

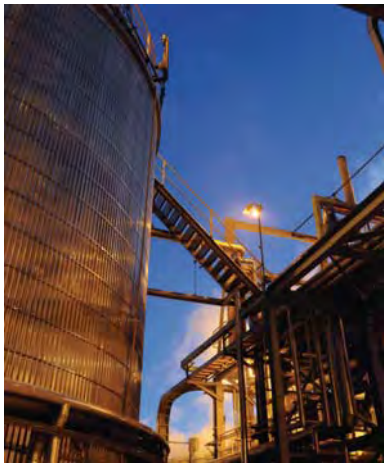

# Appendix K

## Visual Impact Assessment

URS DYNO Dyno Nobel Incitec Pivot SouthernCross International

Incitec Pivot Limited

GREEN BEAN DESIGN *landscape architects* PO Box 3178 Austral NSW 2179

# Proposed Ammonium Nitrate Facility, Kooragang Island

*Proposed view south from the Stockton Bridge*

## VISUAL ASSESSMENT

*Prepared for:*

URS

Incitec Pivot Limited

June 2012

*Prepared by:*

GREEN BEAN DESIGN
*landscape architects*

**Project:** Ammonium Nitrate Facility, Kooragang Island

**Project Number:** 11-150

**Report Title:** Visual Assessment

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| Revision C | 7 May 2012 | AHomewood | Final |
| Revision D | 8 June 2012 | AHomewood | Final (Post Peer Review) |

**Green Bean Design Capability Statement**

Green Bean Design is an experienced landscape architectural consultancy specialising in landscape and visual assessment. As an independent consultant Green Bean Design provide professional advice to a range of Clients involved in large infrastructure project development.

Green Bean Design Principal Landscape Architect Andrew Homewood is a Registered Landscape Architect and member of the Australian Institute of Landscape Architects. With over 18 years continuous employment in landscape consultancy, Andrew has completed numerous landscape and visual assessments for a variety of large scale infrastructure projects including industrial, mining, renewable energy and electrical infrastructure developments.

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## Glossary

This visual assessment has generally adopted the following definitions from the Landscape Institute and Institute of Environmental Management & Assessment, Guidelines for Landscape and Visual Impact Assessment, Second Edition (2002).

**Table 1** Glossary

| | |
|---|---|
| **Cumulative effects** | *The summation of effects that result from changes caused by a development in conjunction with other past, present or reasonably foreseeable actions.* |
| **Element (landscape)** | *A component part of the landscape (for example roads, houses, parks or industrial buildings).* |
| **Landcover** | *Combinations of land use and vegetation that cover the land surface.* |
| **Landform** | *Combinations of slope and elevation that produce the shape and form of the land.* |
| **Landscape character** | *The distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape and how it is perceived by people.* |
| **Landscape feature** | *A prominent eye catching feature, for example a headland or built feature.* |
| **Lux** | *SI unit of luminance and luminous emittance* |
| **Magnitude** | *A combination of the scale, extent and duration of an effect.* |
| **Mitigation** | *Measures, including any processes, activity or design to avoid, reduce, remedy or compensate for adverse landscape and visual effects of a development project.* |
| **Photomontage (Visualisation)** | *Computer simulation or other technique to illustrate the appearance of a development.* |

**Table 1** Glossary

| | |
|---|---|
| **Receptor** | *Physical landscape resource, special interest or viewer group that will experience a visual effect.* |
| **Viewshed** | *The extent of potential visibility to or from the Project within the surrounding landscape.* |
| **Visibility** | *A relative determination of which project components could be clearly discerned and described from a view location.* |
| **Visual Absorption Capacity** | *The degree to which a particular landscape character type or area is able to accommodate change without unacceptable adverse effects on its character.* |
| **Visual amenity** | *The value of a particular area or view in terms of what is seen.* |
| **Visual effect** | *A relative change in the appearance of the landscape as a result of development.* |
| **Visual Assessment** | *A process of applied professional and methodical techniques to assess and determine the extent and nature of change to the composition of existing views that may result from a development.* |
| **View location** | *A private or public place (e.g. residential dwelling, road corridor or park) from which a view toward the project may exist.* |
| **Visual significance** | *A determined outcome taking into consideration the sensitivity of receptors, the duration of change or effect and the magnitude of the change or effect.* |

# Introduction

SECTION 1

## 1.1 Introduction

This visual assessment has been prepared by Green Bean Design (GBD) on behalf of URS Australia Pty Ltd (URS) and involved an evaluation of the visual character of the landscape in which the proposed ammonium nitrate facility (the Project) would be located and an assessment of the potential visual significance that could result from the construction and operation of the Project.

A primary objective of this visual assessment is to determine the likely visual significance of the Project on people living and working in, or travelling through the landscape surrounding the Project. This visual assessment has also been undertaken to:

- assess the existing visual character of the Project area as well as the surrounding landscape;
- identify and describe the proposed Project components that may be visible from surrounding areas;
- determine the extent and nature of the potential visual effects of the Project on surrounding areas; and
- identify measures to mitigate and minimise any potential visual effects.

The visual assessment methodology been applied to a number of similar projects for large scale infrastructure developments prepared by GBD, which have been assessed and approved by the New South Wales Department of Planning & Infrastructure (DP&I). This visual assessment addresses and responds to the Director General's Requirements (DGRs) dated 1 December 2011 for the assessment of potential visual impacts of the Project.

## 1.2 Key Tasks

This visual assessment included the following key tasks:

- desktop study addressing visual character and identification of view locations (including nearest sensitive receptors) within the surrounding area;
- fieldwork and photography;

- preparation of photomontages and illustrative figures;
- assessment and determination of visual significance; and
- determination of potential mitigation measures.

## 1.3 Desktop study

A desktop study was carried out to identify an indicative viewshed for the Project. This was carried out by reference to 1:25,000 scale topographic maps as well as aerial photographs and satellite images of the Project area and surrounding landscape.

Topographic maps and aerial photographs were also used to identify the locations and categories of potential view locations, including the nearest sensitive receptors that could be verified during the fieldwork component of the assessment. The desktop study also outlined the visual character of the surrounding landscape including features such as landform, elevation, landcover and the distribution of residential dwellings.

## 1.4 Fieldwork and Photography

The fieldwork involved:

- day and night time site inspections to determine and confirm the potential extent of visibility of the Project and ancillary structures;
- determination and confirmation of the various view location categories and locations from which the Project structures could potentially be visible; and
- preparation of a record for each view location inspected and assessed.

## 1.5 Photomontages

Photomontages have been prepared from 4 view locations to illustrate the potential visibility of the Project following construction. The photomontage locations were selected and photographed by GBD. The photomontage locations were selected to provide representative views from within the vicinity of residential dwellings (the nearest sensitive receptors) as well as publically accessible areas including road corridors and reserves. The photomontages locations are illustrated in **Figure 8** and the photomontages in **Figures 9 - 12**.

## 1.6 Assessment of Visual Significance

The visual significance of the Project would be partly determined by a combination of factors including:

- visual absorption capacity of the landscape surrounding the Project site;
- distance between a view location and the Project site;
- duration of view from a view location toward the Project site;
- predicted impact of the Project on existing visual amenity;
- nature of predicted impacts; and
- visual sensitivity of view locations from which views toward the Project site exist.

The determination of visual significance is also subject to a number of other factors which are considered in more detail in this visual assessment.

## 1.7 Mitigation Measures

Mitigation measures have been determined to assist in the reduction and, where possible, remediation of any significant adverse effects on surrounding views locations that may arise from the Project.

# Location and existing site

SECTION 2

## 2.1 Location

The Project would be located on the site of an existing fertiliser distribution centre located on Kooragang Island, approximately 3 km north of the Newcastle CBD. The location of the Project is illustrated in **Figure 1**.

The level site is bounded by future industrial development to the north, and the existing Orica ammonium nitrate facility to the south. Land to the east and west is Crown Land bordering the north and south arms of the Hunter River.

Mature tree and shrub planting extends along the east and west site boundaries to the Heron Road and Greenleaf Road corridors which, from a street level, provides a moderate degree of visual screening to existing structures within the site.

## 2.2 Existing site

The existing site contains a mix of large scale industrial buildings (primarily bulk storage facilities), storage tanks and smaller administration and training buildings. Landcover within the site also comprises areas of mown grass around existing buildings as well as broader areas of grass across the eastern portion of the site.

