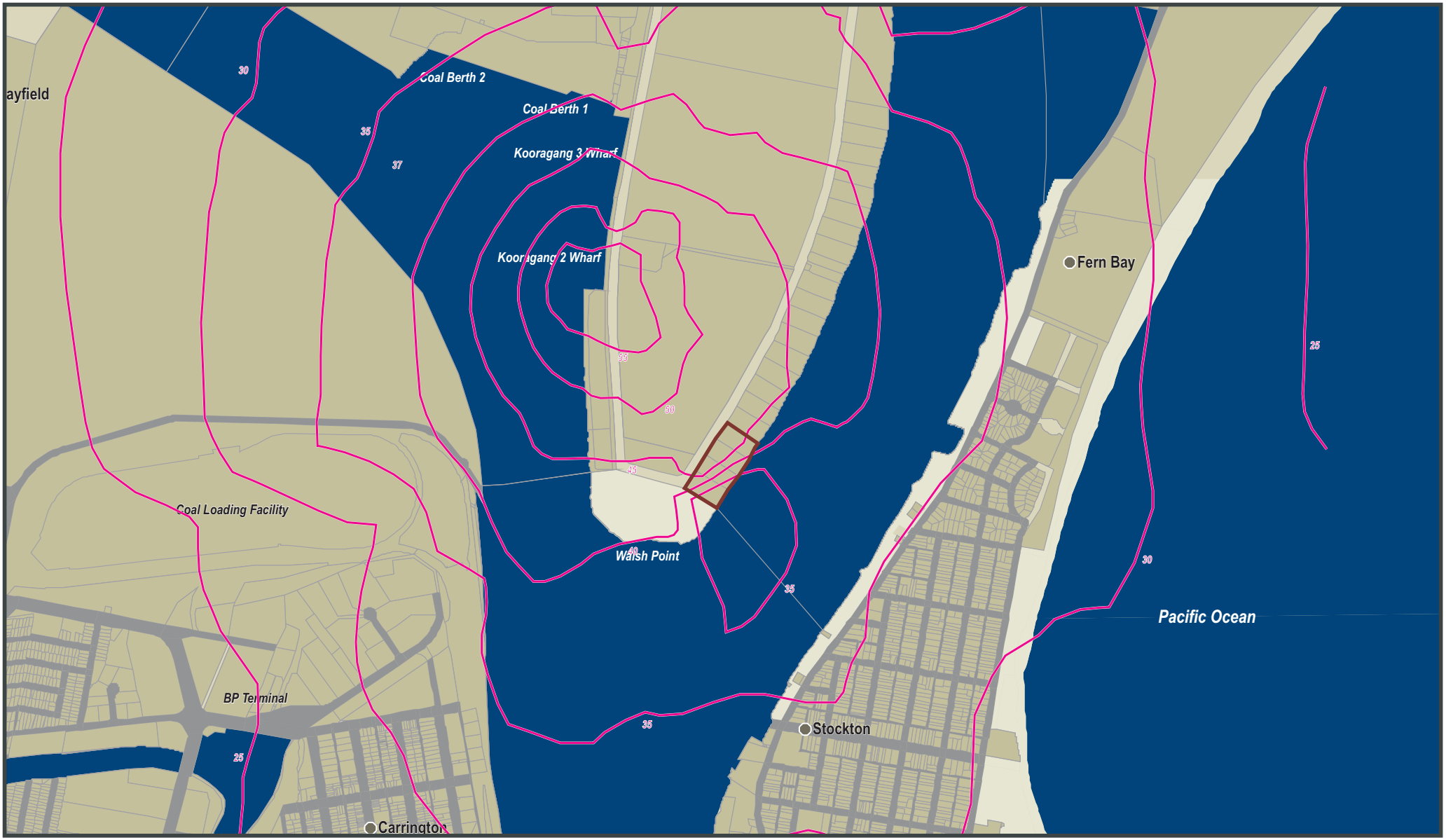
MARSTEL TERMINALS

Figure 8

Ethanol GLC's

Environmental Assessment - Bulk Liquids Storage Facility

Greenleaf Road Kooragang Island



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HLA Merged with ENSR in 2007

