

## **APPENDIX 5**

### **Noise Assessment**



**HEGGIES**

REPORT 30-1559-R1

Revision 1

**Manildra Park Marine Fuel Distribution and  
Biodiesel Production Facility, Kooragang Island  
Construction, Operation and Road Transport  
Noise Impact Assessment**

PREPARED FOR

Umwelt Australia Limited  
2/20 the Boulevard  
PO Box 838  
Toronto NSW 2283

11 JANUARY 2008



# Manildra Park Marine Fuel Distribution and Biodiesel Production Facility, Kooragang Island

## Construction, Operation and Road Transport Noise Impact Assessment

PREPARED BY:

Heggies Pty Ltd  
 ABN 29 001 584 612  
 Level 1, 14 Watt Street Newcastle NSW 2300 Australia  
 (PO Box 1768 Newcastle NSW 2300 Australia)  
 Telephone 61 2 4908 4500 Facsimile 61 2 4908 4501  
 Email newcastle@heggies.com Web www.heggies.com

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## EXECUTIVE SUMMARY

### INTRODUCTION

Manildra Park Pty Ltd (Manildra) proposes to construct and operate a marine fuel Distribution and biodiesel production facility (herein referred to as ‘The Facility’ on Kooragang Island in Newcastle, New South Wales (NSW). It is proposed that the Facility will be constructed in three (3) phases over three (3) to five (5) years. Once fully operational the facility will distribute up to 525 ML/year of marine fuel oils and diesel and produce up to 52 ML of biodiesel per annum.

Heggies Pty Ltd (Heggies) has been engaged by Umwelt (Australia) Pty Limited (Umwelt) to evaluate and assess the potential noise impacts associated with the proposed facility. The Environmental Assessment (EA) is required to address the following:

- Construction noise impacts;
- Operational noise impacts guided by the NSW Industrial Noise Policy (INP) taking into account adverse weather conditions including temperature inversions;
- Cumulative noise impacts; and
- Traffic noise impacts guided by the Environmental Road Traffic Noise Criteria (ECRTN).

### PROJECT OVERVIEW

The facility is proposed to be built and operated in three (3) stages:

Phase 1 Establishment of marine fuel storage/distribution & ship refuelling facility;

Phase 2 Expansion of marine fuel storage/distribution facility; and

Phase 3 Construction of biodiesel production plant.

Construction activities which are audible at any nearby residential property will be limited to between 7.00 am and 6.00 pm Monday to Friday and 8.00 am and 1.00 pm Saturdays. Works outside these hours may be permitted at the request of police or other authorities for safety reasons or in the event of an emergency to avoid the loss of lives, property and / or to prevent environmental harm. Operational activities at the facility will be undertaken 24 hours a day, 7 days a week.

### NOISE IMPACT ASSESSMENT

#### Construction Noise

The project does not involve the mobilisation of an appreciable workforce for the construction of the facility. The associated traffic noise generated by the movement of vehicles to and from the site during the construction program is therefore expected to be minimal. Noise emissions associated with the construction activities during Phase 1 are predominantly associated with the refurbishment of the existing tanks, the installation of supporting pipeline infrastructure and the establishment of office and amenity buildings. While during Phase 2 and 3 the dominant noise sources are trucks and cranes associated with the installation of prefabricated and modular plant components. A computer noise model of the facility was developed to incorporate and predict noise emissions associated with each of the three phases of construction under calm and prevailing meteorological conditions. All predicted construction levels are below the relevant assessment criteria, except at Location SW1 (284 Fullerton Street, Stockton) where LA10 noise levels are predicted to exceed the criteria by up to 2 dBA. It is reasonable to anticipate that LA10(15minute) construction noise emissions will remain undiscernible at the nearest residential receiver areas. Hence, any construction noise impacts arising from the construction program are considered minimal.



## EXECUTIVE SUMMARY

### OPERATIONAL NOISE

A computer noise model of the facility was developed to incorporate and predict noise emissions from the significant noise sources associated with the proposed development. Noise modelling was conducted for the three (3) operational phases of the development for calm and prevailing meteorological conditions.

In all cases, the predicted intrusive levels are below the relevant assessment criteria for all operating periods at all receiver locations.

The predictive modelling involved the investigation of all feasible and reasonable noise mitigation measures particularly for activities (noise sources) associated with the night-time operation of the Facility. It is likely that during the detailed design and equipment procurement process, Manildra will be able to effectively mitigate the noisier items of plant, such that compliance with the amenity criteria at Stockton West could be achieved.

### Cumulative Industrial Noise Amenity Assessment

In accordance with the INP's Chapter 2 Industrial Noise Criteria (Section 2.2.4), an assessment of the night-time cumulative sum of existing and approved (but not yet developed) industry and the proposed Facility noise amenity levels has been determined and assessed against the acceptable and maximum amenity criteria as follows:

**Fern Bay (West)/Stockton (West):** Existing night-time industrial noise generally emanates from Kooragang Island and was estimated as 48 dBA at both receiver areas during noise-enhancing weather conditions. Cumulative noise amenity levels from all proposed and approved developments are anticipated to increase ambient noise levels by up to 1 dBA under noise enhancing conditions and exceed the maximum noise amenity level of 45 dBA by up to 4 dBA.

Generally, industrial noise is at least 5 dBA less in the absence of westerly winds and/or temperature inversions and therefore would be just below the maximum acceptable noise amenity level of 50 dBA. It should be noted that the exceedence of the amenity criteria is a result of existing noise levels and that is not directly attributable to the operation of the Facility at these respective locations.

**Mayfield /Carrington:** There would be no increase in noise amenity levels attributed to the operation of the Facility at these respective locations.

It should be noted that for each of the cases discussed above, the likelihood of all existing, approved and proposed developments emitting maximum noise emission at any one time appears remote. It is therefore considered that this assessment includes a degree of conservatism.

### Traffic Noise

Based on the DECC's (formerly the EPA) "*Environmental Criteria for Road Traffic Noise*" policy (ECRTN) dated May 1999, Nelson Bay Road, Cormorant Road and Industrial Drive are classified as "arterial roads". In all cases (where the nominated criteria are already exceeded), traffic associated with the development should not be permitted to lead to an increase in the existing traffic noise levels of more than 2 dBA.

The maximum increase in daytime facility related traffic flow occurs along Nelson Bay Road. This equates to an anticipated 0.1% increase in total vehicle movements along Nelson Bay Road. This corresponds to a very small, < 0.1 dB, increase in the existing daytime LAeq(15hour) noise level and is considered negligible.



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# 1 INTRODUCTION

## 1.1 Assessment Requirements

Manildra Park Pty Ltd (Manildra) proposes to construct and operate a marine fuel distribution and biodiesel production facility (herein referred to as “The Facility”) on Kooragang Island in Newcastle, New South Wales (NSW). It is proposed that the Facility will be constructed in three (3) phases over three to five years. Once fully operational the facility will distribute up to 525 ML/year of marine fuel oils and diesel and produce up to 52 ML of biodiesel per annum.

Heggies Pty Ltd (Heggies) has been engaged by Umwelt (Australia) Pty Limited (Umwelt) to evaluate and assess the potential noise impacts associated with the proposed facility. The assessment has been guided by NSW Department of Planning (DoP) Environmental Assessment (EA) noise impact requirements are attached as **Appendix A**.

In summary, the EA is required to assess:

- Construction noise impacts;
- Operational noise impacts guided by the NSW Industrial Noise Policy (INP) taking into account adverse weather conditions including temperature inversions;
- Cumulative noise impacts; and
- Traffic noise impacts guided by the Environmental Road Traffic Noise Criteria (ECRTN).

In accordance with the facility’s EA noise impact requirements the major sources of noise emissions may be grouped as follows:

### On-Site Construction and Operational Phases

The facility is proposed to be built and operated in three (3) stages:

- Phase 1 Marine fuel storage/distribution & ship refuelling facility;
- Phase 2 Expansion of marine fuel and diesel storage/distribution facility; and
- Phase 3 Biodiesel production plant

The location of the proposed facility is shown in **Figure 1** and a detailed project description of the construction and operational aspects of each phase of the project for the assessment of the potential noise impacts is described in **Section 2**.

The assessment of potential noise impact from on-site construction works was conducted according to the Department of Environment and Climate Change (DECC) Environmental Noise Control Manual (ENCM) 1994 Chapter 171 Noise Control Guideline - Construction Site Noise.

The NSW Industrial Noise Policy (INP 2000) provides non-mandatory procedures for setting acceptable  $L_{Aeq}(15\text{minute})$  intrusive and  $L_{Aeq}(\text{period})$  amenity noise levels for various receiver areas and guidelines for assessing noise impacts from on-site industrial noise sources.

### Off-Site Transport Noise

**Road Traffic:** as defined in the Environmental Assessment Requirements (EAR), are employee and materials vehicle movements along public roads in the vicinity of the site during construction and operation.

The NSW Environmental Criteria for Road Traffic Noise (ECRTN 1999) provides non-mandatory procedures for setting acceptable  $L_{Aeq}$  noise levels on arterial, collector and local roads and guidelines for assessing noise impacts from off-site road traffic.



## Cumulative Industrial Noise

The assessment of cumulative industrial noise emissions included a review of existing and approved industrial developments and associated noise emissions in the vicinity of the site.

The INP also provides non-mandatory cumulative noise assessment guidelines that address existing and successive industrial development by setting acceptable (and maximum) cumulative  $L_{Aeq(period)}$  amenity levels for all industrial (ie. non-transport related) noise in a receiver area. Note, the INP does not set acceptable cumulative  $L_{Aeq(15minute)}$  intrusive criteria for all industrial noise sources in a receiver area, but rather seeks to control cumulative noise via its amenity criteria.

### 1.2 Hours of Operation - Construction and Operational Phases

Construction activities which are audible at any nearby residential property will be limited to between 7.00 am and 6.00 pm Monday to Friday and 8.00 am and 1.00 pm Saturdays. Works outside these hours may be permitted at the request of police or other authorities for safety reasons or in the event of an emergency to avoid the loss of lives, property and / or to prevent environmental harm.

Operational activities at the facility will be undertaken 24 hours a day, 7 days a week.



Figure 1 Location of Proposed Marine Fuel Distribution and Biodiesel Production Facility



### Legend

-  Greenleaf Road Terminal
-  Receival and Distribution Pipeline
-  Barge Refuelling Pipeline

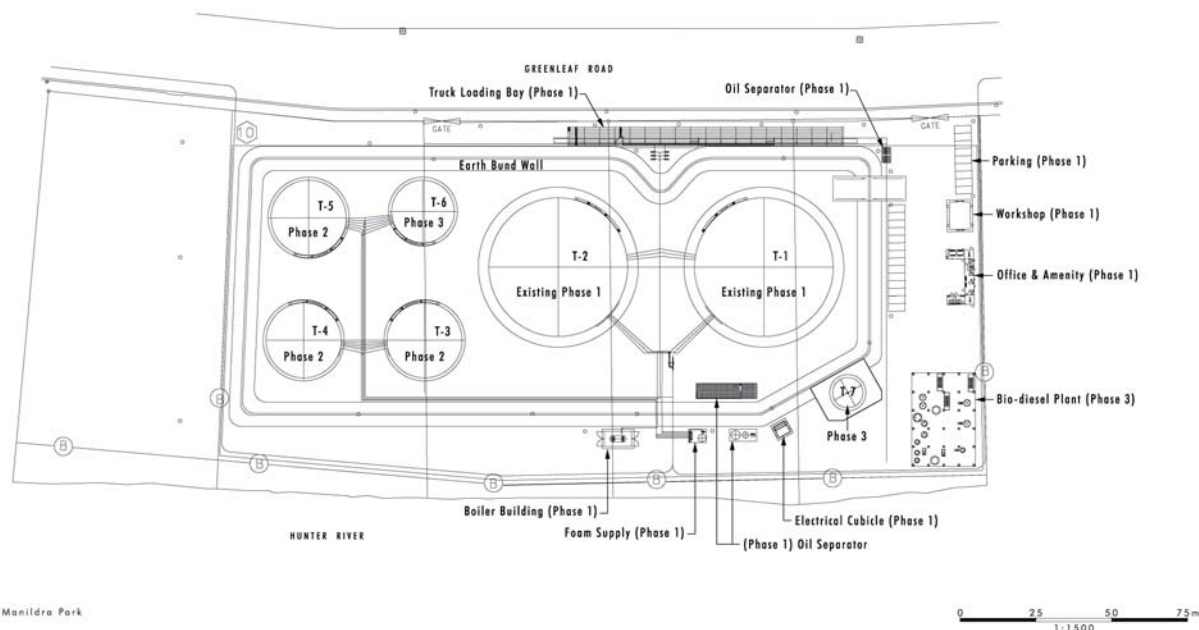


## 2 PROJECT OVERVIEW

### 2.1 Introduction

The general arrangement of the proposed facility is shown in **Figure 2**.

**Figure 2 General Plant Arrangement and Layout**



Source: Manildra Park

Source: Solly Engineering

The main construction activities and associated noise sources for each phase are outlined below.

### 2.2 Project Construction

#### ***Phase 1 – Establishment of Marine Fuel Storage/Distribution & Ship Refuelling Facility***

Phase 1 construction involves:

- Refurbishing the two (2) existing 25 ML storage tanks;
- Constructing road tanker loading bays, office, amenities and service buildings;
- Constructing a fuel pipeline from the Greenleaf Road Terminal to the receive and distribution berths; and
- Refurbishing the barge berth.

