RENZO TONIN & ASSOCIATES
inspired to achieve

Acoustics
Vibration
Structural Dynamics

KEMPS CREEK INDUSTRIAL HUB

SSD-9522 OPERATIONAL NOISE ASSESSMENT FOR MODIFICATION

25 August 2022

Frasers Property Industrial

TM248-02F03 Operational noise assessment (r8)

35 1982-2017 ACOUSTIC ENGINEERING EXCELLENCE

Sydney Melbourne Brisbane Gold Coast Kuwait Singapore
Renzo Tonin & Associates ABN 29 117 462 861
Level 1/418A Elizabeth St SURRY HILLS NSW 2010 | PO Box 877 STRAWBERRY HILLS NSW 2012
P (02) 8218 0500 F (02) 8218 0501 sydney@renzotonin.com.au www.renzotonin.com.au

aaac Association of Australian Acoustical Consultants

Document details

Detail	Reference
Doc reference:	TM248-02F03 Operational noise assessment (r8)
Prepared for:	Frasers Property Industrial
Address:	Level 2, 1C Homebush Bay Drive, Rhodes NSW 2138 Australia
Attention:	Paul Solomon

Document control

Date	Revision history	Non-issued revision	Issued revision	Prepared	Instructed	Reviewed / Authorised
17.11.2021	Draft	0	1	H. Puckeridge	M. Gange	M. Gange
22.11.2021	Revised draft		2	H. Puckeridge	M. Gange	
23.11.2021	Final issue	-	4	H. Puckeridge	M. Gange	M. Gange
25.02.2022	Updated for DPE comment	-	5	H. Puckeridge	M. Gange	M. Gange
25.08.2022	Lots 2 and 3 mod	6-7	8	C. Chan	M. Gange	M. Gange

File Path: R:\AssocSydProjects\TM201-TM250\TM248 mg Kemps Creek Industrial Hub\Task 2 - Operational MOD5 (now MOD3)\1 Docs\03 Assessment report\TM248-02F03 Operational noise assessment (r8).docx

Contents

List of tables

List of figures

1 Introduction

1.1 Overview and purpose of report

Renzo Tonin & Associates (RT&A) has been engaged by Frasers Property Industrial and Altis Property Partners JV to undertake an operational noise impact assessment for the modified design of the proposed Kemps Creek Warehouse, Logistics and Industrial Facilities Hub at 657 - 769 Mamre Road, Kemps Creek (SSD 9522) (the Project).

This report assesses noise impacts and proposes mitigation and management measures to reduce impacts during the operational phases of the Project. The noise assessment has been carried out in accordance with the policies, guidelines and standards presented in Section 3 of this report addressing operational noise.

This report is technical in nature and uses acoustic terminology throughout. A summary and explanation of the common acoustic terms that have been used in this report is presented in APPENDIX A.

1.2 Site overview

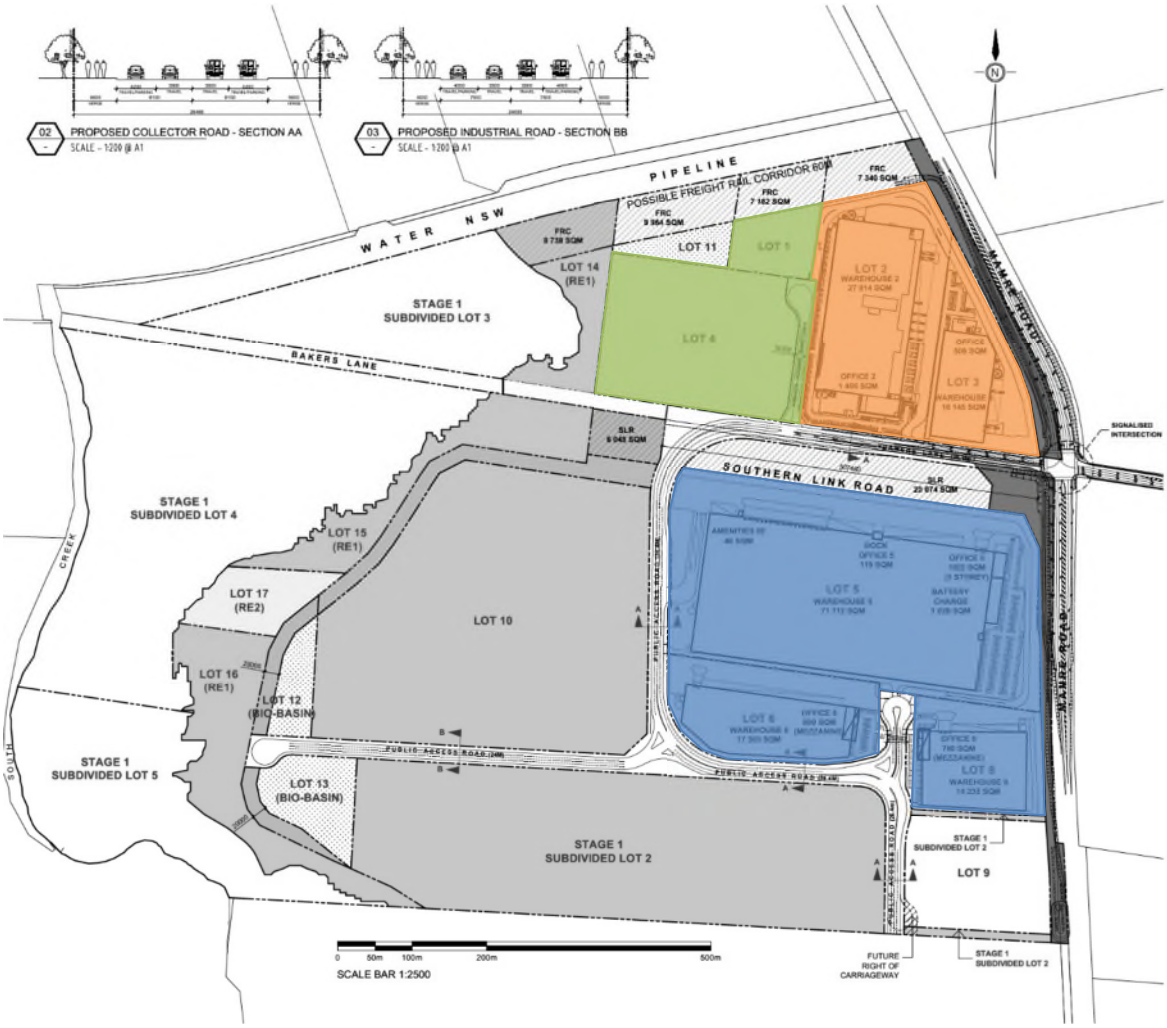
1.2.1 The modification

The site location is shown in Figure 1-1, and is located within the Penrith Local Government Area (LGA) and is zoned IN1 General Industrial under the provisions of State Environmental Planning Policy (Western Sydney Employment Area) 2009 (SEPP WSEA).

The proposed modification relates to changes to the design of Lots 2 and 3 (shown in orange in Figure 1-1). The development (SSADA 9522) also includes Lots 1, 4, 5, 6 and 8 (shown in green and blue in Figure 1-1).

The proposed modification to Lots 2 and 3 would result in changes to the layout of Lots 1 and 4 but at the present point in time, the design of Lots 1 and 4 are to be finalised. The subject proposal does not involve any changes to Lots 5, 6 and 8. As the operational noise limits relate to the cumulative impact of all seven industrial lots in the development, this assessment of the proposed modifications to Lots 2 and 3 includes the operational noise of Lots 1, 4, 5, 6 and 8 .

Figure 1-1: Site location



1.2.2 Access

Access to the site is proposed via the publicly accessible estate access roads approved under SSD 9522. Access into the overall estate is made possible via Mamre Road, which is subject to future road widening as part of the Mamre Road Widening Project. The site is connected to the arterial road network including Mamre Road and both the M4 & M7 Motorways via the public estate access roads.

1.2.3 Site description

The site consists of seven industrial lots as summarised in Table 1-1. The site layout is shown in Figure 1-2.