0 400m

Site boundary

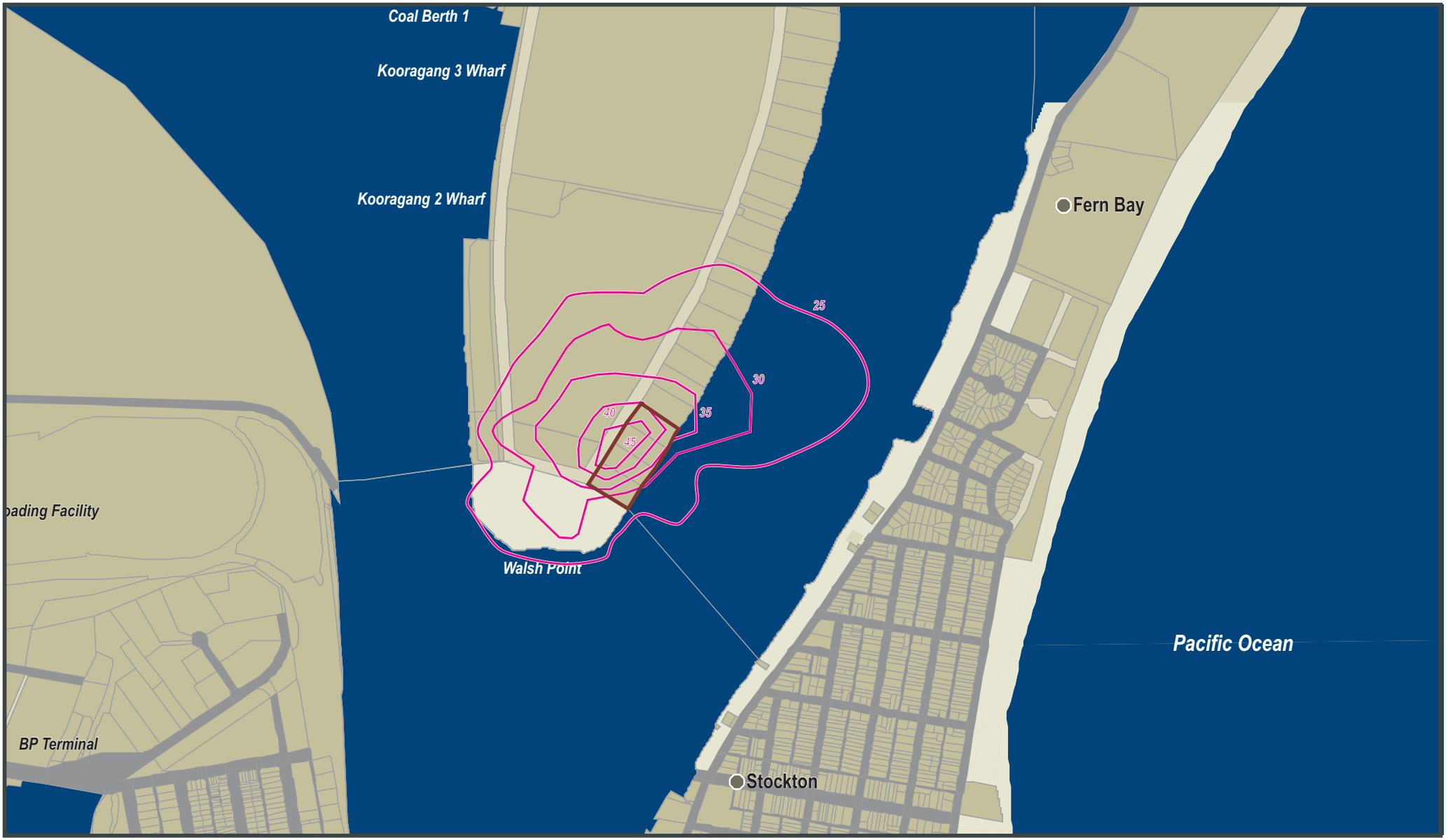
Noise contour (dBA)

Figure 9

Noise Contours - Scenario 2 North West Wind - Ship Unloading and Terminal Operating

Environmental Assessment - Bulk Liquids Storage Facility

Greenleaf Road Kooragang Island



MARSTEL TERMINALS HLA Merged with ENSR in 2007

0 400m

Site boundary
Noise contour (dBA)

Figure 10

Noise Contours - Scenario 5 North West Wind - Terminal Operating

Environmental Assessment - Bulk Liquids Storage Facility

Greenleaf Road Kooragang Island

MARSTEL TERMINALS | HLA | Merged with ENSR In 2007

0 500m

Traffic inbound
Traffic outbound

Figure 11

Traffic Movement

Environmental Assessment - Bulk Liquids Storage Facility

Greenleaf Road Kooragang Island

MARSTEL HLA Merged with ENSR in 2007

0 400m

Site boundary
Proposed pipeline route

Figure 12
Visual Impact of Proposed Bulk Fuel Storage Facility (Artists Impression)
Environmental Assessment - Bulk Liquids Storage Facility
Greenleaf Road Kooragang Island

MARSTEL TERMINALS

HLA Merged with ENSR in 2007

Figure 13

Artists Impression of Proposed Development - Plan View

Environmental Assessment - Bulk Liquids Storage Facility

Greenleaf Road Kooragang Island

MARSTEL HLA Merged with ENSR In 2007

0 25m

Proposed landscaping areas

Figure 14
Proposed Landscaping Areas
Environmental Assessment - Bulk Liquids Storage Facility
Greenleaf Road Kooragang Island

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8 STATEMENT OF COMMITMENTS

8.1 Introduction

In accordance with the requirements under Part 3A of the EP&A Act, the following draft Statement of Commitments (SoC) is provided. The SoC states Marstel's environmental commitments and provides a summary of the environmental management and monitoring of the proposed project during its construction and operation.