The construction of Phase 1 of the project is anticipated to begin in March/ April 2008 and be completed by February 2009. The anticipated plant/machinery and activities associated with Phase 1 construction are outlined in **Table 1**.



**Table 1 Phase 1 Construction Plant and Machinery**

<b>Activity</b>	<b>Plant / Machinery</b>	<b>Length of Time</b>	<b>Sound Power Level</b>
<b>Pipeline Constructions</b>	2 x 25 tonne r/t/cranes	2 months	101 dBA
	25 x concrete trucks	Entire period	100 dBA
	1 x 30 tonne crane	Entire period	101 dBA
	6 x diesel powered welders/generators	Entire period	95 dBA
	1 x 20 tonne excavator	Entire period	104 dBA
	1 x compressor	Entire period	101 dBA
	1 x diesel powered water pump	Entire period	95 dBA
<b>Refurbishment of Two Existing 25 ML Tanks</b>	1 x 25 tonne crane	5 weeks	101 dBA
	2 x 25 r/t/cranes	6 weeks	101 dBA
	2 x 300 tonne cranes	6 days	112 dBA
	2 x 80 tonne cranes	2 months (excluding weekends)	104 dBA
	1 x 25 tonne excavator	Entire period	104 dBA
	5 x diesel powered welders/generators	7 months	95 dBA
	2 x air compressors	Entire period	95 dBA
<b>Refurbishment of Barge Berth / PWCS Receival Berth</b>	1 x Construction barge	Up to 4 weeks	
	1 x 25 tonne crane	Up to 4 weeks	101 dBA
<b>Construction of Administration and Amenity Buildings</b>	1 x 12 tonne excavator	Entire period	104 dBA
<b>Distribution Facility / Loading Bay</b>	1 x 20 tonne excavator	2 days	104 dBA
	1 x 25 tonne r/t/crane	2 weeks	101 dBA

During the Phase 1 construction period, traffic levels would increase by 15 cars per day for construction personnel going to and from site between the hours of 6:30am and 6:30pm Monday to Friday and 7:30am to 1:30pm Saturday. This is in addition to the semi trailers and crane movements mentioned in **Table 1**.

### ***Phase 2 Expansion of Marine Fuel Storage/Distribution Facility***

Phase 2 involves increasing the storage capacity of the Greenleaf Road Terminal. Three (3) new storage tanks with a total capacity of approximately 21 ML and associated pipeline infrastructure will be constructed.

It is anticipated that construction will start July 2008 and finish June 2009. The plant/machinery to be used in the construction of these tanks is outlined in **Table 2**.



**Table 2 Phase 2 Construction Plant and Machinery**

<b>Activity</b>	<b>Plant / Machinery</b>	<b>Length of Time</b>	<b>Sound Power Level</b>
<b>Construction of two (2) Diesel Storage Tanks (7.2 ML)</b>	1 x 25 tonne r/t/crane	3 weeks	101 dBA
	1 x 200 tonne crane	3 days	112 dBA
	1 x 80 tonne crane	2 months (excluding weekends)	104 dBA

### ***Phase 3 Establishment of Biodiesel Production Plant***

The construction of Phase 3 would involve the installation and commissioning of:

- A biodiesel plant and associated pipeline infrastructure; and
- Two (2) new storage tanks with capacities of approximately 5 ML and 0.5 ML.

Construction of the biodiesel plant involves installing prefabricated / modular components and thus the major noise sources will be trucks and mobile cranes. Phase 3 construction activities are expected to be minimal in comparison to the Phase 1 construction activities. It is anticipated that construction will start December 2009 and finish January 2011.

## **2.3 Project Operation**

### ***Phase 1: Marine Fuel Storage / Distribution & Ship Refuelling Facility***

During Phase 1 marine fuel oil and diesel will be received and distributed from the terminal. The marine fuel oil and diesel will generally be distributed via barge to ships within the Port of Newcastle, while road tankers will distribute fuel to other users within the port and bulk users in the Newcastle region.

The marine fuel oil and diesel will be received at either Kooragang Island Berth No 2 or 3 (K2, K3) and transferred to the refurbished tanks at the Greenleaf Road Terminal via ships pumps through the constructed pipeline. The product will then be transferred to the refueling barge located at the Port Waratah Coal Services' (PWCS) Wallarah Berth via a pipeline, as required. A 200 kW positive twin 'screw style' pump located within the Greenleaf Road Terminal will be used to pump the product to the barge. The barge will be self propelled. The pumping of fuel from the barge to the ships will be almost silent due to the pump being located inside of the barges tanks.

The operation will also support the distribution of fuel by truck. Product will be pumped to the truck using the following pumps:

- 2 x 37 kW positive 'lobe style' pumps – for loading trucks with marine fuel oil; and
- 2 x 15 kW centrifugal pumps – for loading trucks with diesel.

It is estimated that during Phase 1 operations, the facility will generate only a handful of daily distribution trips, less than five (5) in total, and will employ 13 full time staff.



The main components of Phase 1 are:

- Greenleaf Road Terminal (The general arrangement of the Greenleaf Terminal can be seen in **Figure 2**) including:
  - Storage tanks;
  - Road Tanker Loading bays; and
  - Amenity and Office Buildings.
- Distribution and Receival Berth Facilities (shown in **Figure 1**), being:
  - K2 and K3; and
  - The Wallarah Berth.

### ***Phase 2: Expansion of Marine Fuel Storage / Distribution & Ship Refuelling Facility***

Phase 2 operations involve increasing the distribution of product by truck to local bulk users. It is estimated that during Phase 2 the daily heavy vehicle generation of the facility will increase to approximately 16 trips (i.e. 8 loads arriving and departing), plus the generation of an additional 4 full time staff (taking the total to 17 full time staff).

### ***Phase 3: Biodiesel Production***

The facility will convert vegetable oil into biodiesel. It is anticipated that approximately 52 ML per annum of biodiesel will be produced at the facility.

At present, only a conceptual plan for the proposed biodiesel plant has been established. A list of the plant/equipment for each section of the plant is provided in **Appendix B**.

When fully operational, the facility in total will generate approximately 32 truck trips per day, and employ 37 full time staff.

#### **2.3.1 Biodiesel Process Description**

The biodiesel facility will convert oil into biodiesel. The chemistry of the biodiesel process is based on transesterification, where fats or oils are mixed with methanol or ethanol and a catalyst (potassium hydroxide (KOH) or sodium hydroxide (NaOH) and heated. The chemical reaction that occurs through this process breaks down the oil molecules and replaces the glycerin portion of the molecule with an alcohol molecule. The glycerin falls to the bottom and is drained off resulting in Biodiesel.



### 3 EXISTING METEOROLOGICAL AND NOISE ENVIRONMENT

#### 3.1 Meteorological Environment

##### Kooragang Island Meteorological Conditions

The NSW INP (2000) Section 5.3, Wind Effects, states:

*“Wind effects need to be assessed where wind is a feature of the area. Wind is considered to be a feature where source to receiver wind speeds (at 10 m height) of 3 m/s or below occur for 30 percent of the time or more in any assessment period in any season.”*

An assessment of prevailing wind conditions was conducted of the meteorological data recorded adjacent to the PWCS Administration Building off Curlew Street, Kooragang Island. The dominant seasonal wind speeds and directions for the 2-year period May 2004 to July 2006 are presented in **Appendix C** for daytime (0700 hours to 1800 hours), evening (1800 hours to 2200 hours) and night-time (2200 hours to 0700 hours).

The prevailing winds less than (or equal to) 3 m/s with a frequency of occurrence greater than (or equal to) 30% and considered to be relevant to the site in accordance with the INP are presented in **Table 3**.

**Table 3 INP Prevailing Wind Assessment**

Season	Winds $\pm 45^\circ \leq 3$ m/s with Frequency of Occurrence $\geq 30\%$		
	Daytime	Evening <sup>1</sup>	Night-time <sup>1</sup>
Summer	Nil	NE 35%, <u>ENE 37%</u> , E 36%, ESE 32%	Nil
Autumn	Nil	Nil	Nil
Winter	Nil	Nil	W 31%, <u>WNW 38%</u> , NW 37%
Spring	Nil	<u>NE 33%</u> , ENE 30%	Nil

Note 1: The dominant seasonal wind speeds are underlined.

The INP Section 5.2, Temperature Inversions, states:

*“Assessment of impacts is confined to the night noise assessment period (10.00 pm to 7.00 am), as this is the time likely to have the greatest impact - that is, when temperature inversions usually occur and disturbance to sleep is possible.”*

*“Where inversion conditions are predicted for at least 30% (or approximately two nights per week) of total night-time in winter, then inversion effects are considered to be significant and should be taken into account in the noise assessment”.*

An assessment of atmospheric stability conditions has also been prepared from the meteorological data set described above. The winter evening and night-time frequency of occurrence of atmospheric stability classes are presented in **Table 4**, together with estimated Environmental Lapse Rates (ELR).



**Table 4 Atmospheric Stability Frequency of Occurrence - Winter Evening/Night-time**

Stability Class	Occurrence Percentage	Estimated ELR <sup>1</sup> °C/100 m	Qualitative Description
A	0%	<-1.9	Lapse
B	0%	-1.9 to-1.7	Lapse
C	0%	-1.7 to-1.5	Lapse
D	25%	-1.5 to-0.5	Neutral
E	17%	-0.5 to 1.5	Weak Inversion
F	57%	1.5 to 4.0	Moderate Inversion
G	1%	>4.0	Strong Inversion

Note 1: ELR (Environmental Lapse Rate).

In accordance with the INP the frequency of occurrence of moderate to strong (ie. 1.5 to >4.0°C/100 m) winter temperature inversions is greater than 30% during the combined evening and night-time period and therefore requires assessment.

### Environmental Noise Model (ENM) Meteorological Parameters

The ENM noise modelling meteorological parameters presented in **Table 5** are based on the default inversion and wind speeds presented in Section 5 of the INP Meteorological Conditions and the analysis of the Kooragang Island meteorological data set.

**Table 5 Calm and INP Noise Enhancing Meteorological Modelling Parameters**

Period	Meteorological Parameter	Air Temp	Relative Humidity	Wind Velocity <sup>1</sup>	Temperature Gradient <sup>1</sup>
Daytime	Calm	20°C	70%	0 m/s	0°C/100 m
Evening	Wind only <sup>1</sup>	15°C	80%	ENE 3 m/s	0°C/100 m
	Wind only <sup>1</sup>	10°C	90%	WNW 3 m/s	0°C/100 m
Night-time	Inversion only <sup>1</sup>	10°C	90%	0 m/s	3°C/100 m
	Inversion and Drainage <sup>2</sup>	10°C	90%	WNW 2 m/s	3°C/100 m

Note 1: INP default wind speed 3 m/s and default temperature inversion 3°C/100 m.

Note 2: INP default inversion 3°C/100 m plus 2 m/s drainage flow to receiver areas east of the Facility only (ie. Fern Bay and Stockton).

## 3.2 Ambient Noise Environment

### Background Noise

Heggies has undertaken several recent ambient noise monitoring programs in the Kooragang Island Industrial area, being

- 2006 - NCIG CET Environmental Assessment - **Heggies Report 10-4515R1**,
- 2006 - Kooragang Coal Terminal Increase to Capacity Throughput Operating and Cumulative Noise Impact Assessment - **Heggies Report 30-1417R2**
- 2003 - Noise and Blasting Assessment Proposed Extension of Shipping Channels Port of Newcastle **Heggies Report 10-2718-R1**; and
- 2003 - Noise Impact Assessment - Carrington Concrete Plant **Heggies Report 30-1157-R2**.



The purpose of the noise monitoring programmes conducted were to assess ambient noise levels (ie. all noise sources), background noise levels and to quantify the existing industrial noise contribution as per the INP assessment procedures. (ie. in the absence of transport, natural and domestic noise sources).

The monitoring locations utilised for the above programs and the data collected provides an extensive background noise data set which is applicable to this project. The noise monitoring locations established for the above studies are listed in **Table 7** and shown in **Figure 3**.

**Table 6 Noise Monitoring Locations**

<b>Receiver Area</b>	<b>ID/Location</b>	<b>INP Noise Amenity Zone</b>	<b>LEP Zone</b>	<b>Noise Monitoring ID</b>
Fern Bay West	FW1 1 Fullerton Lane	Suburban	Residential	N1
Fern Bay East	FE1 21 Braid Road	Suburban	Residential	N2
Stockton West	SW1 284 Fullerton Street	Suburban	Residential	N3
Stockton East	SE1 40 Eames Avenue	Suburban	Residential	N4
Mayfield West	W1 47 Stevenson Avenue	Urban	Residential	N5
	W2 4 Groongal Street			N6
Mayfield	M1 68 Bull Street	Urban	Residential	N7
	M2 45 Simpson Crescent			N8
	M3 1 Arthur Street			N10
	M4 52 Arthur Street			N9
	M5 21 Crebert Street			N11
Carrington	C1 Cnr Hargrave and Young Streets	Urban	City Centre	N12
Sandgate	SG1 4 Mangrove Road	Commercial	Urban Services	N13
Kooragang Island	KI1 Blue Circle Southern	Industrial	Port and Industry	N14
Mayfield North	MN1 OneSteel	Industrial	Port and Industry	N15



Figure 3 Background Noise Monitoring Locations



### Background Noise Monitoring April and July 2006

A noise monitoring programme was conducted in April 2006 (NCIG CET Environmental Assessment **Heggies Report 10-4515R1**) to quantify background noise levels (ie. all noise sources) and to estimate industrial noise only (ie. in the absence of transport, natural and domestic noise sources). Ten unattended noise loggers were positioned at representative residential, commercial and industrial receiver areas in the vicinity of the project site commencing Monday 3 April 2006 for a period of 14 days.

