REVERB ACOUSTICS

Noise and Vibration Consultants

Oakburn Processing Facility & Rendering Plant 1154 Gunnedah Road Westdale NSW

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Building Acoustics-Council/EPA Submissions-Modelling-Compliance-Certification

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SECTION 1
Introduction

1.1 INTRODUCTION

Reverb Acoustics has been commissioned to conduct a revised noise impact assessment for relocation of Baiada's Out Street, Tamworth Processing Plant to 1154 Gunnedah Road, Westdale. The new Processing Plant will be capable of processing up to 3 million birds per week and will be located directly south of the existing Rendering Plant, which will also increase production from 120 tonnes to 240 tonnes of finished product per day.

The purpose of the assessment is to determine the noise impact, operation of the site would have on the surrounding rural environment, and to ensure any noise control measures required are incorporated during the design stages. The assessment is to accompany and forms part of an Environmental Impact Statement (EIS) to support Development Consent to the Department of Planning, Industry and Environment (DPIE).

1.2 TECHNICAL REFERENCE / DOCUMENTS

Beranek, L.L and Istvan, L.V. (1992). *Noise and Vibration Control Engineering.* John Wiley and Sons, Inc.

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Peterson, A.P.G. (1980). *Handbook of Noise Measurement*. Massachusetts, Genrad Inc.

Sharland, I. (1998). *Woods Practical Guide to Noise Control.* England, Woods Acoustics

AS 1055.1.2.3-1997 *"Acoustics – Description and measurement of environmental noise"*.

NSW Environment Protection Authority (2017). *Noise Policy for Industry.*

NSW Environment Protection Authority (1999). *Environmental Criteria for Road Traffic Noise*

NSW Roads and Traffic Authority (2001). *Environmental Noise Management Manual*

HK Clarke & Associates Pty Ltd (1997). *A Noise Impact Assessment for the Proposed Poultry Processing Plant on the Oxley Highway, Tamworth.*

Reverb Acoustics Pty Ltd (October 2018). *Noise Impact Assessment. Increase in Production. Oakburn Rendering Plant. Oxley Highway, Tamworth, NSW (ref: 16-1990-R2)*

A Glossary of commonly used acoustical terms is presented in Appendix A to aid the reader in understanding the Report.

SECTION 2
Project Description
Existing Acoustic Environment
Assessment Criteria

2.1 PROJECT DESCRIPTION

The proposal includes relocation of Baiada's Out Street, Tamworth, Processing Plant to 1154 Gunnedah Road, Westdale, in conjunction with an increase in production to 3 million birds per week, with an increase from 120 tonnes to 240 tonnes of finished product per day at the existing rendering plant. It should be noted that current approved operating hours are 24 hours/day 7 days/week.

Noise sources at the site that must be considered as part of the assessment include fixed and mobile plant and equipment, and truck movements. Other noise sources include general site noise such as employee vehicle movements, delivery vehicles, mechanical equipment and other maintenance machinery. All vehicles and trucks will enter and leave the site via the dedicated access road connecting to Workshop Lane within the Glen Artney industrial estate.

The assessment includes measurement of the existing acoustic environment by Reverb Acoustics to provide baseline data and enable establishment of noise assessment criteria. Noise impacts from trucks are assessed at typical residences along the transport route.

2.2 EXISTING ACOUSTIC ENVIRONMENT

Consideration must be given to the extent of the existing acoustic environment and whether such levels are appropriate for the land use of the receiver area. Nearest residential receivers identified during our site visits are as follows:

R1. Girrawheen: Old Winton Road, 1700m west of the site.
R2. Abbeylands: Bowler's Lane, 1100m north of the site.
R3. The Billabong: Wallamore Road, 1600m east of the site.
R4. Various Residences: New Winton Road (south of airport), 2500m south of the site.

Background noise level surveys were conducted previously for the original assessment at the site in 2007. The data is relatively old therefore, attended background noise level monitoring was conducted at residential receivers during our site visits on 28-29 August 2016 and July 2018 to update the data. To formalise background data long-term monitoring was conducted in July 2018 in Bowlers Lane approximately 600 metres from the Oxley Highway near Girrawheen R1 (Logger Location 1) and at the intersection of Bowlers Lane and Wallamore Road near Abbeylands R2 and The Billabong R3 (Logger Location 2). Table 1 shows a summary of results, with high wind/rain periods excluded prior to analysis, including the Rating Background Level's (RBL's) which were calculated from Assessment Background Levels (ABL's), for the day, evening and night periods, according to the procedures described in the EPA's NPfI and as detailed in Australian Standard AS1055-1997, "Acoustics - Description and Measurement of Environmental Noise, Part 1 General Procedures".

Table 1: Summary of Noise Monitoring Results, dB(A)

Background L90			Ambient Leq		
Day 7am-6pm	Evening 6pm-10pm	Night 10pm-7am	Day 7am-6pm	Evening 6pm-10pm	Night 10pm-7am
Logger Location 1					
31.3	25.1	20.6	57.1	53.0	49.5
Logger Location 2					
29.7	28.5	25.5	51.6	46.3	46.4

The above background (L90) noise levels are below the minimum assumed RBL's specified in Table 2.1 of the NPfI. Therefore, for assessment purposes the minimum RBL's have been adopted in all receiver areas for assessment purposes, i.e. 35dB(A),L90 for day (7am-6pm) and 30dB(A) for the evening and night (6pm -10pm and 10pm-7am).

Figure 1: Site Plan

2.3 CRITERIA

2.3.1 Road Traffic Noise

The Roads and Maritime Services (RMS) base their assessment criteria on those outlined by EPA. Noise reduction measures for new and existing developments should endeavour to meet the noise level targets set out in the EPA's NSW Road Noise Policy (RNP) which contains a number of criteria applied to a variety of road categories (freeway, arterial, sub-arterial and local roads) and situations (new, upgraded roads and new developments affected by road traffic). Table 2 shows the relevant categories, taken from Table 3 of the RNP:

Table 2: - Extract from Table 3 of RNP Showing Relevant Criteria.

Road Category	Day	Night
Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments.	60 LAeq,15hr (external)	55 LAeq,9hr (external)
Existing residences affected by additional traffic on existing local roads generated by land use developments.	55 LAeq,1hr (external)	50 LAeq,1hr (external)

In addition to the assessment criteria detailed above, the increase in total traffic noise must also be considered. Reproduced below in Table 3 are the relative increase criteria that trigger consideration of mitigation measures:

Table 3: - Reproduced Table 6 of RNP
Relative Increase Criteria for Residential Land Uses

Road Category	Type of Project/Development	Total Traffic Noise Level Increase–dB(A)	
		Day (7am-10pm)	Night (10pm-7am)
Freeway/arterial/sub-arterial roads & transitways	New road corridor / redevelopment of existing road/land use development with the potential to generate additional traffic on existing road	Existing traffic LAeq,(15hr)+12dB	Existing traffic LAeq,(9hr)+12dB

Road categories are defined in the RNP are as follows:

Freeway/arterial	Support major regional and inter-regional traffic movement. Freeways and motorways usually feature strict access control via grade separated interchanges.
Sub-arterial	Provide connection between arterial roads and local roads. May provide a support role to arterial roads during peak periods. May have been designed as local streets but can serve major traffic generators or non-local traffic functions. Previously designated as “collector” roads in ECRTN.
Local Road	Provide vehicular access to abutting property and surrounding streets. Provide a network for the movement of pedestrians and cyclists, and enable social interaction in a neighbourhood. Should connect, where practicable, only to sub-arterial roads.

