270 Aldington Road

Operational Noise Report

Stockland Developments

L24, 133 Castlereagh Street
Sydney NSW 2000

Prepared by:

SLR Consulting Australia

SLR Project No.: 610.31010.00009

13 February 2025

Revision: 1.0

Making Sustainability Happen

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1.0	13 February 2025	Jordan McMahon	Steven Luzuriaga	Steven Luzuriaga

Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Stockland Developments (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

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1.0 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been engaged by Stockland Developments Pty Ltd (Stockland) to undertake an operational noise review to accompany the Development Application (DA24/0268) for subdivision work at 270 Aldington Road, Kemps Creek (the proposal). The site is located within the Mamre Road Precinct (MRP).

This report only concerns operational noise. Construction noise and vibration would be managed in accordance with the Construction Environmental Management Plan (CEMP) and the Construction Noise and Vibration Management Plan (CNVMP) for the proposal.

The proposal does not include any future development or industrial operations for the proposal site. This report identifies surrounding noise sensitive receivers and appropriate operational noise goals. Future developments and industrial operations on the proposal site would be subject to future planning applications.

SLR is suitably qualified to produce this noise and vibration impact assessment. SLR staff are members of the Australian Acoustical Society (AAS) and SLR is a member firm of the Association of Australasian Acoustical Consultants (AAAC).

The following report uses specialist acoustic terminology. An explanation of common terms is provided in **Appendix A**.

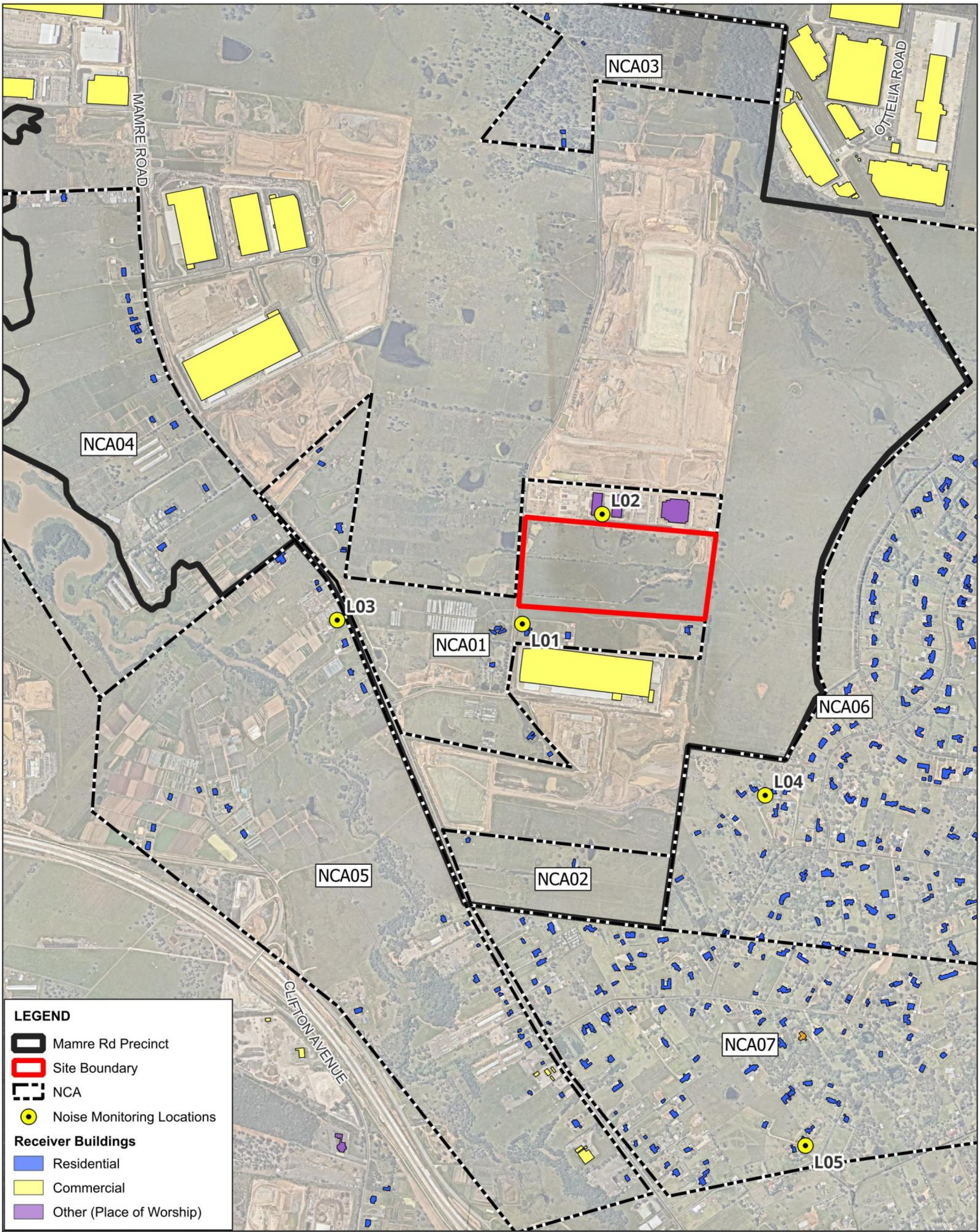
1.1 Proposal Description

The proposed development is predominantly on land at 258-270 and 244-256 Aldington Road, Kemps Creek, NSW 2178, which is legally described as Lots 16 and 17 in DP 253503. The development also includes a 38 m wide ribbon of land extending into the northern edge of 273 Aldington Road, being Lot 15 in DP 253503.

The proposal includes a boundary realignment on the western and southern edges of Lot 16 and on the northern edge of Lot 15 to provide for the dedication of land for the purpose of Aldington Road widening.

The proposal comprises subdivision work to consolidate Lot 16 and 17, and then subdivide into four lots after allowing for the boundary realignment. No subdivision other than the proposed boundary realignment is proposed under this development application for Lot 15.

The proposal site location and nearby sensitive receivers are shown in **Figure 1**.



Scale: Scale: 1:18,000
Coordinate System: GDA2020 / MGA zone 56

Drawn Date: 10-Feb-2025
Project Number: 610.31010

SLR

Data Source:
Nearmap Imagery

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding the data's accuracy or reliability for any purpose.

Site Location and Sensitive Receivers

FIGURE 1

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1.2 Mamre Road Development Control Plan

The Mamre Road Precinct (MRP) Development Control Plan (DCP) applies to the proposal. The requirements of the MRP DCP relevant to noise and vibration are shown in **Table 1**.

Table 1 Mamre Road Precinct Development Control Plan Requirements

Noise and Vibration Controls	Where Addressed
2.2.3 Biodiversity Conservation and Management	
16) Where noise adjacent to natural areas is likely to impact wildlife, the proponent must manage the timing of noise producing activities, including installing appropriate noise treatment barriers along major roads and other attenuation measures.	No operational activity is proposed. To be reviewed in future planning application based on proposed land use.
2.11 Aviation Safeguarding	
3) Development is constructed in accordance with Australian Standards AS2021 – Acoustics Noise Intrusion – Building Siting and Construction.	The site is located inside the Western Sydney Airport ANEC25 contour for Long-term (Year 2063) operations. Based on the highest predicted impact of L_{max} 72dBA, no further treatment to to comply with AS2021:2015 internal assessment requirements for warehouse or office buildings, typical of industrial developments. To be reviewed in future planning application based on proposed land use.
4.3 Amenity – 4.3.1 Noise and Vibration	
1) Any machinery or activity considered to produce noise emissions from a premise shall be adequately sound-proofed so that noise emissions are in accordance with the provisions of the Protection of the Environment Operations Act 1997.	No machinery or activity proposed. To be reviewed in future planning application based on proposed land use.
2) Noise should be assessed in accordance with Noise Policy for Industry (EPA, 2017) and NSW Road Noise Policy (Department of Environment, Climate Change and Water, 2011).	**Section 3.0**
3) An Acoustic Report by a qualified acoustical engineer must be submitted where proposed development, including traffic generated by that development, will create noise and/or vibration impacts, either during construction or operation, that impacts on adjoining developments or nearby rural-residential areas. The Acoustic Report should outline the proposed noise amelioration strategies and management methods.	This report. Construction noise and vibration is addressed separately in the CEMP and CNVMP.
4) An Acoustic Report shall be prepared for developments within 500m of rural-residential areas and other sensitive receivers, including educational establishments.	This report, **Section 2.0**