In order to supplement the unattended logger measurements and to assist in identifying the character and duration of the noise sources, three (3) operator-attended surveys were conducted for the daytime, evening, and night-time at all ten logging locations. The measurement methodology and analysis procedures are described in **Appendix D**. The relevant operator-attended measurement results are summarised in **Table 7**.



**Table 7 Operator-Attended Noise Survey Results 2006 (dBA re 20 µPa)**

Receiver Area/ Receiver Type	ID (Ref)	Background LA90(15minute) All Noise Sources			Estimated LAeq(15minute) Industrial Noise Only		
		Day	Evening	Night	Day	Evening	Night
Fern Bay West Residential	FW1 (N1)	59, 57, 52	44, 50, 49	49, 39, 40	49, n/d, n/d	40, n/d, n/d	49, n/d, <35
Stockton West Residential	SW1 (N3)	52, 44, 45	48, 47, 47	50, 50, 51	51, n/d, n/d	48, <45, <45	49, 49, 50
Mayfield Residential	M1 (N7)	54, 58, 53	55, 53, 53	49, 51, 51	n/d, 51, 50	55, 52, 52	47, 50, 50
Kooragang Island Industrial	KI1 (N14)	56, 57, 56	53, 56, 54	55, 51, 51	57, 57, 56	54, 54, 54	55, 50, 52
Mayfield North Industrial	MN1 (N15)	62, 59, 59	62, 59, 59	55, 60, 61	63, 63, 62	63, 60, 60	59, 61, 62

Note 1: n/d - Industrial noise not discernible.

Attended monitoring identified that industrial noise is a feature of the residential noise environment at all receiver areas, during all day, evening and particularly night time periods. Sometimes it is not discernible - but at other times it is distinguishable, particularly during lulls in transport, domestic and natural noise sources (ie. ocean noise).

### Supplementary Background Noise 2003

Noise monitoring to establish background levels and industrial noise at four representative residential locations in Mayfield was carried out in relation to the Port of Newcastle Extension (EIS GHD 2003). The measurement methodology is described in the Heggies Report 10-2718-R1 dated 6 August 2003 “*Noise and Blasting Assessment Proposed Extension of Shipping Channels Port of Newcastle*”.

Similarly, background levels and industrial noise in Carrington have been derived from Heggies Report 30-1157-R2 dated 30 May 2003 “*Noise Impact Assessment - Proposed Concrete Plant Carrington*”. In each case the background noise data was processed in accordance with the requirements of the INP to determine the background noise levels as shown in **Table 8**.

### 3.3 Summary of Background Noise Assessments 2003 and 2006

The unattended background noise logger data from each monitoring location for the 2003 and 2006 data sets and the on-site weather conditions were analysed on a daily basis. The background noise data was then processed in accordance with the requirements of the INP to derive the Monday to Sunday background noise levels presented in **Table 8**.

Similarly, an analysis of the operator attended measurements was undertaken to quantify the industrial noise contribution at each receiver location, which is also presented in **Table 8**.



**Table 8 Unattended Noise Logger Results 2006 and 2003 (dBA re 20 µPa)**

Receiver Area	ID (Ref)	Measured RBL <sup>4</sup> All Noise Sources			Measured LAeq(period) <sup>3</sup> All Noise Sources			Estimated LAeq(period) <sup>3</sup> Industrial Noise Only		
		Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
Fern Bay West Residential	FW1 (N1)	50	42	44	60	55	54	<54	46	48
Fern Bay East Residential	FE1 (N2)	40	44	42	48	46	46	<54	42	43
Stockton West Residential	SW1 (N3)	42	44	44	63	57	59	<54	47	48
Stockton East Residential	SE1 (N4)	41	43	43	55	50	49	<54	43	44
Warabrook/ Mayfield West Residential	W1 (N5)	44	45	40	59	54	52	<54	45	42
	W2 (N6)	51	49	47	63	57	56	<54	45	43
Mayfield Residential	M1 (N7)	47	49	47	58	53	52	<54	49	48
	M2 <sup>1</sup> (N8)	46	49	46	53	52	51	42	42	42
	M3 <sup>1</sup> (N9)	46	46	43	58	62	51	42	42	42
	M4 <sup>1</sup> (N10)	51	50	43	58	56	54	41	41	41
	M5 <sup>1</sup> (N11)	57	53	48	69	63	61	45	45	45
Carrington Residential	C1 <sup>2</sup> (N12)	42	41	37	62	67	57	46	45	42
Sandgate Commercial	SG1 (N13)	48	45	40	57	54	55	<59	46	43
Kooragang Island Industrial	KI1 (N14)	51	51	47	61	56	55	<64	53	51
Mayfield North Industrial	MN1 (N15)	56	57	57	60	59	59	<64	57	57

Note 1: Supplementary background and industrial noise Port of Newcastle Extension.

Note 2: Supplementary background and industrial noise Proposed Concrete Plant Carrington.

Note 3: Daytime 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours and Night-time 2200 hours to 0700 hours.

Note 4: Rating Background Level.

### 3.4 Assessment Locations

The Kooragang Island Industrial Area is surrounded by a variety of land uses and receivers types. Based on the previous background noise monitoring programs and noise assessments conducted by Heggies for proposed developments on Kooragang Island, selected assessment locations representative of each of the receiver areas are presented in **Table 9**.



**Table 9 Nearest Potentially Affected Receiver Assessment Locations**

Receiver Area	ID/Location	INP Noise Amenity Zone	LEP Zone
Fern Bay West	FW1 1 Fullerton Lane	Suburban	Residential
	FW2 Stockton Hospital	Hospital	Special Uses
Stockton West	SW1 284 Fullerton Street (cnr Beeston Rd)	Suburban	Residential
	SW2 Cnr Pembroke and Fullerton Streets		
Mayfield	M4 52 Arthur Street	Urban	Residential
	M6 Hunter Christian School	School	
	M7 Mayfield East Primary		
Kooragang Island	KI1, KI2, KI3 Egret St industrial	Industrial	Port and Industry
	KI4, KI5 Raven St Industrial		
	KI6, KI7, Sandpiper Cl Industrial		
	KI8, KI9, KI10 Heron Rod/ Cormorant Rd industrial		
Mayfield North	MN1 OneSteel	Industrial	Port and Industry

### 3.5 Background Noise for Assessment Purposes

For the purposes of establishing construction noise criteria and INP-based intrusive and amenity project specific noise criteria, the 2006 and 2003 noise data have been processed for each receiver area into single representative noise levels as presented in **Table 10**.

**Table 10 Background and Industrial Noise for Assessment Purposes (dBA re 20 µPa)**

Receiver Area	ID	Measured RBL <sup>1,2</sup> (LA90) All Noise Sources			Measured LAeq(period) <sup>1,3</sup> All Noise Sources			Estimated LAeq(period) <sup>1,4</sup> Industrial Noise Only		
		Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
Fern Bay West Residential	FW1	50	42	44	60	55	54	<54	46	48
Stockton West Residential	SW1	42	44	44	63	57	59	<54	47	48
Mayfield Residential	M1-M5	46	47	43	63	59	56	<54	45	44
Carrington Residential	C1	42	41	37	62	67	57	46	45	42
Kooragang Is Industrial	KI1	51	51	47	61	56	55	<64	53	51
Mayfield North Industrial	MN1	56	57	57	60	59	59	<64	57	57

Note 1: Daytime 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours and Night-time 2200 hours to 0700 hours.

Note 2: RBL for the Mayfield receiver area is the median of RBL's at all locations (M1-M5)

Note 3: LAeq(Period) for the Mayfield receiver area is the logarithmic average of the LAeq(Period) for all locations (M1-M5)



**Fern Bay/Stockton:** Existing night-time industrial noise generally emanates from Kooragang Island and was estimated at 48 dBA at both receiver areas. Light westerly wind generally prevailed throughout the monitoring period enhancing industrial noise from the island to the nearest residential receivers. The surveys indicated that industrial noise is at least 5 dBA less in the absence of westerly winds and/or temperature inversions.

**Mayfield/ Carrington:** Existing night-time industrial noise generally emanates from the industrial areas located to the immediate north of the receiver areas (eg Mayfield North) and was estimated as 42 dBA to 44 dBA. Due to the relatively close proximity of industry to the residential receiver areas, noise enhancement due to weather effects is less in comparison to Fern Bay and Stockton and the industrial noise contribution relatively more constant.



## 4 PROJECT SPECIFIC NOISE CRITERIA

### 4.1 Construction Assessment Criteria

Potential noise impacts from construction works were assessed according to the DECC ENCM (1994) Chapter 171 Noise Control Guideline - Construction Site Noise (**Appendix E**). The ENCM provides noise limits for construction periods of up to 26 weeks. As the duration of the construction works is greater than 26 weeks, the DECC suggests that the LA10 noise level from construction should generally not exceed the background level by more than 5 dBA and hence, the construction noise criteria for the daytime period is presented in **Table 11**.

**Table 11 Construction Noise Criteria**

Receiver Area	Construction Noise Criteria LA10(15minute) Daytime
Fern Bay West	55 dBA
Stockton West	47 dBA
Mayfield	51 dBA
Carrington	47 dBA
Kooragang Island	70 dBA
Mayfield North	70 dBA

### 4.2 Operating Assessment Criteria

#### Sleep Disturbance

The DECC's "*Sleep Disturbance Noise Criteria Guideline*" dated 22 June 2004 recognises that the current LA1(60sec) sleep disturbance criteria of 15 dBA above the prevailing LA90(15min) level is not ideal. The assessment of potential sleep disturbance is complex and poorly understood and the DECC believes that there is insufficient information to determine a suitable alternative criterion.

In the interim, the DECC suggest that the LA1(60sec) level 15 dBA above the Rating Background Level (RBL) is a suitable screening criteria for sleep disturbance for the night-time period. In practice, sleep disturbance is assessed as the emergence of the LA1(60sec) level above the LA90(15min) prevailing at the time.

A review of noise events from similar operations shows that the maximum or LA1(60sec) levels are typically no greater than 10 dBA above the LAeq(15minute) intrusive level when measured at a distant receiver. Therefore, it is considered that the INP-based criteria would be the controlling factor in determining compliance, as opposed to the sleep disturbance criteria. This relationship enables the noise assessment process to focus on the setting of the appropriate INP-based criteria which aim to minimise annoyance at any noise sensitive receiver location.

#### Operation

The NSW DECC has regulatory responsibility for the control of noise from "scheduled premises" under the Protection of the Environment Operations Act 1997. In implementing the Industrial Noise Policy the DECC has two broad objectives:

- Controlling intrusive noise impacts in the short term.
- Maintaining noise level amenity for particular landuses over the medium to long term.



The INP prescribes detailed calculation routines for establishing “project specific” LAeq(15minute) intrusive criteria and LAeq(period) amenity (ie. non-transport related) criteria for a development at potentially affected receivers.

Ideally, the intrusive noise emission should generally not exceed the background level by more than 5 dBA. Similarly, the amenity level should generally not exceed the specified INP “acceptable” or “maximum” noise level appropriate for the particular locality and land use as shown in **Table 12**.

**Table 12 INP Acceptable and Maximum Noise Amenity Levels (dBA re 20 µPa)**

Receiver Area	Land Use	Amenity LAeq(period) <sup>2</sup> Acceptable			Amenity LAeq(period) <sup>2</sup> Maximum		
		Day	Evening	Night	Day	Evening	Night
Fern Bay Stockton	Suburban Residential	55	45	40	60	50	45
Mayfield Carrington	Urban Residential	60	50	45	65	55	50
Kooragang Island Mayfield North	Industrial	70	70	70	75	75	75
Any	School <sup>1</sup>	External 45 when in use <sup>3</sup>			External 50 when in use <sup>3</sup>		
Any	Hospital	External 50 when in use <sup>3</sup>			External 55 when in use <sup>3</sup>		

Note 1: External criteria equivalent to internal criteria plus 10 dBA.

Note 2: Daytime 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours, Night-time 2200 hours to 0700 hours.

Note 3: Noisiest 1 hour period.

**Table 13 Modification to Acceptable Noise Level (ANL)\* to Account for Existing Levels of Industrial Noise**

Total Existing LAeq noise level from Industrial Noise Sources	Maximum LAeq Noise Level for Noise from New Sources Alone, dBA
≥ Acceptable noise level plus 2 dBA	If existing noise level is <i>likely to decrease</i> in future acceptable noise level minus 10 dBA If existing noise level is <i>unlikely to decrease</i> in future existing noise level minus 10 dBA
Acceptable noise level plus 1 dBA	Acceptable noise level minus 8 dBA
Acceptable noise level	Acceptable noise level minus 8 dBA
Acceptable noise level minus 1 dBA	Acceptable noise level minus 6 dBA
Acceptable noise level minus 2 dBA	Acceptable noise level minus 4 dBA
Acceptable noise level minus 3 dBA	Acceptable noise level minus 3 dBA
Acceptable noise level minus 4 dBA	Acceptable noise level minus 2 dBA
Acceptable noise level minus 5 dBA	Acceptable noise level minus 2 dBA
Acceptable noise level minus 6 dBA	Acceptable noise level minus 1 dBA
< Acceptable noise level minus 6 dBA	Acceptable noise level

\* ANL = recommended acceptable LAeq noise level for the specific receiver, area and time of day from **Table 12**.