Based on the above definitions, the Oxley Highway is classified as an arterial road.

2.3.2 Site Operation (Planning Noise Levels)

Noise from industrial noise sources scheduled under the Protection of Environment Operations Act is assessed using the EPA’s NPfI. However, local Councils may also apply the criteria for land use planning, compliance and complaints management. The NPfI specifies two separate criteria designed to ensure existing and future developments meet environmental noise objectives. The first limits intrusive noise to 5dB(A) above the background noise level and the other applies to protection of amenity of particular land uses based on the existing (Leq) noise level from industrial and commercial noise sources. Project Specific Noise Levels are established for new developments by applying both criteria to the situation and adopting the more stringent of the two.

The existing L(A)eq for the receiver area is dominated by traffic on nearby roads and natural noise sources and some industrial activity. Reference to Table 2.2 of the NPfI shows that the area is classified as rural, i.e. an area generally characterised by low background noise levels (except in the immediate vicinity of industrial noise sources The Project Amenity Level is derived by subtracting 5dB(A) from the recommended amenity level shown in Table 2.2. A further +3dB(A) adjustment is required to standardise the time periods to LAeq,15 minute. The adjustments are carried out as follows:

Recommended Amenity Noise Level (Table 2.2) – 5dB(A) +3dB(A)

Table 4 below specifies the applicable project intrusiveness and amenity noise trigger levels for the proposed redevelopment.

Table 4: - Base Noise Level Objectives

Period	Intrusiveness Criterion	Amenity Criterion
Day	40 (35+5) #	48 (50-5+3)
Evening	35 (30+5) #	43 (45-5+3)
Night	35 (30+5) #	38 (40-5+3)
Receiver Type: Rural (See EPA's NPfI - Table 2.2)		

Minimum assumed RBL's EPA's NPfI Table 2.1

Project specific noise levels, determined as the more stringent of the intrusiveness criterion and the amenity / high traffic criterion, are as follows:

Day **40dB LAeq,15 Minute** 7am to 6pm Mon to Sat or 8am to 6pm Sun and Pub Hol.
Evening **35dB LAeq,15 Minute** 6pm to 10pm.
Night **35dB LAeq,15 Minute** 10pm to 7am Mon to Sat or 10pm to 8am Sun and Pub Hol.

2.3.3 Child Care Centre

The Association of Australian Acoustic Consultant's (AAAC's) document, *"Technical Guideline. Child Care Centre Noise Assessment"* recommends assessment of the noise impact within indoor play areas and sleeping areas, and outdoor play areas, when the development may be impacted upon by road and, rail traffic and industry . The document specifies the following:

External Noise	Outdoor Play Areas	55dB(A)
Indoor Noise	Play/Sleeping Areas	40dB(A)

2.3.4 Maximum Noise Level Event Assessment - Sleep Arousal

Section 2.5 of EPA's NPfI requires a detailed maximum noise level event assessment to be undertaken where the subject development/premises night-time noise levels (10pm-7am) exceed the following:

- LAeq (15 minute) 40dB(A) or the prevailing RBL plus 5dB whichever is greater, and/or
- LAFmax 52dB(A) or the prevailing RBL plus 15dB, whichever is greater.

The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the RBL, and the number of times this happens during the night period.

2.3.5 Modifying Factors - Tonality

Fact Sheet C of the NPfI defines tonal noise as follows:

Level of 1/3 octave band exceeds the level of the adjacent bands on both sides by:

- 5dB or more if the centre frequency of the band containing the tone is in the range 500-10,000Hz
- 8dB or more if the centre frequency of the band containing the tone is in the range 160-400Hz
- 15B or more if the centre frequency of the band containing the tone is in the range 25-125Hz

2.3.6 Construction Noise

Various authorities have set maximum limits on allowable levels of construction noise in different situations. Arguably the most universally acceptable criteria, and those which will be used in this Report, are taken from the NSW Environment Protection Authority's (EPA's) Interim NSW Construction Noise Guideline (ICNG). Since the project involves a significant period of construction activity, a "quantitative assessment" is required, i.e. comparison of predicted construction noise levels with relevant criteria. For assessment of noise impacts at residential receivers Table 3 of the ICNG is reproduced below in Table 5:

Table 5: - Table 3 of ICNG Showing Relevant Criteria at Residences

Time of Day	Management Level Leq (15min)	How to Apply
Recommended Standard Hours: Monday to Friday 7am to 6pm Saturday 8am to 1pm No work on Sundays or Public holidays	Noise affected RBL +10dB(A) i.e**. 45dB(A) day**	- The noise affected level represents the point above which there may be some community reaction to noise. - Where the predicted or measured $L_{AEQ\ (15min)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to minimise noise. - The proponent should also inform all potentially impacted residents of the nature of works to be carried out, expected noise levels, duration, and contact details
	Highly noise affected 75dB(A)	- The highly noise affected level represents the point above which there may be strong community reaction to noise. - Where noise is above this level, the proponent should consider very carefully if there is any other feasible and reasonable way to reduce noise to below this level. - If no quieter work method is feasible and reasonable, and the works proceed, the proponent should communicate with the impacted residents by clearly explaining duration and noise level of the works, and by describing any respite periods that will be provided.
Outside recommended Standard hours	Noise affected RBL +5dB(A)	- A strong justification would typically be required for works outside the recommended standard hours. - Proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5dB(A) above the noise affected level, the proponent should negotiate with the community. For guidance on negotiating see Sec 7.2.2

Section 4.2 of the ICNG also specifies the following external noise level limits for commercial and industrial premises.

Industrial premises	**75dB(A),Leq (15 min)**
Offices, retail outlets	**70dB(A),Leq (15 min)**

Construction will only occur during standard construction hours, i.e. 7am to 6pm Monday to Friday and 8am to 1pm on Saturday, with no construction permitted on Sundays or public holidays, unless otherwise agreed with Council. Table 6 relevant for potentially affected existing receivers (also see Figure 1).

Table 6: Criteria Summary

Assessment Location	Standard Construction Hours		Outside Standard Hours
	Noise Affected	Highly Noise Affected	
R3 – Residential Dev'p	45	75	35#
R1,R2 – Commercial Dev'p	70	75	70

#Evening and night periods.

SECTION 3
Noise Impact Assessment

3.1 METHODOLOGY

3.1.1 Road Traffic

Due to the non-continuous nature of traffic flow to and from the site, noise generated by traffic associated with the rendering plant site, on public roads, is assessed using the EPA approved US Environment Protection Agency's Intermittent Traffic Noise guidelines.

Equation 1 outlines the mathematical formula used in calculating the Leq,T noise level for intermittent traffic noise.