The existing site comprises an industrial complex of ten buildings including:

- Bagging/Storage Warehouse;
- Shed 1: Bulk Storage – 25,000 Tonne of Bulk High Analysis Fertiliser;
- Shed 2: Bulk Storage – 20,000 Tonne of Bulk High Analysis Fertiliser;
- Shed 3: Bulk Storage – 15,000 Tonne of Bulk High Analysis Fertiliser;
- Shed 4: SSDS Storage – 2,000 Tonne of Security Sensitive Dangerous Substances;
- Shed 5: Liquids Storage - Less than 1000 Tonne;
- Central Office, Customer Service and Despatch and Management offices;
- Granulation /Rock Grinding Plant (both plants currently decommissioned);


Source: Google Earth Pro (Copyright Google 2012)

AMMONIUM NITRATE FACILITY
LOCATION PLAN, REGIONAL CONTEXT (Not to scale)


AMMONIUM NITRATE FACILITY -
LOCATION PLAN, STATE CONTEXT (Not to scale)

Figure 1
Project Location

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# PROPOSED AMMONIUM NITRATE FACILITY KOORAGANG ISLAND

- Rock Mill Control Room (Controls Rock Mill production and Engineering offices); and
- Seminar Centre – Management offices and training room.

The layout of existing site infrastructure (as well as proposed infrastructure) is illustrated in **Figure 2**.

The visual characteristics of the landscape surrounding the existing site are predominantly industrial in nature and visually dominated by the Orica ammonium nitrate facility in the south portion of Kooragang Island. This visual assessment has taken into account additional infrastructure associated with the proposed Orica ammonium nitrate expansion project which, in addition to existing infrastructure, would also include:

- an additional prill tower;
- a bulk load out building; and
- a NA plant, absorber, ammonia scrubber and cooling towers.

# Project Description

SECTION 3

## 3.1 Project description

The Project would include a number of constructed elements that would be visible from surrounding view locations. These would include various industrial structures such as towers, stacks and columns as well as large scale plant and buildings. The key constructed elements are outlined in **Table 2**.

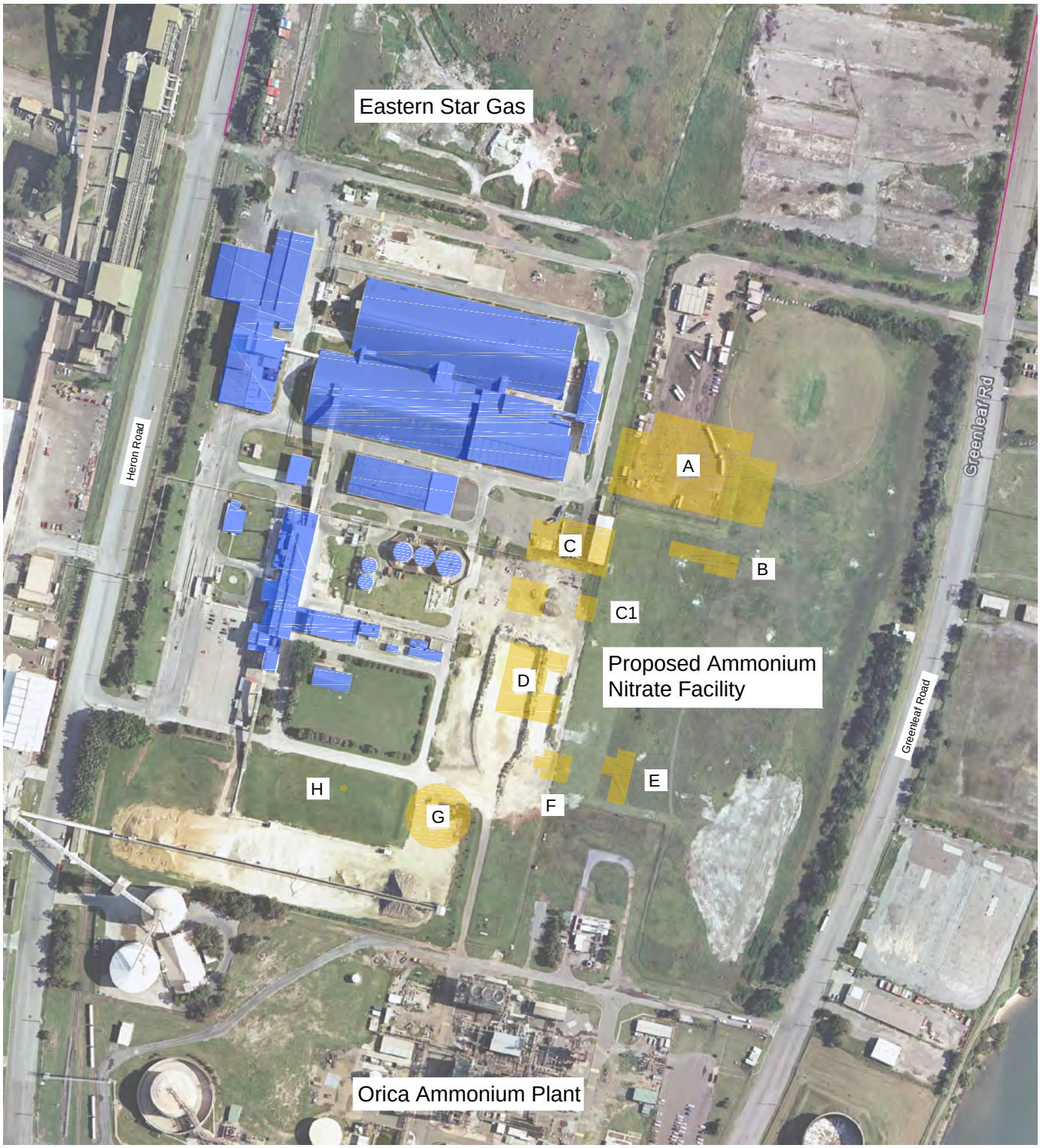
**Table 2** Proposed Infrastructure

| Constructed Element | Height (m) | Diameter / Area (m) |
|---|---|---|
| **Stacks / Columns / Towers** | | |
| NA absorber | 51 | 4.6 |
| AN prill tower | 63 | 12 x 12 |
| Nitric Acid Tank | 13 | 14.5 |
| ANSOL Tank | 11 | 12 |
| Flare | 15 | 0.5 |
| **Major Structures** | | |
| $NH_3$ Tank | 42 | 45 |
| NA Plant structure | 25 | 50 x 42 |
| AN Plant structure | 25 | 40 x 36 |
| AN Plant Drier Scrubber | 28 | 6.5 x 14 |
| AN Bulk Store | 12 (wall)<br>6 (roof) | 120 x 44 |
| **Major Buildings** | | |
| Administration building | 5 | 20 x 29 |
| Workshop building | 8 | 18 x 45 |
| Cooling tower | 10 | 50 x 50 |
| Control room & laboratory | 5.5 | 36 x 38 |

| Constructed Element | Height (m) | Diameter / Area (m) |
|---|---|---|
| Piperacks<br>Heron Road<br>$NH_3$ pipe on sleepers<br>Other Plant | <br>12.5<br>2.5<br>5.5 | <br>6 x 4<br>6<br>6 |

Key elements of infrastructure have been modelled and included in the photomontages (refer **Figures 9 – 12)** and include:

- Prill tower;
- NA absorber;
- AN Bulk Store;
- NH3 Tank;
- Cooling tower; and
- ANSOL Tank.




Source: Google Earth Pro (Copyright Google 2012)

AMMONIUM NITRATE FACILITY
INDICATIVE PROJECT LAYOUT (Not to scale)

Legend

Existing on site infrastructure

Proposed infrastructure

Key Proposed Visual Elements

| | |
|---|---|
| A | AN Bulk Storage |
| B | ANSOL Storage/Handling |
| C | Prill Plant |
| C1 | Prill Tower |
| D | Nitric Acid Plant |
| E | Cooling Towers |
| F | NA Storage Tank |
| G | $NH_3$ Tank |
| H | $NH_3$ Flare |

Figure 2
Indicative Project Layout

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# Visibility

SECTION 4

## 4.1 Introduction

Visibility is a relative determination of which Project components could be clearly discerned and described from individual view locations, and is a key factor together with the sensitivity of view locations, the duration of the view, and view distance in the determination of visual significance.