In accordance with the INP’s Chapter 2 Industrial Noise Criteria, the “project specific” intrusive and amenity assessment criteria for the residential, commercial and industrial receiver areas were determined from **Table 12** and **Table 13** and the estimated industrial contribution from **Table 10**, are presented in **Table 14**. These criteria are nominated for the purposes of assessing potential noise impacts from the Facility.



**Table 14 Project Specific Intrusive and Amenity Assessment Criteria (dBA re 20 µPa)**

Receiver Area	ID Location	Intrusive LAeq(15minute)			Amenity LAeq(period) <sup>1</sup>		
		Day	Evening	Night	Day	Evening	Night
Fern Bay West	All Residential	55	47	49	49	37	37 <sup>3</sup>
Stockton West	All Residential	47	49	49	49	37 <sup>2</sup>	37 <sup>3</sup>
Mayfield	All Residential	51	52	48	60	48	39
Carrington	All Residential	47	46	42	60	48	42
Kooragang Island	All Industrial	Intrusive noise not applicable			70	70	70
Mayfield North	All Industrial	Intrusive noise not applicable			70	70	70
Any	School	Intrusive noise not applicable			External 45 when in use		
Any	Hospital	Intrusive noise not applicable			External 50 when in use		

Note 1: Daytime 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours, Night-time 2200 hours to 0700 hours.

Note 2: Existing industrial contribution -10 dB as future noise levels are unlikely to decrease.

Note 3: Existing industrial contribution -10 dB as future noise levels are unlikely to decrease. Additional 1dBA adjustment as per INP application notes such that night time criteria is not be greater than evening criteria

The INP states that these criteria have been selected to preserve the amenity of at least 90% of the population living in the vicinity of industrial noise sources from the adverse effects of noise for at least 90% of the time. Provided the criteria in the INP are achieved, it is unlikely that most people would consider the resultant noise levels excessive.

In those cases where the INP project specific assessment criteria are not achieved, it does not automatically follow that all people exposed to the noise would find the noise unacceptable. In subjective terms, exceedances of the INP project specific assessment criteria can be generally described as follows:

- Negligible noise level increase <1 dBA  
(Not noticeable by all people).
- Marginal noise level increase 1 dBA to 2 dBA  
(Not noticeable by most people).
- Moderate noise level increase 3 dBA to 5 dBA  
(Not noticeable by some people but may be noticeable by others).
- Appreciable noise level increase >5 dBA  
(Noticeable by most people).



## 5 COMPUTER NOISE MODELLING

### 5.1 Methodology

A computer noise model of the facility was developed to incorporate the significant noise sources associated with the proposed development. Additional surrounding terrain, aspects of the built environment and nearby receiver areas were also included in the model.

The computer model was prepared using RTA Software's Environmental Noise Model (ENM for Windows, Version 3.06), a commercial software system developed in conjunction with the NSW DECC. The acoustical algorithms utilised by this software have been endorsed by the Australian and New Zealand Environment and Conservation Council (ANZECC) and all State Environmental Authorities throughout Australia as representing one of the most appropriate predictive methodologies currently available.

Noise modelling was conducted for each construction and operational phase of the development for calm and prevailing meteorological conditions.

For the purposes of noise impact assessment, the design sound power levels (SWLs) are presented in **Table 15** for all acoustically-relevant items of plant and equipment.

**Table 15 Plant & Equipment Sound Power Levels- dBA re 1pW**

<b>Biodiesel Plant</b>	<b>SWL</b>
Soft Water Pump	93 dBA
Reactor transfer pump (4)	86 dBA each
Mixers (2)	79 dBA each
Acid wash Pump	77 dBA
Glycerin pump (2)	87 dBA each
Heat Exchangers/ Air Cooler (2)	92 dBA
Oil transfer pump (2)	87 dBA each
Methanol / Ethanol transfer pump (3)	87 dBA each
Cooling Water Pump (4)	93 dBA each
Chiller Unit	93 dBA
Air compressor package	91 dBA
Cooling Tower	94 dBA
Boiler	91 dBA
<b>Fuel Distribution</b>	
Truck load out pump (3)	92 dBA each
Transfer pump (3)	90 dBA each
Ship Loading Pump	93 dBA

Note: All pumps have been modelled as enclosed or mitigated source.



## 5.2 Noise Mitigation Measures

The predictive modelling described in **Section 5.1** is inclusive of currently feasible and reasonable noise mitigation measures, particularly for the night-time operation of the Facility. A discussion of the noise mitigation and management controls adopted in the project design is provided below.

### Source Noise Controls

For the purposes of noise impact assessment, the design sound power levels (SWLs) presented in **Table 15**, for all acoustically-relevant items of plant and equipment, are based on currently feasible, reasonable and achievable noise emission levels. Further reductions may be possible in the future. It should be noted that all pumps have been modelled as an enclosed or mitigated noise source.

Subsequent detailed design studies may be required to refine individual SWLs and to prepare procurement specifications to ensure that the approved off-site environmental noise limits are achieved.

Noise control requirements would be delivered through the implementation of design, procurement, commissioning and operating noise management plans and may include:

- The development of noise limits and acoustical specifications for all significant plant contributing to total noise emission from the site during the design phase.
- Acoustic design reviews and validation testing of significant plant during procurement.
- On-site acceptance testing on all acoustically significant plant during commissioning.



## 6 CONSTRUCTION NOISE ASSESSMENT

The predicted LA10(15minute) noise level from daytime construction activities at the nearest receiver areas are presented in **Table 16**.

**Table 16 Predicted Construction LA10(15minute) Noise (dBA re 20 µPa)**

Receiver Area	ID/Location	Phase 1	Phase 2	Phase 3	Construction Criteria
Fern Bay West	FW1 1 Fullerton Lane	<30	<30	<30	55
	FW2 Stockton Hospital	35	34	42	50 <sup>1</sup>
Stockton West	SW1 284 Fullerton Street (cnr Beeston Rd)	<b>49</b>	<b>48</b>	<b>49</b>	47
	SW2 Cnr Pembroke and Fullerton Streets	40	38	40	
Mayfield	M4 52 Arthur Street	< 30	<30	32	51
	M6 Hunter Christian School	<30	<30	30	
	M7 Mayfield East Primary	<30	<30	29	
Carrington	C1 Elizabeth St	<30	<30	<30	47
Kooragang Island	KI1, KI2, KI3 Egret St industrial	32	31	32	70 <sup>1</sup>
	KI4, KI5 Raven St Industrial	33	32	33	
	KI6, KI7, Sandpiper Cl Industrial	34	32	33	
	KI8, KI9, KI10 Heron Rod/ Cormorant Rd industrial	42	41	45	
Mayfield North	MN1 OneSteel	<30	<30	<30	70 <sup>1</sup>

Note 1: External amenity criteria from INP adopted for non residential receivers.

Note 2: Daytime calm meteorological parameters as described in **Table 5**.

Note 3: Criteria based on RBL's from **Table 10**.

All predicted construction noise levels are below the relevant assessment criteria, except at Location SW1 (284 Fullerton Street) where LA10 noise levels are predicted to exceed the criteria by up to 2 dBA. This exceedence of 2 dBA during the daytime would not be discernable; it can be described as a minor noise impact and would be considered acceptable.



## 7 OPERATIONAL NOISE ASSESSMENT

### 7.1 Preliminary Intrusiveness Assessment

#### 7.1.1 Daytime Operation

The predicted  $L_{Aeq}(15\text{minute})$  noise level from daytime operation of the facility at the nearest receiver areas are presented in **Table 17**.

**Table 17 Daytime<sup>3</sup> Operation Intrusive Noise (dBA re 20  $\mu$ Pa)**

Receiver Area	ID/Location	Phase 1	Phase 2	Phase 3	Intrusive Criteria $L_{Aeq}(15\text{minute})$
Fern Bay West	FW1 1 Fullerton Lane	<30	<30	<30	55 dBA
	FW2 Stockton Hospital	<30	<30	<30	50 dBA <sup>1</sup>
Stockton West	SW1 284 Fullerton Street (cnr Beeston Rd)	31	31	31	47 dBA
	SW2 Cnr Pembroke and Fullerton Streets	<30	<30	<30	
Mayfield	M4 52 Arthur Street	<30	<30	<30	51 dBA
	M6 Hunter Christian School	<30	<30	<30	45 dBA <sup>1</sup>
	M7 Mayfield East Primary	<30	<30	<30	
Carrington	C1 Elizabeth St	<30	<30	<30	47 dBA
Kooragang Island	KI1, KI2, KI3 Egret St industrial	<30	<30	<30	70 dBA <sup>1</sup>
	KI4, KI5 Raven St Industrial	<30	<30	<30	
	KI6, KI7, Sandpiper Cl Industrial	<30	<30	<30	
	KI8, KI9, KI10 Heron Rd/ Cormorant Rd industrial	34	34	34	
Mayfield North	MN1 OneSteel	<30	<30	<30	70 dBA <sup>1</sup>

Note 1: External amenity criteria 50 dBA used in the absence of intrusive criteria.

Note 2: Equivalent external amenity criteria 45 dBA used in the absence of intrusive criteria.

Note 3: Daytime calm meteorological parameters as described in **Table 5**.

All predicted operational noise levels are significantly below the relevant assessment for the daytime period.



## 7.1.2 Evening Operation

The predicted LAeq(15minute) noise level from evening operation of the facility at the nearest receiver areas are presented in **Table 18**.

**Table 18 Evening<sup>3</sup> Operation Intrusive Noise (dBA re 20 µPa)**

Receiver Area	ID/Location	Phase 1	Phase 2	Phase 3	Intrusive Criteria LAeq(15minute)	
		Evening NE Wind ± 45° <sup>2</sup>				
Fern Bay West	FW1	1 Fullerton Lane	<30	<30	<30	47 dBA
	FW2	Stockton Hospital	<30	<30	<30	50 dBA <sup>1</sup>
Stockton West	SW1	284 Fullerton Street	<30	<30	33	49 dBA
	SW2	Cnr Pembroke and Fullerton Sts	<30	<30	32	
Mayfield	M4	52 Arthur Street	<30	<30	<30	52 dBA
	M6	Hunter Christian School	N/A	N/A	N/A	N/A
	M7	Mayfield East Primary	N/A	N/A	N/A	
Carrington	C1	Elizabeth St	<30	<30	<30	46 dBA
Kooragang Island	K11, K12, K13 Egret St industrial		<30	<30	<30	70 dBA
	K14, K15 Raven St Industrial		<30	<30	<30	
	K16, K17, Sandpiper Cl Industrial		<30	<30	<30	
	K18, K19, K110 Heron Rod/ Cormorant Rd industrial		36	36	36	
Mayfield North	MN1	OneSteel	<30	<30	<30	70 dBA

Note 1: External amenity criteria 50 dBA used in the absence of intrusive criteria.

Note 2: Evening wind meteorological parameters as described in **Table 5**.

All predicted operational noise levels are significantly below the relevant assessment for the evening period.



### 7.1.3 Night-time Operation

The predicted LAeq(15minute) noise level from night-time operation (worst case temperature inversion and drainage wind) of the facility at the nearest receiver areas are presented in **Table 19**.

**Table 19 Night-time<sup>3</sup> Operation Intrusive Noise (dBA re 20 µPa)**

Receiver Area	ID/Location		Phase 1	Phase 2	Phase 3	Intrusive Criteria LAeq(15minute)
			Temp Inversion & Drainage Wind <sup>2</sup>			
Fern Bay West	FW1	1 Fullerton Lane	<30	<30	<30	49 dBA
	FW2	Stockton Hospital	30	30	30	50 dBA <sup>1</sup>
Stockton West	SW1	284 Fullerton Street	39	39	40	49 dBA
	SW2	Cnr Pembroke and Fullerton Sts	<30	<30	<30	
Mayfield	M4	52 Arthur Street	<30	<30	<30	48 dBA
	M6	Hunter Christian School	N/A	N/A	N/A	
	M7	Mayfield East Primary	N/A	N/A	N/A	N/A
Carrington	C1	Elizabeth St	<30	<30	<30	42 dBA
Kooragang Island	K11, K12, K13 Egret St industrial		<30	<30	<30	70 dBA
	K14, K15 Raven St Industrial		<30	<30	<30	
	K16, K17, Sandpiper CI Industrial		30	30	30	
	K18, K19, K110 Heron Rod/ Cormorant Rd industrial		45	45	45	
Mayfield North	MN1	OneSteel	<30	<30	<30	70 dBA

Note 1: External amenity criteria 50 dBA used in the absence of intrusive criteria.

Note 2: Night-time temperature inversion (and drainage flow) meteorological parameters as described in **Table 5**.

All predicted operational noise levels are significantly below the relevant assessment for the night-time period.



## 7.2 Amenity Assessment

### 7.2.1 Daytime Operation

The predicted  $L_{Aeq}(9hour)$  amenity noise levels from daytime operation of the facility at the nearest receiver areas are presented in **Table 20**.