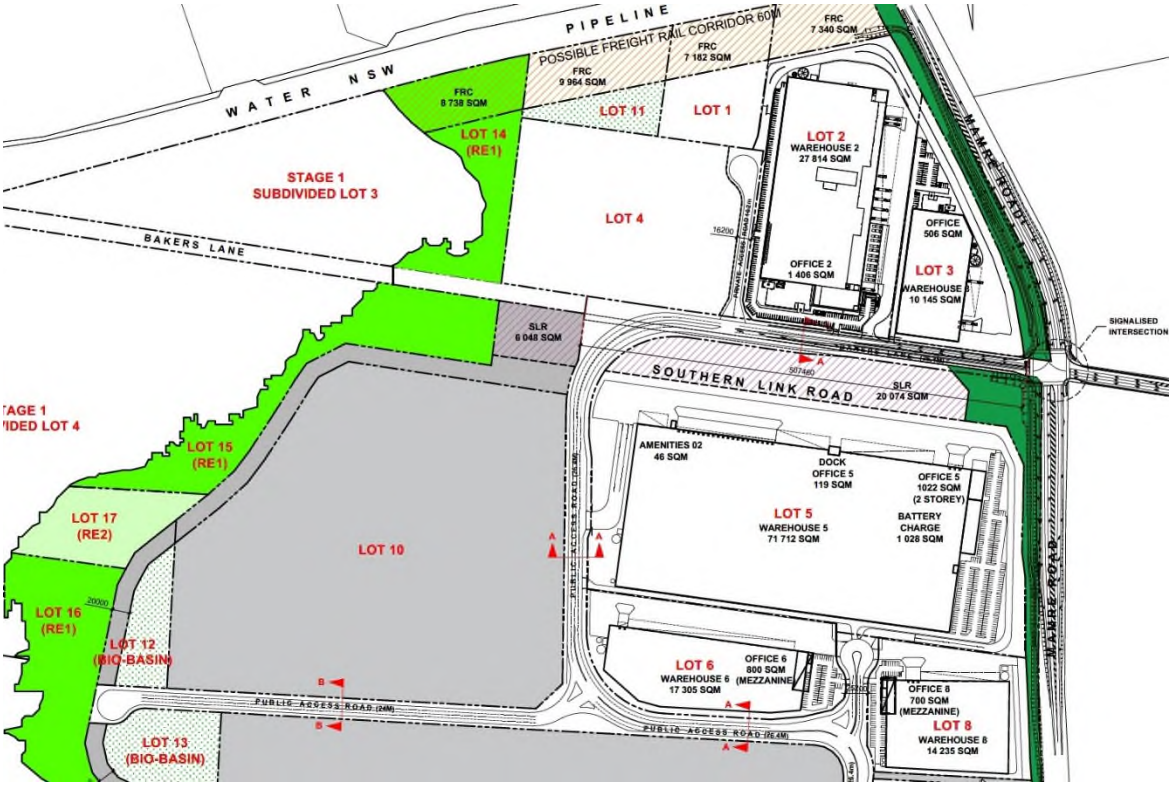
The operations on site will include the following:

- For Lot 2 automated sorting and picking of pharmaceutical products and refrigerated warehouse operations (3 am to 1 am), delivery/dispatch of materials (4 am to 12 am) and office activities (5 am to 6 pm).
- For all other lots the specific operation activities and times are currently unknown, however this assessment assumes 24/7 operation for all warehouses. Operations in each lot will consist of general warehouse operations, office activities and delivery/dispatch of materials via recessed and flush loading docks.

Table 1-1: Summary of proposed facilities

Lot	Lot Area (m^2)	Building area (m^2)	Details
Lot 1	16,654	3,657	Warehouse, office, loading docks and carpark
Lot 2	62,449	29,220	Refrigerated warehouse, workshop, office, loading docks and carparks
Lot 3	25,403	10,651	Warehouse, office, loading docks and carpark
Lot 4	48,695 (excluding access road)	26,621	Warehouse, chiller rooms, offices, loading docks and carpark
Lot 5	145,527	73,963	Warehouse, office, loading docks and carpark
Lot 6	33,833	18,105	Warehouse, office, loading docks and carpark
Lot 8	26,256	14,935	Warehouse, office, loading docks and carpark

Figure 1-2:Site layout



1.2.4 Mamre Road Precinct (MRP)

The site is located within the Mamre Road Precinct (MRP). The MRP is within the Western Sydney Employment Area and was rezoned in June 2020. The MRP provides about 850 hectares of industrial land. The rezoning of the precinct preserves around 95 hectares of land for environmental conservation and open space and protects a site for a potential Western Sydney freight intermodal terminal (IMT). The draft development control plan (MRP DCP) was on public exhibition from 10 November to 17 December 2020. As of November 2021, the finalisation of the MRP DCP was still under consideration.

As detailed in Section 1.6 "*Precinct Vision*" of the MRP DCP states:

"*The Mamre Road Precinct will be a world-class industrial area, primarily catering for warehousing and logistics and forming an extension of the Western Sydney Employment Area. Larger consolidated land parcels will facilitate the development of these uses. A flexible zoning and land use controls will also allow other smaller industrial, manufacturing, commercial and clean industrial uses to locate here. Smaller industrial and urban services uses are encouraged throughout the Precinct, and particularly in transition areas, where the industrial area adjoins rural-residential properties.*

This Precinct presents the opportunity for an intermodal terminal serviced by the planned Western Sydney Freight Line. Precinct design, including the provision of a dedicated connection into the freight terminal, will minimise adverse impacts on the amenity of adjoining rural-residential areas, including views and visual impacts, and noise.

The interface with adjoining rural-residential areas and educational facilities within the Precinct will be carefully managed so as to minimise adverse impacts. Considered site planning and building design will be required at the interface with Wianamatta-South Creek and Kemps Creek, bushland and open space, to ensure public spaces are attractive and activated…"

Presented in Figure 1-3 is the structure plan for the MRP as part of the rezoning, while presented in Figure 1-4 are the currently proposed surrounding developments within the MRP, with the applicable SSD or Development Application (DA) reference.

Figure 1-3:Mamre Road Precinct – Structure Plan (June 2020)