Marstel commits to the preparation and implementation of the environmental management and monitoring plans and environmental mitigation measures detailed in the SoC for the proposed terminal facility.

8.2 Summary of Safeguards

Provided in **Table 8-1** is a summary of the safeguards which will be implemented during the construction and operation of the terminal facility.

Table 8-1: Summary of Safeguards

Issue	Safeguard
Hazard and Risk	1. A 50 kg wheeled dry powder extinguisher will be installed at the ; 2. The underground pipeline will be marked with tape stating "FUEL LINE UNDER; 3. A fire monitor will be placed no less than 29 m from the wharf hose connection point; 4. Fuel loading and unloading will be automated through a central computerized system, including automatic shut down in the event of an emergency.
Surface Water	5. An Erosion and Sediment Control Plan is to be developed and implemented for the construction phase. 6. Surface water will be managed in accordance with the Stormwater Management Plan; 7. All ships will be operated in accordance with ISGOTT procedures;
Ground water	8. an impermeable liner will be installed across the site to protect groundwater below the site; 9. Groundwater will be tested for the range of analytes prior to any dewatering actvities;
Soils	10. An Acid Sulphate Soils Management Plan will be undertaken prior to construction for the pipeline route and site works; 11. No soils will be disposed of off site prior to waste classification;

Issue	Safeguard
Air Quality	12. Petrol tanks are to be fitted with internal floating roofs; 13. A Vapour Recovery Unit will be used for appropriate equipment on site;
Noise	14. Except during ship unloading the site will operate between 6 am and 4 pm Monday to Friday and 6 am till 12 noon Saturdays.
Maritime Safety	15. Ships will not be anchored off shore; 16. Ships will be brought into Newcastle Port by tugs and direction of the Harbour Master.
Terrestrial Ecology	17. Bitou Bush will be removed from site prior to construction and in accordance with Council requirements.
Indigenous Heritage	18. Monitoring of subsurface conditions by Aboriginal community representatives and qualified personnel will be undertaken in the event the natural soil profile is to be disturbed.
Security	19. A comprehensive security system is to be installed on site prior to operation.

8.3 Environmental Management and Monitoring

Environmental management practices will be an integral component of the construction and operation of the proposed terminal facility. These will incorporate the identified safeguards as detailed in the previous section and the various procedures that will be implemented on the site.

Environmental management will be detailed in a number of documents that will be produced specific to the construction and operation of the site. Such plans will refernce other specific management plans and monitoring required and are summarized in **Table 8-2**.

Table 8-2: Environmental Management Plan

Management Plan	Timing	Content
Construction Environmental Management Plan (CEMP)	Prior to construction	• Routine inspection of plant and equipment on site; • Erosion and Sediment Control Plan; • Acid Sulphate Soils (ASS) Management Plan; • Regular audit of environmental compliance on site; • Testing of dewatered groundwater prior to disposal; • Management of wastes, weeds, and soils on site.

Management Plan	Timing	Content
Port Operations Management Plan	8 weeks prior to first vessel to enter the port	• Navigation of vessels; • Location of lighting; • Movements within the port • Communication • Tie up facilities and floating equipment; • Notification requirements; and • Risk assessments for all activities.
Wharf Emergency Response Plan	4 weeks prior to fuel receival	• spill response procedures; • emergency drills / exercise
Site Management Plan (SMP)	Prior to the commencement of operations	• Stormwater Management Plan (SWMP); • Groundwater Monitoring • Waste management procedures; • Fuel transfer procedure and pipeline inspections; • Spill response procedures at the terminal; • Landscaping and maintenance; • Routine site inspections and monitoring. • Consultation and complaint handling procedure

Routine monitoring and will form a component of the SMP. This is summarized in **Table 8-3**.

Table 8-3: Monitoring

Issue	Location	Parameters
Surface Waters	• In-situ inspection and testing at the bunds; • In-situ inspection and testing at the bund water retention pit; • Laboratory testing of stormwater in the bund retention pit; • Laboratory testing of stormwater in the first flush pit; and • Laboratory testing of stormwater in the truck fill area spill collection pit, when water has accumulated.	Insitu testing for: • pH; • Dissolved oxygen; • Electrical conductivity Laboratory Testing: • pH • Electrical conductivity • Total Organic Carbon; • Suspended Solids.

Issue	Location	Parameters
Groundwater	Boreholes 1 -5.	• pH • organics (e.g nitrogen) • Metals • PAHs • TPH • BTEX • Flow rate

8.4 Statement of Commitments

The SoC has been prepared in respect of the construction and operation of the proposed terminal facility and has been compiled on an issues basis, as informed by the EA and the environmental risk analysis. The SoC has been written in a format which can be incorporated into approval conditions and is shown in **Table 8-4**.