**Table 20 Daytime<sup>1</sup> Operation Amenity Noise (dBA re 20  $\mu$ Pa)**

Receiver Area	ID/Location	Phase 1	Phase 2	Phase 3	Amenity Criteria $L_{Aeq}(\text{Period})$
Fern Bay West	FW1 1 Fullerton Lane	<30	<30	<30	49 dBA
	FW2 Stockton Hospital	<30	<30	<30	49 dBA
Stockton West	SW1 284 Fullerton Street	<30	<30	<30	49 dBA
	SW2 Cnr Pembroke and Fullerton Sts	<30	<30	<30	
Mayfield	M4 52 Arthur Street	<30	<30	<30	60 dBA
	M6 Hunter Christian School	<30	<30	<30	
	M7 Mayfield East Primary	<30	<30	<30	
Carrington	C1 Elizabeth St	<30	<30	<30	60 dBA
Kooragang Island	KI1, KI2, KI3 Egret St industrial	<30	<30	<30	70 dBA
	KI4, KI5 Raven St Industrial	<30	<30	<30	
	KI6, KI7, Sandpiper Cl Industrial	<30	<30	<30	
	KI8, KI9, KI10 Heron Rod/ Cormorant Rd industrial	32	32	32	
Mayfield North	MN1 OneSteel	<30	<30	<30	70 dBA

Note 1: Daytime calm meteorological parameters as described in **Table 5**.

All predicted noise amenity levels are below the relevant assessment criteria for the daytime period.



## 7.2.2 Evening Operation

The predicted  $L_{Aeq(9hour)}$  amenity noise levels from evening operation of the facility at the nearest receiver areas are presented in **Table 21**.

**Table 21 Evening Operation Amenity Noise (dBA re 20  $\mu$ Pa)**

Receiver Area	ID/Location	Phase 1	Phase 2	Phase 3	Amenity Criteria $L_{Aeq(Period)}$
Fern Bay West	FW1 1 Fullerton Lane	<30	<30	<30	37 dBA
	FW2 Stockton Hospital	<30	<30	<30	50 dBA
Stockton West	SW1 284 Fullerton Street	<30	<30	33	37 dBA
	SW2 Cnr Pembroke and Fullerton Sts	<30	<30	30	
Mayfield	M4 52 Arthur Street	<30	<30	<30	48 dBA
	M6 Hunter Christian School	N/A	N/A	N/A	
	M7 Mayfield East Primary	N/A	N/A	N/A	N/A
Maryville Carrington	C1 Elizabeth St	<30	<30	<30	48 dBA
Kooragang Island	KI1, KI2, KI3 Egret St industrial	<30	<30	<30	70 dBA
	KI4, KI5 Raven St Industrial	<30	<30	<30	
	KI6, KI7, Sandpiper Cl Industrial	<30	<30	<30	
	KI8, KI9, KI10 Heron Rod/ Cormorant Rd industrial	34	34	34	
Mayfield North	MN1 OneSteel	<30	<30	<30	70 dBA

Note1: Evening wind meteorological parameters as described in **Table 5**.

All predicted noise amenity levels are below the relevant assessment criteria for the evening period.



### 7.2.3 Night-time Operation

The predicted LAeq(9hour) amenity noise levels from night-time operation of the facility at the nearest receiver areas are presented in **Table 22**.

**Table 22 Night-time<sup>1</sup> Operation Amenity Noise (dBA re 20 µPa)**

Receiver Area	ID/Location	Phase 1	Phase 2	Phase 3	Amenity Criteria LAeq(Period)	
		Temp Inversion & Drainage	Wind <sup>2</sup>	Wind <sup>2</sup>		
Fern Bay West	FW1	1 Fullerton Lane	<30	<30	<30	37 dBA
	FW2	Stockton Hospital	30	30	30	50 dBA
Stockton West	SW1	284 Fullerton Street	36	36	37	37 dBA
	SW2	Cnr Pembroke and Fullerton Sts	<30	<30	<30	
Mayfield	M4	52 Arthur Street	<30	<30	<30	39 dBA
	M6	Hunter Christian School	N/A	N/A	N/A	
	M7	Mayfield East Primary	N/A	N/A	N/A	
Carrington	C1	Elizabeth St	<30	<30	<30	42 dBA
Kooragang Island	K11, K12, K13 Egret St industrial		<30	<30	<30	70 dBA
	K14, K15 Raven St Industrial		<30	<30	<30	
	K16, K17, Sandpiper Cl Industrial		30	30	30	
	K18, K19, K110 Heron Rod/ Cormorant Rd industrial		43	43	43	
Mayfield North	MN1	OneSteel	<30	<30	<30	70 dBA

Note 1: Night-time wind meteorological parameters as described in **Table 5**.

Note 2: Night-time temperature inversion (and drainage flow) meteorological parameters as described in **Table 5**.

All predicted noise amenity levels are significantly below the relevant assessment criteria for the night-time period at the majority of receiver locations whereas predicted noise levels at the nearest receiver (i.e. Fullerton St, Stockton West) meet the relevant criteria.



## 8 CUMULATIVE NOISE AMENITY ASSESSMENT

### Noise Amenity Criteria LAeq(period)

In order to assess any cumulative noise impacts, it is important to appreciate and distinguish between the INP's first and second environmental noise control objectives.

The INP's first objective - that the intrusive noise emission from any single source does not exceed the background level by more than 5 dBA - relates to individual industrial sites where the intrusive noise limit is generally specified in the Development Consent and/or Environmental Protection Licence.

There is no established procedure (or regulatory requirement) to derive intrusive LAeq(15minute) noise criteria for the cumulative operation of existing and/or approved industrial developments in a locality.

The INP's second objective - that the LAeq(period) amenity level (ie. non-transport related) does not exceed the specified "acceptable" or "maximum" noise level appropriate for the particular locality and land use - is aimed at restricting the potential cumulative increase in amenity noise levels otherwise known as "background creep". The INP based acceptable and maximum noise amenity levels for residential, commercial and industrial areas are presented in **Table 12**.

### Approved Industrial Developments on Kooragang Island and Immediate Surrounds

A review of approved industrial developments on Kooragang Island and in the vicinity of the proposed Facility site is presented in **Table 23**.

**Table 23 Approved Industrial Development on Kooragang Island and Surrounds**

Site	Operator	Approval Date	Development	Status	Source of Noise Data
Newcastle Coal Export Terminal	Newcastle Coal Infrastructure Group	13/4/07	Stage 1 Stage 2	Approved Approved	Heggies (2006)
Kooragang Coal Terminal	Port Waratah Coal Services Ltd	25/11/1996	Stages 1, 2 and 3A Stage 3 Steps (1-4) Project 3D Stage 3 Remainder	Operating Operating Operating Planned Development	ERM (1996)
Cargill Oilseed Processing Facility	Cargill Australia Ltd	04/04/2006	Stage 1 Stage 2 Expansion	Operating Planned Development	HLA Envirosciences (2005)
Extension of Shipping Channels	NSW Waterways Authority	09/08/2005	Approved	Temporary Planned Development	NSW Waterways Authority (2004)
Cold Mill Facility	Protech Steel Pty Ltd	2002	Approved	Unlikely <sup>1</sup>	GHD (2001)
Multi-purpose Facility	BHP Company Ltd	06/04/2001	Approved	Not yet commenced	URS (2000)

Note 1: Cold Mill Facility not assessed cumulatively as this project would be effectively sterilised by the Facility.

The likelihood of all existing, approved and proposed developments in **Table 23** emitting maximum noise emission at any one time appears remote.



## Night-time Cumulative Noise Amenity Assessment

Existing amenity levels (from industrial noise) at the adjacent commercial and industrial receiver areas are below the INP's acceptable levels (70 dBA) during daytime, evening and night-time periods. Similarly, the existing amenity levels (from industrial noise) at residential areas presented in **Table 10** are below the INP's acceptable level during the daytime and evening (but not *night-time*).

Existing amenity levels at night-time in residential areas are in some cases just above the INP's acceptable criteria (but below the maximum). It is therefore reasonable to confine the cumulative assessment of noise from existing, approved and proposed developments at residential areas to the *night-time* period only.

In accordance with the INP's Chapter 2 Industrial Noise Criteria, the night-time cumulative sum of existing and approved developments and the proposed Facility noise amenity levels are presented in **Table 24**, together with the acceptable and maximum amenity criteria for the residential receiver areas.

**Table 24 Night-time Cumulative Existing, Approved and Facility Amenity Noise Levels (dBA re 20 µPa)**

Industrial Noise Source	Fern Bay West Residential	Stockton West Residential	Mayfield Residential	Carrington Residential
Existing Industry Measured	48	48	44	42
PWCS Remainder (Adverse) <sup>2</sup>	34	35	31	24
Cargill Stage 2 (Adverse) <sup>1</sup>	33	33	28	25
Channel Extension (Adverse) <sup>1</sup>	30	35	39	30
Multi Purpose (Limits) <sup>1</sup>	30	30	36	34
CET Facility (Adverse) <sup>1</sup>	36	35	38	31
Manildra (Adverse) <sup>1</sup>	< 30	38	<30	<30
<b>Cumulative Sum (Adverse)<sup>1</sup></b>	<b>49</b>	<b>49</b>	<b>47</b>	<b>43</b>
<b>INP Amenity Criteria (night time)</b>	<b>Suburban</b>		<b>Urban</b>	
Acceptable	40		45	
Maximum	45		50	

Source: refer to **Table 23** for the sources of non-Manildra noise emissions.

Note 1: Average adverse weather noise predictions for each locality.

Note 2: PWCS noise contribution based on predicted noise emissions associated with the approved capacity through put increase for KCT.

As discussed in **Section 3.2**, existing industrial noise is a feature of the residential night-time noise environment at all receiver areas. Sometimes it is not discernible but at other times it is distinguishable particularly during lulls in transport, domestic and natural noise sources.



**Fern Bay (West)/Stockton (West):** Existing night-time industrial noise generally emanates from Kooragang Island and was estimated as 48 dBA at both receiver areas during noise-enhancing weather conditions. Cumulative noise amenity levels from all proposed and approved developments are anticipated to increase ambient noise levels by up to 1 dBA under noise enhancing conditions and exceed the maximum noise amenity level of 45 dBA by up to 4 dBA. Generally, industrial noise is at least 5 dBA less in the absence of westerly winds and/or temperature inversions and therefore would be just below the maximum acceptable noise amenity level of 50 dBA. It should be noted that the exceedence of the amenity criteria is a result of existing noise levels and that is not directly attributable to the operation of the Facility at these respective locations.

**Mayfield /Carrington:** There would be no increase in amenity noise levels attributed to the operation of the Facility at these respective locations.



## 9 NOISE MITIGATION DESIGN & CONTROL

Manildra Park will implement an Acoustical Design, Procurement, Construction and Commissioning process with the aim of achieving compliance with Project Specific Noise Goals. Hence, a Noise Risk Management Programme consistent with current regulatory and community standards including the following procedures will be implemented:

- noise limits and acoustical specifications for all individual items of plant;
- desktop design validation and supplier shop testing during procurement; and
- *in-situ* acceptance testing during plant commissioning.



## 10 OFF-SITE TRANSPORT

### 10.1 Road Transport

#### Traffic Noise Criteria

Based on the EPA's "Environmental Criteria for Road Traffic Noise" policy (ECRTN) dated May 1999, Nelson Bay Road, Teal Street, Cormorant Road and Industrial Drive are classified as "arterial roads". The applicable noise criteria are presented in **Table 25**.

**Table 25 NSW Environmental Criteria for Road Traffic Noise**

Receiver Area	Road	Policy	Period	Traffic Noise Criteria
Fern Bay	Nelson Bay Road	Land use developments with the potential to create additional traffic existing on freeways/arterials	Daytime (0700 – 2200)	60 dBA LAeq(15hour)
Kooragang Island	Cormorant Road		Night-time (220 – 0700)	55 dBA LAeq(9hour)
Mayfield Carrington Maryville	Industrial Drive			

There are no residential receivers along Heron Road, Greenleaf Road and Cormorant Road. Therefore, traffic noise levels have not been considered at these locations.

Note that in all cases where the nominated criteria are already exceeded, traffic associated with the development should not be permitted to lead to an increase in the existing traffic noise levels of more than 2 dBA.

#### 10.1.1 Traffic Movements

A series of traffic surveys in the local area were undertaken in December 2006; these surveys were augmented by available counts commissioned for other local projects in the past few years (and available publicly) and the RTA's own AADT figures.

Classified counter data was provided at the following locations:

- Greenleaf Rd south of Teal St;
- Cormorant Rd West of Teal St;
- Cormorant Rd east of Teal St; and
- Teal St north of Cormorant Rd.

Intersection surveys were also conducted at the following locations: -

- Cormorant Rd & Teal St roundabout; and
- Teal St on and off ramps to Greenleaf Rd

A summary of the traffic survey results are provided in shown in **Table 26** .



**Table 26 Existing Traffic Flow Summary**

Location	Vehicle Type	AM Peak Hour			PM Peak Hour			Daily		
		Total	North/ East	South/ West	Total	North/ East	South/ West	Total	North / East	South/ West
Cormorant Road east of Teal Street	Light	1602	726	876	2223	1298	925	24,000		
	Heavy	151	85	66	69	26	43			
	Total	1753	811	942	2292	1324	968			
Cormorant Road west of Teal Street	Light	267	207	60	249	58	191	2530	1106	1424
	Heavy	63	28	35	59	27	32	1137	545	593
	Total	329	234	95	308	84	223	3667	1651	2016
Teal Street north of Cormorant Street	Light	1537	668	869	2066	1289	777	20,000		
	Heavy	118	68	50	48	20	28			
	Total	1655	736	919	2114	1309	805			
Greenleaf Road south of Teal Street	Light	145	20	124	183	85	98	1455	499	957
	Heavy	12	4	8	31	12	19	313	113	200
	Total	157	24	133	214	97	117	1768	612	1157
Teal Street on-ramp	Light	69	69		12	12				
	Heavy	12	12		4	4				
	Total	81	81		16	16				
Teal Street off-ramp	Light	9		9	62		62			
	Heavy	9		9	9		9			
	Total	18		18	71		71			

A breakdown of the anticipated traffic movements at the completion of Phase 3 of the Facility is presented in **Table 27**.