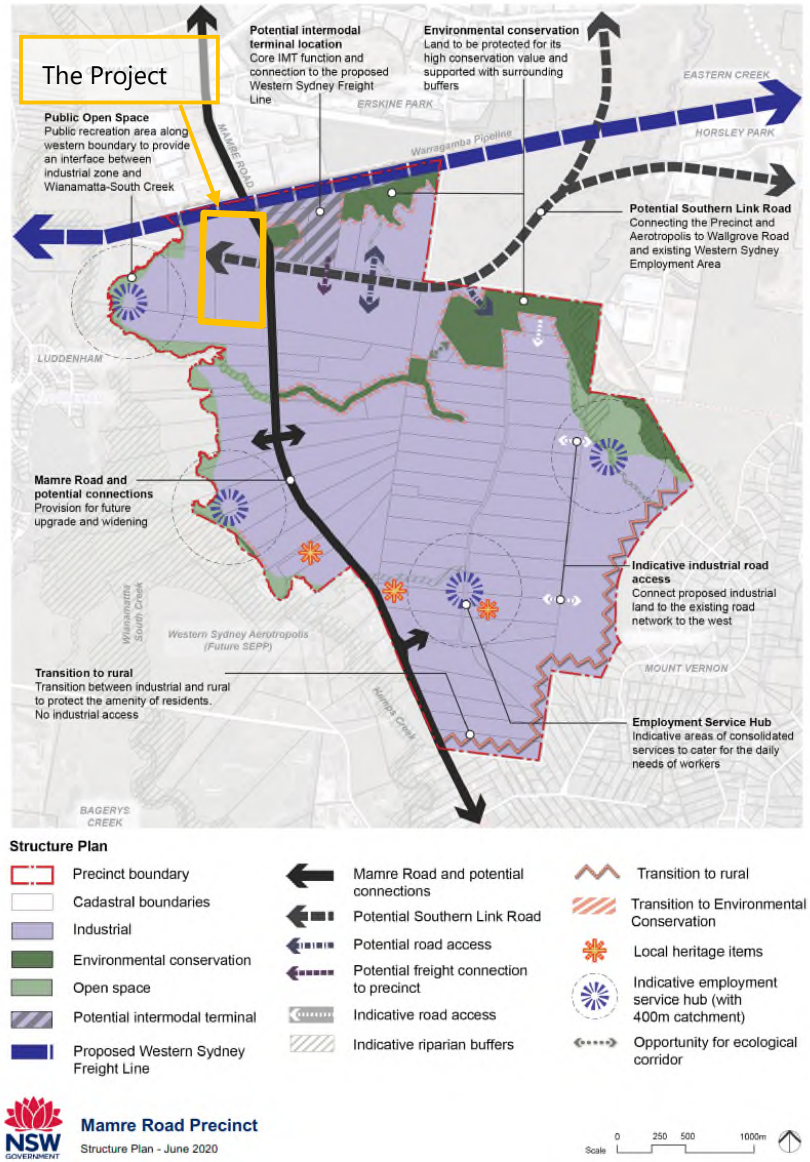
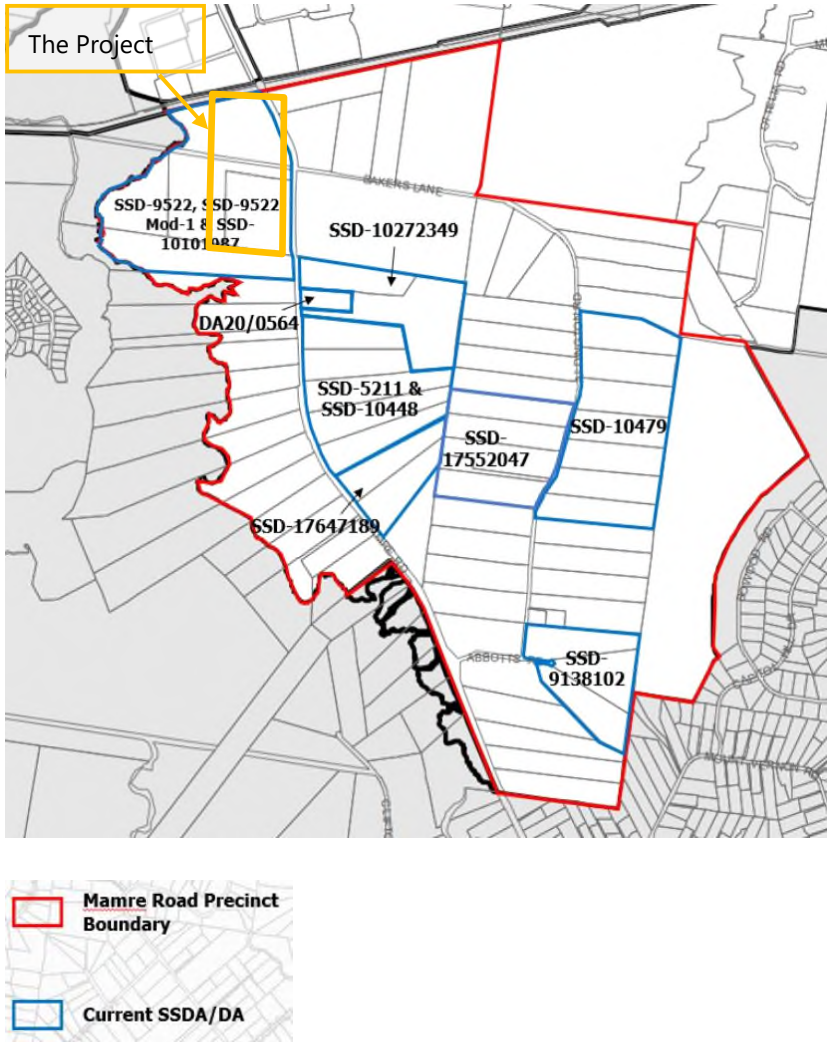


Figure 1-4:Currently proposed surrounding developments within the MRP



1.3 SSD-9522 Development Consent modification

The Development Consent for SSD-9522 was issued on 21 December 2020. The consent contained several conditions relating to operational noise.

Condition B52 provided a table of operational noise limits to be met at nearby receivers. Condition B54 nominated an acoustic barrier that must be constructed prior to the commencement of operation.

Updates to the design and assessment in this modification have resulted in these conditions of the Development Consent requiring amendment. The reasoning for these amendments is explained below.

1.3.1 Condition B52

Condition B52 states:

> ***Operational Noise Limits***
>
> *B52. The Applicant must ensure that noise generated by operation of the development does not exceed the noise limits in Table 5 at the receiver locations shown on the plan in Appendix 3.*
>
> ***Table 5*** *Noise Limits dB(A)*

Location	Day $L_{Aeq(15minute)}$	Evening $L_{Aeq(15minute)}$	Night $L_{Aeq(15minute)}$
Receiver 1: residences on Medinah Avenue, Luddenham	41	38	35
Receiver 2: 654-674 Mamre Road, Kemps Creek	48	43	38
Receiver 3: 676-702 Mamre Road, Kemps Creek	48	43	38
Receiver 4: 706-752 Mamre Road, Kemps Creek	48	43	38
Receiver 5: 754-770 Mamre Road, Kemps Creek	48	43	38
Receiver 6: 771-781 Mamre Road, Kemps Creek	48	43	38
Receiver 7: 579-649 Mamre Road, Orchard Hills	48	43	38
Receiver A: Altis Warehouse and Distribution Hub, 585- 649 Mamre Road, Orchard Hills	70	70	70

Note: Noise generated by the development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Noise Policy for Industry (EPA, 2017) (as may be updated or replaced from time to time).

At the time of the SSD-9522 lodgement receivers R2 to R6 were residential receivers within rural (RU) land zoning. These receivers have subsequently been rezoned to be industrial (IN1), as part of the Mamre Road Precinct (see Section 1.2.4).

654-702 Mamre Road (receivers R2 and R3) is currently on offer for sale for the purpose of industrial development. Evidence of the sale is provided in APPENDIX C.

706-752 Mamre Road (receiver R4) is intended to be developed for industrial purposes. Evidence of the current SSD process is provided in APPENDIX C. The proposed Southern Link Road (see Figure 1-3) also passes through this property.

While the residential receivers at R2 – R4 are now in an IN1 Industrial Zone and are to be developed into industrial premises in the future, we have been advised by the Department of Planning and Environment (DPE) that the noise emission of the development to the current residential receivers at R2 – R4 are to assessed with respect to the noise limits in Condition B52 Table 5 above (which have been determined for residential receivers in a rural environment). Receivers R5 and R6 have been recently demolished for the purpose of industrial development. Evidence is provided in APPENDIX C. As the residences no longer exist, these receivers have been reclassified as industrial and the project trigger level for these receivers have been amended to 63dB(A) (to be consistent with Table 2.2 of the NPfI for industrial receivers). As detailed in Section 3.5, Condition B52 Table 5, amended with the updated project trigger levels, is provided below.

Table 5 *Noise Limits dB(A)*

Location	Day $L_{Aeq(15minute)}$	Evening $L_{Aeq(15minute)}$	Night $L_{Aeq(15minute)}$
Receiver 1: residences on Medinah Avenue, Luddenham	41	38	35
Receiver 2: 654-674 Mamre Road, Kemps Creek	48	43	38
Receiver 3: 676-702 Mamre Road, Kemps Creek	48	43	38
Receiver 4: 706-752 Mamre Road, Kemps Creek	48	43	38
Receiver 5: 754-770 Mamre Road, Kemps Creek	63	63	63
Receiver 6: 771-781 Mamre Road, Kemps Creek	63	63	63
Receiver 7: 579-649 Mamre Road, Orchard Hills	48	43	38
Receiver A: Altis Warehouse and Distribution Hub, 585- 649 Mamre Road, Orchard Hills	70	70	70

Note: Noise generated by the development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Noise Policy for Industry (EPA, 2017) (as may be updated or replaced from time to time).

1.3.2 Condition B54

Condition B54 states:

> ***Acoustic Barrier***
>
> *B54. The Applicant must construct the acoustic barrier for Warehouse 3 as shown in the site plan SP-KC1-DA-003 (Issue I), prepared by Frasers Property Australia Pty Ltd, dated 31 July 2020, prior to the commencement of operation of Warehouse 3.*

The noise barrier referred to in this condition is no longer relevant as the internal access road for the previous Warehouse 3 that this barrier was designed to screen no longer exists in the modified design. Noise barriers have been considered for the mitigation of sleep disturbance impacts in Section 6.4, however due to the site redesign the location and extent of any potential noise barriers are different from what was specified in this Condition.

It is recommended that Condition B54 be updated to require the provision of the noise barrier in Figure 6-1, to be constructed only should the residence at 654-674 Mamre Road (R2) remain habited once the Lot 2 operations commence.

1.4 Acoustic terms

A summary of the acoustic terms that have been used in this report is presented in APPENDIX A.

2 Sensitive receivers

2.1 Site and surrounding land use

The Project site is located within the MRP, and the surrounding land currently comprises of predominantly rural typology, with a variety of rural dwellings, rural land, farm dams and scattered vegetation. As per Section 1.2.4, this land has been rezoned for the MRP from RU2 Rural Landscape zone to IN1 General Industrial zoning under the State Environmental Planning Policy (Western Sydney Employment Area) 2009 (WSEA SEPP). Following the approval of the MRP rezoning, large areas of this land have been purchased for industrial development, and construction has commenced on a number of approved developments.