Noise and Vibration Controls	Where Addressed
5) Acoustic Reports for individual developments must assess cumulative noise impacts, including likely future noise emissions from the development and operation of the Precinct. The consultant should liaise with the relevant consent authority to determine acceptable amenity goals for individual industrial developments and background noise levels.	**Section 3.0** and **Appendix B**
6) The use of mechanical plant and equipment may be restricted in areas close to sensitive receivers, such as adjoining rural-residential development and educational establishments.	No mechanical plant is proposed. To be reviewed in future planning application based on proposed land use.
7) Building design is to incorporate noise amelioration features. Roof elements are to control potential breakout noise, having regard to surrounding topography.	No buildings are proposed. To be reviewed in future planning application based on proposed land use.
8) Boundary fences are to incorporate noise amelioration features and control breakout noise having regard to developments adjoining rural-residential areas.	Not applicable. The proposal site does not adjoin rural-residential areas (ie Mount Vernon).
9) Development shall comply with the relevant Australian Standards for noise and vibration.	Construction vibration is addressed separately in the CEMP and CNVMP.
10) A qualified acoustical consultant is to certify any acoustic design measures have been satisfactorily incorporated into the development at construction certificate stage and validate the criteria at occupation certificate stage.	No acoustic design measures included for subdivision works. Will be undertaken following approval at construction certificate stage and occupation certificate stage for future planning applications concerning the proposed operational use of the site.

1.3 Nearest Sensitive Receivers

Sensitive receivers in the area surrounding the proposal have been identified and Noise Catchment Areas (NCAs) have been defined. These are summarised in **Table 2** and shown in **Figure 1**. The sensitive receivers are divided into those within the MRP and those outside the MRP.

The MRP was rezoned on 11 June 2020 to create additional industrial land for Western Sydney to meet projected demand. This included rezoning all existing receivers within the MRP to industrial. The rezoning delivered around 850 hectares of industrial land that can be readily serviced and developed, is integrated with the existing Western Sydney Employment Area (WSEA) and in close proximity to the Aerotropolis. The strategic intent is for the MRP to become a warehousing industrial hub providing around 17,000 new jobs in Western Sydney.

Various planning applications have been submitted (or are in the process of being submitted) for much of the land within the MRP, with multiple developments within the MRP already approved and under construction or in operation. It is understood that ultimately, all existing receivers within the MRP will be redeveloped into future industrial land uses.

Table 2 NCAs and Sensitive Receivers

Location	NCA	Receiver Type	Direction	Closest Distance[1]
Within MRP (now zoned industrial)	NCA01	Residential	South	80 m
		Place of Worship (BAPS Temple)	North	30 m
	NCA02	Residential	South	950 m
	NCA03	Residential	North	1,380 m
	NCA04	Residential	West	1000 m
Outside MRP	NCA05	Residential	West	650 m
	NCA06	Residential	East	580 m
	NCA07	Residential	South	1,200 m

Note 1: Distance does not include the road reserve which would not be part of any future onsite operational activity.

The NCAs have been determined based on the existing background noise levels and the likely number of individual developments within the MRP contributing to each receiver area.

2.0 Existing Environment

The existing noise environment in the area is typically dominated by road traffic noise from Mamre Road, with rural ambient noise becoming dominant at distances further back from existing roads. Industrial noise from existing premises also influences the noise environment at receivers close to those premises.

Previously measured existing noise levels in the vicinity of the MRP have been used for this proposal. The measured noise levels have been used to determine the existing noise environment and to set the criteria used to assess the potential impacts from the proposal.

The noise monitoring locations are shown in **Figure 1** and the monitoring results are summarised in **Table 3**.

Table 3 Summary of Existing Noise Levels

ID	NCA	Address	Measured Noise Levels (dBA)[1]					
			Background Noise (RBL)			Average Noise (L_{Aeq})		
			Day[5]	Eve.	Night	Day	Eve.	Night
L01[2]	NCA01, NCA02, NCA03	284 Aldington Rd, Kemps Creek	35 (34 actual)	34	33	47	48	46
L02[3]		230-242 Aldington Rd, Kemps Creek	35 (32 actual)	31	30	50	35	35
L03[4]	NCA04, NCA05	981 Mamre Rd, Kemps Creek	48	46	34	61	59	57
L04[4]	NCA06	62 Mount Vernon Rd, Mount Vernon	36	36	33	50	44	43
L05[4]	NCA07	26 Cressy Rd, Mount Vernon	42	40	35	53	48	47

Note 1: The assessment periods are the daytime which is 7 am to 6 pm Monday to Saturday and 8 am to 6 pm on Sundays and public holidays, the evening which is 6 pm to 10 pm, and the night-time which is 10 pm to 7 am on Monday to Saturday and 10 pm to 8 am on Sunday and public holidays. See the NSW EPA Noise Policy for Industry.

Note 2: Measured data from L01 taken from RWDI report 2101343 Version B, dated February 2021. The monitoring was completed in November 2020.

Note 3: Monitoring at locations L02 taken from White Noise Acoustics report 20141_200819_Noise Impact Assessment_BW_R8c dated 26 August 2022. The monitoring was completed in August 2020.

Note 4: Measured data from L03, L04 and L05 taken from SLR report 610.30893.00100-R02-v3.0-20240808, dated August 2024. The monitoring was completed in June 2022.

Note 5: The *Noise Policy for Industry* minimum RBLs have been applied where appropriate.

The noise monitoring at L01 and L02 show slightly varied measured noise levels at two nearby locations within the MRP. This is likely due to the L01 measurement location being more exposed to road traffic noise. The lower measured noise levels of L02 have been adopted to conservatively represent the existing noise environment potentially most affected residential location in NCA01, NCA02 and NCA03 when determining operational noise criteria for the proposal.

3.0 Operational Noise Criteria

The NSW *Noise Policy for Industry* (NPfI) was released in 2017 and sets out the requirements for the assessment and management of operational noise from industry in NSW.

The NPfI defines how to determine 'trigger levels' for noise emissions from industrial developments. Where a development is likely to exceed the trigger levels at existing noise sensitive receivers, feasible and reasonable noise management measures are required to be considered to reduce the impacts.

There are two types of trigger levels – one to account for 'intrusive' noise impacts and one to protect the 'amenity' of particular land uses:

- The **intrusiveness** of an industrial noise source is generally considered acceptable if the L_{Aeq} noise level of the source, measured over a period of 15-minutes, does not exceed the representative background noise level by more than 5 dB. Intrusive noise levels are only applied to residential receivers. For other receiver types, only the amenity levels apply.
- To limit continual increases in noise levels from the use of the intrusiveness level alone, the ambient noise level within an area from all industrial sources should remain below the recommended **amenity** levels specified in the NPfI for that particular land use.

Intrusive and amenity noise levels are not used directly as regulatory limits. They are used to assess the potential impact of noise, assess feasible and reasonable mitigation options and subsequently determine achievable noise requirements.

The NPfI provides guidance on assigning residential receiver amenity noise categories based on the site-specific features shown in **Table 4**.

Table 4 Residential Receiver Amenity

Receiver Category	Typical Planning Land Use Zoning	Typical Existing Background Noise Levels (RBL)	Description
Rural	RU1 – primary production RU2 – rural landscape RU4 – primary production small lots R5 – large lot residential E4 – environmental living	Daytime <40 dBA Evening <35 dBA Night <30 dBA	Rural – an area with an acoustical environment that is dominated by natural sounds, having little or no road traffic noise and generally characterised by low background noise levels. Settlement patterns would be typically sparse. Note: Where background noise levels are higher than those presented due to existing industry or intensive agricultural activities, the selection of a higher noise amenity area should be considered.
Suburban residential	RU5 – village RU6 – transition R2 – low density residential R3 – medium density residential E2 – environmental conservation E3 – environmental management	Daytime <45 dBA Evening <40 dBA Night <35dBA	Suburban – an area that has local traffic with characteristically intermittent traffic flows or with some limited commerce or industry. This area often has the following characteristic: evening ambient noise levels defined by the natural environment and human activity.

Receiver Category	Typical Planning Land Use Zoning	Typical Existing Background Noise Levels (RBL)	Description
Urban residential	R1 – general residential R4 – high density residential B1 – neighbourhood centre (boarding houses and shop-top housing) B2 – local centre (boarding houses) B4 – mixed use	Daytime >45 dBA Evening >40 dBA Night >35 dBA	Urban – an area with an acoustical environment that: • Is dominated by 'urban hum' or industrial source noise, where urban hum means the aggregate sound of many unidentifiable, mostly traffic and/or industrial related sound sources • Has through-traffic with characteristically heavy and continuous traffic flows during peak periods • Is near commercial districts or industrial districts • Has any combination of the above.