Equation 1:

$$L_{eq},T = L_b + 10\log\left[1+\frac{ND}{T}\left(\frac{10^{(L\max - Lb)/10}-1}{2.3}-\frac{\left(L_{\max}-L_b\right)}{10}\right)\right]$$

Where L_b background noise level (dB(A))
T is the time for each group of vehicles (min)
D is duration of noise of each vehicle (min)
L_{MAX} is vehicle noise (dB(A))
N is number of vehicle trips

Typical vehicle noise levels were sourced from our library of technical data, while background noise levels are those described in Section 2.2. The Lmax vehicle noise levels used in Equation 1 are the maximum predicted noise levels produced at the facade of a typical residence by vehicles entering and departing the site.

3.1.2 Site Activities

Noise levels produced by activities/equipment associated with the existing rendering plant were measured during our site visit on 20 July 2016 and/or sourced from our library of technical data. Noise levels produced by the proposed Processing Plant were measured at Baiada's existing processing plant facilities in Tamworth and Griffith. These noise level measurements were taken with a Svan 912AE Sound and Vibration Analyser. The instrument is Class 1 accuracy, in accordance with the requirements of IEC 61672, and has the capability to measure steady, fluctuating, intermittent and/or impulsive sound, and to compute and display percentile noise levels for the measuring period. A calibration signal was used to align the instrument train prior to measuring and checked at the conclusion. Difference in the two measurements was less than 0.5dB. Each measurement was taken over a representative time period to include all aspects of machine operation, including additional start-up noise where applicable. Items of equipment, which produced a brief burst of noise, such as a truck, were measured for a similarly brief time period to ensure the results were not influenced by long periods of inactivity between operations.

Sound measurements were generally made around all sides of each machine/activity, to enable the acoustic sound power (dB re 1pW) to be calculated. The sound power level of each item is then theoretically propagated to each receiver with allowances made for geometric spreading, directivity, molecular absorption, intervening topography or barriers and ground effects giving the received noise level at the receiver from that particular plant item.

Addition of the received Sound Pressure Level (SPL) for each of the individual operating sources gives the total SPL at each receiver, which is then compared to the relevant criteria. Where noise impacts above the criteria are identified, suitable noise control measures are implemented and reassessed to demonstrate satisfactory received noise levels.

Calculations were performed with RTA Technology Environmental Noise Model computer software, which accepts information on ground type and topography, source and receiver locations, weather details and source sound power spectra. Ground contours were obtained from topographical maps of the site and surrounds. All noise sources at the site were input into our model as point sources using the point calculation mode to determine the noise level at each receiver. Results from the noise model are presented for various scenarios in later Sections of this report.

3.1.3 Atmospheric Conditions

In the Tamworth region atmospheric conditions can exacerbate received noise levels for a percentage of the time. Temperature inversions may be expected in the area during the night and early morning at a frequency of greater than 30% of the time during winter and to a lesser degree in the warmer months. Inversion effects are strongest in the early hours of the morning but tend to weaken rapidly and may be considered to have completely dissipated by 9am or earlier. The ENM model was prepared for the following operating scenarios, as shown below (ref: NPfI Fact Sheet D):

1. Standard meteorological conditions for day/evening/night, i.e. 0.5m/s wind 10m AGL.
2. 3m/sec wind source to receiver (day/evening).
3. F-class temperature inversion of 3°C/100m and 2m/sec source to downhill receiver wind for night. (See Table C2, Appendix C-EPA's INP)

An F-class inversion, i.e. 3°C/100m, is typical in the Tamworth area and slightly weaker inversions are generally expected for coastal areas. Therefore, we have modelled this default inversion strength.

Wind in a particular direction causes increased received noise levels at downwind receivers, therefore the effect of noise enhancement due to wind has been considered. Wind will occur more often in the colder months just before dawn, implying the cause is from inversion build-up at night. The NPfI suggests a 3° inversion with 2m/sec wind downhill for an area with rainfall greater than 500mm/year (See Table C2, Appendix C). Therefore, modelled conditions for night are 3° inversion with 2m/sec wind in each direction. Alternatively, a 3m/sec wind could have been modelled, however, less noise enhancement is given for a wind of this strength in all directions, hence the preferred modelling scenario is the former.

3.1.4 Construction Activities

Future noise and vibration sources on the site cannot be measured at this time, consequently noise and vibration levels produced by plant and machinery to be used on the site have been sourced from manufacturers' data and/or our library of technical data, which has been accumulated from measurements taken in many similar situations on other sites for others.

All noise level measurements were taken with a Svan 912A Sound & Vibration Analyser. This instrument has the capability to measure steady, fluctuating, intermittent and/or impulsive sound, and to compute and display percentile noise levels for the measuring period. A calibration signal was used to align the instrument train prior to measuring and checked at the conclusion. Difference in the two measurements was less than 0.5dB. Each measurement was taken over a representative time period to include all aspects of machine/process operation, including additional start-up noise where applicable. Sound measurements were generally made around all sides of each machine, to enable the acoustic sound power (dB re 1pW) to be calculated. The sound power level is then theoretically propagated to the receiver, with allowances made for spherical spreading.

Atmospheric absorption, directivity and ground absorption have been ignored in the calculations. As a result, predicted received noise levels are expected to slightly overstate actual received levels, thus providing a measure of conservatism. Addition of the received Sound Pressure Level (SPL) for each of the individual operating sources gives the total SPL at each receiver, which is then compared to the criteria. Where noise impacts above the criterion are identified, suitable noise control measures are implemented and reassessed to demonstrate satisfactory received noise levels.

This theoretical assessment is based on a worst-case scenario, where all plant items are operating simultaneously in locations most exposed to the receiver. In reality, most plant will be located in shielded areas, so actual received noise is expected to be less than the predictions shown in this report, or at worst equal to the predicted noise levels for only part of the time.

3.2 ANALYSIS AND DISCUSSION

3.2.1 Received Noise Levels – Road Traffic

Traffic due to the proposal travelling on nearby public roads is assessed separate to site noise and is subject to the criteria described in Section 2.3.1 of this report. Trucks will approach and depart the site from the both directions along the Oxley Highway, however, to provide a measure of conservatism, this assessment assumes all trucks and vehicles will approach and depart the site from the same direction.

Reproduced are traffic data supplied by Transport Planning Pty Ltd for the existing and anticipated vehicle movements for the site.

Table 7: - Oakburn Processing Plant & Render Plant Vehicle Movements

Trip Generator	RENDERING PLANT						PROCESSING PLANT		
	Existing Situation			Interim Modification					
	Light	Heavy	TOTAL	Light	Heavy	TOTAL	Light	Heavy	TOTAL
Staff	30	-	30	30	-	30	1966	-	1966
Render Plant Raw Material	-	58	58	-	70	70	-	40	40
Render Plant Finished Material	-	8	8	-	12	12	-	20	20
General Deliveries & Waste Collection	-	4	4	-	10	10	-	40	40
Live Birds	-	-	-	-	-	-	-	168	168
Finished Product	-	-	-	-	-	-	-	140	140
Daily Total	**30**	**70**	**100**	**30**	**92**	**122**	**1966**	**408**	**2374**
Day (7am-10pm)	**15**	**52**	**67**	**15**	**69**	**84**	**1019**	**290**	**1309**
Night (10pm-7am)	**15**	**18**	**33**	**15**	**23**	**38**	**947**	**118**	**1065**

Truck noise varies from one machine to another, with more modern larger trucks consistently producing a sound power in the range 104 to 108 dB(A) at full power. This assessment assumes a typical truck sound power of 106dB(A), as full engine power is not typically required to approach and depart the site at low speed.