2.2 Representative receivers

The representative receivers included in this assessment are shown in Table 2-1. Receivers R1.1 - R1.4 correspond to Receiver 1 identified in Condition B52 of the Development Consent. R2 - R7 corresponds to Receiver 2 – 7 and R8 corresponds to Receiver A in B52. The table includes the updated receiver land uses, as discussed in Section 1.3.

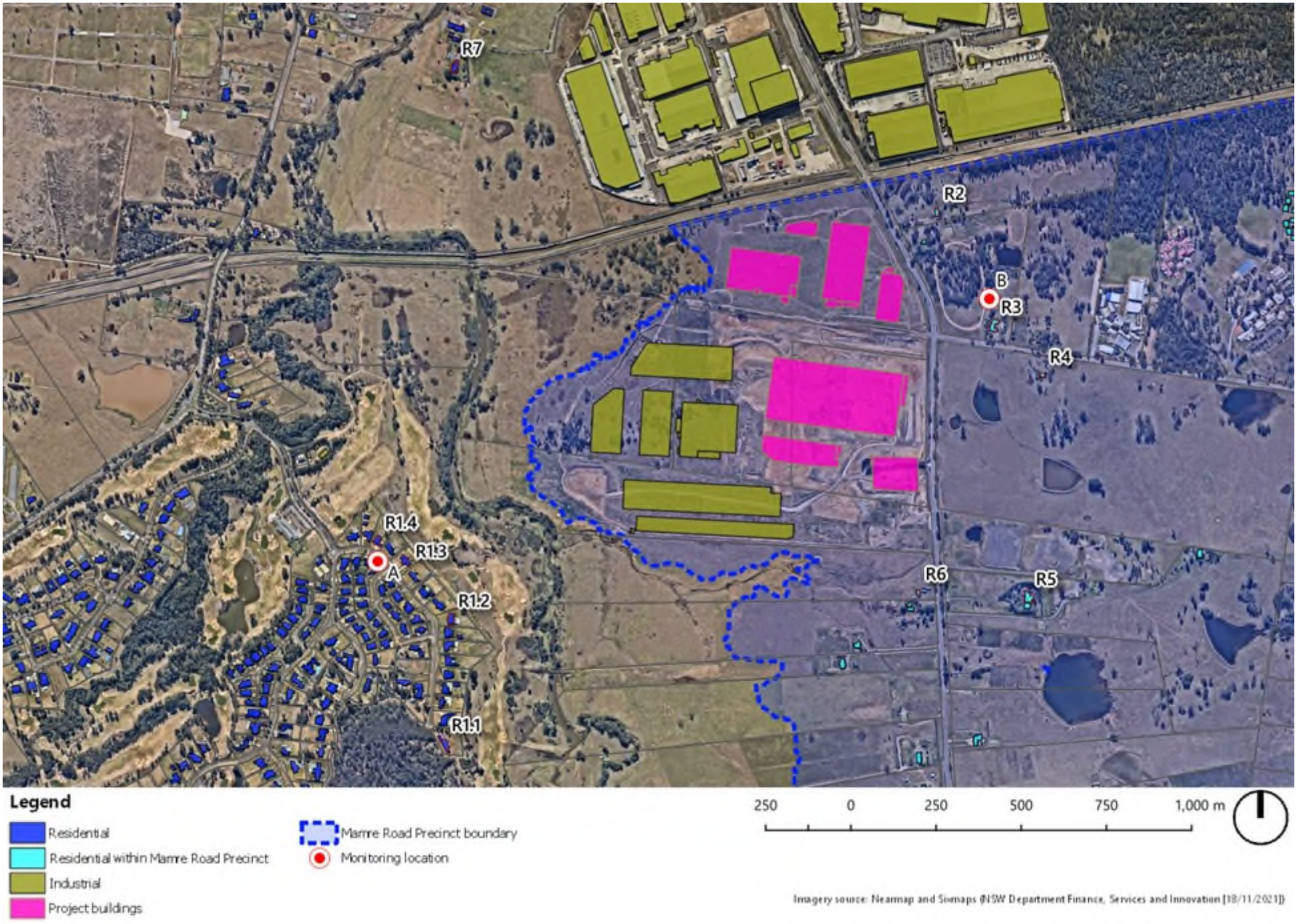
Table 2-1: Representative receiver locations

Rec No.	Address	Receiver type	Approximate distance to site boundary (m)
R1.1	31 Medinah Avenue, Luddenham	Residential	1,000
R1.2	15 Medinah Avenue, Luddenham	Residential	770
R1.3	7 Medinah Avenue, Luddenham	Residential	810
R1.4	3 Medinah Avenue, Luddenham	Residential	870
R2	654-674 Mamre Road, Kemps Creek	Residential	760
R3	676-702 Mamre Road, Kemps Creek	Residential	680
R4	706-752 Mamre Road, Kemps Creek	Residential	870
R5	772-782 Mamre Road, Kemps Creek	Industrial	920
R6	771-781 Mamre Road, Kemps Creek	Industrial	640
R7	579a Mamre Road, Orchard Hills	Residential	1,100
R8 (A)	7-9 Distribution Drive, Orchard Hills	Industrial	540

The nearest long-term residential receivers outside of the MRP are on Medinah Avenue, Luddenham, to the west of the site (R1.1 to R1.4).

The site and surrounding receivers are presented in Figure 2-1.

Figure 2-1:Site location, nearby noise sensitive receivers and monitoring locations



3 Noise objectives

3.1 Industrial noise

This assessment aims to quantify the potential operational noise emissions from the Project in accordance with the NSW 'Noise Policy for Industry' (NPfI), 2017. The assessment procedure has two components:

- Controlling intrusive noise impacts in the short-term for residences; and
- Maintaining noise level amenity for residences and other land uses.

In accordance with the NPfI, noise impact should be assessed against the project noise trigger level which is the lower value of the project intrusiveness noise levels and project amenity noise levels.

3.2 Existing noise environment

Criteria for the assessment of operational noise are derived from the existing noise environment for the day, evening and night periods. Fact Sheet B of the NPfI outlines the methods for determining the background noise level of an area. The time periods established for the assessment in accordance with the NPfI are as follows:

- **Day** is defined as 7:00am to 6:00pm, Monday to Saturday and 8:00am to 6:00pm Sundays & Public Holidays.
- **Evening** is defined as 6:00pm to 10:00pm, Monday to Sunday & Public Holidays.
- **Night** is defined as 10:00pm to 7:00am, Monday to Sunday & Public Holidays.

Noise measurements are ideally carried out at the nearest or most potentially affected locations surrounding a development in absence of noise from the subject site. Furthermore, representative locations may be established in the case of multiple receivers as it is usually impractical to carry out. As such, noise catchment areas have been established to group assessment receivers based on areas with similar acoustic characteristics.

Project noise trigger levels have already been established in MOD1 acoustic assessment [1] and Development Consent Condition B52 for receivers R1 to R8. Details of the noise monitoring locations used to derive the criteria for these receivers (Locations A and B) are provided for information in Table 3-1.

Table 3-1: Reference noise monitoring locations

Monitoring location	Address	Monitoring period	Description
A	8 Medinah Avenue, Luddenham	11/04/2018 – 19/04/2018	Collected by Acoustic Works as part of the MOD1 acoustic assessment.
B	676-702 Mamre Road, Kemps Creek	11/04/2018 – 19/04/2018	Collected by Acoustic Works as part of the MOD1 acoustic assessment.

The measured background noise levels at the monitoring locations are presented in Table 3-2 and the noise monitoring locations are shown in Figure 2-1.

Table 3-2: Measured rating background noise levels

Ref.	Location description	Rating background noise levels (RBL), $L_{A90,\ 15\ minute}$		
		Day[1]	Evening[2]	Night[3]
A	8 Medinah Avenue, Luddenham	36	33	30 (28[6])[5]
B	676-702 Mamre Road, Kemps Creek	44	43	37

Notes:
1. Day: 7.00am to 6.00pm Monday to Saturday and 8.00am to 6.00pm Sundays & Public Holidays
2. Evening: 6.00pm to 10.00pm Monday to Sunday & Public Holidays
3. Night: 10.00pm to 7.00am Monday to Sunday & Public Holidays
4. As required by the NPfI, the external ambient noise levels presented are free-field noise levels. [ie. no facade reflection]
5. As per NPfI Section 2.3, the minimum assumed RBL for the night period is 30 dB(A).
6. The reference report notes that this level has been documented where background noise levels have been measured below this NPfI minimum level.