3.1 Project Noise Trigger Levels

Project Noise Trigger Levels (PNTLs) were determined based on the intrusiveness and amenity criteria, in accordance with the *Noise Policy for Industry* (NPfI). All surrounding receivers have been assumed to be rural.

Amenity criteria for each NCA have been determined using the approach to cumulative noise impacts detailed in Section 2.4.2 of the NPfI *"Amenity noise levels in areas near an existing or proposed cluster of industry"*. This approach sets appropriate amenity criteria for individual developments based on the total number of developments contributing to industrial noise levels in a particular NCA. The potentially contributing industrial sites for each NCA are shown in **Appendix B**.

The intention of this approach is to ensure that the total cumulative industrial noise levels from the MRP (and any existing industrial sites, where appropriate) remain compliant with the overall amenity goals. By doing this, the policy accounts for potential cumulative impacts by lowering the criteria for each individual development to ensure that the ambient noise level within an area from all industrial noise sources combined remains below the recommended amenity noise levels, where feasible and reasonable. The NPfI states that *"where the project amenity noise level applies and it can be met, no additional consideration of cumulative industrial noise is required"*.

The potential cumulative impacts from the development and other sources of industrial noise in the area are therefore accounted for in the proposal-specific PNTLs. The trigger levels for industrial noise from the proposal are summarised in **Table 5**.

The PNTLs are the more stringent of the intrusiveness and amenity trigger level for each period and are highlighted in green below.

Table 5 Project Noise Trigger Levels

NCA	Receiver Type	Period	Amenity Noise Level LAeq (dBA)	Measured Noise Level (dBA)		Number of Contributing Developments[2]	Project Noise Trigger Levels LAeq(15minute) (dBA)	
				RBL[1]	LAeq (period)		Intrusiveness	Amenity[3,4]
NCA01	Residential	Day	50	35	50	11	**40**	43
		Evening	45	31	35		39	**38**
		Night	40	30	35		38	**33**
NCA01	Place of Worship[5]	When in use	50	n/a	n/a	11	n/a	**43**
NCA02	Residential	Day	50	35	50	9	**40**	43
		Evening	45	31	35		39	**38**
		Night	40	30	35		38	**33**
NCA03	Residential	Day	50	35	50	11	**40**	43
		Evening	45	31	35		39	**38**
		Night	40	30	35		38	**33**
NCA04	Residential	Day	50	48	61	11	53	**43**
		Evening	45	46	59		51	**38**
		Night	40	34	57		39	**33**
NCA05	Residential	Day	50	48	61	10	53	**43**
		Evening	45	46	59		51	**38**
		Night	40	34	57		39	**33**
NCA06	Residential	Day	50	36	50	9	**41**	43
		Evening	45	36	44		41	**38**
		Night	40	33	43		38	**33**
NCA07	Residential	Day	50	42	53	9	47	**43**
		Evening	45	40	48		45	**38**
		Night	40	35	47		40	**33**

Note 1: RBL = Rating Background Level.

Note 2: Number of existing and proposed industrial developments potentially contributing to the industrial noise levels in this NCA (see **Appendix B**).

Note 3: The recommended amenity noise levels have been reduced based on the NPfI formula for clusters of industry, using the recommended amenity noise level. This addresses the potential cumulative impacts from the development and any existing/future projects.

Note 4: The project amenity noise levels have been converted to a 15-minute level by adding 3 dB, as outlined in the NPfI.

Note 5: The criterion is specified as an internal noise level for this receiver category. As the noise model predicts external noise levels, it has been conservatively assumed that all ‘places of worship’ have openable windows and external noise levels are therefore 10 dB higher than the corresponding internal level, which is generally considered representative of windows being partially open for ventilation.

It is noted that the NPfI approach for deriving amenity noise levels in areas near a cluster of industry does not account for the proportional size of each development, proximity to the receiver and likelihood of concurrent peak operations. For example, the proposal site is directly south of the BAPS Temple receiver location, however, it is allowed the same proportion of the total amenity noise level as more distance contributing developments. It may be appropriate for regulators to consider additional allowances to the individual development amenity noise levels based on the above factors when conditioning noise limits.

3.2 Sleep Disturbance

The potential for sleep disturbance from maximum noise level events during the night-time period from the development is required to be considered.

The NPfI defines the sleep disturbance screening level as 52 dBA L_{AFmax} or the prevailing background level plus 15 dB, whichever is greater.

A detailed maximum noise level event assessment should be completed where the sleep disturbance screening level is exceeded. 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-time period.

The NPfI refers to the Road Noise Policy (RNP) for additional information regarding sleep disturbance. enHealth Council studies are referenced which indicate that for short-term or transient noise events, for good sleep over eight hours the indoor L_{AFmax} sound pressure level should ideally not exceed around 45 dBA more than 10 or 15 times per night.

The RNP goes on to conclude that from the research on sleep disturbance to date:

- Maximum internal noise levels below 50 dBA to 55 dBA are unlikely to awaken people from sleep.
- One or two events per night with maximum internal noise levels of 65-70 dBA are not likely to affect health and wellbeing significantly.

The sleep disturbance screening levels for the proposal are shown in **Table 6**.

Table 6 Sleep Disturbance Screening Levels

NCA	Noise Level (dBA)	
	Measured Prevailing Night-time Background Level	Sleep Disturbance Screening Level[1]
NCA01, NCA02, NCA03	30	52
NCA04, NCA05	34	52
NCA06	33	52
NCA07	35	52

Note 1: The sleep disturbance screening level as 52 dBA L_{AFmax} or the prevailing background level plus 15 dB, whichever is greater.

3.3 Corrections for Annoying Noise Characteristics

Sources of industrial noise can cause greater annoyance where they contain certain characteristics, such as tonality, intermittency or dominant low-frequency content. The NPfI specifies the following modifying factor corrections, shown in **Table 7**, which are to be applied where annoying characteristics are present. The corrections are to be added to the noise level at the receiver before comparison with the PNTLs.

Table 7 NPfI Modifying Factor Corrections

Factor	Assessment/ Measurement	When to Apply	Correction[1]
Tonal noise	One-third octave or narrow band analysis	Level of one-third octave band exceeds the level of the adjacent bands on both sides by the levels defined in the NPfI.	5 dB[2]
Low-frequency noise	Measurement of source contribution C-weighted and A-weighted level and one-third octave measurements	Measure/assess source contribution C and A weighted $L_{eq,t}$ levels over same time period. Correction to be applied where the C minus A level is 15 dB or more and the level to which the thresholds defined in the NPfI are exceeded.	2 or 5 dB[2]
Intermittent noise	Subjectively assessed but should be assisted with measurement to gauge the extent of change in noise level	The source noise heard at the receiver varies by more than 5 dB and the intermittent nature of the noise is clearly audible. The NPfI further defines intermittent noise as noise where the level suddenly drops/increases several times during the assessment period, with a noticeable change in source noise level of at least 5 dB, for example, equipment cycling on and off. The EPA has confirmed that the intermittent correction does not apply to short-term events that emerge above the general industrial noise level and is therefore not applicable to industrial or commercial sites that have vehicle or plant movements at night, including audible reversing alarms.[4] The intermittency correction is not intended to be applied to changes in noise level due to meteorology.	5 dB[3]
Maximum adjustment	Refer to individual modifying factors	Where two or more modifying factors are indicated.	Maximum correction of 10 dB[2] (excluding duration correction)

Note 1: Corrections to be added to the measured or predicted levels.

Note 2: Where a source emits tonal <u>and</u> low-frequency noise, only one 5 dB correction should be applied if the tone is in the low-frequency range, that is, at or below 160 Hz.

Note 3: Adjustment to be applied to night-time only.

Note 4: *How to Apply the Noise Policy for Industry Intermittent Modifying Factor Corrections*, NSW Environment Protection Authority, Acoustics Australia Vol. 50, No. 3, September 2022.

3.4 Residual Impacts

The NPfI defines residual noise impacts as exceedances of the Project Noise Trigger Levels which remain after all feasible and reasonable source and pathway mitigation measures have been considered.

The significance of residual noise impacts, as defined in the NPfI, is shown in **Table 8**. Examples of receiver-based treatments that can be used to mitigate residual impacts are shown in **Table 9**.