Cars typically produce an average sound power of 92dB(A), however wide variations are noted particularly with smaller modern cars and larger V8 or diesel powered vehicles. Our calculations present the worst case for the situation, as the noise produced by a typical car accelerating at full power is used to determine the received noise level. In reality, many people will not leave the site at full acceleration but will depart more sedately.

Traffic Noise Calculations

The following Tables show results of traffic noise calculations, propagated to a theoretical facade at varying distances from the Oxley Highway (100km/hr zone) for existing and proposed situations. Received noise is the combined noise impact from cars and trucks at the facade of the residence.

Table 8: Traffic Noise Calc's – Oxley Highway, dB(A),Leq
EXISTING OPERATIONS – Rendering Plant

Traffic and Receiver	Day (7am-10pm)		Night (10pm-7am)	
Vehicle Type	Trucks	Cars	Trucks	Cars
Movements per period	69	15	23	15
Vehicle Sound Power	106	92	106	92
Distance to Rec, m	20			
Received Noise Level	45.0	26.3	42.6	28.1
Total Received	**45.1**		**42.8**	
Criteria	**60dB(A),Leq 15hr**		**55dB(A),Leq 9hr**	
Impact	**-**		**-**	
Distance to Rec, m	50			
Received Noise Level	41.1	23.6	38.7	25.0
Total Received	**41.1**		**38.9**	
Criteria	**60dB(A),Leq 15hr**		**55dB(A),Leq 9hr**	
Impact	**-**		**-**	
Distance to Rec, m	100			
Received Noise Level	38.1	22.1	35.7	23.1
Total Received	**38.2**		**36.0**	
Criteria	**60dB(A),Leq 15hr**		**55dB(A),Leq 9hr**	
Impact	**-**		**-**	

Table 9: Traffic Noise Calc's – Oxley Highway, dB(A),Leq
PROPOSED OPERATIONS – Upgraded Rendering Plant + New Processing plant

Traffic and Receiver	Day (7am-10pm)		Night (10pm-7am)	
Vehicle Type	Trucks	Cars	Trucks	Cars
Movements per period	359	1034	141	962
Vehicle Sound Power	106	92	106	92
Distance to Rec, m	20			
Received Noise Level	53.4	43.6	51.6	45.4
Total Received	**53.8**		**52.5**	
Criteria	**60dB(A),Leq 15hr**		**55dB(A),Leq 9hr**	
Impact	**-**		**-**	
Distance to Rec, m	50			
Received Noise Level	49.4	39.6	47.6	41.5
Total Received	**49.9**		**48.5**	
Criteria	**60dB(A),Leq 15hr**		**55dB(A),Leq 9hr**	
Impact	**-**		**-**	
Distance to Rec, m	100			
Received Noise Level	46.4	36.5	44.6	38.4
Total Received	**46.8**		**45.5**	
Criteria	**60dB(A),Leq 15hr**		**55dB(A),Leq 9hr**	
Impact	**-**		**-**	

Results in the above Tables show that noise levels from cars and trucks travelling to and from the site, for existing and proposed operations, along the Oxley Highway are compliant with the RNP day and night criteria for all residences.

The RNP also recommends that the increase in road traffic noise levels due to redevelopment of an existing land use development not exceed 12dB(A) during the day and night for freeways and arterial roads. As can be seen by the results in the above Tables, the relative increase due to the development is not expected to be more than 8.8dB(A) during the day and 9.7dB(A) at night and considered acceptable.

3.2.2 Received Noise Levels – Site Noise

The Sound Power Levels (Lw's) of plant and equipment operating at the site during the day, evening and night for proposed operations, which were input into our computer model, are shown in the following Tables. The Tables give the A-weighted sound power levels for each listed plant item, principally based on our site measurements. Also shown is the number of plant operating at each location on the site for a worst-case situation (see Appendix B).

Table 10: Plant and Equipment – Day/Evening (PROPOSED OPERATIONS)

Machine/Process	Lw dB(A)	Render Plant & Dams	Main Access Rd	Processing Plant	Loop Road
Render Plant South	**100**	1 (S1)			
Render Plant East	**89**	1 (S2)			
Render Plant North	**103**	1 (S3)			
Render Plant West	**104**	1 (S4)			
Truck Driving	**102**		1 (S5)	1 (S15)	3 (S7,S8)
Truck Idling	**90**				1 (S6)
Fork Lift	**98**			1 (S17)	1 (S9)
WWTW Pumps	**94/86**	2 (S10,S22)			
Fork lifts, Trucks, Cooling Fans	**106**			2 (S11)	
Fork Lifts, Trucks, Unload	**104**			2 (S12)	
Processing Plant North	**95**			1 (S13)	
Truck Reverse/Idle	**94**			2 (S14,S15)	
Cold Storage Blg East	**95**			1 (S16)	
Refrig Truck Units x4	**95**			4 ((S18)	
Refrig Truck Reverse	**104**			1 (S19)	
Cold Storage Blg North	**95**			1 (S20)	
Trucks Access Rd/W'bridge	**102**		2 (S21)		
Cars in Carpark	**82**			200(S23,S24)	
Secondary processing pl east	**95**			1 (S25)	
Plant, cooling towers	**108**			2 (S26)	

Table 11: Plant and Equipment – Night (PROPOSED OPERATIONS)

Machine/Process	Lw dB(A)	Render Plant & Dams	Main Access Rd	Processing Plant	Loop Road
Render Plant South	**100**	1 (S1)			
Render Plant East	**89**	1 (S2)			
Render Plant North	**103**	1 (S3)			
Render Plant West	**104**	1 (S4)			
Truck Driving	**102**		1 (S5)	1 (S15)	2 (S7,S8)
Truck Idling	**90**				1 (S6)
Fork Lift	**98**			1 (S17)	
WWTW Pumps	**94/86**	2 (S10,S22)			
Fork lifts, Trucks, Cooling Fans	**106**			2 (S11)	
Fork Lifts, Trucks, Unload	**102**			2 (S12)	
Processing Plant North	**95**			1 (S13)	
Truck Reverse/Idle	**98**			2 (S14,S15)	
Cold Storage Blg East	**95**			1 (S16)	
Refrig Truck Units x4	**95**			4 ((S18)	
Refrig Truck Reverse	**104**			1 (S19)	
Cold Storage Blg North	**95**			1 (S20)	
Trucks Access Rd/W'bridge	**102**		2 (S21)		
Surge Dam Pumps S22	**93**	2 (S22)			
Cars in Carpark	**82**			150 (S23,S24)	
Secondary processing pl east	**95**			1 (S25)	
Plant, cooling towers	**108**			2 (S26)	