3.3 Intrusive noise levels

According to the NPfI, the intrusiveness of a noise source may generally be considered acceptable if the equivalent continuous (energy-average) A-weighted level of noise from the source (represented by the $L_{Aeq,15min}$ descriptor) does not exceed the background noise level measured in the absence of the source by more than 5 dB(A).

The project intrusiveness noise level, which is only applicable to residential receivers, is determined as follows:

$L_{Aeq,15minute}$ Intrusiveness noise level = Rating Background Level ('RBL') plus 5 dB(A)

3.4 Amenity noise levels

The project amenity noise levels for different time periods of day are determined in accordance with Section 2.4 of the NPfI. The NPfI recommends amenity noise levels ($L_{Aeq,period}$) for various receivers including residential, commercial, industrial receivers and sensitive receivers such as schools, hotels, hospitals, churches and parks. These "recommended amenity noise levels" represent the objective for total industrial noise experienced at a receiver location.

The recommended amenity noise levels are reproduced from the NPfI in Table 3-3 below.

Table 3-3: Recommended amenity noise levels

Type of receiver	Noise amenity area	Time of day	Recommended amenity noise level, L_{Aeq}, dB(A)
Residential	Rural	Day	50
		Evening	45
		Night	40
	Suburban	Day	55
		Evening	45
		Night	40
	Urban	Day	60
		Evening	50
		Night	45
Hotels, motels, caretakers' quarters, holiday accommodation, permanent resident caravan parks	See column 4	See column 4	5 dB(A) above the recommended amenity noise level for a residence for the relevant noise amenity area and time of day
School classroom (internal)	All	Noisiest 1-hour period when in use	35[5]
Hospital ward	All		
- Internal		Noisiest 1-hour	35
- External		Noisiest 1-hour	50
Place of worship (internal)	All	When in use	40
Passive recreation (e.g. national park)	All	When in use	50
Active recreation (e.g. school playground, golf course)	All	When in use	55
Commercial premises	All	When in use	65
Industrial premises	All	When in use	70
Industrial interface (applicable only to residential noise amenity areas)	All	When in use	Add 5 dB(A) to recommended noise amenity area

Notes:
1. Daytime 7.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 7.00 am.
2. On Sundays and Public Holidays, Daytime 8.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night-time 10.00 pm - 8.00 am.
3. The L_{Aeq} index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period.
4. The recommended amenity noise levels refer only to noise from industrial sources. However, they refer to noise from all such sources at the receiver location, and not only noise due to a specific project under consideration. The levels represent outdoor levels except where otherwise stated
5. In the case where existing schools are affected by noise from existing industrial noise sources, the acceptable LAeq noise level may be increased to 40 dB LAeq(1hr)

3.5 Project noise trigger levels

The project noise levels established in the MOD1 acoustic assessment and Condition B52 of the Development Consent have been adopted, except in the case of receivers R5 and R6 which no longer have residential dwellings (as identified in Section 1.1).

For receiver R5 and R6, the project noise level is derived from industrial amenity level, in accordance with Section 2.4 of the NPfI. Typically, the project amenity noise level is calculated from the recommended amenity noise level minus 5 dB(A). This is to ensure that cumulative industrial noise levels from all developments in the area remains within the recommended amenity noise levels. For this

assessment the project amenity noise level has been calculated by conservatively applying a 10 dB(A) reduction to the recommended amenity level.

$L_{Aeq,period}$ Project amenity noise level = $L_{Aeq,period}$ Recommended amenity noise level – 10dB(A)

This approach makes allowance for contributions from other industrial developments within the MRP.

Furthermore, given that the intrusiveness noise level is based on a 15 minute assessment period and the project amenity noise level is based on day, evening and night assessment periods, the NPfI provides the following guidance on adjusting the $L_{Aeq,period}$ level to a representative $L_{Aeq,15minute}$ level in order to standardise the time periods.

$L_{Aeq,15minute}$ = $L_{Aeq,period}$ + 3dB(A)

The project noise trigger levels for the representative receivers are presented in Table 3-4. The amendment of the project trigger levels from those established in the Development Consent is addressed in Section 1.3.

Table 3-4: Project noise trigger levels

Rec No.	Address	Receiver type	Day $L_{Aeq(15min)}$	Evening $L_{Aeq(15min)}$	Night $L_{Aeq(15min)}$
R1.1	31 Medinah Avenue, Luddenham	Residential	41	38	35
R1.2	15 Medinah Avenue, Luddenham	Residential	41	38	35
R1.3	7 Medinah Avenue, Luddenham	Residential	41	38	35
R1.4	3 Medinah Avenue, Luddenham	Residential	41	38	35
R2	654-674 Mamre Road, Kemps Creek	Residential	48	43	38
R3	676-702 Mamre Road, Kemps Creek	Residential	48	43	38
R4	706-752 Mamre Road, Kemps Creek	Residential	48	43	38
R5	772-782 Mamre Road, Kemps Creek	Industrial	63	63	63
R6	771-781 Mamre Road, Kemps Creek	Industrial	63	63	63
R7	579a Mamre Road, Orchard Hills	Residential	48	43	38
R8 (A)	7-9 Distribution Drive, Orchard Hills	Industrial	70	70	70

3.6 Sleep disturbance noise levels

The potential for sleep disturbance due to maximum noise level events from the site during the night-time period needs to be considered. In accordance with NPfI, a detailed maximum noise level event assessment should be undertaken where the subject development night-time noise levels at a residential location exceed the following noise trigger screening levels:

- $L_{Aeq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater.

The detailed assessment should consider all feasible and reasonable noise mitigation and management measures with a goal of achieving the sleep disturbance noise trigger levels. The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period. Some guidance on possible impact is contained in the review of research results in the NSW Road Noise Policy (see Section 3.6.1).

Other factors that may be important in assessing the extent of impacts on sleep include:

- how often high noise events will occur
- the distribution of likely events across the night-time period and the existing ambient maximum events in the absence of the subject development
- whether there are times of day when there is a clear change in the noise environment (such as during early-morning shoulder periods)
- current scientific literature available at the time of the assessment regarding the impact of maximum noise level events at night (see Section 3.6.2)

Maximum noise level event assessments should be based on the L_{AFmax} descriptor on an event basis under 'fast' time response.

3.6.1 NSW RNP

In relation to maximum noise level events, the NSW RNP [3] identifies in its summary on sleep disturbance research to date that:

1. Maximum internal noise levels below 50–55 dB(A) are unlikely to awaken people from sleep
2. One or two noise events per night, with maximum internal noise levels of 65–70 dB(A), are not likely to affect health and wellbeing significantly.

The above references identify that internal noise levels of 50 to 55 dB(A), are unlikely to cause awakenings. On the assumption that there is a 10 dB(A) outside-to-inside noise loss through an open window (see Section 2.6 of the NPfI, p15), this indicates that external noise levels of L_{Amax} 60 to 65 dB(A) are unlikely to cause awakening reactions. Given the equivalent external noise levels and considering the second point above, an L_{Amax} 65 dB(A) has then been used as the assessment noise level to determine the potential for awakening reactions.

3.6.2 World Health Organisation reports

As stated in the NPfI, other factors that may be important in assessing the extent of impacts on sleep, includes current scientific literature regarding the impact of maximum noise level events at night. The organisation that reports on the current scientific literature pertaining to night-time impacts on sleep is the World Health Organisation (WHO).

The latest guidelines produced by the WHO relating to night-time impacts on sleep, were produced in 2009 [6] and 2018 [7]. These reports mainly focus on sleep disturbance from transportation noise sources, such as aircraft, road and rail, with the 2018 guideline also providing recommendations for wind turbine and leisure noise sources. As stated in the later report, it does not provide specific recommendations for industrial activity noise due to lack of information and data.

However, given that some of the proposed operations of the Project may have a similar nature and character of noise to road traffic noise, guidance and limits relating to road traffic noise are referred to in this assessment to assess potential sleep disturbance from site operations.

Following the publication of community noise guidelines in 1999, the WHO released the *Night Noise Guidelines for Europe (WHO 2009)* in 2009, which uses $L_{night\ (outside)}$ as a primary measure of night-time noise. The $L_{night\ (outside)}$ is an A-weighted noise level at the most exposed facade outdoors over all night periods determined as a long-term average over a year, and is roughly equivalent to the external $L_{Aeq,9hour}$ night-time descriptor.