Table 8 NPfI Significance of Residual Noise Impacts

If the Predicted Noise Level minus the Project Noise Trigger Level is:	And the Total Cumulative Industrial Noise Levels is:	Then the Significance of the Residual Noise Level is:
≤ 2 dBA	Not applicable	Negligible
≥ 3 but ≤ 5 dBA	< recommended amenity noise level or > recommended amenity noise level, but the increase in total cumulative industrial noise level resulting from the development is less than or equal to 1dB	Marginal
≥ 3 but ≤ 5 dBA	> recommended amenity noise level and the increase in total cumulative industrial noise level resulting from the development is more than 1 dB	Moderate
> 5 dBA	≤ recommended amenity noise level	Moderate
	> recommended amenity noise level	Significant

Table 9 NPfI Examples of Receiver-based Treatments to Mitigate Residual Noise Impacts

Significance of Residual Noise Impact	Example of Potential Treatment
Negligible	The exceedances would not be discernible by the average listener and therefore would not warrant receiver-based treatments or controls.
Marginal	Provide mechanical ventilation/comfort condition systems to enable windows to be closed without compromising internal air quality/amenity.
Moderate	As for ‘marginal’, but also upgraded facade elements, such as windows, doors or roof insulation, to further increase the ability of the building facade to reduce noise levels.
Significant	May include suitable commercial agreements where considered feasible and reasonable.

3.5 Traffic on Surrounding Roads

The potential impacts from proposal-related traffic on the surrounding public roads are assessed using the NSW EPA *Road Noise Policy* (RNP).

An initial screening test is first applied to evaluate if existing road traffic noise levels are expected to increase by more than 2.0 dB. Where this is considered likely, further assessment is required using the RNP criteria shown in **Table 10**.

Table 10 RNP Criteria for Assessing Traffic on Public Roads

Road Category	Type of Project/Land Use	Assessment Criteria (dBA)	
		Daytime (7 am – 10 pm)	Night-time (10 pm – 7 am)
Freeway/ arterial/ sub-arterial roads	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	$L_{Aeq(15hour)}$ 60 (external)	$L_{Aeq(9hour)}$ 55 (external)
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use developments	$L_{Aeq(1hour)}$ 55 (external)	$L_{Aeq(1hour)}$ 50 (external)

3.6 Prevailing Weather Conditions

Fact Sheet D of the NPfI requires noise assessments to consider the potential effects of noise-enhancing weather conditions, such as wind from the source to the receiver and/or temperature inversions.

Analysis of the prevailing weather conditions has been undertaken in accordance with the NPfI for a 10-year period from 2013 to 2022 to determine the prevailing wind and temperature inversion conditions at the site. Wind data was obtained from the Bureau of Meteorology automatic weather station at Horsley Park, and cloud cover data (to determine the occurrence of temperature inversions) from the Bureau of Meteorology automatic weather station at Bankstown Airport.

The weather data was analysed to determine the frequency of occurrence of wind speeds up to 3 m/s in each period. The NPfI states that where wind blows from the source to the receiver at speeds of up to 3 m/s for more than 30% of the daytime, evening or night-time in any season, then wind is considered to be a feature of the area. The results of the wind analysis are presented for the daytime, evening and night-time periods in **Table 11**, **Table 12**, and **Table 13** respectively.

Table 11 Occurrence of Noise-Enhancing Winds for Daytime Period

Season	Percentage of Occurrence of Noise-Enhancing Winds (0.5-3 m/s) (Winds Blowing From)							
	North	Northeast	East	Southeast	South	Southwest	West	Northwest
Summer	7.4%	19.0%	12.5%	13.4%	14.0%	10.6%	7.2%	10.2%
Autumn	5.6%	13.3%	8.7%	10.3%	14.1%	19.0%	17.7%	16.4%
Winter	6.2%	7.4%	3.8%	5.8%	9.2%	18.5%	23.1%	23.4%
Spring	7.4%	14.6%	8.7%	7.7%	8.5%	10.8%	12.2%	16.5%

Note 1: Noise-enhancing winds (0.5-3 m/s) were calculated per direction ±45 degrees during the daytime (7 am to 6 pm) for each season.

Table 12 Occurrence of Noise-Enhancing Winds for Evening Period

Season	Percentage of Occurrence of Noise-Enhancing Winds (0.5-3 m/s) (Winds Blowing From)							
	North	Northeast	East	Southeast	South	Southwest	West	Northwest
Summer	1.6%	13.3%	20.6%	16.4%	9.6%	3.6%	2.1%	2.4%
Autumn	1.9%	13.3%	19.6%	22.3%	22.2%	16.8%	10.5%	6.8%
Winter	4.0%	6.2%	8.8%	14.3%	20.6%	25.1%	21.4%	16.8%
Spring	2.5%	14.9%	20.2%	16.8%	11.4%	7.3%	7.5%	6.7%

Note 1: Noise-enhancing winds (0.5-3 m/s) were calculated per direction ±45 degrees during the daytime (6 pm to 10 pm) for each season.

Table 13 Occurrence of Noise-Enhancing Winds for Night-time Period

Season	Percentage of Occurrence of Noise-Enhancing Winds (0.5-3 m/s) (Winds Blowing From)							
	North	Northeast	East	Southeast	South	Southwest	West	Northwest
Summer	2.5%	11.0%	13.6%	19.6%	28.4%	22.8%	9.0%	4.1%
Autumn	1.3%	2.8%	2.5%	6.1%	21.2%	**35.7%**	24.0%	9.9%
Winter	3.9%	1.9%	0.3%	1.2%	10.0%	**33.0%**	**33.0%**	20.5%
Spring	3.8%	6.9%	7.0%	10.3%	20.7%	26.1%	17.2%	10.5%

Note 1: Noise-enhancing winds (0.5-3 m/s) were calculated per direction ±45 degrees during the daytime (10 pm to 7 am) for each season.

The weather data was also analysed to estimate the frequency of occurrence of temperature inversions during the night-time in winter. This analysis used the Pasquill-Gifford stability classification scheme based on cloud cover as detailed in Fact Sheet D of the NPfI. The NPfI states that where the sum total of F and G category inversions occur for at least 30% of the total night-time during the winter, then temperature inversions are considered to be a feature of the area. The results of the stability class analysis are presented in **Table 14**.

Table 14 Occurrence of Stability Classification Distribution during the Night-time Period in Winter

Stability Class	Category Description	Frequency of Occurrence During Night-time in Winter
D	Neutral	3%
E	Slightly stable	10%
F	Moderately stable	17%
G	Extremely stable	31%
Sum Total: F+G	**Moderately to Extremely Stable**	**48%**

Note 1: Stability classes A (extremely unstable), B (moderately unstable) and C (slightly unstable) have not been shown as they are not relevant to the analysis of temperature inversions.

The above analysis shows that noise-enhancing wind and temperature inversions are a feature of the area during the night-time. Any future operational noise assessments for the proposal site should consider noise enhancing meteorological conditions accordingly, with reference to Fact Sheet D of the NPfI.

4.0 Potential Future Operations

There is no proposed land use or industrial operations included in the Development Application for the proposal. Therefore, it is not feasible to assess potential future operational noise at this time.

Operational uses of the proposal site would be subject to future planning applications which would assess operational noise as required. Future operational noise assessments should consider all potential industrial noise sources in accordance with the Noise Policy for Industry (NPfI) and recommend mitigation strategies as needed to meet the Project Noise Trigger Levels (PNTL) defined in this report (or appropriately updated based on the noise environment and noise sensitive receivers at the time).

The typical hierarchy for mitigation and management of industrial noise sources is as follows:

- Reducing noise emissions at the source (ie noise source control)
- Reducing noise in transmission to the receiver (ie noise path control)
- Reducing noise at the receiver (ie at-receiver control).

When considering operational noise mitigation, reference can be made to the Best Management Practice (BMP) and the Best Available Technology Economically Available (BATAE) measures listed in the NPfI (see **Appendix C**).

Based on the nearest sensitive receivers and PNTLs defined in this report, it is expected that residential receivers in NCA01 (within the MRP) will control the mitigation requirements for any future industrial operation at the proposal site. Once the existing residential receivers within the MRP are redeveloped, it is expected that the place of worship in NCA01 and the residential receivers in NCA05 and NCA06 would control the mitigation requirements for any future industrial operation at the proposal site.

5.0 Conclusion

SLR has been engaged by Stockland to undertake an operational noise review to accompany the Development Application (DA24/0268) for subdivision work at 270 Aldington Road, Kemps Creek. The site is located within the Mamre Road Precinct (MRP).

There is no proposed land use or industrial operations included in the Development Application. Therefore, it is not feasible to assess potential future operational noise at this time.