The Projects visibility would result primarily from the combination of two factors:

- The level to which individual infrastructure components would be clearly discernable from surrounding areas; and
- The degree of visual contrast between the Project structures and the capacity of the surrounding landscape to visually accommodate them.

The potential visual significance of the Project from particular view locations is strongly dependant on the level of visibility from that location, which in turn is dependent on a number of criteria which are defined in **Table 3**.

## 4.2 Visibility and Distance

The distance between the Project and view locations has been illustrated as a series of concentric band widths extending out from the Project site across the surrounding landscape. Individual view locations can be identified and assessed in relation to their distance from the Project and the degree of potential visibility.

The influence of distance on visibility results primarily from two factors:

- With increasing distance the proportion of the horizontal and vertical view cone occupied by the Projects structures would decline.
- As the view distance increases so do the atmospheric effects resulting from dust and moisture in the atmosphere. This tends to make constructed elements of the Project appear grey thus reducing the contrast between the Project and the background against which it is viewed.

## 4.3 Visual Absorption Capacity

Visual Absorption Capacity (VAC) is a classification system used to describe the relative ability of the landscape to accept modifications and alterations without the loss of landscape character or deterioration of visual amenity. VAC relates to physical characteristics of the landscape that are often inherent and often quite static in the long term.

Low undulating areas with a combination of open views interrupted by groups of trees, residential or industrial areas would tend to have a high capacity to visually absorb the Project without significantly changing its amenity.

On the other hand, areas of cleared vegetation on level ground with limited screening would have a lower capacity to visually absorb the Project without changing the visual character and potentially reducing visual amenity.

Given the extent and combination of existing industrial and commercial character surrounding the Project site, the capacity of the landscape to absorb the key components of the Project is considered to be high. The high VAC of the surrounding landscape is likely to reduce the potential magnitude and visual significance of the Project and has been taken into account in the overall determination of visual significance.

# Panoramic Photographs (Existing views)

SECTION 5

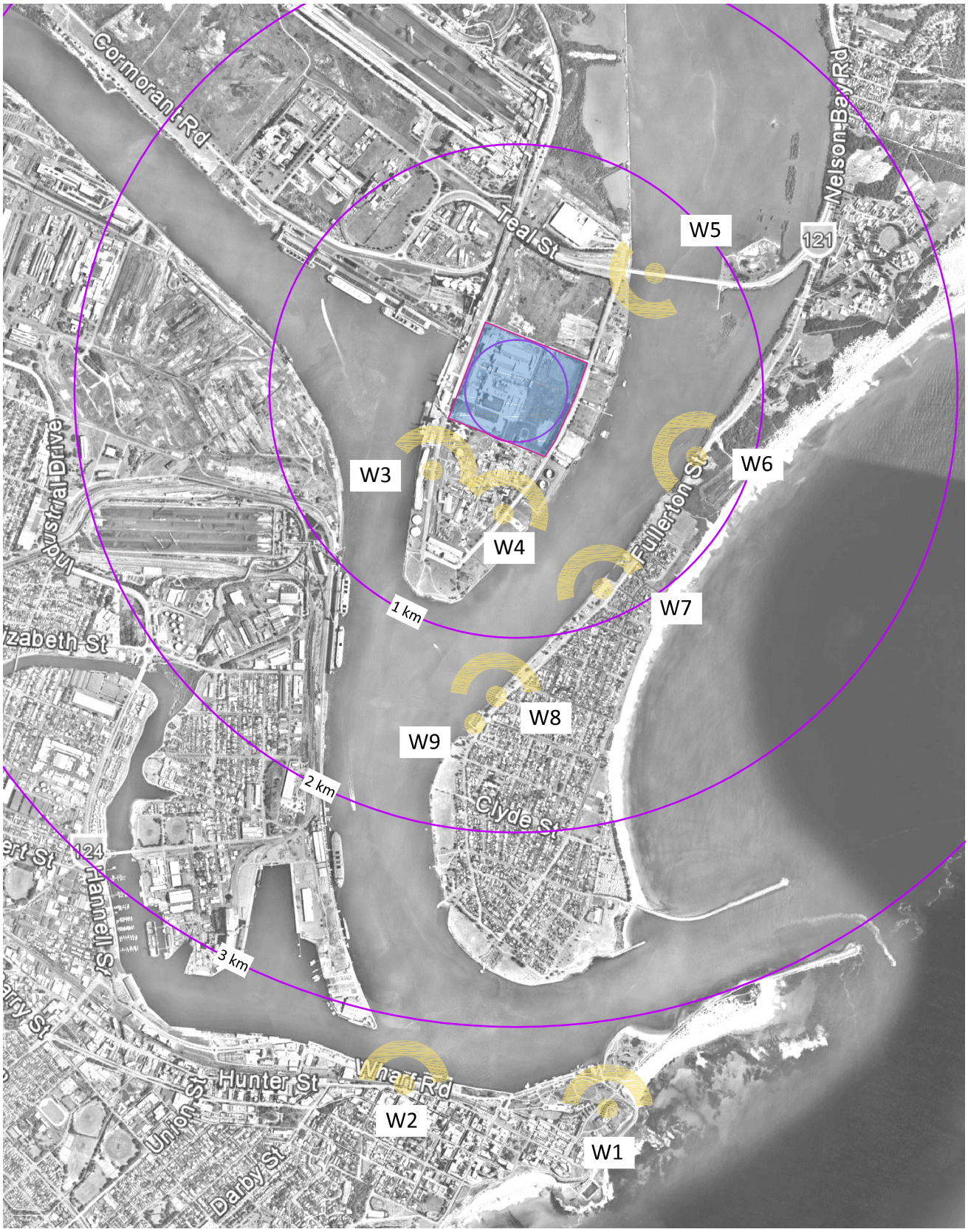
## 5.1 Panoramic Photographs

A series of digital photographs were taken during the course of the fieldwork to illustrate existing views in the vicinity of a number of view locations inspected and assessed as part of this visual assessment. Individual photographs were digitally stitched together to form a segmented panorama image to provide a visual illustration of the existing view from each photo location.

The panoramic photographs presented in this visual assessment have been annotated to identify key features or structures located within the existing view. They also indicatively illustrate the general extent and location of potentially visible structures within the Project.

The panoramic photograph locations (numbered W1 – W9) are illustrated in **Figure 3**. The panoramic photographs are presented in **Figures 4** - **6**.

The panoramic photographs are not to be confused with the photomontages. The panoramic photographs do not include a representation or model of the Project structures. The photomontages are discussed in **Section 8** of this visual assessment, and are illustrated in **Figures 9** - **12**.




Source: Google Earth Pro (Copyright Google 2012)

AMMONIUM NITRATE FACILITY
PHOTO LOCATIONS (Not to scale)

Proposed Ammonium Nitrate Facility

Photo location & indicative direction

Distance from project

Figure 3
Photo Locations

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Photo Location W1 - Existing view north to north west from Fort Scratchley (Distance to proposed facility approximately 3.7 km)


Photo Location W2- Existing view north from Queens Wharf (Distance to proposed facility approximately 3.5 km)

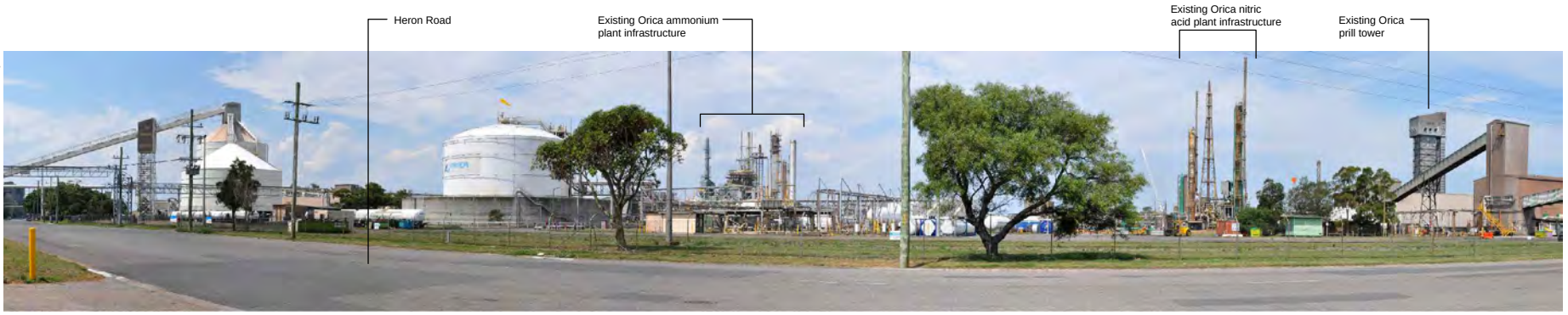


Photo Location W3 - Existing view north east to east from Heron Road (Distance to proposed facility approximately 300m)