**Table 27 Daily Total Two-way Traffic Movements Generated by the Facility**

Vehicle Type	No of Movements		
	Day <sup>1</sup> (0700 – 2200)	Night <sup>1</sup> (2200- 0700)	Total
Employee	56	18	74
Visitors/representatives	6	-	6
Other deliveries	6	-	6
Delivery truck (semi-trailer)	48	16	64

Source: Umwelt Australia)

Note 1: Assumed 75% - 25% split for day – night facility related traffic movements

It is assumed that 20% of the vehicle movements' travel via Nelson Bay Road and 80 % travel via Cormorant Road, and then a 90 % split westbound and remaining 10 % east onto Industrial Drive.

**Table 28 Daily Breakdown of Traffic Movements**

Road	No Of Movements
Total Movements from Facility	64
Nelson Bay Road	12 <sup>1</sup>
Cormorant Road	52 <sup>1</sup>
Industrial Drive - Northbound	48 <sup>2</sup>
Industrial Drive - Southbound	4 <sup>2</sup>

Note: 1- 20% to Cormorant Road and 80% to Nelson Bay Road  
 2 – 90% from Cormorant Road onto Industrial Drive – Eastbound, 10% onto Industrial Drive – Westbound

For the purposes of noise impact assessment, the existing and anticipated operating traffic flows at the completion of Phase 3 are presented in **Table 29** for the daytime (0700 hours to 2200 hours) and night-time (2200 hours to 0700 hours). The percentage increase arising from the Facility contributed traffic is also shown..

**Table 29 Existing and Anticipated Traffic Flows**

Location	Time Period	Existing	Additional Movements	% Increase from Facility
Nelson Bay Road	Daytime	16,744	10	< 0.1 %
Cormorant Road	0700 hrs to 2200 hrs	24,000	38	< 0.1 %
Industrial Drive		27,687	38	< 0.1 %
Nelson Bay Road	Night-time	2,791	2	< 0.1 %
Cormorant Road	2200 hrs to 0700 hrs	3,540	6	< 0.1 %
Industrial Drive		4,521	6	< 0.1 %

Source:

### 10.1.2 Traffic Noise Impact Assessment

The increase in vehicle movements on all roads assessed is less than 0.1% from daytime and night-time facility related traffic. This corresponds to a very small, < 0.1 dB increase in the existing daytime LAeq(15hour) or night time LAeq(9hour) noise level and is considered negligible.



## 11 SUMMARY OF FINDINGS

### 11.1 Construction Noise Assessment

The project does not involve the mobilisation of an appreciable workforce for the construction of the facility. The associated traffic noise generated by the movement of vehicles to and from the site during the construction program is therefore expected to be minimal. Noise emissions associated with the construction activities during Phase 1 are predominantly associated with the refurbishment of the existing tanks, the installation of supporting pipeline infrastructure and the establishment of office and amenity buildings. While during Phase 2 and 3 the dominant noise sources are trucks and cranes associated with the installation of prefabricated and modular plant components. All predicted construction levels are below the relevant assessment criteria, except at Location SW1 (284 Fullerton Street, Stockton) where LA<sub>10</sub> noise levels are predicted to exceed the criteria by up to 2 dBA. It is reasonable to anticipate that LA<sub>10(15minute)</sub> construction noise emissions will remain undiscernible at the nearest residential receiver areas. Hence, any construction noise impacts arising from the construction program are considered minimal.

### 11.2 Operating Noise Assessment

#### Facility Noise Modelling Results and Impact Assessment

The computer noise model of the facility was developed to incorporate and predict noise emissions from the significant noise sources associated with the proposed development. Additional surrounding terrain, aspects of the built environment and nearby receiver areas were also included in the model. The operations modelling includes all significant items of plant and equipment working concurrently to simulate and predict the highest intrusive LA<sub>eq(15minute)</sub> and amenity LA<sub>eq(period)</sub> levels.

Noise modelling was conducted for three (3) operational phases of the development for calm and prevailing meteorological conditions.

Predicted intrusive and amenity noise levels due to the operation of the facility for all phases meet the relevant assessment criteria for all operating periods at all receiver locations.

The predictive modelling assumed that all currently feasible and reasonable noise mitigation measures particularly for activities (noise sources) associated with the night-time operation of the Facility are implemented. It was also assumed that the noise emissions from all pumps have been mitigated.

### 11.3 Cumulative Industrial Noise Amenity Assessment

In accordance with Section 2.2.4 of the INP's Industrial Noise Criteria, an assessment of the night-time cumulative sum of existing and approved developments plus the proposed Facility noise amenity levels has been determined and assessed against the acceptable and maximum amenity criteria as follows:

**Fern Bay (West)/Stockton (West):** Existing night-time industrial noise generally emanates from Kooragang Island and was estimated as 48 dBA at both receiver areas during noise-enhancing weather conditions. Cumulative noise amenity levels are anticipated to increase by up to 1 dBA under noise enhancing conditions and would not exceed the maximum noise amenity level of 50 dBA. Industrial noise is at least 5 dBA less in the absence of westerly winds and/or temperature inversions and therefore would be just below the acceptable noise amenity level of 45 dBA.

**Mayfield /Carrington:** There would be no increase in amenity noise levels attributable to the operation of the Facility at these respective locations.



It should be noted that for each of the cases discussed above, the likelihood of all existing, approved and proposed developments emitting maximum noise emission at any one time appears remote. It is therefore considered that this assessment includes a degree of conservatism.

#### **11.4 Road Transport**

The increase in vehicle movements as a result of this proposal on all roads assessed is less than 0.1% during the daytime and night time periods. This corresponds to a very small, < 0.1 dB increase in the existing daytime  $L_{Aeq(15\text{hour})}$  or night time  $L_{Aeq(9\text{hour})}$  noise level and is considered negligible.

**ENVIRONMENTAL ASSESSMENT REQUIREMENTS****3. Noise Emissions**

Noise levels within the Port of Newcastle have been identified as a significant issue. Recently prepared noise impact assessments for new developments indicate that the existing noise levels in residential areas of Carrington, Stockton and the Newcastle foreshore already exceed the DECC's recommended background planning noise levels.

The EA must include a comprehensive noise assessment of the existing environment, potential impacts, and proposed noise amelioration measures over the life of the development. The EA should identify all potential noise sources and describe the extent to which noise emissions are likely to impact on any residences in the vicinity of the site including, but not necessarily limited to, the residential areas of Newcastle, Stockton, and Carrington. The New South Wales Industrial Noise Policy (DECC, 2000) provides a comprehensive guide to the determination of background noise levels, prediction of likely noise levels and assessment of noise impacts. The EA should clearly show that the process detailed in this policy has been closely followed.

The evaluation should cover the construction and operational phases of the development over the operating hours proposed, and take into account adverse weather conditions including temperature inversions. Sound power levels measured or estimated for all plant and equipment should be clearly stated and justified. Additionally, the EA should include an assessment of

cumulative noise impacts, having regard to existing developments and any developments which have received development consent in the Port area but which have not commenced.

**3.1 Road Traffic Noise**

Road transport of cargo from the development site has the potential to increase disturbance in residential areas in the immediate vicinity of the development, and along transport routes more distant from the development site. To assess the extent of the impact, the noise assessment should identify the transport route(s) to be used and quantify the noise impacts. The guidelines contained in the DECC's publication "Environmental Criteria for Road Traffic Noise (June 1999)" describes the methods used to determine noise planning levels for road traffic noise in locations of varying sensitivity.

The methodology, data and assumptions used to assess the impact of road haulage on residential properties must be fully documented and justified.

Where disturbance due to road transport is likely to exceed the recommended criteria, the EA must describe the measures proposed to mitigate the impacts and the extent to which the measures are likely to be effective in achieving the relevant criteria.

If the planning noise levels cannot be achieved after applying the best practicable noise control measures, additional information should be provided to demonstrate the socio-economic benefits of the proposal. This information may include:

- i) the overall value of the development in an economic sense to the region and the State;
- ii) the overall value of the development in a social sense to the region;
- iii) changed land use values; and
- iv) community acceptance.

PLANT AND EQUIPMNET LIST FOR PROPOSED BIO-DIESEL PLANT

**EQUIPMENT SPECIFICATION FOR CONCEPT BIODIESEL PLANT**

The following equipment will comprise the proposed biodiesel plant:

Table 1 – Equipment Specification for the Oil Intake System and drying evaporator		
Item	Quantity	Description
	One (1) only,	oil vessel
	One (1) only,	Heat Exchanger to pre-heat soybean oil
	Two (2) only,	Oil transfer pump
	One (1) only,	oil filter
	One (1) only,	Flow meter
	One (1) only,	Valve set for the system
	One (1) only,	Set of inter-connecting piping and fittings for the system.
	One (1) only,	Drying evaporator for high moisture feedstock

Table 2 – Equipment Specification for the Methanol System		
Item	Quantity	Description
	One (1) only,	Methanol / Ethanol storage vessel
	One (1) only,	KOH hopper
	One (1) only,	Methanol / Ethanol -KOH vessel, cooled via jacket
	One (1) only,	Methanol / Ethanol -KOH batch vessel
	Three (3) only,	Methanol/ Ethanol /KOH transfer pumps
	Three (3) only,	Flow meters
	One (1) only,	Methoxide eductor reactor system
	One (1) only,	Valve set for the system
	One (1) only,	Set of inter-connecting piping and fittings for the system.

Table 3 – Equipment Specification for the Reactors		
Item	Quantity	Description
a.	Two (2) only,	Reactor
b.	Two (2) only,	SS settling vessel with integral biodiesel skimmer system
c.	One (1) only,	Flow meter
d.	Two (2) only,	Static mixer
e.	Four (4) only,	Transfer pumps
f.	One (1) only,	Valve set for the system
g.	One (1) only,	Set of inter-connecting piping and fittings for the system.

## PLANT AND EQUIPMNET LIST FOR PROPOSED BIO-DIESEL PLANT

Item	Quantity	Description
	One (1) only,	Raw glycerin vessel
	One (1) only,	Glycerin vessel
	One (1) only,	Free fatty acid vessel
d.	One (1) only,	Acid dosing system
e.	One (1) only,	Valve set for the system
f.	Two (2) only,	Transfer pump
g.	One (1) only,	Set of inter-connecting piping and fittings for the system.

Item	Quantity	Description
a.	One (1) only,	Softened water storage vessel
b.	One (1) only,	Water wash settling vessel
c.	One (1) only,	Acid storage vessel
d.	One (1) only,	Acid wash settling vessel
e.	One (1) only,	Water and soap collection and reaction vessel
f.	Two (2) only,	Flow meter
g.	One (1) only,	Heat exchanger
h.	Six (6) only,	Transfer pumps
i.	Two (2) only,	Static mixers
j.	One (1) only,	Valve set for the system
k.	One (1) only,	Coalescer device
l.	One (1) only,	Set of inter-connecting piping and fittings for the system.

PLANT AND EQUIPMNET LIST FOR PROPOSED BIO-DIESEL PLANT

Table 6 – Equipment Specification for the Biodiesel Evaporator		
Item	Quantity	Description
	One (1) only,	Evaporator, manufactured in SS316, containing: Internal SS316 calandria bundle SL2 heads in SS316 Inlet and outlet nozzles
	One (1) only,	Vapour separator vessel in SS316, containing: Inlet duct with tangential entry Outlet duct for vapor flow Outlet nozzle for product recovery Internal mist eliminator to reduce liquid droplet entrainment into the vapor duct.
	One (1) only,	Vapour condenser manufactured in SS304, containing: Internal SS304 calandria bundle Inlet and outlet nozzles
	One (1) only,	Centrifugal re-circulation pump
	One (1) only,	Product transfer pump in SS316.
	One (1) only,	Inlet feed pump, helical rotor type with SS wetted parts.
	One (1) only,	Grit strainer.
	One (1) only,	Heat recovery heat exchanger, plate type.
	One (1) only,	Steam control set including: Steam strainer Steam control valve Steam pressure reducing valve Steam temperate controller Steam shutoff valve
	One (1) only,	Valve set for the system
	One (1) only,	Set of inter-connecting piping and fittings for the system.
	One (1) only,	Set of control instrumentation

PLANT AND EQUIPMNET LIST FOR PROPOSED BIO-DIESEL PLANT

Table 7 – Equipment Specification for the Methanol Evaporator		
Item	Quantity	Description
	One (1) only,	Evaporator, manufactured in SS316, containing: Internal SS316 calandria bundle SL2 heads in SS316 Inlet and outlet nozzles
	One (1) only,	Vapour separator vessel in SS316, containing: Inlet duct with tangential entry Outlet duct for vapor flow Outlet nozzle for product recovery Internal mist eliminator to reduce liquid droplet entrainment into the vapor duct.
	One (1) only,	Vapour condenser manufactured in SS304, containing: Internal SS304 calandria bundle Inlet and outlet nozzles
	One (1) only,	Centrifugal re-circulation pump
	One (1) only,	Product transfer pump in SS316.
	One (1) only,	Inlet feed pump, helical rotor type with SS wetted parts.
	One (1) only,	Grit strainer.
	One (1) only,	Heat recovery heat exchanger, plate type.
	One (1) only,	Steam control set including: Steam strainer Steam control valve Steam pressure reducing valve Steam temperate controller Steam shutoff valve
	One (1) only,	Valve set for the system
	One (1) only,	Set of inter-connecting piping and fittings for the system.
	One (1) only,	Set of control instrumentation

Table 8 – Equipment Specification for the Biodiesel Storage System		
Item	Quantity	Description
	One (1) only,	Finished biodiesel intermediate storage vessel
	One (1) only,	Off spec material vessel
	Two (2) only,	Flow meters
	One (1) only,	Valve set for the system
	One (1) only,	Set of inter-connecting piping and fittings for the system.