The nearest noise sensitive receivers have been reviewed and identified within and outside of the MRP. The existing noise environment has been reviewed based on several noise monitoring locations. The operational noise criteria have been defined at the surrounding sensitive receivers.

Operational uses of the proposal site would be subject to future planning applications which would assess operational noise as required, with reference to the receivers and noise criteria in this report.

Appendix A Acoustic Terminology

270 Aldington Road

Operational Noise Report

Stockland Developments

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13 February 2025

1. Sound Level or Noise Level

The terms ‘sound’ and ‘noise’ are almost interchangeable, except that ‘noise’ often refers to unwanted sound.

Sound (or noise) consists of minute fluctuations in atmospheric pressure. The human ear responds to changes in sound pressure over a very wide range with the loudest sound pressure to which the human ear can respond being ten million times greater than the softest. The decibel (abbreviated as dB) scale reduces this ratio to a more manageable size by the use of logarithms.

The symbols SPL, L or LP are commonly used to represent Sound Pressure Level. The symbol LA represents A-weighted Sound Pressure Level. The standard reference unit for Sound Pressure Levels expressed in decibels is 2×10^{-5} Pa.

2. ‘A’ Weighted Sound Pressure Level

The overall level of a sound is usually expressed in terms of dBA, which is measured using a sound level meter with an ‘A-weighting’ filter. This is an electronic filter having a frequency response corresponding approximately to that of human hearing.

People’s hearing is most sensitive to sounds at mid frequencies (500 Hz to 4,000 Hz), and less sensitive at lower and higher frequencies. Different sources having the same dBA level generally sound about equally loud.

A change of 1 dB or 2 dB in the level of a sound is difficult for most people to detect, whilst a 3 dB to 5 dB change corresponds to a small but noticeable change in loudness. A 10 dB change corresponds to an approximate doubling or halving in loudness. The table below lists examples of typical noise levels.

Sound Pressure Level (dBA)	Typical Source	Subjective Evaluation
130	Threshold of pain	Intolerable
120	Heavy rock concert	Extremely noisy
110	Grinding on steel	
100	Loud car horn at 3 m	Very noisy
90	Construction site with pneumatic hammering	
80	Kerbside of busy street	Loud
70	Loud radio or television	
60	Department store	Moderate to quiet
50	General Office	
40	Inside private office	Quiet to very quiet
30	Inside bedroom	
20	Recording studio	Almost silent

Other weightings (eg B, C and D) are less commonly used than A-weighting. Sound Levels measured without any weighting are referred to as ‘linear’, and the units are expressed as dB(lin) or dB.

3. Sound Power Level

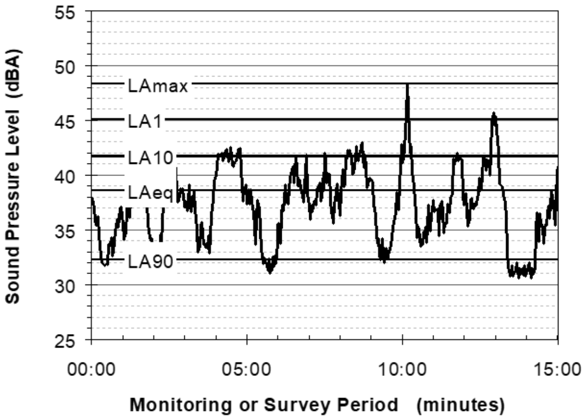
The Sound Power of a source is the rate at which it emits acoustic energy. As with Sound Pressure Levels, Sound Power Levels are expressed in decibel units (dB or dBA), but may be identified by the symbols SWL or L_W, or by the reference unit 10^{-12} W.

The relationship between Sound Power and Sound Pressure is similar to the effect of an electric radiator, which is characterised by a power rating but has an effect on the surrounding environment that can be measured in terms of a different parameter, temperature.

4. Statistical Noise Levels

Sounds that vary in level over time, such as road traffic noise and most community noise, are commonly described in terms of the statistical exceedance levels LAN, where LAN is the A-weighted sound pressure level exceeded for N% of a given measurement period. For example, the LA1 is the noise level exceeded for 1% of the time, LA10 the noise exceeded for 10% of the time, and so on.

The following figure presents a hypothetical 15 minute noise survey, illustrating various common statistical indices of interest.



Of particular relevance, are:

LA1 The noise level exceeded for 1% of the 15 minute interval.

LA10 The noise level exceeded for 10% of the 15 minute interval. This is commonly referred to as the average maximum noise level.

LA90 The noise level exceeded for 90% of the sample period. This noise level is described as the average minimum background sound level (in the absence of the source under consideration), or simply the background level.

LAeq The A-weighted equivalent noise level (basically, the average noise level). It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.

LAmax The A-weighted maximum sound pressure level of an event measured with a sound level meter.

5. Frequency Analysis

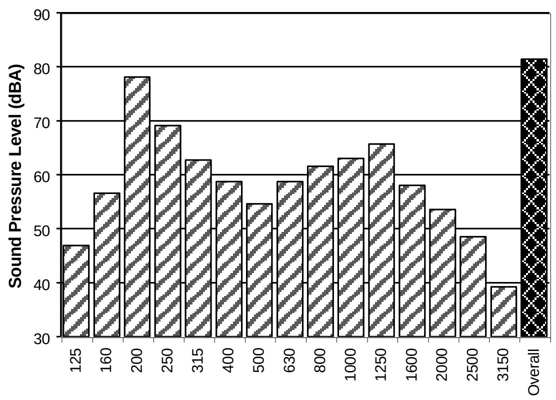
Frequency analysis is the process used to examine the tones (or frequency components) which make up the overall noise or vibration signal.

The units for frequency are Hertz (Hz), which represent the number of cycles per second.

Frequency analysis can be in:

- Octave bands (where the centre frequency and width of each band is double the previous band)
- 1/3 octave bands (three bands in each octave band)
- Narrow band (where the spectrum is divided into 400 or more bands of equal width)

The following figure shows a 1/3 octave band frequency analysis where the noise is dominated by the 200 Hz band. Note that the indicated level of each individual band is less than the overall level, which is the logarithmic sum of the bands.



6. Annoying Noise (Special Audible Characteristics)

A louder noise will generally be more annoying to nearby receivers than a quieter one. However, noise is often also found to be more annoying and result in larger impacts where the following characteristics are apparent:

- **Tonality** - tonal noise contains one or more prominent tones (ie differences in distinct frequency components between adjoining octave or 1/3 octave bands), and is normally regarded as more annoying than 'broad band' noise.
- **Impulsiveness** - an impulsive noise is characterised by one or more short sharp peaks in the time domain, such as occurs during hammering.
- **Intermittency** - intermittent noise varies in level with the change in level being clearly audible. An example would include mechanical plant cycling on and off.
- **Low Frequency Noise** - low frequency noise contains significant energy in the lower frequency bands, which are typically taken to be in the 10 to 160 Hz region.

7. Vibration

Vibration may be defined as cyclic or transient motion. This motion can be measured in terms of its displacement, velocity or acceleration. Most assessments of human response to vibration or the risk of damage to buildings use measurements of vibration velocity. These may be expressed in terms of 'peak' velocity or 'rms' velocity.

The former is the maximum instantaneous velocity, without any averaging, and is sometimes referred to as 'peak particle velocity', or PPV. The latter incorporates 'root mean squared' averaging over some defined time period.

Vibration measurements may be carried out in a single axis or alternatively as triaxial measurements (ie vertical, longitudinal and transverse).

The common units for velocity are millimetres per second (mm/s). As with noise, decibel units can also be used, in which case the reference level should always be stated. A vibration level V, expressed in mm/s can be converted to decibels by the formula 20 log (V/Vo), where Vo is the reference level (10^{-9} m/s). Care is required in this regard, as other reference levels may be used.

8. Human Perception of Vibration

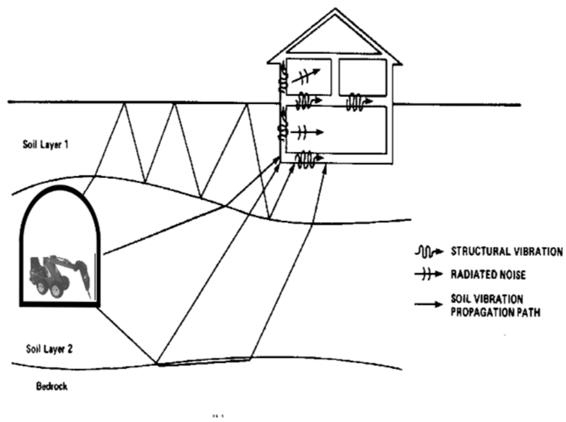
People are able to 'feel' vibration at levels lower than those required to cause even superficial damage to the most susceptible classes of building (even though they may not be disturbed by the motion). An individual's perception of motion or response to vibration depends very strongly on previous experience and expectations, and on other connotations associated with the perceived source of the vibration. For example, the vibration that a person responds to as 'normal' in a car, bus or train is considerably higher than what is perceived as 'normal' in a shop, office or dwelling.