# PROPOSED AMMONIUM NITRATE FACILITY KOORAGANG ISLAND

Figure 4
Panoramic Photographs
Sheet 1

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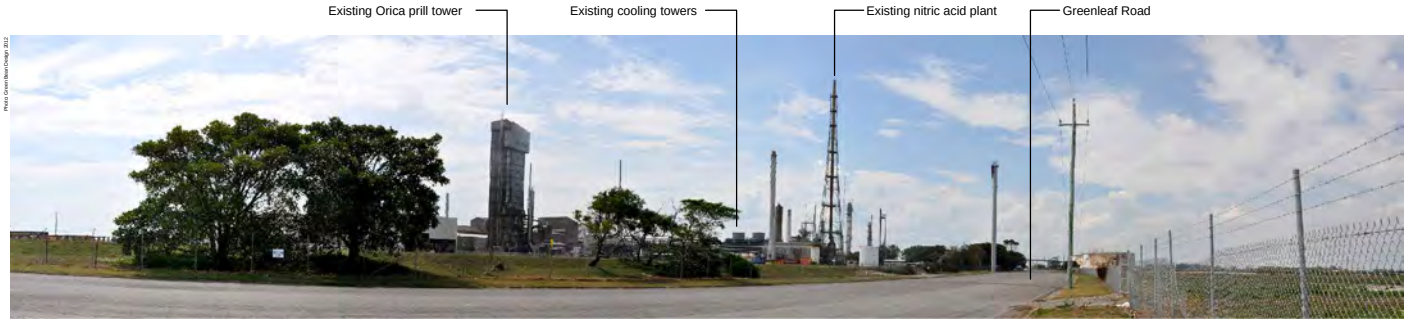


Photo Location W4 - Existing view north from Greenleaf Road (Distance to proposed site approximately 500m)


Photo Location W5 - Existing view south to south west from Stockton Bridge (Distance to proposed site approximately 530m)


Photo Location W6- Existing view west from Fullerton Street (Distance to proposed site approximately 750m)

Figure 5
Panoramic Photographs
Sheet 2

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# PROPOSED AMMONIUM NITRATE FACILITY
# KOORAGANG ISLAND

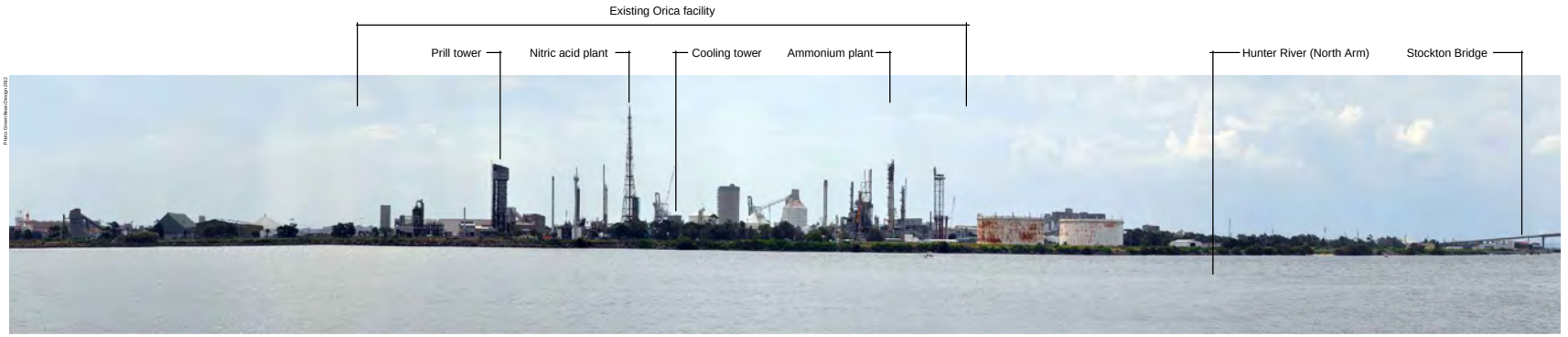


Photo Location W7 - Existing view west from boat ramp, Fullerton Road (Distance to proposed site approximately 800m)

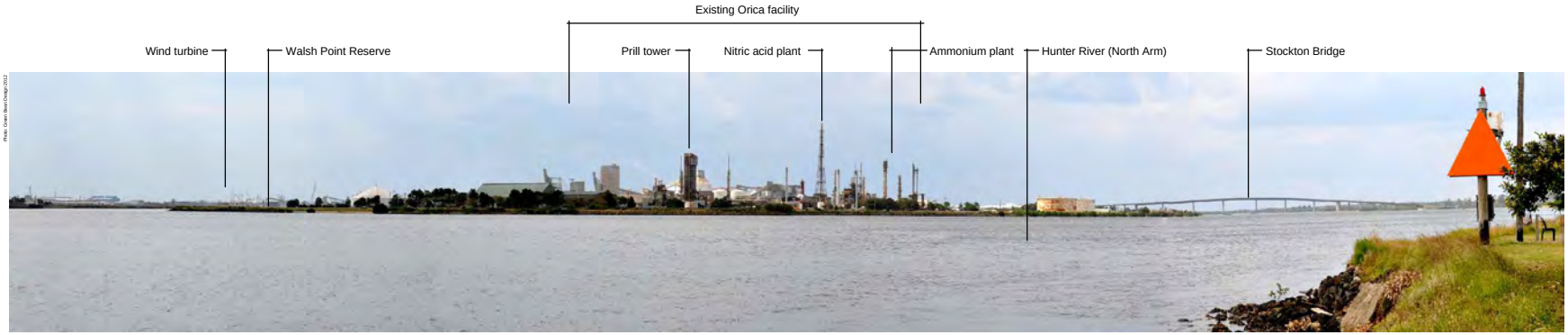


Photo Location W8 - Existing view north west from foreshore open space, Fullerton Road (Distance to proposed site approximately 1.35 km)


Photo Location W9 - Existing view north west from Stockton marina, Fullerton Road (Distance to proposed site approximately 1.55 km)

Figure 6
Panoramic Photographs
Sheet 3

# PROPOSED AMMONIUM NITRATE FACILITY
# KOORAGANG ISLAND

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# Visual Assessment

SECTION 6

## 6.1 Introduction

The magnitude and visual significance resulting from the construction and operation of the Project would primarily result from a combination of the following factors:

- visual absorption capacity of the landscape surrounding the Project site;
- distance between the view location and the Project site;
- period of view from view location toward the Project site;
- predicted impact of the Project on existing visual amenity;
- nature of predicted impacts; and
- visual sensitivity of locations from which views toward the Project site exist.