## PLANT AND EQUIPMNET LIST FOR PROPOSED BIO-DIESEL PLANT

Item	Quantity	Description
	One (1) only,	IC-SEP* unit with 304 stainless steel housing
	One (1) only,	Set of patented ISG nozzles and liners for wastewater aeration
	One (1) only,	Progressive cavity pump for IC-SEP* system (continuous duty)
	One (1) only,	304 stainless steel retention vessel including PVC inline mixer
	One (1) only,	304 stainless steel flotation vessel comprising: One (1) only aerated effluent diffusion plate One (1) only aerated solids overflow weir One (1) only aerated solids scraper comes with gear motor with electric motor One (1) only mixing tee
	One (1) only,	Air admission set comprising: Plastic air flow meter Needle valve Needle valve for air flow adjustment
	One (1) only,	In feed pump
	One (1) only,	IC-SEP* skid assembly
	One (1) only,	Valve set for the system
	One (1) only,	Set of inter-connecting piping and fittings for the system.

Item	Quantity	Description
	One (1) only,	8 bar(g) gas/biodiesel fired boiler
	One (1) only,	Boiler feed water treatment system
	One (1) only,	Chiller unit for methanol condenser
	One (1) only,	Cooling tower unit for evaporator condenser duty
	One (1) only,	Installation of the above items
	One (1) only,	Set of inter-connecting piping and fittings for the systems

## PLANT AND EQUIPMNET LIST FOR PROPOSED BIO-DIESEL PLANT

Item	Quantity	Description
	One (1) only,	Air compressor for air actuation of valves
	One (1) only,	Set air operated control valves as required
	One(1) only,	Set of instrument and electrical cable trays/conduits
	One (1) only,	Complete set of Instrumentation for all equipment to ensure accurate control and monitoring of equipment by operators and control by PLC system.
	One (1) only,	MCC cabinet for control of all pumps, valves and instruments
	One (1) only,	Process Logic Controller (PLC) to control all plant variables
	One (1) only,	Programming of PLC and operator interfaces for continuous, accurate control of the process variables
	One (1) only,	Integration of PLC controls system into LAN Ethernet site network
	Three (3) only,	PC based operator interfaces for operator control of the plant. Including remote monitoring display for management personnel
	One (1) only,	Installation of all above items

## KOORAGANG ISLAND METEOROLOGICAL DATA SET - MAY 2004 TO APRIL 2006

**Table C1 Seasonal Frequency of Occurrence Wind Speed Intervals - Daytime**

Period	Calm (<0.5 m/s)	Wind Direction ±(45°)	Wind Speed		
			0.5 to 1.5 m/s	1.5 to 3 m/s	0.5 to 3 m/s
Summer	1.7	ESE	5.5	17.2	22.7
Autumn	14.8	ESE	11.3	10.1	21.3
Winter	12.2	NW	11.6	10.9	22.5
Spring	3.2	E	5.9	15.2	21.1

**Table C2 Seasonal Frequency of Occurrence Wind Speed Intervals - Evening**

Period	Calm (<0.5 m/s)	Wind Direction ±(45°)	Wind Speed		
			0.5 to 1.5 m/s	1.5 to 3 m/s	0.5 to 3 m/s
Summer	<b>9.4</b>	<b>ENE</b>	<b>18.0</b>	<b>18.9</b>	<b>36.8</b>
Autumn	<b>36.8</b>	<b>WNW</b>	<b>11.4</b>	<b>4.7</b>	<b>16.1</b>
Winter	<b>29.6</b>	<b>NW</b>	<b>16.0</b>	<b>9.7</b>	<b>25.7</b>
Spring	<b>19.8</b>	<b>NE</b>	<b>19.7</b>	<b>13.3</b>	<b>32.9</b>

**Table C3 Seasonal Frequency of Occurrence Wind Speed Intervals - Night-time**

Period	Calm (<0.5 m/s)	Wind Direction ±(45°)	Wind Speed		
			0.5 to 1.5 m/s	1.5 to 3 m/s	0.5 to 3 m/s
Summer	<b>25.4</b>	<b>SE</b>	<b>14.0</b>	<b>5.6</b>	<b>19.6</b>
Autumn	<b>33.2</b>	<b>WNW</b>	<b>15.6</b>	<b>8.3</b>	<b>23.8</b>
Winter	<b>29.1</b>	<b>WNW</b>	<b>24.3</b>	<b>15.3</b>	<b>39.6</b>
Spring	<b>29.9</b>	<b>NW</b>	<b>18.3</b>	<b>6.5</b>	<b>24.8</b>

Season	Winds ± 45° ≤3 m/s with Frequency of Occurrence ≥30%		
	Daytime	Evening <sup>1</sup>	Night-time <sup>1</sup>
Summer	Nil	NE 34.2, ENE 36.8, E 35.4, ESE 30.9	Nil
Autumn	Nil	Nil	Nil
Winter	Nil	Nil	W31.8, WNW 39.6, NW 39.3
Spring	Nil	NE 32.9, ENE 30.1	Nil

**Table C4 Frequency of Occurrence of Atmospheric Stability Classes - Evening & Night-time**

Stability Class	Frequency of Occurrence				Estimated ELR °C/100 m	Qualitative Description
	Summer	Autumn	Winter	Spring		
A	0.0%	0.0%	0.0%	0.0%	<-1.9	Lapse
B	0.0%	0.0%	0.0%	0.0%	-1.9 to -1.7	Lapse
C	0.0%	0.0%	0.0%	0.0%	-1.7 to -1.5	Lapse
D	14.4%	21.6%	23.0%	16.4%	-1.5 to -0.5	Neutral
E	16.3%	19.7%	17.6%	15.9%	-0.5 to 1.5	Weak Inversion
F	68.8%	57.6%	58.1%	66.4%	1.5 to 4	Moderate Inversion
G	0.5%	1.2%	1.2%	1.4%	>4.0	Strong Inversion

Note: ELR (Environmental Lapse Rate).

## BACKGROUND NOISE MEASUREMENT METHODOLOGY AND RESULTS

### 3.1 Overview of Methodology

A noise monitoring programme was conducted in April 2006 to quantify background noise levels (ie all noise sources) and to estimate industrial noise only (ie in the absence of transport, natural and domestic noise) at ten representative residential, commercial and industrial receiver areas in the vicinity of Kooragang Island in relation to the proposed Newcastle Coal Export Terminal (EA Resource Strategies 2006). Supplementary noise monitoring was carried-out at two additional locations, Fern Bay North (FN1) and Fern Bay West (FW3) commencing Tuesday 25 July 2006 for a period of 10 days.

In order to supplement the unattended logger measurements and to assist in identifying the character and duration of the noise sources, operator-attended daytime, evening, and night-time surveys were also conducted at all twelve logging locations. The background noise monitoring programme was implemented in accordance with AS 1055-1997 "Acoustics-Description and Measurement of Environmental Noise" and the NSW Industrial Noise Policy (INP) 2000.

### 3.2 Instrumentation and Measurement Parameters

#### Unattended Monitoring and Operator-Attended Surveys

All acoustic instrumentation employed throughout the noise monitoring programme has been designed to comply with the requirements of AS 1259.2-1990, "Sound Level Meters" and carries current National Association of Testing Authorities (NATA) or manufacturer calibration certificates.

A description of instrumentation, designated type and serial numbers is shown in **Table D1**.

**Table D1 Acoustic Instrumentation Schedule**

Receiver Area	ID/Location (Ref <sup>1</sup> )	Logger Position	Instrumentation
Fern Bay North Residential	FN1 (BG5 <sup>1</sup> ) Bayway Village Nelson Bay Road	Adjacent to Bayway Village Entrance (25m from roadside)	194561
Fern Bay West Residential	FW1 (BG4 <sup>1</sup> ) 1 Fullerton Lane FW3 30 Nelson Bay Road	Front fence boundary Front fence boundary (25m from roadside)	194528 194662
Fern Bay East Residential	FE1 21 Braid Road	Front fence boundary	194591
Stockton West Residential	SW1 (BG1 <sup>1</sup> ) 284 Fullerton Street	Front fence boundary	194801
Stockton East Residential	SE1 40 Eames Avenue	Side fence boundary	194627
Warabrook/Mayfield West Residential	W1 47 Stevenson Avenue W2 4 Groongal Street	Front fence boundary Front fence boundary	194625 16004038
Mayfield Residential	M1 68 Bull Street	Side fence boundary	16004033
Sandgate Commercial	SG1 4 Mangrove Road	Side fence boundary	16004034
Kooragang Island Industrial	KI1 Blue Circle Southern	Eastern Boundary - adjacent to railway line and administration buildings	194574
Mayfield North Industrial	MN1 OneSteel	River Frontage - adjacent to railway line and administration buildings	16203528

Note 1: EIS 1996 measurement Location reference

**BACKGROUND NOISE MEASUREMENT METHODOLOGY AND RESULTS**

All instrumentation was programmed to record continuously the noise exceedance levels in 15 minute intervals including the L<sub>Amax</sub>, LA<sub>1</sub>, LA<sub>10</sub>, LA<sub>50</sub>, LA<sub>90</sub>, LA<sub>99</sub>, L<sub>Amin</sub> and the L<sub>Aeq</sub>. Instrument calibration was conducted before and after each measurement survey, with the variation in calibrated levels not exceeding ±0.5 dBA.

**Weather Monitoring Station**

Meteorological data was obtained from the permanent automatic weather station located at the Port Waratah Coal Services Ltd (PWCS) Administration Building on Kooragang Island.

**3.3 Unattended Background Noise Monitoring Results**

The unattended background noise logger data from each monitoring location, together with the on-site weather conditions were analysed on a daily basis.

The statistical noise exceedance levels (L<sub>AN</sub>) are the levels exceeded for N% of the interval period. The LA<sub>90</sub> represents the level exceeded for 90% of the interval period and is referred to as the average minimum or background noise level. The LA<sub>10</sub> is the level exceeded for 10% of the time and is usually referred to as the average maximum noise level. The L<sub>Aeq</sub> is the equivalent continuous sound pressure level and represents the steady sound level which is equal in energy to the fluctuating level over the interval period.

Prior to further analysis, the background noise data from each location which correlated with periods of unstable weather (eg rainfall greater than 0.5 mm or wind speed greater than 5 m/s) were discarded. The acceptable background noise data was then processed in accordance with the INP “Appendix B - Applying the Background Noise Policy” to derive the Monday to Sunday background noise levels presented in **Table D2**.

**Table D2 Unattended Noise Logger Results 2006 (dBA re 20 µPa)**

Receiver Area	ID (Ref <sup>1</sup> )	Measured RBL All Noise Sources			Measured L <sub>Aeq</sub> (period) <sup>2</sup> All Noise Sources			Estimated L <sub>Aeq</sub> (period) <sup>2</sup> Industrial Noise Only		
		Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
Fern Bay West Residential	FW1 (BG4 <sup>1</sup> )	50	43	44	60	55	54	<54	46	48
		47	45	43	63	62	57	<54	44	44
Stockton West Residential	SW1 (BG1 <sup>1</sup> )	42	44	44	63	57	59	<54	47	48
Mayfield Residential	M1	47	49	47	58	53	52	<54	49	48
Kooragang Island Industrial	KI1	51	51	47	61	56	55	<64	53	51
Mayfield North Industrial	MN1	56	57	57	60	59	59	<64	57	57

Note 1: EIS 1996 measurement Location reference

Note 2: Daytime 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours and Night-time 2200 hours to 0700 hours.

**3.4 Operator-Attended Background Noise Survey Results**

Operator-attended noise surveys of 15 minutes duration were conducted with a precision integrating sound level meter in order to qualify the results obtained with the unattended noise loggers. During the attended noise surveys, the operator identified the character and duration of acoustically significant background noise sources. Wherever applicable the operator quantified local traffic flow and made a qualitative assessment of the prevailing weather conditions.