Table 8-4: Statement of Commitments

Environmental Issue	Commitment
General Management Plans	1. Prior to construction, a Construction Environmental Management Plan shall be developed in consultation with DECC incorporating the management of soils, surface waters, weed management, air quality, noise and waste management. 2. Prior to operation a Wharf Emergency Plan shall be developed in consultation with the NSW Fire Brigade; Newcastle Port Corporation (NPC) and NSW Maritime. This is to be located at the wharf and include: • Emergency response procedures; • Spill response procedures; 3. Prior to operation, a Site Management plan shall be developed in consultation with, DECC, that will detail the ongoing monitoring and environmental management requirements for the facility. 4. Eight weeks prior to the first vessel entering the port, a Port Operations Management Plan shall be developed in consultation with NPC.

Environmental Issue	Commitment
Hazard and Risk	5. All ship movements and fuel unloading shall be undertaken in accordance with procedures outlined in ISGOTT and coordinated to compounding cumulative risk. 6. The proponent shall install a 50kg wheeled dry powder extinguisher at the K2 Wharf. 7. The proponent shall identify the pipeline with a marker tape over the top of the line (i.e. between the surface and pipeline) indicating "FUEL LINE UNDER" and install pipeline surface markers at every 100m under the footpath location. 8. The proponent shall implement a fuel transfer procedure in which an inspection of the pipeline route will be conducted. 9. The proponent shall install a fire monitor at a minimum of 29m from the wharf hose connection point. 10. Plant maintenance schedules shall include the following: a. Annual testing of fire detectors at the site; and b. Weekly tests of the fire pump systems and foam activation valves.
Surface Water Management	Construction 11. The proponent shall prepare and implement a Construction Environmental Management Plan (CEMP) which shall include a detailed Erosion and Sediment Control Plan. Operation 12. The proponent shall prepare a stormwater management system that is designed and implemented to capture stormwater from the site, to prevent leaks and spills from occurring and to facilitate the discharge of clean stormwater to the Hunter River under an EPL. 13. Surface water shall be managed in accordance with the stormwater management plan developed for the site. 14. The proponent shall implement an inspection and testing program of the stormwater system as detailed in the stormwater management plan.
Groundwater	15. A claymax liner shall be installed over the site and overlain with bitumen to create an impervious seal across the site and up the sides of the bund wall. 16. The proponent shall prepare and implement a Site Management Plan (SMP) which shall include a schedule for groundwater sampling for pH, EC, TPH, BTEX, metals and groundwater flow rate.
Soil	17. Excavation, classification, treatment and disposal of Potential Acid Sulphate Soils and contaminated materials shall be undertaken in accordance with requirements detailed in the CEMP. 18. Prior to transportation off site, spoil shall be classified in accordance with DEC (June 2004) 19. Material imported to the site shall be classified in accordance with NSW EPA (December 1994) prior to receipt.

Environmental Issue	Commitment
Air Quality	20. Dust mitigation strategies shall be implemented as part of the CEMP and shall include: a. Disturbed surfaces will be stabilised as soon as practical. b. All vehicles leaving the site will not have excessive soil on their tyres which may fall onto the roadways creating dust emissions. c. Road ways are to be kept clean during construction and operation. d. Any stockpiled material will be sprayed with water during times of high wind. 21. Petrol tanks shall be fitted with internal floating roofs. 22. A Vapour Recovery Unit shall be used for appropriate equipment on site.
Noise and Vibration	23. The proponent shall conduct noise sensitive activities during the hours of 7am and 4pm Monday to Friday and 7am to 1pm on Saturdays unless otherwise agreed by DECC. 24. Other than during the unloading of ships, the proponent shall not conduct noise sensitive activities on Sundays and public holidays. 25. During operation of the facility, the proponent will liaise with residents potentially affected by noise.
Traffic and Transport	26. Off street car parking shall be available to staff and visitors during normal operations, not including ship unloading. 27. All trucks shall enter and exit the site via left in and left out configuration.
Visual	28. Landscaping in the vicinity of the car park and office/workshop area shall be undertaken with suitable native species in consultation with NCC. 29. The site shall remain clean and free of rubbish or debris as a result of operations.
Waste Management	30. Purchasing requirements for construction shall be such that products purchased for the site will align with site demands to avoid wastage of unwanted products. 31. The proponent shall design and operate the VRU so that loss of vapour emissions to the atmosphere is minimised during truck filling operations. 32. The proponent shall implement a system for recycling paper, cardboard, glass and plastics. Bins shall be collected by a waste management contractor on a regular basis. 33. Recycling of waste material shall be maximised wherever possible during operation of the facility.
Terrestrial Ecology	34. All bitou bush will be removed from site in accordance with NCC's weed removal policies. 35. Plantings on the site are to comprise of a mixture of natives species endemic to the area.
Indigenous and Non-Indigenous Heritage	36. Monitoring of the site shall be undertaken in the event natural soil profiles are to be excavated.