An overall determination of visual significance at each view location has also been assessed and determined against the criteria outlined in **Table 3** below:

**Table 3 -** View Location Assessment Criteria

| Criteria | Definition |
|---|---|
| **View Distance:** | |
| Long (L) | > 3 km |
| Medium (M) | 2 – 3 km |
| Short (S) | 0 – 2 km |
| **View Duration:** | |
| Long term (LT) | > 2 hours |
| Moderate term (MT) | 30 - 120 minutes |
| Short term (ST) | 10 – 30 minutes |
| **Predicted Visual Effect:** | |
| Adverse (A) | Predicted visual effect of the Project on existing view is likely to be negative. |
| Neutral (N) | Predicted visual effect of the Project on existing view is likely to be neutral. |

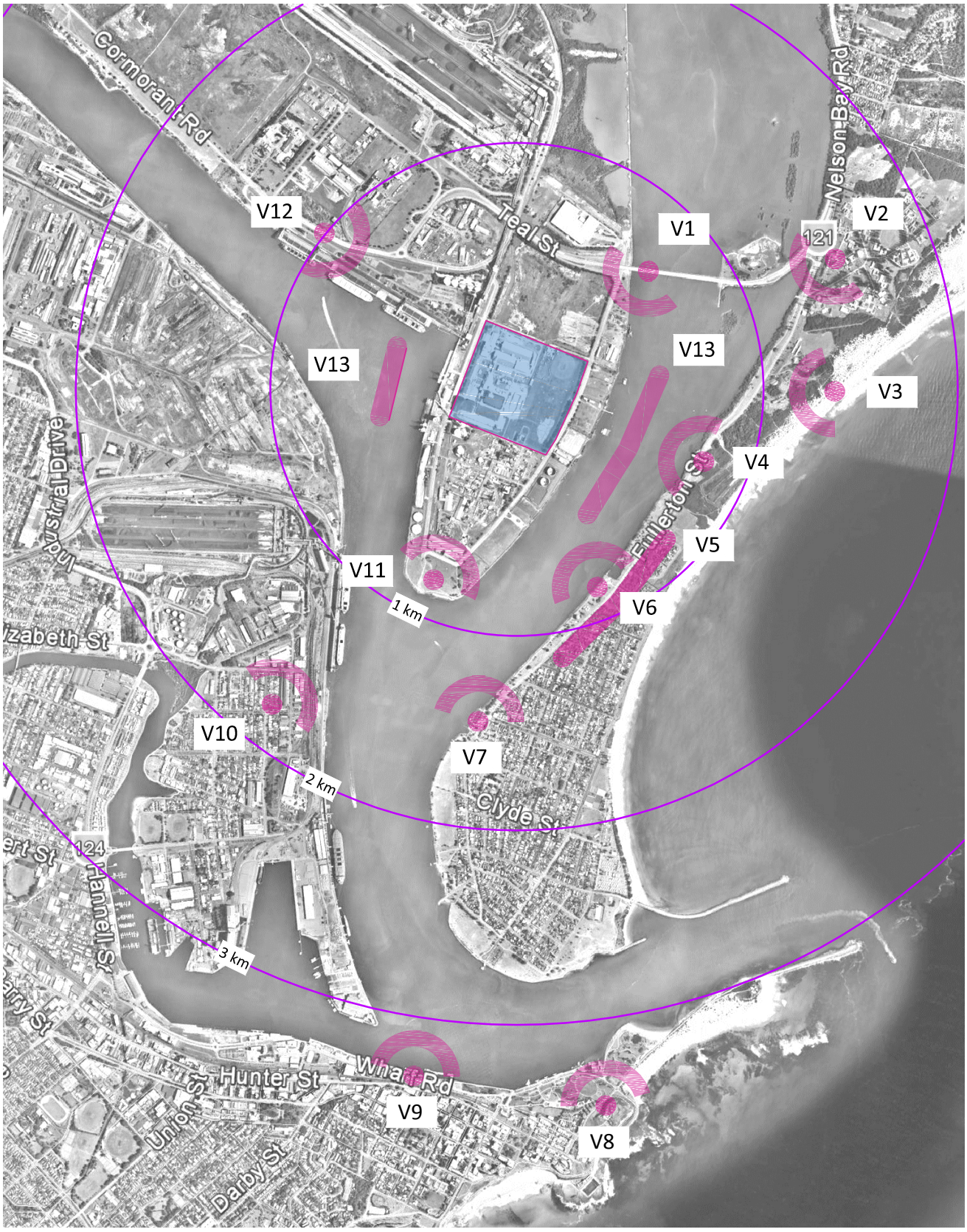
| Criteria | Definition |
|---|---|
| Beneficial (B) | Predicted visual effect of the Project on existing view is likely to be positive. |
| **Nature of visual effect:** | |
| Temporary (T) | Visual effect would be temporary in nature. |
| Permanent (P) | Visual effect would be permanent in nature. |
| Reversible (R) | Visual effect would be considered reversible. |
| Irreversible (IR) | Visual effect would be considered irreversible. |
| **Magnitude**: | |
| High (H) | Total loss or major change to pre-development view or introduction of elements which are uncharacteristic to the existing landscape features. |
| Medium (M) | Partial loss or alteration to pre-development view or introduction of elements that may be prominent but not necessarily uncharacteristic with the existing landscape features. |
| Low (L) | Minor loss or alteration to pre-development view or introduction of elements that may not be necessarily uncharacteristic with the existing landscape features. |
| Negligible (N) | Very minor loss or alteration to pre-development view or introduction of elements which are not uncharacteristic with the existing landscape features (resulting in a no change situation). |
| **Receptor Sensitivity:** | |
| High (H) | Residential locations (within residence and curtilage)<br>Schools, Hospitals etc… |
| Medium (M) | Public recreation areas, beaches, parks and sportsgrounds |
| Low (L) | Motorists, Business (commercial and industrial areas) |

| Criteria | Definition |
|---|---|
| **Visual Significance:** | |
| High (HS) | The Project would be a significant and dominant feature within the surrounding landscape and at complete variance with the landform, scale and pattern of the landscape. The project would have the capacity to cause a significant deterioration in the existing view. The Project's visual effects may not be minimised by mitigation measures and cumulative effects may result in an increased level of visual significance. |
| Moderate (MS) | The Project would be a recognisable feature, but not dominate views within the surrounding landscape. The Project would be out of scale and discordant with the landform, scale and pattern of the landscape and have the capacity to cause a noticeable deterioration in the existing view. The Project's visual effects may be partially mitigated through appropriate measures. |
| Low (LS) | The Project would form a visible element within the surrounding landscape but is unlikely to constitute a marked effect on existing views. The Project would complement the scale, landform and pattern of the surrounding landscape and would not create a noticeable deterioration in the existing view. The Project's visual effects would be positively mitigated through appropriate measures. |
| Negligible (NS) | The Project would result in no discernible deterioration in the existing view. |

The assessment criteria outlined in **Table 3** are used **as a guide** to determine the degree of visual significance. The visual significance for each view location is also considered against other factors, which include the overall visibility of the Project from surrounding view locations. The general relationship between a view location and its potential level of sensitivity is outlined in **Table 4.**

## 6.2 Visual Assessment Matrix

The matrix presented in **Table 4** presents the assessment and determination of visual significance for the selected view locations (including the nearest sensitive receptors). The view locations (labelled V1 – V13) are illustrated in **Figure 7**.




Source: Google Earth Pro (Copyright Google 2012)

AMMONIUM NITRATE FACILITY
VIEW LOCATIONS (Not to scale)

Proposed Ammonium Nitrate Facility

Figure 7
View Locations

# PROPOSED AMMONIUM NITRATE FACILITY KOORAGANG ISLAND

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**Table 4 –** Visual Assessment Matrix

| Viewpoint Ref: | View direction | Description | Distance | | | Duration | | | Predicted Visual Effect | | | Nature of Visual Effect | | | | Magnitude | Receptor sensitivity | Significance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | M | S | LT | MT | ST | A | N | B | T | P | R | IR | | | |
| V1<br>Stockton Bridge | South - south west | Stockton Bridge (westbound). Partial and indirect short term views from motor vehicles travelling west bound lane across the Stockton Bridge.<br>Infrequent pedestrian traffic along central reservation would experience direct and elevated views across the Eastern Star Gas (ESG) site toward the Project site. | | | | | | | | | | | | | | L | L | LS |
| V2<br>Stockton Centre, Hunter Residences | South west | Potential for short distance views are largely mitigated and filtered by built development and tree planting within and bounding the facility. | | | | | | | | | | | | | | L | H | LS |
| V3<br>Stockton Beach | West | Views toward the Project site are largely obscured by landform rising to the west of the beach area as well as built development (residential areas) within Stockton. | | | | | | | | | | | | | | N | M/H | NS |