The daytime, evening and night-time operator-attended noise survey results are presented below:

## BACKGROUND NOISE MEASUREMENT METHODOLOGY AND RESULTS

### FW1 1 Fullerton Lane, Fern Bay West

Date/Start Time Weather		Primary Noise Descriptor (dBA re 20uPa)					Typical maximum Levels L <sub>Amax</sub> - dBA
		Leq	L1	L10	L50	L90	
Day 4/4/06 1640 hrs 5 Okta 26°C 45% Calm - 1 m/s N	Ambient	66	72	69	65	59	Traffic 65-70
	Industrial	Estimated LAeq 50 dBA					Bicycle 67 Birds 66 Insects <40 Industrial 50
Day 10/4/06 1600 hrs 0-1 Okta 21°C 55% 2-3 m/s E	Ambient	66	74	69	63	57	Truck 74-76
	Industrial	Not discernable					Cars 61-69 Aeroplane 58-60
Day 10/4/06 1615 hrs 0-1 Okta 21°C 55% 2-3 m/s E	Ambient	66	75	69	63	52	Truck 70-72
	Industrial	Not discernable					Motorbike 65-67 Cars 63-65 Dog 51-53 Birds 49-51
Evening 3/4/06 2050 hrs 0 Okta 20°C 50% Calm -1 m/s S	Ambient	57	66	61	52	44	Traffic 49-63
	Industrial	Estimated LAeq 40 dBA					Insects 41-42 Industrial 40
Evening 10/4/06 1900 hrs 0 Okta 18°C 60% Calm - 1 m/s E	Ambient	58	67	62	56	50	Traffic 55-67
	Industrial	Not discernable					Music 50-52 Insects <50
Evening 10/4/06 1915 hrs 0 Okta 19°C 65% Calm - 1 m/s E	Ambient	58	67	62	55	49	Traffic 60-72
	Industrial	Not discernable					Music 50-52
Night 4/4/06 2300 hrs 6-7 Okta 21°C 65% Calm	Ambient	57	67	60	53	49	Traffic 52-61
	Industrial	Estimated LAeq 49 dBA					Insects 45-48 Industrial 49
Night 10/4/06 2310 hrs 1-2 Okta 17°C 75% Calm	Ambient	53	64	58	44	39	Traffic 51-68
	Industrial	Not discernable					Power lines 37-38 Insects 38-39
Night 10/4/06 2325 hrs 1-2 Okta 17°C 80% Calm	Ambient	54	63	58	46	40	Traffic 58-63
	Industrial	Estimated LAeq <35 dBA					Power line 39-40 Industrial <35

## BACKGROUND NOISE MEASUREMENT METHODOLOGY AND RESULTS

### SW1 284 Fullerton Street, Stockton West

Date/Start Time Weather		Primary Noise Descriptor (dBA re 20uPa)					Typical maximum Levels L <sub>Amax</sub> - dBA
		Leq	L1	L10	L50	L90	
Day 4/4/06 1720 hrs 5 Okta 26°C 45% Calm - 1 m/s W	Ambient	62	76	65	57	52	Traffic 59-61 Dog 59, 65 Industrial 51
	Industrial	Estimated LAeq 51 dBA					
Day 10/4/06 1635 hrs 1 Okta 21°C 50% 2-3 m/s E	Ambient	59	70	62	51	44	Near traffic 57-58 Local traffic 51-52 Bus 67-72 Dog 65-68 Ocean 45-46
	Industrial	No contribution					
Day 10/4/06 1650 hrs 0-1 Okta 20°C 55% 2-3 m/s E	Ambient	57	66	62	51	45	Traffic 55 Bird 52 Dog 51-73 Residential 51-55 Aeroplane 51-52 Wind 45-48
	Industrial	No contribution					
Evening 3/4/06 2125 hrs 2-3 Okta 21°C 50% Calm	Ambient	56	67	59	49	48	Traffic 54-65 Horn 55 Reversing alarm 47 Insects 41-42 Industrial 48
	Industrial	Estimated LAeq 48 dBA					
Evening 10/4/06 1930 hrs 0 Okta 20°C 66% Calm	Ambient	56	66	59	49	47	Traffic 61-62 Industrial <45
	Industrial	Estimated LAeq <45 dBA					
Evening 10/4/06 1945 hrs 0 Okta 21°C 60% Calm	Ambient	58	68	62	50	47	Traffic 58-64 Aeroplane 64-67 Residential 47-48 Insects 45 Industrial <45
	Industrial	Estimated LAeq <45 dBA					
Night 4/4/06 2325 hrs 7-8 Okta 20°C 65% Calm - 1 m/s W	Ambient	53	63	53	52	50	Wind 45 Industrial 49
	Industrial	Estimated LAeq 49 dBA					
Night 10/4/06 2340 hrs 1 Okta 17°C 80% Calm	Ambient	53	62	52	51	50	Traffic 55-57 Industrial 49
	Industrial	Estimated LAeq 49 dBA					
Night 10/4/06 2355 hrs 0-1 Okta 17°C 85% Calm	Ambient	53	63	53	52	51	Traffic 55-60 Industrial 50
	Industrial	Estimated LAeq 50 dBA					

BACKGROUND NOISE MEASUREMENT METHODOLOGY AND RESULTS

**K11 Blue Circle Southern, Kooragang Island**

Date/Start Time Weather		Primary Noise Descriptor (dBA re 20uPa)					Typical maximum Levels L <sub>Amax</sub> - dBA
		Leq	L1	L10	L50	L90	
Day 4/4/06 1745 hrs 6 Okta 24°C 50% Calm - 1 m/s N	Ambient	58	65	59	58	56	Traffic 59 Aeroplane 67-74 Plant 57
	Industrial	Estimated LAeq 57 dBA					
Day 10/4/06 1730 hrs 0-1 Okta 18°C 40% Calm - 1 m/s NE	Ambient	60	66	61	59	57	Traffic 59-67 Plant 57
	Industrial	Estimated LAeq 57 dBA					
Day 10/4/06 1745 hrs 0-1 Okta 18°C 40% Calm - 1 m/s NE	Ambient	58	63	59	57	56	Traffic 59-67 Plant 56
	Industrial	Estimated LAeq 56 dBA					
Evening 4/4/06 1815 hrs 6 Okta 24°C 60% Calm	Ambient	56	61	58	56	53	Traffic 56-57 Plant 54
	Industrial	Estimated LAeq 54 dBA					
Evening 10/4/06 1800 hrs 2 Okta 24°C 60% Calm - 1 m/s NE	Ambient	58	61	59	58	56	Traffic 59-67 Plant 54
	Industrial	Estimated LAeq 54 dBA					
Evening 10/4/06 1815 hrs 2 Okta 19°C 70% Calm - 1 m/s NE	Ambient	56	63	58	55	54	Traffic 59-67 Plant 54
	Industrial	Estimated LAeq 54 dBA					
Night 3/4/06 2210 hrs 4 Okta 17°C 65% Calm	Ambient	59	66	61	57	55	Traffic 54-62 Horn 63 Pump 57 Plant 55
	Industrial	Estimated LAeq 55 dBA					
Night 10/4/06 2210 hrs 2 Okta 18°C 85% Calm - 1 m/s NE	Ambient	53	60	54	52	51	Traffic 50-52 Truck 66-68 Cars 55 Plant 50 Siren 46
	Industrial	Estimated LAeq 50 dBA					
Night 10/4/06 2225 hrs 2 Okta 18°C 85% Calm - 1 m/s NE	Ambient	55	65	55	52	51	Traffic 50-52 Exhaust brake 77 Truck 66-68 Cars 55 Plant 52 Siren 48
	Industrial	Estimated LAeq 52 dBA					

## BACKGROUND NOISE MEASUREMENT METHODOLOGY AND RESULTS

### MN1 OneSteel, Mayfield North

Date/Start Time Weather		Primary Noise Descriptor (dBA re 20uPa)					Typical maximum Levels L <sub>Amax</sub> - dBA
		Leq	L1	L10	L50	L90	
Day 4/4/06 1750 hrs 6 Okta 25°C 45% 1-2 m/s W	Ambient	63	65	63	63	62	Radio 68-70 Plant 60-66
	Industrial	Estimated LAeq 63 dBA					
Day 10/4/06 1715 hrs 0-1 Okta 20°C 55% 1 m/s E	Ambient	63	74	64	60	59	Distant Traffic 59-61 Truck 77-79 Forklift 68-70 Plant 59-61
	Industrial	Estimated LAeq 63 dBA					
Day 10/4/06 1730 hrs 0-1 Okta 20°C 55% 1 m/s E	Ambient	62	71	63	60	59	Trucks 64-74 Plant 59-61
	Industrial	Estimated LAeq 62 dBA					
Day 10/4/06 1745 hrs 0-1 Okta 19°C 60% 2 m/s E	Ambient	61	63	61	61	59	Plant 60-62
	Industrial	Estimated LAeq 61 dBA					
Evening 4/4/06 1810 hrs 6 Okta 25°C 60% 1-2 m/s W	Ambient	63	67	63	63	62	Truck 75 Plant 63
	Industrial	Estimated LAeq 63 dBA					
Evening 4/4/06 1830 hrs 6 Okta 25°C 60% 1-2 m/s W	Ambient	60	64	61	59	59	Trucks 65-70 Plant 60
	Industrial	Estimated LAeq 60 dBA					
Evening 4/4/06 1845 hrs 6 Okta 25°C 60% 1-2 m/s W	Ambient	60	65	61	59	59	Trucks 65-75 Plant 60
	Industrial	Estimated LAeq 60 dBA					
Night 4/4/06 2220hrs 7-8 Okta 20°C 60% Calm	Ambient	59	66	61	58	55	Plant 60-61
	Industrial	Estimated LAeq 61 dBA					
Night 10/4/06 2215 hrs 1-2 Okta 18°C 75% Calm	Ambient	61	64	62	61	60	Plant 61
	Industrial	Estimated LAeq 61 dBA					
Night 10/4/06 2230 hrs 0 Okta 18°C 75% Calm	Ambient	62	65	63	62	61	Plant 62 Helicopter 61-62
	Industrial	Estimated LAeq 62 dBA					

## **ENVIRONMENTAL NOISE CONTROL MANUAL - CHAPTER 171 NOISE CONTROL GUIDELINE CONSTRUCTION SITE NOISE**

Where there is likelihood of annoyance due to noise from construction sites, conditions such as the following may be specified in a development consent or building application.

This applies particularly to non-scheduled premises such as commercial buildings where a long construction time is not likely.

The criteria may not be applicable to long-term construction such as coal mines which may take several years.

Variations should be made according to local conditions.

### **Level Restrictions**

- i Construction period of 4 weeks and under.

The LA10 level measured over a period of not less than 15 minutes when the construction site is in operation must not exceed the background level by more than 20 dBA.

- ii Construction period greater than 4 weeks and not exceeding 26 weeks.

The LA10 level measured over a period of not less than 15 minutes when the construction site is in operation must not exceed the background level by more than 10 dBA.

### **Time Restrictions**

- i Monday to Friday 7.00 am to 6.00 pm.
- ii Saturday 7.00 am to 1.00 pm if inaudible on residential premises, otherwise 8.00 am to 1.00 pm.
- iii No construction work to take place on Sunday or Public Holidays.

### **Silencing**

All possible steps should be taken to silence construction site equipment. It is particularly important that silenced equipment should be used on road or rail works where 24 hour operation is necessary.

# Appendix F

Report 30-1559-R1

NOISE CONTOURS



**Kooragang Island**

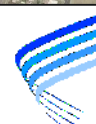
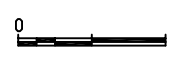
**Fern Bay**

**Mayfield**

**Carrington**

**Stockton**

75 mm ON ORIGINAL  
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75



**Heggies Pty Ltd**  
Level 1, 14 Watt Street  
PO Box 1768  
Newcastle NSW 2300  
Email address [newcastle@heggies.com.au](mailto:newcastle@heggies.com.au)  
Telephone 02 4908 4500 Facsimile 02 4908 4501

30-1559 Manildra Park  
Ship Refuelling and Bio Diesel Plant  
Construction Worst Case

REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED
0	14/09/07		RL	DW

FILE NAME  
30-1559 Master Drawing UCS 20070517.dwg

DRAWING No.  
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REVISION  
0

**Kooragang Island**

**Fern Bay**

**Mayfield**

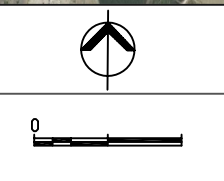
**Carrington**

**Stockton**



75 mm ON ORIGINAL

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0	13/09/07														
REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED											



**Heggies Pty Ltd**  
 Level 1, 14 Watt Street  
 PO Box 1768  
 Newcastle NSW 2300  
 Email address newcastle@heggies.com.au  
 Telephone 02 4908 4500 Facsimile 02 4908 4501

FILE NAME  
 30-1559 Master Drawing UCS 20070517.dwg

30-1559 Manildra Park  
 Ship Refuelling and Bio Diesel Plant  
 Intrusive- Night Time Worst Case

DRAWING No.  
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 0

**Kooragang Island**

**Fern Bay**

**Mayfield**

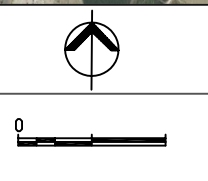
**Stockton**

**Carrington**



75 mm ON ORIGINAL  
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0	13/09/07		RL	DW
REV.	DATE	AMENDMENT / ISSUE DESCRIPTION	PREPARED	CHECKED



**Heggies Pty Ltd**  
 Level 1, 14 Watt Street  
 PO Box 1768  
 Newcastle NSW 2300  
 Email address newcastle@heggies.com.au  
 Telephone 02 4908 4500 Facsimile 02 4908 4501

FILE NAME  
 30-1559 Master Drawing UCS 20070517.dwg

30-1559 Manildra Park  
 Ship Refuelling and Bio Diesel Plant  
 Amenity - Night Time Worst Case

DRAWING No.  
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REVISION  
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