Environmental Issue	Commitment
Security	37. A comprehensive security system shall be installed on site and shall include monitoring of all fences and entry exits to the site.
Soils and Landform	38. The proponent shall minimise the erosion and the potential discharge of sediments from the site.

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9 RESIDUAL RISK ANALYSIS

9.1 Approach

The Environmental Risk Analysis for the proposed project is based on a process adapted from *Australian Standard AS 4369:1999 Risk Management*, as well as environmental risk tools developed by other organisations. The process is qualitative and is based on the Residual Risk Matrix shown in **Table 9-1**.

Residual Environmental Risk is assessed on the basis of the significance of environmental effects of the proposed project and the ability to confidently manage those effects to minimise harm to the environment.

The significance of environmental effects is given a numerical value between 1 and 5 based on the receiving environment, the level of understanding of the type and extent of impacts, and community response to the environmental consequences of the project. This enables both the actual and perceived impacts to be considered. The manageability of environmental effects is similarly given a numerical value between 1 and 5 based on the complexity of mitigation measures, the known level of performance of the safeguards proposed, and the opportunity for adaptive management. The numerical value allocated for each issue is based upon the following considerations:

Significance of Effects

5. *Extreme*
   Undisturbed receiving environment; type or extent of impacts unknown; substantial community concern.

4. *High*
   Sensitive receiving environment; type or extent of impacts not well understood; high level of community concern.

3. *Moderate*
   Resilient receiving environment; type and extent of impacts understood; community interest.

2. *Minor*
   Disturbed receiving environment; type and extent of impacts well understood; some local community interest.

1. *Low*
   Degraded receiving environment; type and extent of impacts fully understood; uncontroversial project.

Manageability of Effects

5. *Complex*
   Complicated array of mitigation measures required; safeguards or technology are unproven; adaptive management inappropriate.

4. *Substantial*
   Significant mix of mitigation measures required; limited evidence of effectiveness of safeguards; adaptive management feasible.

3. *Straightforward*
   Straightforward range of mitigation measures required; past performance of safeguards is understood; adaptive management easily applied.

2. *Standard*
   Simple suite of mitigation measures required; substantial track record of effectiveness of safeguards; adaptive management unlikely to be required.

1. *Minimal*
   Little or no mitigation measures required; safeguards are standard practice; adaptive management not required,

The numbers are added together to provide a result which provides a ranking of potential residual effects of the project when the safeguards identified in this EA are implemented.

Table 9-1: Residual Risk Matrix

Significance of Effects	Manageability of Effects				
	5 Complex	4 Substantial	3 Straightforward	2 Standard	1 Minimal
1 Low	**6 (Medium)**	**5 (Low/Medium)**	**4 (Low/Medium)**	**3 (Low)**	**2 (Low)**
2 Minor	**7 (High/Medium)**	**6 (Medium)**	**5 (Low/Medium)**	**4 (Low/Medium)**	**3 (Low)**
3 Moderate	**8 (High/Medium)**	**7 (High/Medium)**	**6 (Medium)**	**5 (Low/Medium)**	**4 (Low/Medium)**
4 High	**9 (High)**	**8 (High/Medium)**	**7 (High/Medium)**	**6 (Medium)**	**5 (Low/Medium)**
5 Extreme	**10 (High)**	**9 (High)**	**8 (High/Medium)**	**7 (High/Medium)**	**6 (Medium)**

9.2 Analysis

The analysis of residual environmental risk for issues related to the proposed project is shown in **Table 9-2**. This analysis indicates the environmental risk profile for the proposed project based on the assessment of environmental effects, the identification of appropriate safeguards, and the Statement of Commitments shown in this EA.

Table 9-2: Risk Profile – Proposed Upgrade

Issue	Significance	Manageability	Residual Risk
Hazard and Risk	2	3	**6 (Medium)**
Surface Water Management	3	2	**5 (Low/Medium)**
Groundwater	2	1	**3 (Low)**

Issue	Significance	Manageability	Residual Risk
Soil	1	1	**2 (Low)**
Air Quality	2	2	**4 (Low/Medium)**
Greenhouse Gas Emissions	3	1	**4 (Low/ Medium)**
Noise and Vibration	2	1	**3 (Low)**
Traffic and Transport	2	2	**4 (Low/Medium)**
Visual	2	1	**3 (Low)**
Waste Management	1	1	**2 (Low)**
Terrestrial Ecology	1	1	**2 (Low)**
Indigenous Heritage	1	1	**2 (Low)**
Socio-Economic	1	1	**2 (Low)**

9.3 Conclusion

The above residual risk analysis indicates that the proposed Bulk Fuel Storage Facility, including appropriate safeguards as outlined in this EA, would give rise to predominantly a low to low/medium risk in relation to the identified environmental issues. Environmental issues associated with the proposed facility that are considered of medium risk are hazard and risk due to the level of community interest with this issue.