**Table 4 –** Visual Assessment Matrix

| Viewpoint Ref: | View direction | Description | Distance | | | Duration | | | Predicted Visual Effect | | | Nature of Visual Effect | | | | Magnitude | Receptor sensitivity | Significance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | M | S | LT | MT | ST | A | N | B | T | P | R | IR | | | |
| V4<br>Residences, Fullerton Street | West | Potential for direct and short distance views toward the Project site with some screening or filtering afforded by tree planting along Project boundary (Greenleaf Road) as well as mangrove and cultural planting adjoining residences. | | | | | | | | | | | | | | L | H | LS |
| V5<br>Residential housing, Stockton | North west | Potential for direct and short distance views toward the Project site with limited screening or filtering afforded by tree planting. | | | | | | | | | | | | | | L | H | LS |
| V6<br>Boat ramp, trailer park | North west | Potential for direct and short distance views toward the Project site with limited screening or filtering afforded by tree planting. | | | | | | | | | | | | | | M | M | LS |
| V7<br>Ballast Park (north) | North | Potential for direct and short distance views toward the Project site with limited screening or filtering afforded by tree planting along. | | | | | | | | | | | | | | L | H | LS |

**Table 4 –** Visual Assessment Matrix

| Viewpoint Ref: | View direction | Description | Distance | | | Duration | | | Predicted Visual Effect | | | Nature of Visual Effect | | | | Magnitude | Receptor sensitivity | Significance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | M | S | LT | MT | ST | A | N | B | T | P | R | IR | | | |
| V8<br>Newcastle<br>(Fort Scratchley) | North | Extensive and panoramic views from elevated land around the Fort would include distant views toward the Project site; however the proposed infrastructure would not be significantly prominent amongst existing industrial elements within the view. | | | | | | | | | | | | | | N | H | NS - LS |
| V9<br>Queens Wharf | North | Panoramic views along public foreshore areas of the Newcastle CBD would include distant views toward the Project site; however the proposed infrastructure would not be significantly prominent amongst existing industrial elements within the view. | | | | | | | | | | | | | | N | H | NS |
| V10<br>Residential housing (Carrington) | North east | Potential for views toward the Project site are largely blocked by Newcastle Port facilities (bulk storage buildings and berth/loading facilities). | | | | | | | | | | | | | | N | H | NS |
| V11<br>Walsh Park Reserve | North north east | Potential views from the Walsh Park Reserve toward the Project site are largely screened by large scale industrial buildings adjoining Heron and Greenleaf Roads. | | | | | | | | | | | | | | N | H | NS |

**Table 4 –** Visual Assessment Matrix

| **Viewpoint Ref:** | **View direction** | **Description** | **Distance** | | | **Duration** | | | **Predicted Visual Effect** | | | **Nature of Visual Effect** | | | | **Magnitude** | **Receptor sensitivity** | **Significance** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **L** | **M** | **S** | **LT** | **MT** | **ST** | **A** | **N** | **B** | **T** | **P** | **R** | **IR** | | | |
| V12<br>Cormorant Road (eastbound) | South east | Potential views toward the Project site are predominantly screened by existing industrial infrastructure alongside the port berth facilities. | | | | | | | | | | | | | | N | L | NS |
| V13<br>Hunter River (north and south arm) | West and east | Direct and short distance views would extend toward mid and upper portions of proposed infrastructure. | | | | | | | | | | | | | | L | M | LS |

## 6.3 Summary of Visual Significance

A total of thirteen view locations were identified as part of this visual assessment. These represent a range of typical view locations from surrounding areas and include:

- residential dwellings;
- pedestrian access;
- public open space and recreation facilities;
- road corridors; and
- water bodies.

A total of 7 view locations were assessed and determined to have a low level of significance, and 6 view locations were assessed and determined to have a negligible level of significance.

Whilst a number of the view locations (including the nearest sensitive receptors) were determined to be high sensitive, this visual assessment identified that predicated visual effects were likely to be neutral overall, with a low to negligible order of magnitude due to the extent and nature of existing and surrounding industrial development on Kooragang Island as well as industrial facilities located around the broader area of the Newcastle Port Corporation development.

# Cumulative Assessment

SECTION 7

## 7.1 Cumulative Assessment

A cumulative visual effect could result from the Project being constructed in conjunction with other existing or proposed developments which could be either associated or separate to it.

Separate developments could also occur within the established viewshed of the Project, or be located within a regional context where visibility is dependent on a journey between each site or an individual project viewshed.

The Project site adjoins an existing ammonium nitrate facility owned and operated by Orica. The Orica facility includes a number of constructed elements that are similar in scale and form to those proposed in the Project. The Orica facility is also subject to proposed development to expand existing operations and a visual assessment prepared for this development determined that "*the visual impacts of the proposed development are not likely to significantly alter the existing visual nature of the southern end of Kooragang Island. The site and surrounding landscape are industrial in nature and the proposed development is unlikely to result in a significant modification to the skyline*" (AECOM June 2009).

The Project site is also located within the broader visual catchment of the Newcastle Port which includes the proposed Port Waratah Coal Loader (PWCL) development. This development would include construction of coal handling and ship loading facilities to the west of the Project site and has also been subject to a visual assessment as part of the development application process. The results of the PWCL visual assessment determined that the impact would be relatively low as the development would be located in an existing industrial/port zone.

The Project is considered to have limited potential to increase the significance of cumulative visual impact due to the relatively small scale of the Project and its proximity to existing and similar infrastructure on Kooragang Island, together with the wider occurrence of industrial infrastructure within the Newcastle Port facility.

# Photomontages

SECTION 8

## 8.1 Photomontages

Photomontages locations were selected to illustrate a range of distances between view locations and the Project site. The 4 photomontages locations are illustrated in **Figure 8** and the photomontages are presented in **Figures 9 – 12**.

The photomontages locations were selected from accessible sections of surrounding road corridors and public land, and represent a range of distances between viewpoint locations and the Project to illustrate the potential influence of distance on visibility. Where possible photomontages locations were selected to provide representative views from single or multiple residential properties located within the vicinity of the photo location.

The photomontages have been prepared with regard to the British Landscape Institute Advice Note 01/11 (March 2011) Photography and photomontage in landscape and visual impact assessment. The horizontal and vertical field of view within the majority of the photomontages exceeds the parameters of normal human vision. However, in reality the eyes, head and body can all move and under normal conditions a person would sample a broad area of landscape within a panorama view. Rather than restricting the extent of each photomontage to a single photographic image or cropped image representing the static human field of view, a broader field of view has been presented to more fully illustrate the extent of the Project as well as existing industrial infrastructure.

Whilst a photomontage can provide an image that illustrates a very accurate representation of a development in relation to its proposed location and scale relative to the surrounding landscape, this visual assessment acknowledges that large scale objects in the landscape can appear smaller in a photomontage than in real life and is partly due to the fact that a flat image does not allow the receptor to perceive any information relating to depth or distance.

The British Landscape Institute states that *'it is also important to recognise that two-dimensional photographic images and photomontages alone cannot capture or reflect the complexity underlying the visual experience and should therefore be considered an approximate of the three-dimensional visual experiences that an observer would receive in the field'.*


Source: Google Earth Pro (Copyright Google 2012)

AMMONIUM NITRATE FACILITY
PHOTOMONTAGES LOCATIONS (Not to scale)

Proposed Ammonium Nitrate Facility

PM1 Photomontage location

Figure 8
Photomontages
Locations

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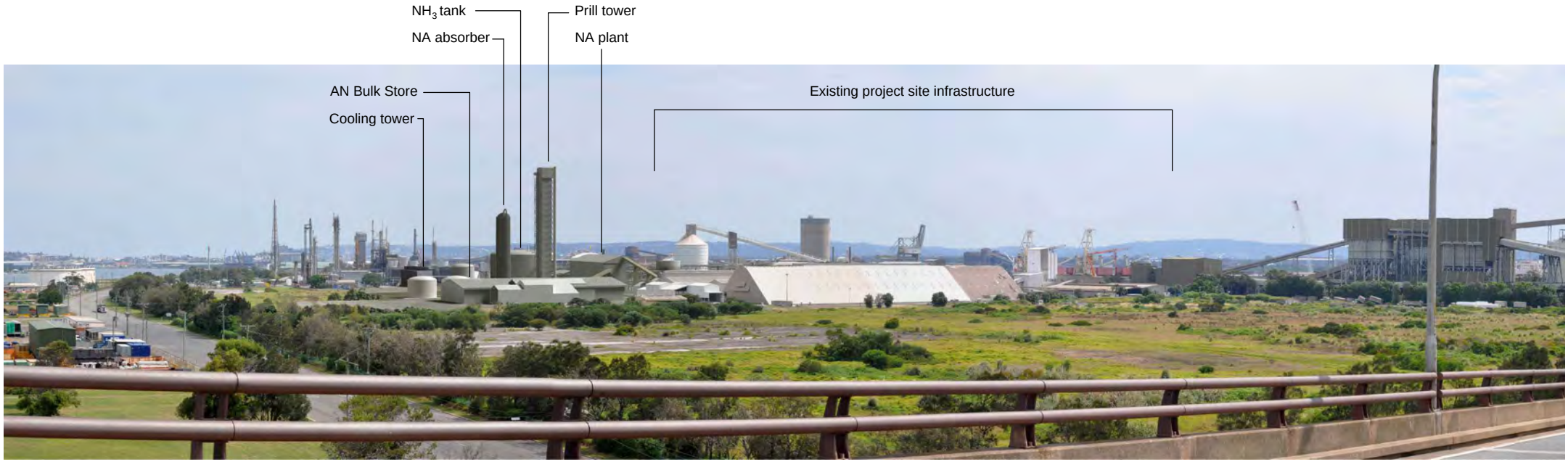
# PROPOSED AMMONIUM NITRATE FACILITY KOORAGANG ISLAND