9. Ground-borne Noise, Structure-borne Noise and Regenerated Noise

Noise that propagates through a structure as vibration and is radiated by vibrating wall and floor surfaces is termed 'structure-borne noise', 'ground-borne noise' or 'regenerated noise'. This noise originates as vibration and propagates between the source and receiver through the ground and/or building structural elements, rather than through the air.

Typical sources of ground-borne or structure-borne noise include tunnelling works, underground railways, excavation plant (eg rockbreakers), and building services plant (eg fans, compressors and generators).

The following figure presents an example of the various paths by which vibration and ground-borne noise may be transmitted between a source and receiver for construction activities occurring within a tunnel.



The term 'regenerated noise' is also used in other instances where energy is converted to noise away from the primary source. One example would be a fan blowing air through a discharge grill. The fan is the energy source and primary noise source. Additional noise may be created by the aerodynamic effect of the discharge grill in the airstream. This secondary noise is referred to as regenerated noise.

Appendix B Potentially Contributing Industrial Sites

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Figure B-1: Potentially Contributing Sites – NCA01

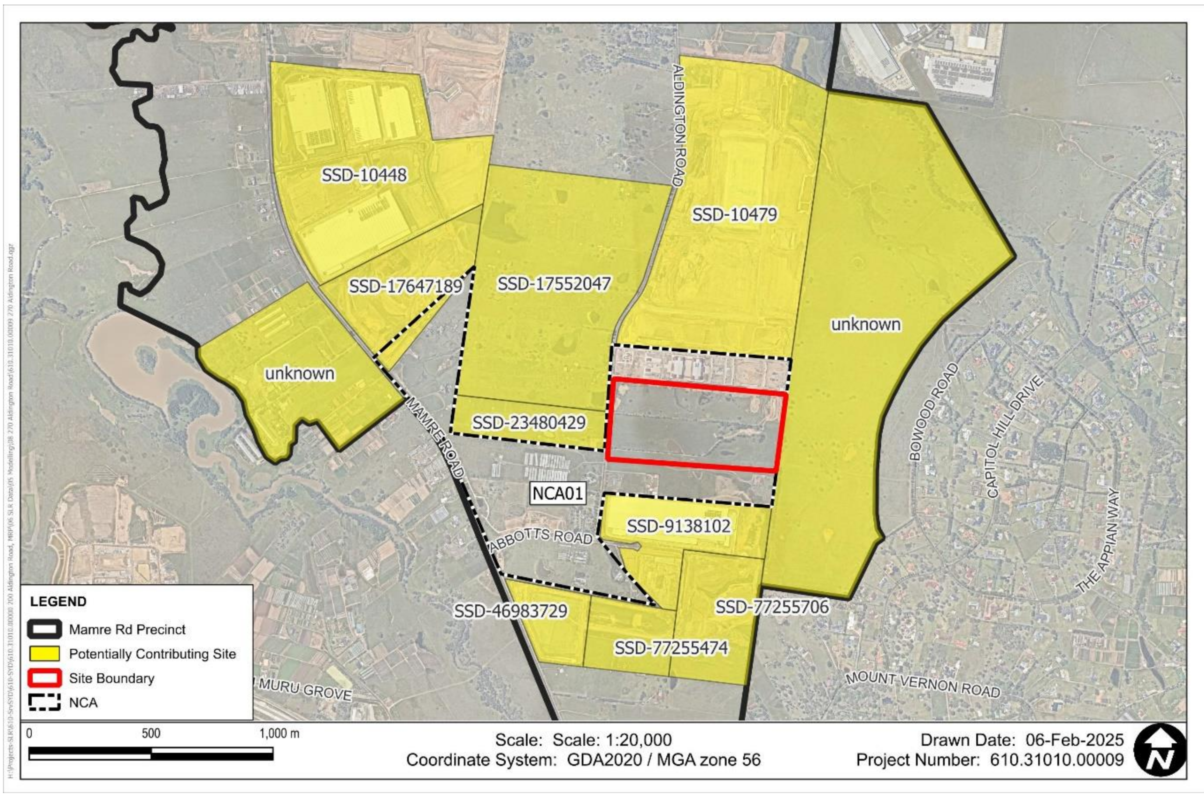


Figure B-2: Potentially Contributing Sites – NCA02

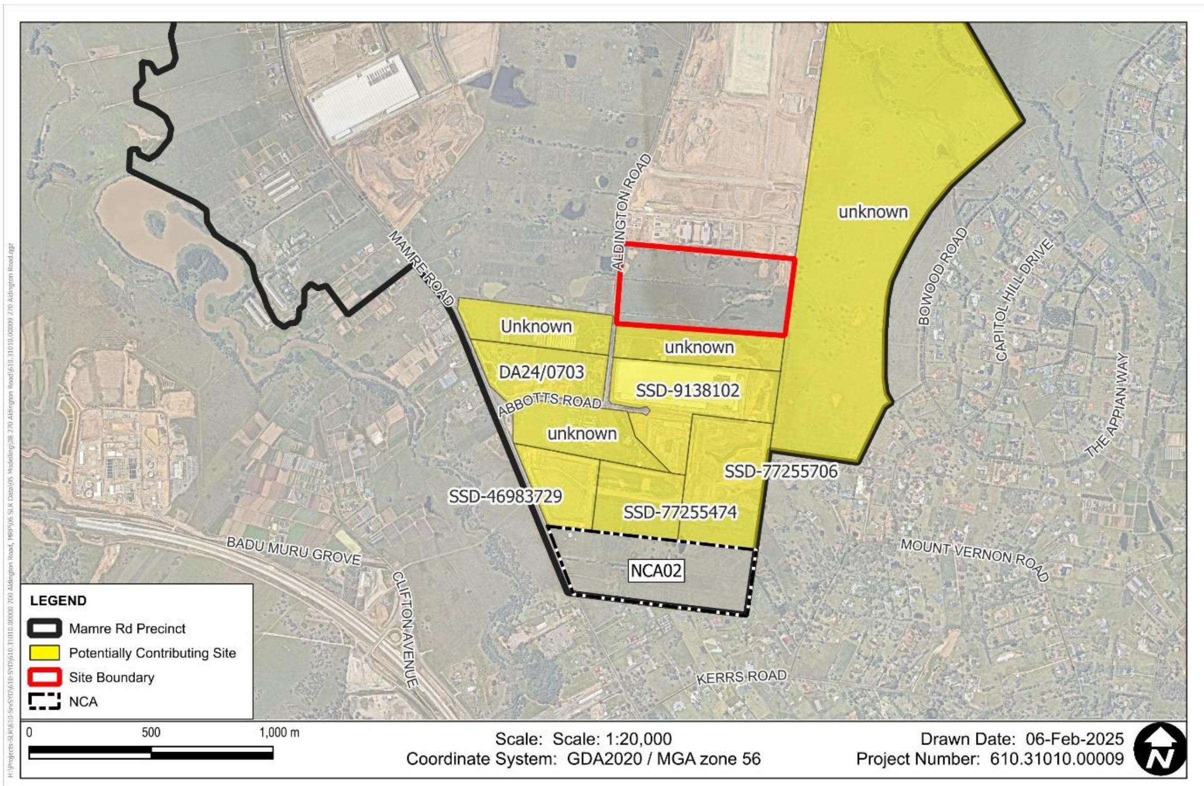


Figure B-3: Potentially Contributing Sites – NCA03

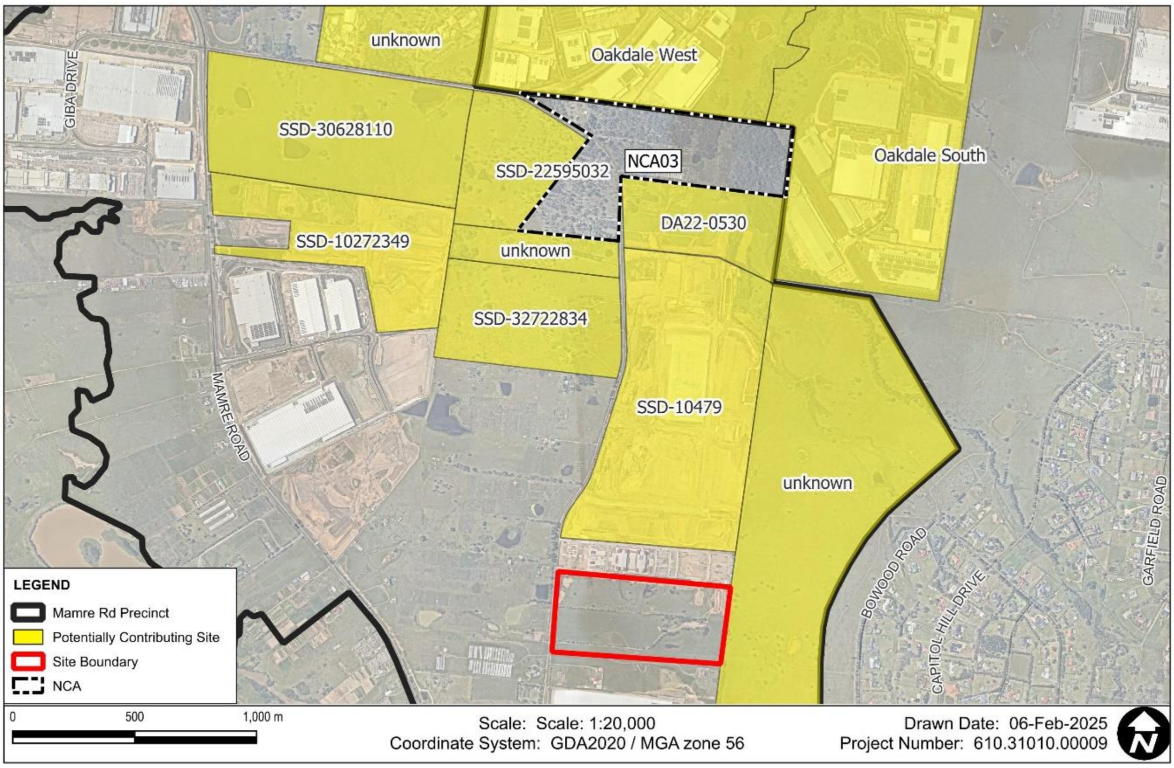