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10 PROPOSAL JUSTIFICATION

The proposed Bulk Fuel Storage Facility provides benefits to the community and industry through the provision of alternate fuel supplies to the Hunter region. The proposed facility is well placed to meet the future fuel demands of the region and would reduce the potential environmental impacts by situating the facility closer to the consumers.

The facility is an ideal proposal for port related facilities. It is close to existing industrial infrastructure such as wharf facilities and heavy vehicle transport routes. The site is currently vacant disturbed industrial land, therefore the proposal would use this area for beneficial use to both the community and industry.

The proposal has been designed and planned beyond the accepted international standards for similar facilities. Marstel has an unblemished record in both environmental and occupational health and safety procedures. These would be reproduced on the Kooragang Island facility, ensuring the proposal would achieve the benefits discussed in this section.

10.1 Justification

Schedule 2 of the EP&A Regulation requires justification for the project to be provided, having regard to biophysical, economic and social considerations together with the principles of Ecologically Sustainable Development (ESD). The assessment of the proposal undertaken in this EA, and in particular **Section 7** has incorporated biophysical, economic and social considerations.

The consumption of fuel and biofuels in the Hunter Valley, and throughout Australia, is increasing. With the refining capabilities in Australia operating at maximum production, the increasing demand for fuel will need to be met through imports, which will in turn require waterfront terminalling facilities. The existing fuel terminal facilities in Newcastle receive fuel via truck or pipeline from Sydney. Vehicle access from fuel facilities in Sydney is via the F3 Freeway, and is limited by route restrictions for hazardous bulk liquids. The fuel pipeline from the facilities in Sydney is currently carrying capacity loads. The alterative transport route available to Newcastle facilities is via ship. The proposed Bulk Fuel Storage Facility would be developed to service the growing fuel demand in the local region, whilst minimising the impacts on existing infrastructure.

10.2 Biophysical

The potential biophysical effects associated with the proposed development were assessed in **Section 7** of this EA. The key environmental issues assessed were:

- Surface water management;
- Soils
- Groundwater;
- Noise;
- Air quality;
- Terrestrial ecology; and
- Waste management.

The assessment outlined in **Chapter 7** of this EA provides an assessment of the biophysical impacts identified above. This EA demonstrates that the construction and operation of the proposed terminal facility would not result in significant adverse environmental impacts to either surface water or groundwater with the implementation of appropriate safeguards. There would be no significant impact on the current terrestrial ecology or issues associated with waste management. This EA concludes that the residual risk associated with these potential impacts, after appropriate mitigation and management measures are implemented, is considered low.

The residual risk analysis undertaken for surface waters was concluded to be low. A comprehensive stormwater management plan would be implemented on the site. The operation of similar facilities with the proposed stormwater system has proved to be successful.

Air and noise impacts have both been predicted to be low, particularly with the implementation of appropriate management strategies. Impact to air quality from potential pollutants has been demonstrated to be very low, with no predicted significant impact to sensitive receivers. Noise emissions would be primarily limited to day time operations and are not predicted to significant impact on the local community.

The project is therefore justifiable in terms of the biophysical elements of the environment.

10.3 Sociocultural

The potential effects of the proposed project on social and cultural aspects of the area were examined in **Section 7**, and included consideration of:

- hazards;
- heritage (indigenous and non-indigenous);
- traffic and transport; and
- landscape and visual amenity issues.

The risk analysis conducted for the proposal has identified that the risks associated with the proposed terminal facility do not exceed the criteria published in Hazardous Industry Planning Advisory Paper No.4 (Ref.4). Residual analysis identified some events had a potential to impact off site, however with the proposed measures as provided in the Statement of Commitments in place and comparison with criteria, these are assessed as medium to low.

The assessment presented in this EA regarding heritage, traffic and visual amenity indicates that, provided appropriate mitigation and management measures as outlined in the Statement of Commitments are implemented, the proposed project would have a minimal and acceptable impact on sociocultural issues. Furthermore, the proposed project is considered to be in accordance with both the current and future consumer demand for biofuels in the region.

The project is therefore justifiable on social and cultural grounds.

10.4 Economic

The proposed development would provide economic benefits to the local, regional and state economies. While the construction phase of the development would provide local employment opportunities and subsequent income for the Newcastle area, the operational phase would provide economic benefit to consumers in the Hunter Region through introducing greater competition in the fuel market, which is expected to result in lower fuel prices.

The proposed project is, therefore, considered to be justifiable from the economic perspective.