Photo Location W5 - Existing view south west to west from Stockton Bridge


Photo Location W5 - Proposed view south west to west from Stockton Bridge




Photomontage PM1 - Proposed view south west to west from Stockton Bridge - Detail View

Figure 9
Photomontage PM1

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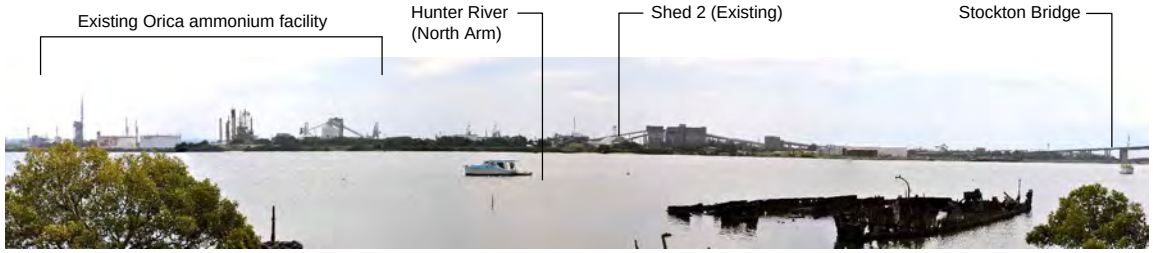
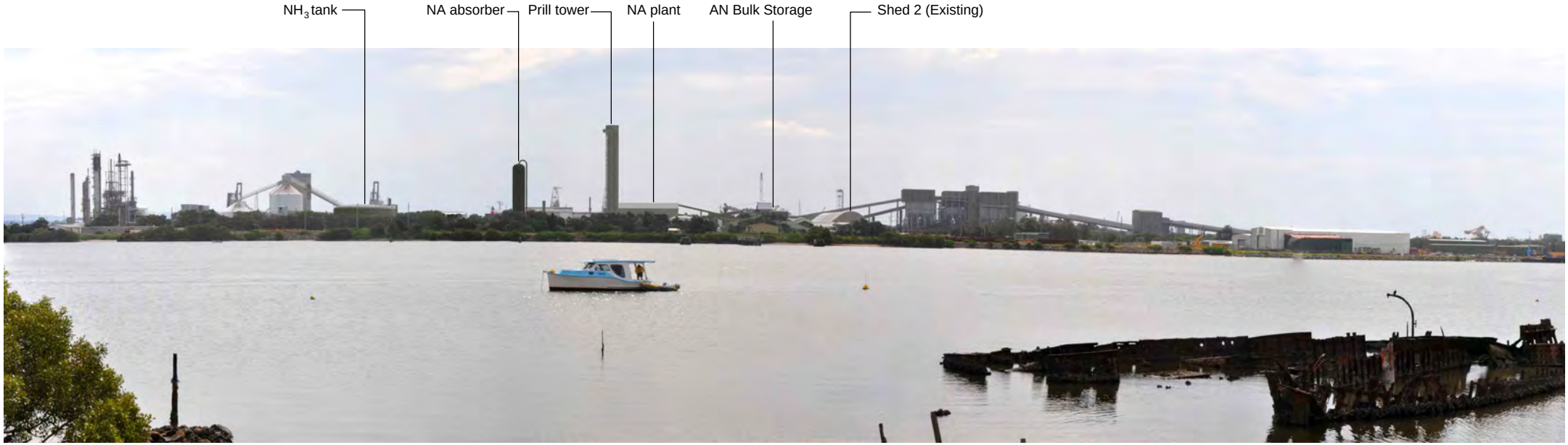



Photo Location W6 - Existing view west from Fullerton Street, Stockton


Photo Location W6 - Proposed view west from Fullerton Street, Stockton




Photomontage PM2 - Proposed view west from Fullerton Street, Stockton - Detail View

Figure 10
Photomontage PM2

# PROPOSED AMMONIUM NITRATE FACILITY KOORAGANG ISLAND

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Photo Location W7 - Existing view west from boat ramp (west of Fullerton Street and Booth Street intersection), Stockton


Photo Location W7 - Proposed view west from boat ramp (west of Fullerton Street and Booth Street intersection), Stockton


Photomontage PM3 - Proposed view west from boat ramp (west of Fullerton Street and Booth Street intersection), Stockton - Detail view

Figure 11
Photomontage PM3

# PROPOSED AMMONIUM NITRATE FACILITY
# KOORAGANG ISLAND

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Photo Location W8 - Existing view south west to north west from foreshore park (west of Fullerton and Bay Street intersection), Stockton


Photo Location W8 - Proposed view south west to north west from foreshore park (west of Fullerton and Bay Street intersection), Stockton


Photomontage PM4- Proposed view west from foreshore park (west of Fullerton and Bay Street intersection), Stockton - Detail View

# PROPOSED AMMONIUM NITRATE FACILITY KOORAGANG ISLAND

Figure 12
Photomontage PM4

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# Night Time Lighting

SECTION 9

## 9.1 Existing light sources

Existing night time light sources are readily visible both within and surrounding the existing site. Night time lights extend around the Newcastle Port loading berths, across the existing Orica ammonium nitrate facility and the Stockton Bridge. Navigation markers provide points of light along the Hunter River with lights from vehicles travelling along the local roads providing dynamic and temporary sources of light. Light sources are also available from surrounding residential and urban areas.

The extent of existing night time lighting from photo location W7 toward the Project site (refer **Figure 3**) is illustrated in **Figure 13**.

## 9.2 Potential light sources

Lighting associated with the Project would be designed to provide adequate illumination for twenty four hour a day operation as well as temporary illumination periods during the construction phase. Maximum operational illumination in any area would not exceed three times the average illumination with exception of task illumination. Recommended average illumination outdoor levels are shown in **Table 5** below:

**Table 5 –** Proposed illumination

| Area | Lux |
|---|---|
| Roads | 10 |
| Parking areas | 10 |
| Open areas | 10 |
| Storage areas – general<br><br>Working areas | 10<br><br>100 |
| Platforms | 100 |

| Area | Lux |
|---|---|
| Stairs and ladders | 100 |
| Walkways | 100 |
| Outdoor working areas | 100 |

Flood lighting, major road lighting and high bay lighting (higher then 4.5m) would be metal halide fittings. Fluorescent fittings would be used for low bay lighting (up to 4.5m).

## 9.3 Potential views and effects

The categories of potential views that may be impacted by night time lighting are largely restricted to residents and motorists. Irrespective of the total number of visible light sources, night time lights are more likely to be noticeable from a residential curtilage rather than building interiors where interior room lights tend to reflect and mirror internal views in windows, or curtains and blinds tend to be drawn.

Although visible from areas beyond the immediate Project viewshed, the intensity of night time lighting would tend to diminish quickly with distance, and would be more likely to be screened by vegetation surrounding individual residential dwellings.

Low level lighting within the Project site would also tend to be mitigated to some extent by existing large scale infrastructure beyond the site, as well as existing tree planting along the site boundary to Greenleaf Road.

Construction and operational night time lighting associated with the Project is unlikely to have a significant visual effect (or cumulative visual effect) on the majority of surrounding view locations.