Legend of assessed noise sources (see Figure 2):

S1-S4	Render plant operating at full capacity.
S5	Truck driving on main access road
S6	Truck idling in bay
S7	Truck driving on loop road (north)
S8	Truck driving on loop road (south)
S9	Fork lift operating
S10A/B	WWTP operating at full capacity
S11	Live bird fans, trucks, fork lifts
S12	Trucks idling, fork lifts unloading at Live Bird
S13	Processing plant (north)
S14,S15	Truck reverse, idle driving on loop road (south)
S16	Cold storage building (east)
S17	Fork lift operating north side processing plant
S18	Refrigerated truck units at Cold Storage
S19	Refrigerated truck reverse at Cold Storage
S20	Cold storage building (north)
S21	Trucks on main access rd & at weighbridge
S22	Pumps at dams (north)
S23,S24	Cars in main carpark
S25	Secondary processing plant east
S26	Plant, cooling towers

Additional plant and noise sources encountered on the site include split system air conditioners, small pumps, etc, all of which produce a sound power less than 75dB. Collectively, with up to 3 or 4 sources operating simultaneously on occasions, the sum could be as high as 80dB. This overall sum is at least 10dB below significant sources shown in the above Tables, therefore they will not contribute or raise the sound level at nearby receivers.

The following Table shows predicted received noise levels at nearest residential receivers under neutral and noise enhancing atmospheric conditions. Allowances have been made for intervening structures, topographical features in the calculations. Exceedances of the criteria are shown in bold.

Table 12: Received Noise Levels – Render Plant (PROPOSED OPERATIONS)
Propagated to Nearest Residential Receivers – No Noise Control

	Received Noise Levels, dB(A),Leq		
Residential Receiver	**Neutral Conditions (Day)**	**3m/sec Wind Source to Rec (Day/Evening)**	**3°C/100m Inversion (Night)**
Girrawheen R1	32	34	35
Abbeylands R2	38	**41**	**40**
The Billabong R3	33	**38**	**37**
Airport South R4	20	25	23

Criteria: All Receivers Day=40, Evening=35, Night=35.

Reference to theoretical results in the above Table shows that site operations are predicted to be compliant with the criteria at Girrawheen, and residences along New Winton Road (airport south). However, under adverse weather conditions exceedances of 2-6dB(A) are predicted at Abbeylands and The Billabong during the night and evening.

Reference to our acoustic model reveals that activities and equipment associated with the Live Bird area (trucks, fork lifts, ventilation fans) are responsible for the exceedances. Several noise control options were investigated with the most economical option detailed below:

- Erect acoustic mound or wall 2700mm above FGL along the west side of the Live Bird Module and Hardstand (see Appendix B).
- Erect acoustic barrier 2100mm above FGL adjacent to Cooling towers and associated pumps, etc, on the north side processing plant (see Appendix B).

The following Table shows recalculation of the predicted received noise levels at nearest residential receivers under neutral and noise enhancing atmospheric conditions with the above noise control modifications and strategies in place.

Table 13: Received Noise Levels – Render Plant (PROPOSED OPERATIONS) Propagated to Nearest Residential Receivers – Noise Control in Place

	Received Noise Levels, dB(A),Leq		
Residential Receiver	**Neutral Conditions (Day)**	**3m/sec Wind Source to Rec (Day/Evening)**	**3°C/100m Inversion (Night)**
Girrawheen	32	34	35
Abbeylands	33	**36**	35
The Billabong	30	35	34
Airport South	20	25	23

Criteria: All Receivers Day=40, Evening=35, Night=35.

The above Table shows that compliance with the criteria is predicted at all nearby receivers, with the exception of a minor 1dB(A) exceedance at Abbeylands under adverse weather conditions, with inclusion of the noise control detailed above. It is highly unlikely that all items included in our acoustic model will be operating simultaneously implying compliance. In saying this, there is some uncertainty in all theoretical calculations, as such, we recommended a noise monitoring program is the commissioning in the early life of the site to verify our theoretical calculations and enable further noise control strategies to be implemented in the event of any non-compliance.

3.2.3 Received Noise Levels – Short-Term Events

Noise levels from short term events such as truck movements have the potential to interrupt the sleep of nearby neighbours in the early hours of the morning. Nearest residential receivers are approximately 1100 metres from the site, with loudest events producing <40dB(A), Lmax at the residential facade, which is below the maximum noise level event limit of 52dB(A),max. Noise from short-term noise events are therefore acceptable and no further noise control is required for these sources.

It should be acknowledged that mobile plant is generally well shielded from residential receivers by intervening structures and buildings on the site and received noise is expected to be substantially lower than our predictions indicate.

3.2.4 Tonal Noise Assessment

Reverb Acoustics has completed detailed noise monitoring assessments over many years at Baiada's Processing Plant in Griffith NSW. Noise monitoring results taken at residences exposed to the sites loudest items, i.e. live bird area and processing plant have been sourced to determine the tonal content or otherwise. Shown below is our assessment of noise tonality for Baiada's plant and activities.

Tonality Assessment – Baiada's Griffith NSW Processing Plant

TONALITY ASSESSMENT																								
Data Input																								
Frequency, Hz	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.3k	1.6k	2k	2.5k	3.2k	4k	5k	6.3k	8k	10k	dB
Measured Spectrum	7.4	11.5	14.3	24.4	24.8	23.7	27.3	25.3	27.2	29.2	29.7	30.3	28.2	27.3	29.7	32.8	29.6	27.5	26.1	26	26.7	25.7	21.7	19.1	41.0
NSW EPA, Noise Policy for Industry 2017																								
Frequency, Hz	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.3k	1.6k	2k	2.5k	3.2k	4k	5k	6.3k	8k	10k	
Spectrum	7.4	11.5	14.3	24.4	24.8	23.7	27.3	25.3	27.2	29.2	29.7	30.3	28.2	27.3	29.7	32.8	29.6	27.5	26.1	26	26.7	25.7	21.7	19.1	41.0
Tonality	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Adjusted Level																									41.0

As can be seen by the above results, noise emissions at nearest receivers are not expected to contain any significant tonal components, in accordance with the requirements of Fact Sheet C of the NPfI. No further adjustments or penalties are therefore required for noise predictions at residential receivers.

3.2.5 Site Child Care Centre

The proposed child care centre will be located on the south side of the processing building. The centre will include indoor areas (i.e. play areas, cot rooms, amenities, etc) and an outdoor play area. Potential noise sources that may impact upon the child care centre are dominated by the closest items of equipment or activity. In this case, only vehicle movements in the carpark (cars driving, reversing, car doors) are noise sources of concern. Long-term monitoring conducted by Reverb Acoustics at the entrance to busy carparks, reveals that average noise levels are as high as 62dB(A),Leq, which is 7dB(A) above the criteria for child care centre outdoor play areas. As such, an acoustic fence will be required at the perimeter of the outdoor area.