10.5 Ecological Sustainability

Schedule 2 of the EP&A Regulation establishes four primary principles of ecologically sustainable development (ESD): the Precautionary Principle, intergenerational equity, biological diversity and ecological integrity, and valuation and pricing of environmental resources. The EPBC Act specifies a fifth principle for consideration, which involves decision-making processes. The application of these principles to the assessment of the proposed project is discussed below.

10.5.1 Precautionary Principle

The precautionary principle outlines the need to prevent environmental degradation whether a risk to the environment has been scientifically demonstrated or not. the identification of potential impacts to the environmental through detailed specialist studies undertaken as part of this EA has enabled the proposed project to be designed to avoid significant environmental impacts, and has allowed appropriate environmental management measures to be developed to manage potential impacts so that significant adverse environmental outcomes are avoided.

10.5.2 Intergenerational Equity

The principle of intergenerational equity puts an onus on society to ensure that the health, diversity and productivity of the environment are maintained, if not enhanced, for the benefit of future generations. The proposed project would ll have minimal effect on the health of either the environment or local residents during construction and operation, as air emissions would be negligible in relation to the existing environment. As the project site is a previously cleared portion of land, the diversity and productivity of the site will not be adversely affected by the proposed facility. Although the proposed project involves the receival, storage and distribution of fossil fuels, the proposal represents a move towards the use of more environmentally friendly fuels through the blending of petrol and diesel with ethanol and biodiesel respectively. The resultant emissions from the combustion of these fuels represents an improvement over current conditions and practices. The proposed project is, therefore, considered to be consistent with the principle of intergenerational equity.

10.5.3 Biological Diversity and Ecological Integrity

This principle requires the maintenance and conservation of a full and diverse range of plant and animal species. An assessment of the effect of the proposed project on biological diversity and ecological integrity is contained in **Section 7.10**. As outlined above, the project site is a previously cleared, highly disturbed area that is currently covered primarily by pest flora and fauna species. The proposed environmental management practices to be implemented during construction and operation of the facility would minimise any adverse effects on the ecology of the Hunter River and harbour. As such, the proposed project is believed to be consistent with the principle of biological diversity and ecological integrity.

10.5.4 Valuation and Pricing of Environmental Resources

The *Intergovernmental Agreement on the Environment* (IGAE) and POEO Act require improved valuation, pricing and incentive mechanisms to be included in policy making and program implementation. In the context of environmental assessment and management, this would translate to environmental factors being considered in the valuation of assets and services.

Integration of environmental and economic goals is a key principle of ESD, which can be measured undertaking a cost-benefit analysis, that is, by measuring the costs of proceeding with a project against the benefits arising from the project.

Given the different values placed on the environment, and the various components of an environment, it is difficult to assign a monetary value against the environmental costs and benefits associated with the project. Given this, the approach adopted for this project is the management of environmental impacts through appropriate safeguards, and to include the cost of implementing recommended safeguards in the total cost of the project.

Relevant to the consideration of the valuation and pricing of environmental resources are the impact assessment and alternative options which have been developed during planning of the Bulk Fuel Storage Facility.

The value of the environment is also managed through the legislative process by imposing financial penalties or requirements to rehabilitate on persons responsible for polluting the environment.

Marstel would implement the safeguards and monitoring requirements outlined in this EA to minimise environmental impacts caused by the proposal, and to minimise the potential for pollution to occur.

10.5.5 Decision-Making Process

Under the EPBC Act, decision-making processes need to include economic, environmental, social and equitable considerations in the short and long term. This EA has provided an assessment of the proposed development in terms of these considerations, which will need consideration by the Department of Planning in determining approval for the proposed development under Part 3A of the EP&A Act, and by the Department of Environment and Climate Change in determining the conditions of the Environmental Protection Licence (EPL) that will be required for operation of the facility.

10.6 Climate Change and the Greenhouse Effect

The Greenhouse Effect is the name given to the process of increased temperatures experienced on the earth's surface as a result of the presence of greenhouse gases in the atmosphere, which are gases that trap thermal radiation. The operation of industries throughout the world has enhanced this naturally-occurring phenomenon by increasing the amount of greenhouse gases (GHG) in the atmosphere, and this process is considered to be a contributing factor to climate change.

The proposed development has the potential to decrease net GHG transportation emissions by locating the Marstel terminal closer to end user markets, thereby reducing the truck transportation distance required to supply fuel to service stations. The proposed facility will enable bulk fuel to be delivered to the Hunter Region via ship, rather than the current road transportation and significantly reduce the number of truck movements between fuel refineries in Sydney and the consumers in the Hunter Region.

10.7 Consequences of Not Proceeding

The demand for fuel is increasing at local, regional and national levels. The existing fuel terminal facilities in Newcastle receive fuel via truck or pipeline from Sydney. Vehicle access from fuel facilities in Sydney is limited by route restrictions for hazardous bulk liquids, and the fuel pipeline is currently carrying capacity loads. The alterative transport route available to Newcastle facilities is via ship. The proposed location of the terminal facilities was chosen for its ready access to wharf facilities and the reduced congestion around the Newcastle area relative to alternative locations such as Sydney.