# Mitigation Measures

SECTION 10

## 10.1 Mitigation Measures

While the overall significance of the Project's visual effect has been determined as low, the following mitigation measures would potentially help to minimise the level of visual significance. The mitigation measures generally involve reducing the extent of visual contrast between the visible portions of the Project structures and the surrounding landscape.

### 10.1.1 Structures

The colour and texture of structures in the Project should be dark in tone and utilise non-reflective materials. This would potentially minimise the visual contrast between the structures and surrounding industrial background to a number of views locations surrounding the site.

### 10.1.2 Lighting

- Lighting associated with the Project should be designed to avoid direct line of sight from areas surrounding the site where possible.
- The top of the stacks and towers are not expected to require aviation obstacle lighting.
- Large floodlights would generally not be used, although it is likely that some lights may be required for emergency lighting to allow emergency maintenance.
- Security lighting should be designed to minimise light spill.

### 10.1.3 Existing planting

Existing mature tree and shrub planting extends along a large portion of the Project site perimeter and provides a significant degree of visual screening from adjoining street level views. More distant views toward lower portions of existing site infrastructure, including those from the nearest sensitive residential receptors, are also partially mitigated by existing tree planting. Existing tree planting should be retained where possible and supplemented to mitigate views toward the lower portions of proposed infrastructure.

A summary of the visual mitigation measures is presented in **Table 6**.

**Table 6** Summary of visual Mitigation Measures

| Mitigation Measures | Planning & Design | Operation |
|---|---|---|
| Materials utilised in the construction of the Project would be generally dark in tone and where possible non reflective. | ✓ | ✓ |
| Lighting would avoid direct line of sight toward residences beyond the site where possible. | ✓ | ✓ |
| Top of the stacks and towers would not have aviation obstacle lighting. | ✓ | ✓ |
| The use of large floodlights to be minimised where possible. | ✓ | ✓ |
| Retain and supplement existing site boundary tree planting. | ✓ | ✓ |


Photo Location W7 - Existing view west from boat ramp, Fullerton Road (Distance to proposed site approximately 800m)

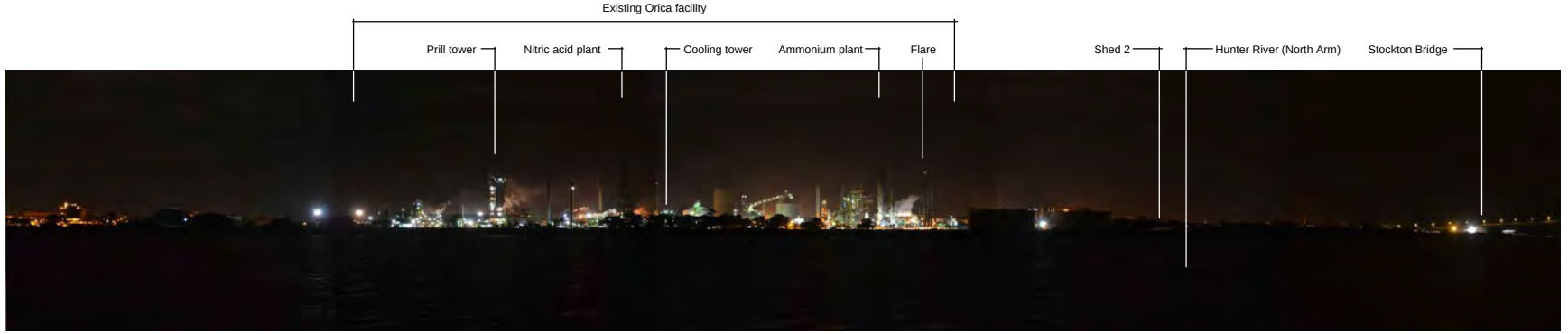


Photo Location W7 - Existing night time view west from boat ramp, Fullerton Road (Distance to proposed site approximately 800m)

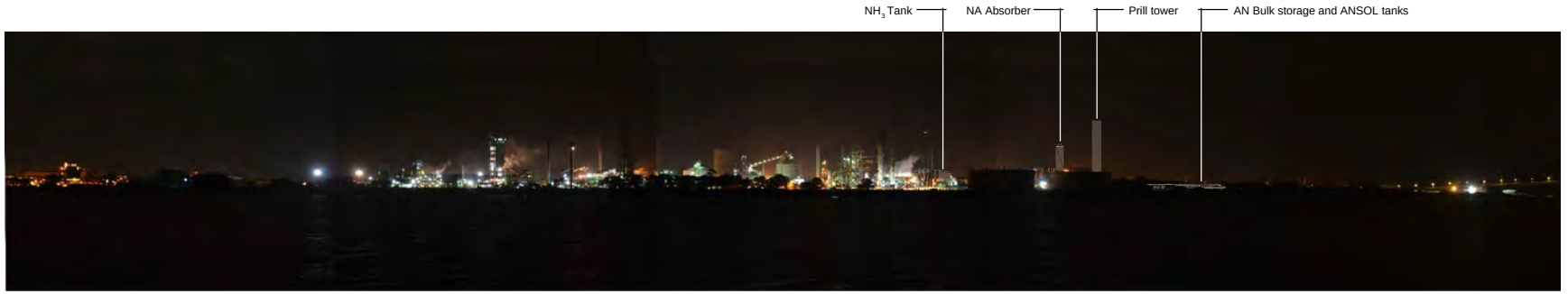


Photo Location W7 - Night time view west from boat ramp with proposed infrastructure, Fullerton Road (Distance to proposed site approximately 800m)

Figure 13
Night time lighting

# PROPOSED AMMONIUM NITRATE FACILITY KOORAGANG ISLAND

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# Conclusion

SECTION 11

## 11.1 Summary

This visual assessment concludes that the Project would result in an overall low visual significance for the majority of people living in or travelling through areas surrounding the site, including the nearest residential view locations in Stockton, as well as the broader urban and public open spaces surrounding Kooragang Island. The low visual significance would be largely due to a combination of the following factors:

- The majority of view locations surrounding the Project, including the nearest sensitive receptor locations, would experience a low visual effect in relation to the Project infrastructure.
- The Project would be located within a context of existing landuse and built elements similar in form and function to the proposed infrastructure and the resulting visual magnitude of the Project would be low.
- The extent and location of existing industrial infrastructure on, and surrounding, Kooragang Island would result in a high visual absorption capacity allowing the existing landscape to accommodate additional infrastructure development.
- Existing mature tree planting surrounding the Project site (Heron Road and Greenleaf Road) together with existing industrial infrastructure located on Kooragang Island, would provide screening and visual filtering to some of the lower portions of proposed infrastructure within the Project site.
- There are no significant views toward the Project site from surrounding dedicated public lookouts. Distant pubic vantage points including Fort Scratchley and foreshore areas adjoining the Newcastle CBD will not be significantly impacted by the Project.
- The prill tower and NA absorber, which are the tallest structures associated with the Project, would be visible from a number of surrounding residential properties as well as surrounding local roads. The elements would also be visible above the skyline from some view locations surrounding the Project site. Given the generally narrow profile of these elements and taking

into account the proposed mitigation measures, it is unlikely that they would create a significant visual effect

- Distant views (in excess of 3 km) toward the Project are more likely to be influenced by atmospheric conditions which will tend to reduce the visibility of the taller structures.
- Proposed construction and operational night time lighting would be visible within the context and extent of existing night time lighting of the adjoining Orica facility as well as broader Newcastle Port development, but is not expected to significantly alter the existing night time lighting environment.
- The use of dark colours and non-reflective materials would help to minimise the potential for visual contrast between the Project and surrounding landscape when viewed from some view locations beyond the Project site.

# Limitations

GBD has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of URS Australia Pty Ltd and only those third parties who have been authorised in writing by GBD to rely on the report. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. It is prepared in accordance with the scope of work and for the purpose outlined in the GBD Proposal dated 1 July 2011.

The methodology adopted and sources of information used are outlined in this report. GBD has made no independent verification of this information beyond the agreed scope of works and GBD assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to GBD was false.

This report was prepared between November 2011 and May 2012 and is based on the conditions encountered and information reviewed at the time of preparation. GBD disclaims responsibility for any changes that may have occurred after this time.

This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties. This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.