The acoustic fence will provide the added advantage of shielding internal areas of the child care centre from intruding industrial noise. The difference between external and internal noise levels is typically 15dB(A) when windows are open for ventilation, for masonry structures. Therefore, based on an external noise level of <55dB(A) with the acoustic fence in place, satisfactory noise levels are expected within indoor areas of the child care centre. In saying this we do recommend that acoustic windows are installed in cot rooms.

We understand that internal areas will be air conditioned, although windows may be open to provide natural ventilation. Consideration should be given to installing ceiling fans to provide additional ventilation when windows are open.

See Section 4 for required acoustic modifications.

3.2.6 Predicted Noise levels - Construction Plant and Equipment

Received noise produced by anticipated construction activities is shown in Table 13 below, for a variety of distances to a typical receiver, with no noise barriers or acoustic shielding in place and with each item of plant operating at full power. Entries in bold type highlight exceedances of the day Noise Affected criteria of **45dB(A),Leq**.

Table 14: Predicted Plant Item Noise Levels, dB(A)Leq

		Distance to Residence			
Plant/Activity	(Lw)	1km	1.5km	2km	3km
Mobile crane	(104)	36	32	30	28
Hammering	(98)	30	26	24	22
Angle grinder	(106)	38	34	32	30
Air wrench (silenced)	(98)	30	26	24	22
Vibrating roller	(108)	40	36	34	32
Road truck	(104)	36	32	30	28
Grader	(106)	38	34	32	30
Air compressor	(98)	30	26	24	22
Concrete Agitator	(112)	44	40	38	36
Concrete Pump	(110)	42	38	36	34
Water cart	(112)	44	40	38	36
Excavator	(102)	34	30	28	26
Bull dozer	(116)	**48**	44	42	40
Rendering plant	(104)	36	32	30	28
Positrack	(106)	38	34	32	30
Circular Saw	(111)	43	39	37	35

Residential receivers are within 1 km of the site and some construction activities are may exceed the criteria, particularly mobile plant. Noise levels above 45dB(A) are possible at closest locations.

The ICNG recommends that as a first course of action, consideration should be given as to whether any alternate feasible or reasonable method of construction is possible. Consultation with the construction contractor confirms that due to the nature of ground conditions there are no quieter alternates available. The ICNG further recommends that when alternate feasible and reasonable options have been considered the proponent then should communicate with the impacted residents by clearly explaining the duration and noise level of the works, and any respite periods that will be provided. These strategies will be discussed in more detail in Section 4.

When earthworks occur noise levels in the order of 48-50dB(A) are possible at nearest locations. To reduce noise levels any appreciable amount a physical barrier would be required to intercept the line of site between the source and receivers. We suggest that temporary earthen mounds utilising available fill on site may be considered. The above strategies may reduce noise levels at residential locations by 5dB(A) or more.

It should be noted that calculations are based on plant items operating in exposed locations and at full power, with no allowances made for intervening topography or shielding provided by intervening structures. Cumulative impacts, from several machines operating simultaneously, may be reduced when machines are operating in shielded areas not wholly visible to receivers. In saying this, if two or more machines were to operate simultaneously on the site, received noise levels would be raised and higher exceedances may occur.

Initial earthworks are expected to employ a bull dozer, excavator, and 1-2 dump trucks. The combined acoustic power level of these machines, assuming normal contractor's machines up to 10 years old in reasonably good condition, is expected to be in the range 108 to 116B(A),Leq.

However, the machines will typically be spread over the site, and noise at any receiver is typically dominated by the few closest machines, such as an excavator loading a truck, while a second truck reverses into position to be loaded by an excavator. With a combined acoustic power level of 108 dB(A) for 3 typical machines operating at full power, 40dB(A) is expected at the closest residence during peak activity.

As previously mentioned, constructing temporary barriers of excess fill, etc, at least 2m high, at the perimeter of the construction site (or at least adjacent to noisy plant items) may be considered for mitigating some of the construction noise at nearest receivers. These barriers will offer the additional benefit of securing the site from unwanted visitors. With barriers in place, worst case construction will reduce by up more than 5dB(A), although, as previously stated, these noise levels are expected to occur for a relatively short time and reduce as work progresses to a new area.

It should be acknowledged that construction activities that produce higher noise for a shorter period are often more desirable than alternate construction techniques that produce lower noise for a much longer period. This combined with noise control strategies discussed in Section 4 will ensure that minimum disruption occurs.

SECTION 4
Summary of Recommended Noise Control

4.1 NOISE CONTROL RECOMMENDATIONS - OPERATION

4.1.1 Noise Mound/Barrier

1. Acoustic mounds or barriers are to be erected at the following locations:

Location	*Height Above FGL (mm)*
West side Live Bird Area and Hardstand	2700
North side Cooling towers & associated plant	2100

An acoustic barrier is one which is impervious from the ground to the recommended height, and is typically constructed from lapped and capped timber, Hebel Power Panel, earthen mound, or a combination of the above. No significant gaps should remain in the barrier to allow the passage of sound below the recommended height. Other construction options are available if desired, providing the mound or wall is impervious and of equivalent or greater surface mass than the above construction options. Also see Appendix B for mound/wall location.

4.1.2 General Noise Control Recommendations

2. The site may operate 24 hours day. Monday to Sunday

3. All access roads should be kept in good condition, i.e. no potholes, etc.

4. Trucks and other machines should not be left idling for extended periods unnecessarily. Machines found to produce excessive noise compared to industry best practice should be removed from the site or stood down until repairs or modifications can be made.

5. A regular maintenance schedule should be adopted for all mobile and fixed plant items. Items found producing high noise should be stood down until repairs are completed.

6. A noise monitoring program, during commissioning, or in the early life of the site is recommended. This program will verify our predictions and in the unlikely event that complaints may arise, enable noise control strategies to be implemented, where required.

A typical noise monitoring program may consist of the following:
- Initial commissioning attended monitoring during the day, evening and night at potentially affected residential receivers, i.e. Girrawheen, Abbeylands, The Billabong, New Winton Road.
- Subsequent bi-annual monitoring at the above locations.
- In the event of any non-compliance(s), provide Noise Reduction Program for the site and additional compliance monitoring at completion of works, or
- If compliance is verified reduce to annual monitoring at receivers.

4.1.3 Site Child Care Centre

7. An acoustic fence 1800mm above FGL is to be erected at the perimeter of the child care centre outdoor area. Acceptable forms of construction include Colorbond, lapped and capped timber, Hebel Powerpanel, , masonry, or a combination of the above. No significant gaps should remain in the fence to allow the passage of sound below the recommended height. Other construction options are available if desired, providing the fence or wall is impervious and of equivalent or greater surface mass than the above construction options.

8. Windows to the Cot Rooms must be upgraded to achieve an acoustic rating of Rw32. This can typically be achieved with the use of laminated glass and Q-Lon seals at sliders.

9. Consideration should be given to installing ceiling fans to supplement air conditioning.

4.2 NOISE CONTROL RECOMMENDATIONS - CONSTRUCTION

4.2.1 Noise Monitoring Program

We recommend that attended noise monitoring should be carried out at commencement of each process/activity that has the potential to produce excessive noise. Attended monitoring offers the advantage of immediate identification of noise exceedances at the receiver and ameliorative action required to minimise the duration of exposure. Unattended long-term monitoring only identifies a problem at a later date and is not recommended.