Figure B-4: Potentially Contributing Sites – NCA04

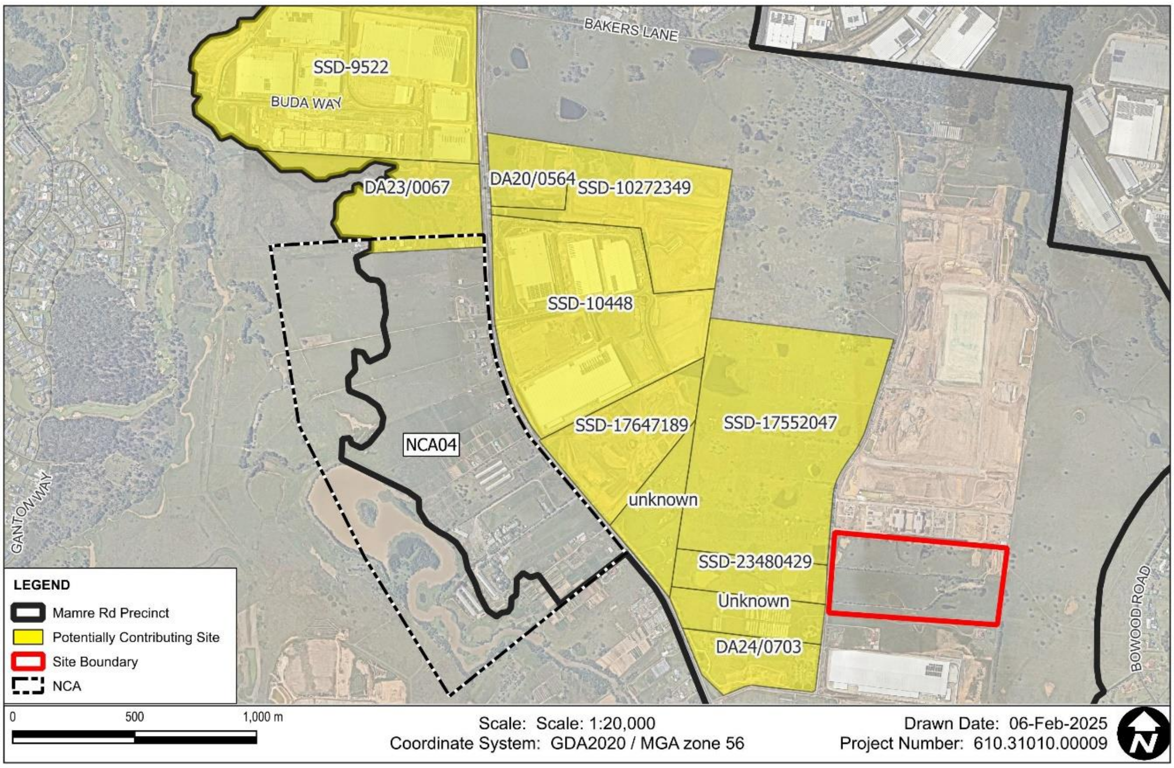


Figure B-5: Potentially Contributing Sites – NCA05

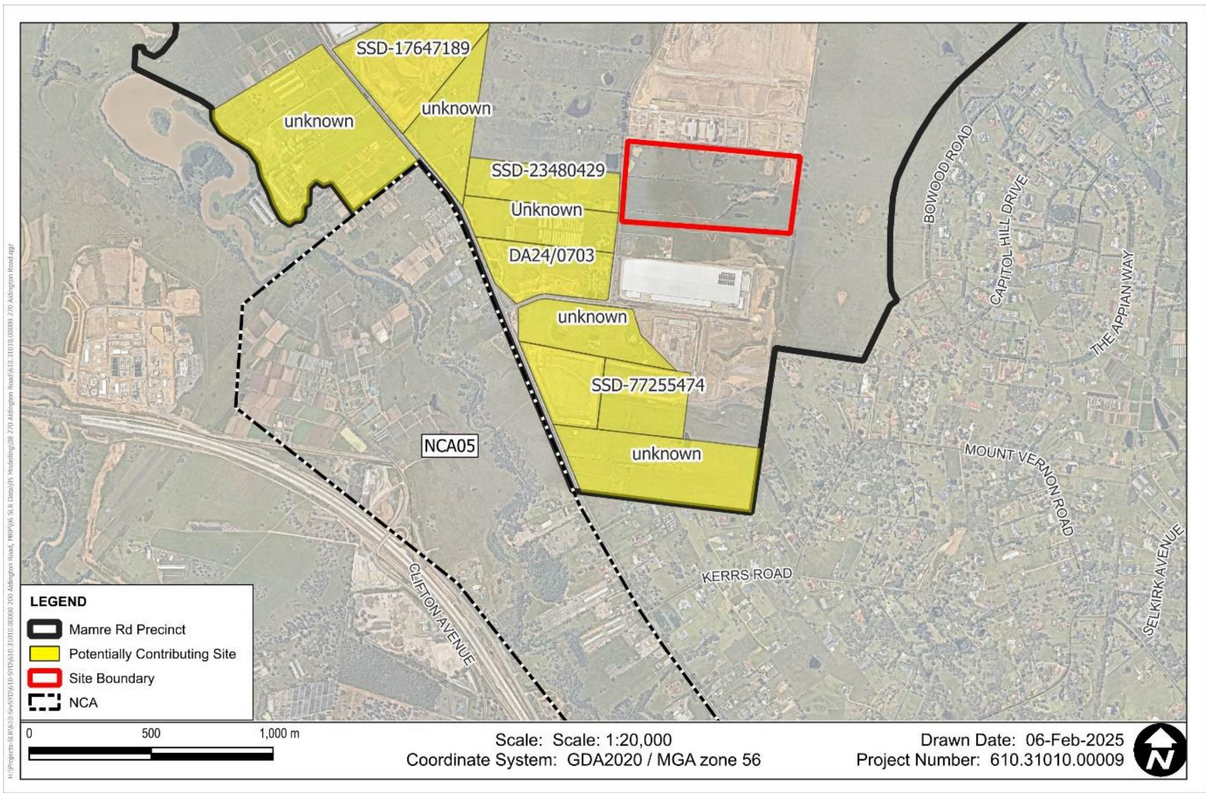


Figure B-6: Potentially Contributing Sites – NCA06

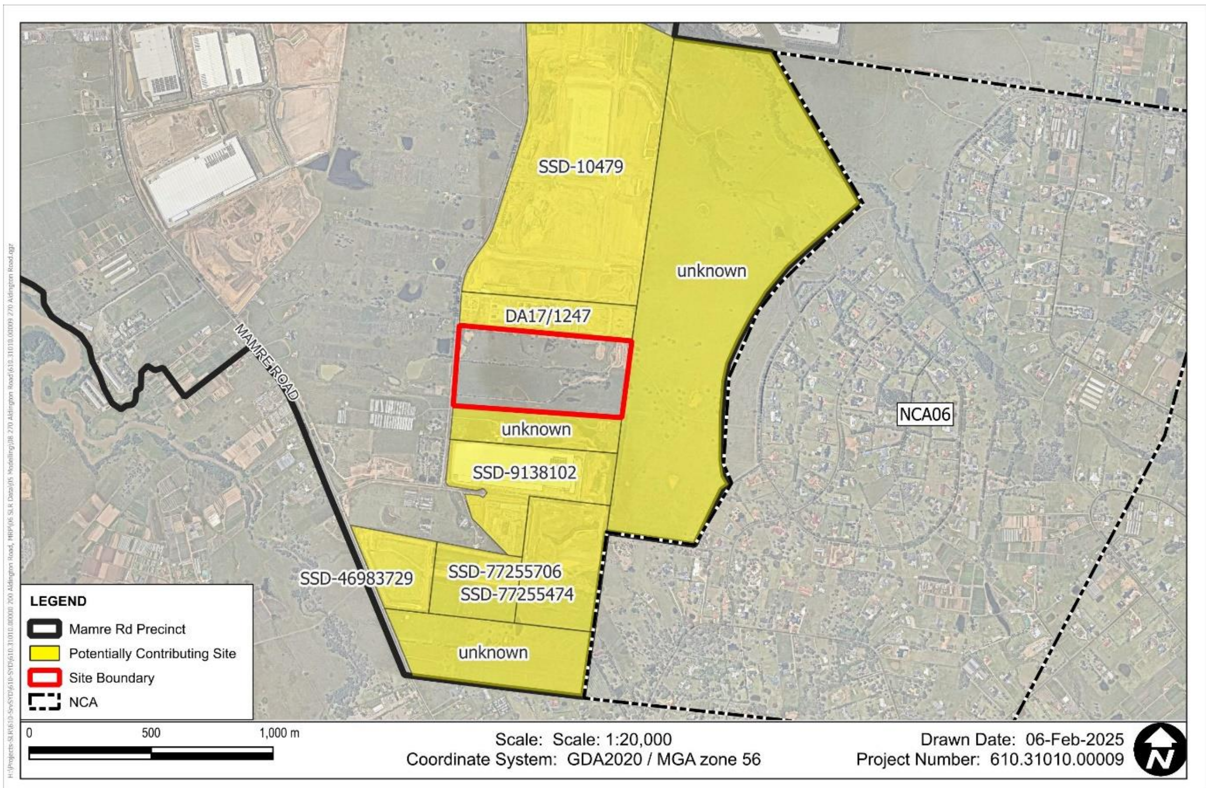
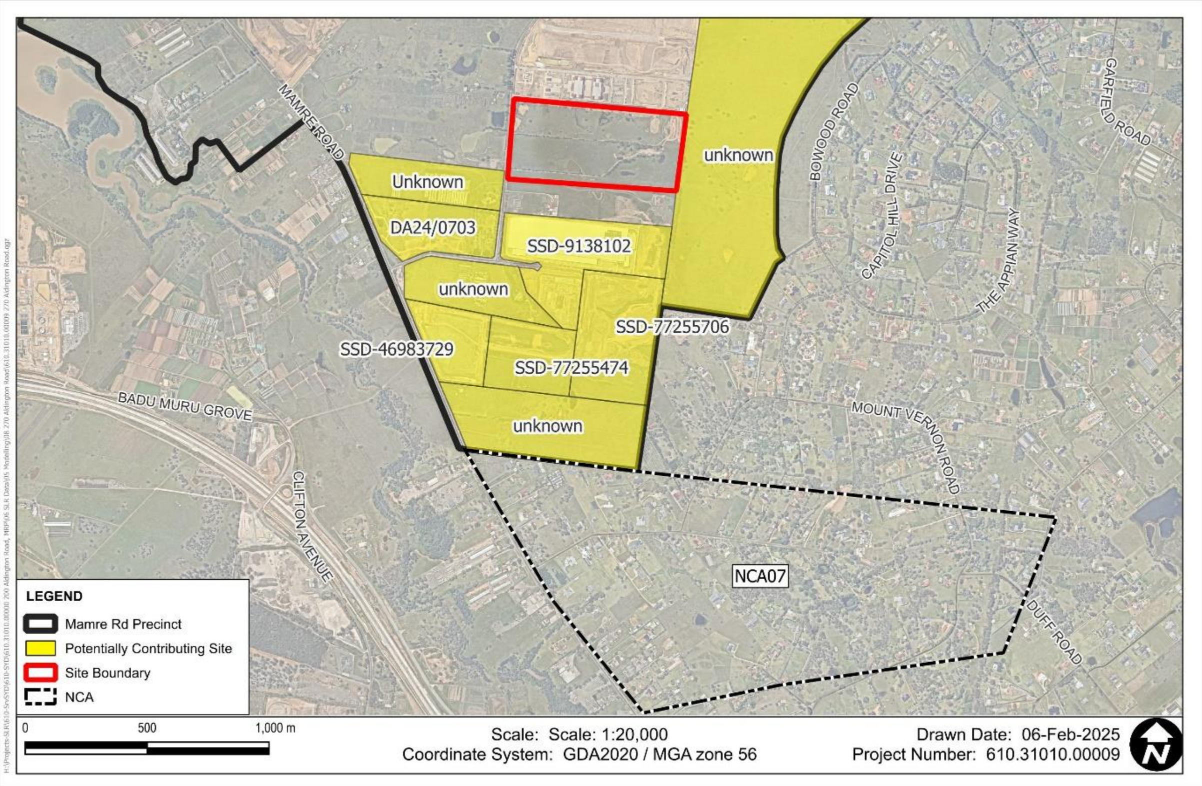


Figure B-7: Potentially Contributing Sites – NCA07



Appendix C NPfI Mitigation Measures

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Best Management Practice (BMP)

Best management practice (BMP) is the application of particular operational procedures that minimise noise while retaining productive efficiency.

Where applied, these measures and practices are often documented in a noise management plan so that operational practices and undertakings are clearly understood and applied at all levels of an industrial operation. Application of BMP can include the following types of practice:

- Using the quietest plant that can do the job
- Scheduling the use of noisy equipment at the least-sensitive time of day
- Not operating, or reducing operations at night
- Siting noisy equipment behind structures that act as barriers, or at the greatest distance from the noise-sensitive area or orienting the equipment so that noise emissions are directed away from any sensitive areas, to achieve the maximum attenuation of noise
- Where there are several noisy pieces of equipment, scheduling operations so they are used separately rather than concurrently
- Keeping equipment well-maintained and operating it in a proper and efficient manner
- Using ‘quiet’ practices when operating equipment, for example, positioning idling trucks in appropriate areas
- Running staff-education programs and regular tool box talks on the effects of noise and the use of quiet work practices.

Best Available Technology Economically Achievable (BATEA)

With ‘Best available technology economically achievable’ (BATEA), equipment, plant and machinery that produce noise incorporate the most advanced and affordable technology to minimise noise output. Affordability is not necessarily determined by the price of the technology alone. Increased productivity may also result from using more advanced equipment, offsetting the initial outlay, for example, using ‘quieter’ equipment that can be operated over extended hours. Old or badly-designed equipment can often be a major source of noise.

Where BMP fails to achieve the required noise reduction by itself, the BATEA approach should then be considered. Examples of uses of BATEA include:

- Considering alternatives to tonal reversing alarms (where work health and safety is appropriately considered)
- Using equipment with efficient muffler design
- Using quieter engines, such as electric instead of internal combustion
- Fitting and maintaining noise reduction packages on plant and equipment
- Using efficient enclosures for noise sources
- Damping or lining metal trays or bins
- Active noise control.

For many industries there are a wide range of factors that can restrict the feasibility and reasonableness of applying BMP or BATEA measures on a particular site. Work health and safety considerations must also be taken into account as well as any other regulatory and process requirements.

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