Biofuels (biodiesel and ethanol) are generated from renewable, organic sources. The use of fuels blended with biofuels can result in environmental benefits, including reduced exhaust emissions of some toxic pollutants and reductions in greenhouse gas emissions. Failure to provide these fuels to the market would contribute to air quality issues.

Other potential issues that may arise if the proposed project does not proceed include ongoing high fuel costs due to a lack of competition in the market, and less security in the fuel supply.

10.8 Conclusion

The proposed project, if operated in accordance with the Statement of Commitments, is considered to be in accordance with the principles of ecologically sustainable development. The terminal facility will provide economic benefits to the region, primarily through the introduction of greater competition in fuel costs, as well as a stable fuel supply that would promote growth opportunities for the region. Environmental benefits would also result from the provision of more environmentally friendly fuels. There would be no significant greenhouse gas emissions generated from the development. Risks associated with the project have been demonstrated to be below the accepted criteria for such facilities. Residents' amenity would not be significantly impacted through air, noise or traffic impacts.

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11 CONCLUSION

The proposed project is for the construction and operation of a Bulk Fuel Storage Facility on land managed by the Regional Land Management Corporation on Kooragang Island in Newcastle, NSW. The proposed facility would be used for the receival, storage, blending and distribution of high quality fuels and biofuels for customers throughout the Hunter Region.

Pursuant to the provisions of Part 3A of the EP&A Act, Marstel is seeking a project approval for the receival, storage and dispatch of biofuels from the Kooragang Island facility. As the project is identified as a Major Project under SEPP 2005, this application is made to the Minister of Planning who is the approval authority with respect to this application.

11.1 The Proposal

Bulk unleaded and diesel fuel would be delivered to the facility by ship which would unload at the K2 wharf. Fuel would be pumped from the ship via a dedicated underground fuel pipeline which would be installed within the road reserve of Heron Road and Greenleaf Road. Ship unloading will be undertaken over a period of approximately 36 hours, after which the line would be cleared of residual product. Biodiesel and ethanol would be transported to site via road. Tankers will be unloaded from the truck loading gantry where the product would be stored on site at a dedicated storage tank.

Fuel would be blended directly from the storage tanks via one of the three truck loading gantries to the road tankers. Blended fuel would comprise E10 (Ethanol 10%:Unleaded 90%) and B20 (Biodiesel 20%:Diesel 80%). It is anticipated that the majority of the customers would be located in the Hunter Valley. Trucks would exit the site via Greenleaf Road, travelling north via Cormorant Road and Tourle Street.

The design of the facility incorporates numerous features to ensure the safe and efficient operation of the facility. A comprehensive security system is to be installed on site as well as routine monitoring and inspections.

11.2 Project Justification

The proposed facility meets the objectives of the relevant planning instruments as discussed in **Section 4**. The area has been identified as strategically important for both industrial and port development in the region and is to be utilised by development that requires access to deep port access and associated industrial infrastructure. The proposed Bulk Fuel Storage facility is ideally suited to this use and would establish a state of the art facility on Kooragang Island, implementing world best practice procedures and infrastructure.

The facility would also support the future economic growth of the Hunter Region, through the provision of alternative fuel supplies. Current research indicates that future fuel demand will continue to increase in Australia, along with population and industrial development. Petroleum production in Australia currently does not meet fuel demand, and this is predicted to continue. The proposed facility by Marstel is therefore ideally situated to meet the future fuel demands for the Hunter Region, which are currently sourced from refineries in Sydney.

11.3 Project Sustainability

The proposal has been subject to an environmental assessment in accordance with Part 3A of the EP&A Act and the requirements issued by the Director General. The detailed environmental assessments that have been undertaken assessed key issues including; hazard and risk, surface and groundwater, air quality, noise, waste and visual impacts. It was determined that there were no significant adverse impacts to the environment that could not be managed through appropriate mitigation measures, which have been reflected in the draft Statement of Commitments. It has been demonstrated that the facility is within the context of the surrounding built form and land use. The environmental assessment undertaken concluded that the proposal would have an overall low to medium residual risk after the implementation of specific mitigation measures.

Benefits to the community as a result of the proposal include provision of an alternate fuel supply and appropriate use of vacant industrial port side land. The facility would also assist in the reduction of greenhouse gas emissions by minimising transport of fuel to the customer and supplying fuels that comprise a percentage of renewable fuels.

11.4 Conclusion

The proposed Bulk Fuel Storage Facility on Kooragang Island is a project which is ideally suited to the proposed location, due to its need for deep port access and its minimal impact to the environment. The project would bring to the Hunter Region a new development that would supply an alternative to traditional fuel supplies, and would be operated by a company that has a proven track record in environmental excellence.