4.2.2 Acoustic Barriers/Screening

To minimise noise impacts during construction, early work should concentrate on grading and levelling the areas in unshielded locations. In the event of complaints arising from residents, we offer the following additional strategies for consideration:

- Place acoustic enclosures or screens directly adjacent to stationary noise sources such as compressors, generators, drill rigs, etc.

4.2.3 Consultation/Complaints Handling Procedure

The construction contractor should analyse proposed noise control strategies in consultation with the Acoustic Consultant as part of project pre-planning. This will identify potential noise problems and eliminate them in the planning phase prior to site works commencing.

Occupants of adjacent properties should be notified of the intended construction timetable and kept up to date as work progresses, particularly as work changes from one set of machines and processes to another. In particular, occupants should understand how long they will be exposed to each source of noise and be given the opportunity to inspect plans of the completed development. Encouraging resident understanding and "participation" gives the local community a sense of ownership in the development and promotes a good working relationship with construction staff. Programming noisy activities (such as earthworks) outside critical times should be considered.

We recommend that construction noise management strategies should be implemented to ensure disruption to the occupants of nearby buildings is kept to a minimum. Noise control strategies include co-ordination between the construction team and residents to ensure the timetable for noisy activities does not coincide with sensitive activities.

The site manager/environmental officer and construction contractor should take responsibility and be available to consult with community representatives, perhaps only during working hours. Response to complaints or comments should be made in a timely manner and action reported to the concerned party.

All staff and employees directly involved with the construction project should receive informal training with regard to noise control procedures. Additional ongoing on the job environmental training should be incorporated with the introduction of any new process or procedure. This training should flow down contractually to all sub-contractors.

4.2.4 Equipment Selection

All combustion engine plant, such as generators, compressors and welders, should be carefully checked to ensure they produce minimal noise, with particular attention to residential grade exhaust silencers and shielding around motors.

Trucks and other machines should not be left idling unnecessarily, particularly when close to residences. Machines found to produce excessive noise compared to industry best practice should be removed from the site or stood down until repairs or modifications can be made. Framing guns and impact wrenches should be used sparingly, particularly in elevated locations, with assembly of modules on the ground preferred. Table 15 shows some common construction equipment, together with noise control options and possible alternatives.

Table 15- Noise Control, Common Noise Sources

Equipment / Process	Noise Source	Noise Control	Possible Alternatives
Compressor Generator	Engine	Fit residential muffler. Acoustic enclosure.	Electric in preference to petrol/diesel. Plant to be Located outside building Centralised system.
	Casing	Shielding around motor.	
Concrete breaking Drilling Core Holing	Hand piece	Fit silencer, reduces noise but not efficiency Enclosure / Screening	Use rotary drill or thermic lance (used to burn holes in and cut concrete) Laser cutting technology
	Bit	Dampened bit to eliminate ringing. Once surface broken, noise reduces. Enclosure / Screening.	
	Air line	Seal air leaks, lag joints	
	Motor	Fit residential mufflers.	
Drop/Circular saw Brick saw	Vibration of blade/product.	Use sharp saws. Dampen blade. Clamp product.	Use handsaws where possible. Retro-fitting.
Hammering	Impact on nail		Screws
Brick bolster	Impact on brick	Rubber matting under brick	Shielded area.
Explosive tools (i.e. ramset gun)	Cartridge explosion	Use silenced gun	Drill fixing.
Material handling	Material impact	Cushioning by placing mattresses, foam, waffle matting on floor. Acoustic screening.	
Waste disposal	Dropping material in bin, trolley wheels.	Internally line bins/chutes with insertion rubber, conveyor belting, or similar.	
Dozer, Excavator, Truck, Grader, Crane	Engine, track noise	Residential mufflers, shielding around engine, rubber tyred machinery.	
Pile driving/boring	Hammer impact engine	Shipping containers between pile & receiver	Manual boring techniques

Note: Generally, noise reductions of 7-10dB will be achieved with the use of barriers, 15-30dB by enclosures, 5-10dB from silencers and up to 20-25dB by substitution with an alternate process.

4.2.5 Risk Assessment

A risk assessment should be undertaken for all noisy activities and at the change of each process. This will help identify the degree of noise and/or vibration impact at nearby receivers and ameliorative action necessary. A sample Risk Assessment Check Sheet is included in Appendix C as a guide.

SECTION 5
Conclusion

5 CONCLUSION

A revised noise impact assessment for Baiada's Oakburn Processing Facility and Rendering Plant, has been completed. The report has shown that providing recommendations detailed in this report are implemented, noise levels from the upgraded site will be compliant with the EPA's NPfI requirements at all nearby residential receivers during the day, evening and night, for neutral and worst-case atmospheric conditions. Noise emissions from activities associated with the site will be either within the criteria or generally below the existing background noise level in the area for the majority of the time.

Considering the abundance of industrial/commercial premises already in the area and relatively constant traffic on nearby roads, noise generated by the site may be audible at times but not intrusive at any nearby residence. Since the character and amplitude of activities associated with the site will be similar to those already impacting the area, it will be less intrusive than an unfamiliar introduced source.

During construction the total impact at each receiver is related to the received noise level and the duration of excessive noise. Generally, construction noise will comply with the criteria, however, during major construction activities some exceedances may occur. However, nearby neighbours should accept some periods of high noise, considering the relatively short-term nature of louder construction activities.

To reduce the impact in the area during construction, we recommend that louder construction activities, should be completed with the minimum of undue delay. In any case, all reasonable attempts should be made to complete significant noisy activities within as short a time as possible.

As previously stated, construction activities that produce higher noise for a shorter period are often more desirable than alternate construction techniques that produce lower noise for a much longer period

Construction activities should generally be restricted to the nominated hours. If construction does occur outside the standard hours, it is vital that the local community be informed of the construction timetable with letter drops, meetings, etc.

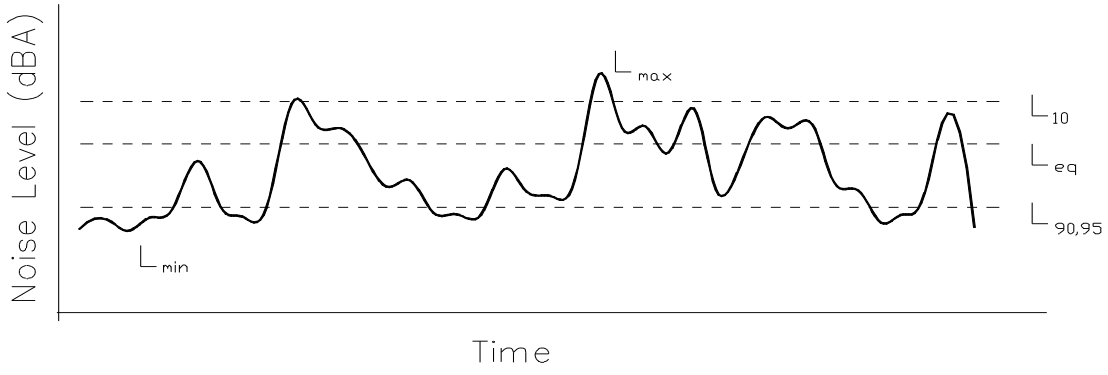
In conclusion, operation and construction of the Oakburn site will not cause any long term excessive environmental noise at any residential properties. We therefore see no acoustic reason why the proposal should be denied.