The report recommends a long-term $L_{night\ (outside)}$ noise guideline level of 40 dB(A), with an interim $L_{night\ (outside)}$ target level of 55 dB(A). The interim target is only intended as an intermediate step in localised situations as health impacts, particularly on vulnerable groups, are apparent at this noise level. The report notes:

1. For $L_{Aeq(9hour)}$ (external) levels above 55 dB(A), adverse health effects occur frequently, and a sizeable proportion of the population is highly annoyed and sleep disturbed.
2. For $L_{Aeq(9hour)}$ (external) levels between 40 dB(A) and 55 dB(A), adverse health effects are observed and vulnerable groups are more severely affected.

The WHO released the latest research into sleep in 2018 as the *Environmental Noise Guidelines for the European Region: A systematic Review on Environmental Noise and Effects on Sleep* (WHO 2018). The WHO 2018 guideline recommends reducing noise levels produced by road traffic during night-time to below 45 dB(A) $L_{night\ (outside)}$, as night-time road traffic noise above this level is associated with adverse effects on sleep.

The WHO 2018 guideline does not recommend criteria in terms of single-event noise indicators or maximum sound pressure levels (eg L_{Amax}), because the assessment of the relationship between different types of single-event noise indicators and long-term health outcomes at the population level remains tentative. The WHO guideline therefore makes no recommendations for single-event noise indicators. Thus, the WHO guideline is restricted to long-term health effects during night time and therefore only includes recommendations about average noise indicators, e.g. $L_{night\ (outside)}$.

3.6.3 Sleep disturbance assessment noise levels

In accordance with the NPfI and current scientific literature, the sleep disturbance project assessment noise levels, are presented in Table 3-5 below.

Table 3-5: Sleep disturbance project assessment noise levels

Receiver type	EPA NPfI sleep disturbance screening levels		WHO 2018 $L_{Aeq,15min}$[3]	Awakening reaction[4], L_{Amax}
	Screening level $L_{Aeq,15min}$	Screening level L_{AFmax}		
Residential	40[1]	52[2]	48[3]	65

Notes:
1. As per NPfI Section 2.5, minimum screening level is the greater of LAeq 40 dB(A) or RBL + 5dB.
2. As per NPfI Section 2.5, minimum screening level is the greater of LAFmax 52 dB(A) or RBL + 15dB.
3. As per Section 2.2 of the NPfI, the WHO 45 dB(A) Lnight (outside) has been converted to a LAeq,15minute level by adding 3 dB(A).
4. As per the NSW RNP, as detailed in Section 3.6.1.
5. Sleep disturbance assessment is applicable for the night period (10:00pm to 7:00am), as per Section 2.5 of the NPfI.

3.7 Road traffic noise

Noise impacts from the potential increases in traffic on the surrounding road network due to operational activities from the Project are assessed in accordance with the NSW Road Noise Policy (RNP) [3]. The RNP sets out criteria to be applied to particular types of roads and land uses. These noise criteria are to be applied when assessing noise impacts and determining mitigation measures for sensitive receivers that are potentially affected by road traffic noise associated with the operation of the subject site, with the aim of preserving the amenity appropriate to the land use.

The Project will be using sub-arterial / arterial roads and not local roads. Therefore, for existing residences affected by additional traffic on existing sub-arterial / arterial roads generated by land use developments, the following RNP road traffic noise criteria apply.

Table 3-6: RNP Road Traffic Noise Criteria

Road Category	Type of Project/Land Use	Assessment Criteria, dB(A)	
		Day 7am – 10pm	Night 10pm – 7am
Freeway/arterial/sub-arterial roads	3. Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	$L_{Aeq,(15\ hour)}$ 60 (external)	$L_{Aeq,(9\ hour)}$ 55 (external)

Further to the above, the RNP states the following for land use developments generating additional traffic:

> *"For existing residences and other sensitive land uses affected by* **additional traffic on existing roads generated by land use development***, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'."*

The RNP states that in assessing feasible and reasonable mitigation measures, an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person.

4 Noise prediction methodology

4.1 Modelling overview

Airborne noise impacts from the Project were determined by modelling the noise sources, receiver locations and topographical features, and potential noise mitigation measures using a 3D noise modelling package, CadnaA (Version 2021 MR 1). Noise modelling algorithms were used to calculate the contribution of each noise source at each identified sensitive receiver location and to predict the total noise from the site for the various reasonable worst-case scenarios developed for the Project.

The noise prediction model considers:

- Location of noise sources and sensitive receiver locations (including multi-storey buildings).
- Heights of sources and receivers referenced to digital ground contours (1 metre contour intervals) or relative to the Project building structure.
- Noise source levels of individual plant and equipment.
- Internal noise levels within the facility, and the breakout of these noise levels through the façade building elements.
- Separation distances between sources and receivers.
- Ground type and reflections between sources and receivers (ground absorption value of 0 for the site, warehouse areas and roads, and 0.5 outside of this area (ie. from grassed areas / suburban areas).
- Attenuation from barriers, buildings and structures (natural terrain and purpose built).
- Shielding from proposed buildings as part of the proposed SSD 10101987 data centre buildings and the buildings proposed for the adjacent Lot 10.
- Atmospheric losses and meteorological conditions.
- Feasible and reasonable noise mitigation/treatments and management measures that have been determined for the Project.

The CONCAWE [1] noise propagation algorithm was implemented for assessing potential noise impacts because:

- Some receivers are located at large distances often greater than 700 metres from the Project, and as such this algorithm allows for prevailing noise enhancing weather conditions to be included and accounted for in the assessment and provides a provides for a conservative assessment.
- CONCAWE allows for the meteorological conditions presented in NPfI Fact Sheet D to be directly considered.

4.2 Meteorological factors

The NPfI requires the noise assessment to consider the effects of adverse meteorological conditions such as wind and temperature inversions.

The NPfI recommends that project noise criteria are to apply under weather conditions characteristic of an area. These may include standard meteorological conditions (ie. calm) and noise-enhancing meteorological conditions (ie. winds and temperature inversions). In this regard, the increase in noise that results from atmospheric temperature inversions and winds may need to be assessed. The noise levels predicted under characteristic meteorological conditions for each receiver are then compared with the criteria, to establish whether the meteorological effects will cause a significant impact.

The NPfI permits two approaches for assessing these effects, either use of default parameters or use of site-specific parameters. For the purpose of this noise assessment, default parameters have been used for a conservative assessment. By using default parameters, general meteorological values are used to predict noise levels, foregoing detailed analyses of site-specific meteorological data. This approach assumes that meteorological effects are conservative, in that it is likely to predict the upper range of increases in noise levels. Actual noise levels may be less than predicted.

Noise modelling has considered prevailing temperature inversions and prevailing winds using the CONCAWE noise modelling algorithm implementing the noise-enhancing meteorological conditions presented in NPfI Fact Sheet D. In accordance with Table D1 of the NPfI, the following parameters have been used when modelling meteorological conditions.

Table 4-1: Parameters for meteorological conditions

Meteorological conditions	Parameters	Assessment periods
Noise-enhancing conditions	Wind • Stability Category D • 3m/s wind speeds[1]	• Day (7am to 6pm) • Evening (6pm to 10pm)
	Temperature Inversions • Stability Category F • 2m/s wind speeds[1]	• Night (10pm to 7am)

Notes: 1. All directions considered.

4.3 Operational noise sources

To undertake a noise assessment for the facility, the NPfI requires a comprehensive assessment of the potential operational noise emissions from the Project. The basis of these noise emissions is what would be the "reasonable worst case 15-minute period" noise emissions for each of the day (7:00am to 6:00pm), evening (6:00pm to 10:00pm) and night (10:00pm to 7:00am) periods.

The noise sources associated with the operation of the Project can be separated into the following categories:

- Truck/light vehicle movements within the facilities for delivery and dispatch
- passenger vehicle movements and car parking
- loading dock receiving and dispatching activities
- internal manufacturing and warehouse activities
- office related activities
- fixed Mechanical, Electrical, Plumbing (MEP) plant

The following sections detail the key noise generating plant and equipment that will operate as part of typical operations of the facilities. All noise generating activities modelled have been based upon noise measurements undertaken at the existing similar facilities or sourced from the RT&A database of previously measured levels representative of the proposed noise generating activity.

As noted in Section 1.2.1, the subject proposal relates to modifications of Lots 2 and 3 only. However, the noise limits in Condition B52 Table 5 relate to the cumulative impact of all seven industrial lots. Therefore, this assessment includes the operational noise sources and buildings of Lots 1, 4, 5, 6 and 8 and considers all seven industrial lots of the development to operate simultaneously.

The noise source levels used for the modelling are presented in APPENDIX B. The internal truck routes, light vehicles routes and carpark locations are shown in Figure 4-1 and Figure 4-2.

Figure 4-1: Vehicle routes and carpark areas for Lots 1-4

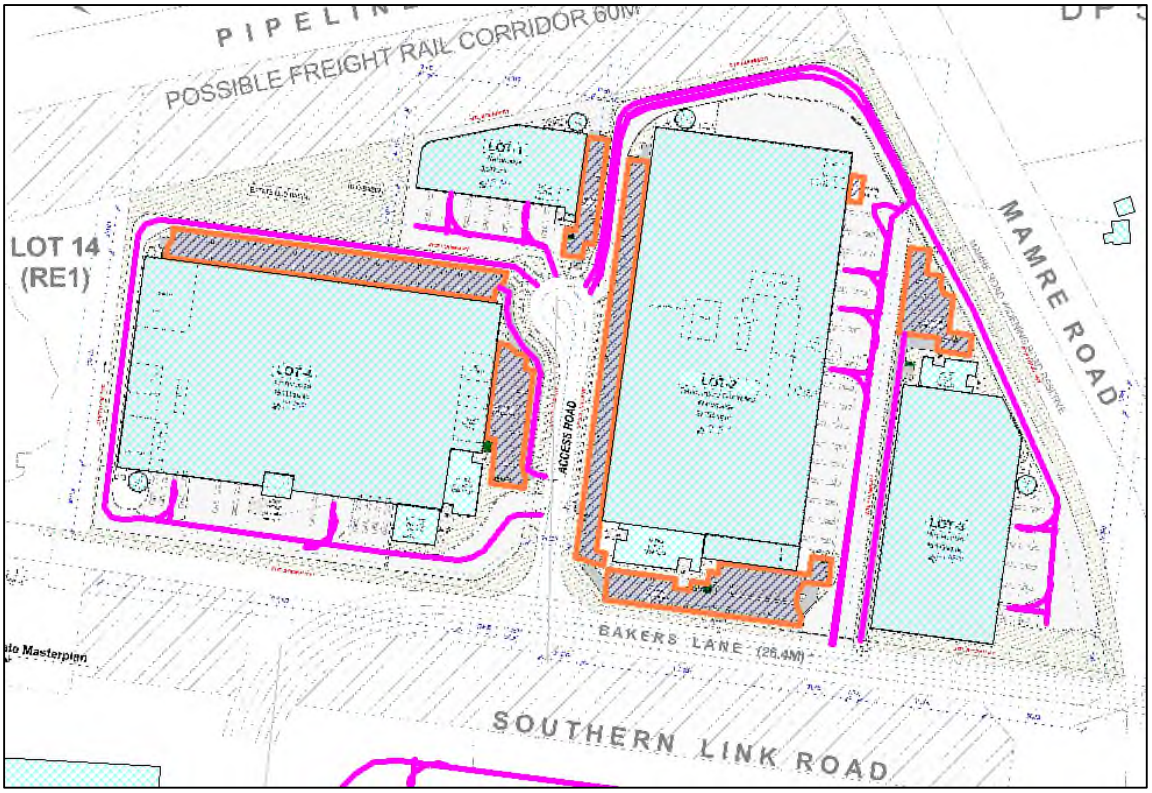
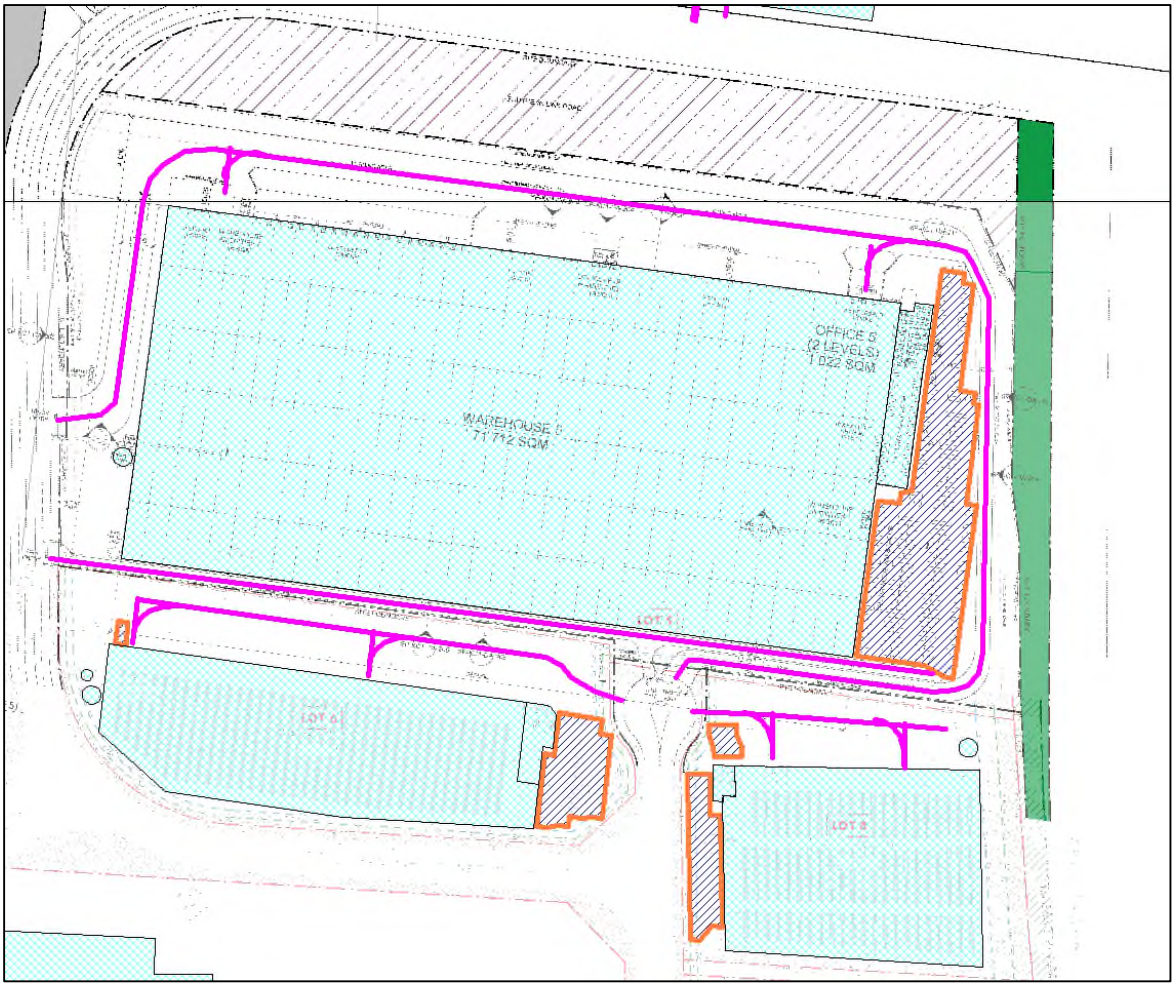


Figure 4-2: Vehicle routes and carpark areas for Lots 5, 6 and 8



4.3.1 Delivery/dispatch movements

The vehicles operating through the site will travel to and from the site as detailed in Section 7. Once vehicles enter the site they are assessed in accordance with the NPfI. While outside of the site, such as on public roads within the SSD 9522 industrial estate, they are assessed using the RNP, as per Section 3.7. It is expected that the delivery vehicles that operate through the facilities will comprise the following:

- Class 1 – light commercial vehicles (van, ute etc).
- Class 3 – rigid two axle trucks
- Class 6 – three axle articulated trucks
- Class 9 – six axle articulated trucks
- Class 10 – B double trucks

Trucks would move around the site at 15 km/h when not undertaking manoeuvres. During manoeuvres, the trucks will operate at slower speeds, and different noise levels as per assumptions detailed in APPENDIX B.

The confirmed tenant for Lot 2 has advised on the expected peak hourly inbound and outbound vehicle movements for each vehicle class. This information has been used to model the reasonable worst case 15 minute period for Lot 2 as shown in Table 4-2. For all scenarios allowance has been made for two refrigerated trucks (one idling continuously and one arriving at and leaving a recessed dock).