Steve Brady M.A.S.A. A.A.A.S.
Principal Consultant

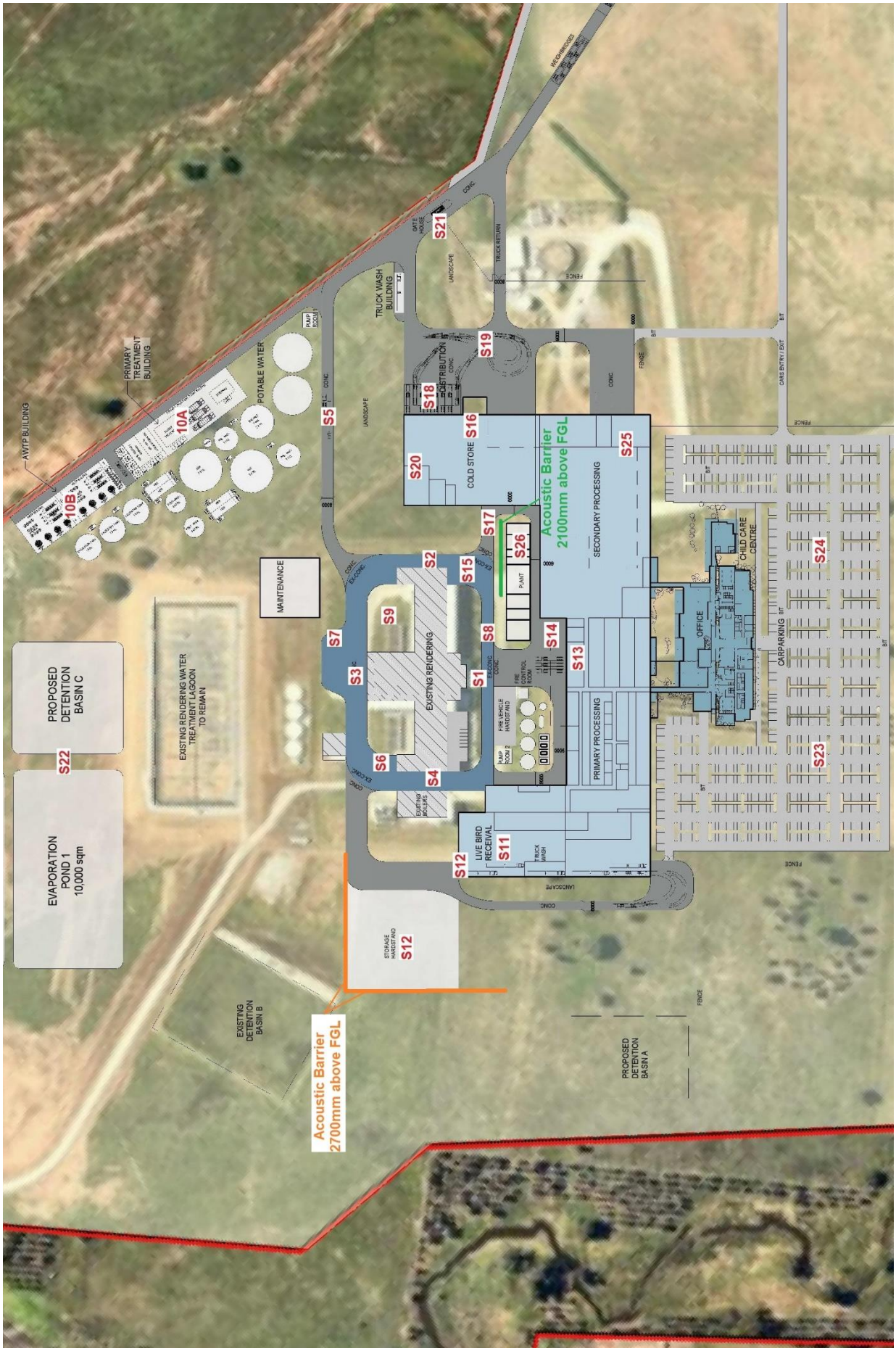
APPENDIX A
Definition of Acoustic Terms

Definition of Acoustic Terms

Term	Definition
dB(A)	A unit of measurement in decibels (A), of sound pressure level which has its frequency characteristics modified by a filter ("A-weighted") so as to more closely approximate the frequency response of the human ear.
ABL	*Assessment Background Level* – A single figure representing each individual assessment period (day, evening, night). Determined as the L90 of the L90's for each separate period.
RBL	*Rating Background Level* – The overall single figure background level for each assessment period (day, evening, night) over the entire monitoring period.
Leq	Equivalent Continuous Noise Level - which, lasting for as long as a given noise event has the same amount of acoustic energy as the given event.
L90	The noise level which is equalled or exceeded for 90% of the measurement period. An indicator of the mean minimum noise level, and is used in Australia as the descriptor for background or ambient noise (usually in dBA).
L10	The noise level which is equalled or exceeded for 10% of the measurement period. L_{10} is an indicator of the mean maximum noise level, and was previously used in Australia as the descriptor for intrusive noise (usually in dBA).



APPENDIX B
Noise Source Locations
Acoustic Mound/Barrier


AWTP BUILDING
10B
PRIMARY TREATMENT BUILDING
10A
POTABLE WATER
PUMP ROOM
TRUCK WASH BUILDING
GATE HOUSE
S21
TRUCK RETURN
LANDSCAPE
FENCE
CONC
BIT
CARS ENTRY / EXIT
S19
DISTRIBUTION
S18
S5
S20
COLD STORE
S16
Acoustic Barrier 2100mm above FGL
S25
SECONDARY PROCESSING
S17
S26
PLANT
CHILD CARE CENTRE
S24
MAINTENANCE
S2
S15
S9
S7
S8
S14
S13
OFFICE
CARPARKING
PROPOSED DETENTION BASIN C
S22
EXISTING RENDERING WATER TREATMENT LAGOON TO REMAIN
EXISTING RENDERING
S3
S1
FIRE CONTROL ROOM
FIRE VEHICLE HARDSTAND
PUMP ROOM 2
PRIMARY PROCESSING
S23
S6
S4
EVAPORATION POND 1 10,000 sqm
LIVE BIRD RECEIVAL
S11
TRUCK WASH
S12
LANDSCAPE
STORAGE HARDSTAND
S12
EXISTING DETENTION BASIN B
Acoustic Barrier 2700mm above FGL
PROPOSED DETENTION BASIN A

APPENDIX C
Risk Assessment Checklist

Risk Assessment Checklist

Item/Date	Risk Identified (Yes/No)	Risk Level (H/M/L)	Noise Control Required (Yes/No)	Noise Control Strategy