For other lots one movement of a B double truck (including arrival and departure) in 15 minutes has been assumed for the evening and night periods. The day 15 minute period includes one B double and one rigid truck movement.

Based upon the above, the following assumptions were used for modelling reasonable worst case 15-minute period two-way movements.

Table 4-2: Reasonable worst case 15-minute period delivery/dispatch two-way movements

Facility	Day 15 min period	Evening/Night 15 min period
Lot 1	1x Class 3 1x Class 10	1x Class 10
Lot 2	4x Class 1 3x Class 3 1x Class 9 idling (refrigerated) 1x Class 10 (refrigerated)	4x Class 1 1x Class 3 1x Class 9 idling (refrigerated) 1x Class 10 (refrigerated)
Lot 3	1x Class 3 1x Class 10	1x Class 10
Lot 4	1x Class 3 1x Class 10	1x Class 10
Lot 5	1x Class 3 1x Class 10	1x Class 10
Lot 6	1x Class 3 1x Class 10	1x Class 10
Lot 8	1x Class 3 1x Class 10	1x Class 10
Total movements per 15 min period	**15**	**9**

4.3.2 Loading dock activities

Loading dock activities will include trucks reversing into the loading dock, either side loaded with a forklift or internally and accelerating away. The noise sources included in the model are trucks reversing at low speed, trucks idling for 5 minutes, forklifts operating externally at flush docks, loading noise and trucks accelerating (including up ramps from recessed docks).

4.3.3 Staff vehicle movements and car parking

The noise generating car park activities included in the noise model are vehicle doors closing, vehicle engines starting, vehicles accelerating and vehicles moving. Cars are expected to move at 10 km/h within the carpark areas of each facility.

For Lot 2 the confirmed tenant has advised that staff will arrive in two shifts, 120 one-way vehicle movements for the day shift and 80 movements for the afternoon shift. Ten visitors are anticipated per day. It has been assumed that vehicles for each shift will arrive/depart over a two hour period. Therefore, the peak hourly movements are expected to be 60 one-way movements.

For other lots the peak number of movements has been assumed from the number of available car spaces. Where lots have multiple carparks, the movements have been modelled in proportion to the number of spaces. The worst case 15 minute scenario has been determined by dividing the peak hourly movements by four and rounding up. The worst case 15 minute scenario has been used for assessing the day, evening and night periods. A summary of the carpark movements per lot is provided in Table 4-3.

Table 4-3: Car parking movements

Lot	Number of car spaces	Number of one-way movements during peak hour	Number of one-way movements in 15 minute scenario
Lot 1	30	15	4
Lot 2	200	60	16
Lot 3	46	23	6
Lot 4	220	66	18
Lot 5	280	84	21
Lot 6	72	36	9
Lot 8	64	32	9
Total	**912**	**316**	**83**

4.3.4 Internal operations

Internal operations within the Lot 2 warehouse will consist of automated picking and sorting of products. Based on information provided by the confirmed tenant and measurements taken in a similar facility the internal reverberant noise level due to automation equipment is assumed to be 70 dB(A). As a worst-case scenario the modelling includes breakout of this noise source through a loading dock door for each warehouse, open throughout a 15 minute period.

4.3.5 Fixed plant

A summary of the fixed MEP plant, either known at this stage of design or assumed, is provided in Table 4-4, with assumed noise source levels included in APPENDIX B. The noise sources for the plant listed in Table 4-4 have been included in the noise model.

The proposed backup generators are expected to be operated approximately 40 hours per year in response to emergencies, power events and for periodic testing.

Table 4-4: MEP plant noise sources

Noise source	Number of units	Location
Air conditioners - VPAC180	10	Lot 2 roof top
Air conditioners - VPAC135	5	Lot 2 roof top
Commercial air conditioners	8	Roof top of each office space
Backup generators	6	3x genset configuration in Lot 2 and Lot 4
Compactor	1	Lot 2, adjacent to loading dock
Pumps	7	Pump room of each lot

Fixed plant and equipment associated with the development has the potential to impact on noise sensitive receivers if not designed or selected correctly. To carry out a quantitative assessment of fixed plant, a complete specification of equipment is required. An acoustic assessment of fixed plant should be undertaken when the complete fixed plant design is known for each lot to ensure that the cumulative noise of all equipment does result in an exceedance of the applicable noise criteria.

In-principle noise management measures to be considered for fixed plant are provided in Section 6.1.

5 Operational noise assessment

5.1 Predicted operational noise levels

To assess operational noise emissions from the Project, the 15 minute period scenarios have been modelled as detailed in Section 4. Each of these assessment scenarios represent the reasonable worst-case operating scenarios. However, as modelling assumes that all activities will occur simultaneously during the same 15-minute period, actual noise levels are likely to be lower than those predicted.

The predicted noise levels presented in this section include all feasible and reasonable mitigation and management measures presented in Section 6.

Predicted noise levels have been assessed to the nearby representative receivers, and a summary of these results are presented in Table 5-1. The results reveal compliance with the project noise trigger levels presented in Section 3.5 at the long-term residential and industrial receivers but non-compliance at receivers R2 to R4. A discussion of the non-compliance at receivers R2 to R4 and recommendations of feasible and reasonable noise mitigation measures are presented in Section 6.3.

Table 5-1: Predicted operational noise levels

Assessment scenario		Daytime (7:00am to 6:00pm)		Evening (6:00pm to 10:00pm)		Night (10:00pm to 7:00am)	
Rec. No.	Receiver type	PNTL	Predicted noise level, $L_{Aeq(15min)}$, dB(A)	PNTL	Predicted noise level, $L_{Aeq(15min)}$, dB(A)	PNTL	Predicted noise level, $L_{Aeq(15min)}$, dB(A)
R1.1	Residential	41	23	38	22	35	22
R1.2	Residential	41	25	38	24	35	25
R1.3	Residential	41	26	38	24	35	25
R1.4	Residential	41	26	38	24	35	25
R2	Residential	48	59	43	53	38	54
R3	Residential	48	53	43	49	38	49
R4	Residential	48	48	43	45	38	45
R5	Industrial	63[1]	34	63[1]	31	63[1]	32
R6	Industrial	63[1]	36	63[1]	33	63[1]	34
R7	Residential	48	26	43	23	38	23
R8	Industrial	70[2]	48	70[2]	46	70[2]	47

Notes: 1. Project specific noise limits only applicable when in use.

5.2 Annoying noise characteristics adjustments

Where the character of the industrial noise is assessed as particularly annoying at a receiver location (i.e. if the resulting noise level at a receiver location is tonal, low frequency or is intermittent at night), an adjustment is added to penalise the predicted noise for its potential increase in annoyance. Fact Sheet C of the NPfI provides procedures for determining whether a modifying factor should be applied. The

corrections are to be added to the predicted noise levels at the receiver before comparison with the project noise trigger levels.

Measurements of key noise sources at similar facilities have been undertaken in accordance with AS1055:2018 [5], to determine if the annoyance penalties are applicable for these sources.

5.2.1 Tonality

The sources identified as having the potential to be tonal at sensitive receivers are tonal reversing alarms on heavy vehicles. However tonal reversing alarms are only one source within many. The cumulative industrial noise level is unlikely to exceed the tonality requirement of the NPfI, and so the predicted noise levels do not require an annoyance penalty to be applied.

5.2.2 Intermittent noise

The NPfI details that the test for intermittent noise that applies during the night period to be *"The source noise heard at the receiver varies by more than 5 dB(A) and the intermittent nature of the noise is clearly audible."* and *"…where the level suddenly drops/increases several times during the assessment period…"*. During the environmental assessment stage it is not possible to listen and subjectively assess the noise at the receiver as required by the guideline. However, only where all of the following tests are met shall a penalty be applicable to the predicted noise level at the relevant receiver:

- the noise level fluctuates / cycles by more than 5 dB(A);
- this difference relates to a 'sudden' drop/increase in the activity noise level;
- this activity may occur multiple times during a 15-minute assessment period; and
- the predicted noise level from the subject source at a receiver is clearly audible over the ambient noise environment.

Potential intermittent noise sources include HVAC equipment cycling on/off and idling trucks turning on/off. However, these individual sources are unlikely to change the cumulative industrial noise by more than 5 dB(A) and therefore fails the NPfI intermittent test.

5.2.3 Impulsiveness noise

AS1055-2018 describes how potentially annoying characteristics, such as impulsiveness, should be assessed. Section 6.7.4 Impulse adjustment (K2) of AS1055-2018 states:

"If impulsiveness is a significant characteristic of the sound within a measurement time interval, an adjustment shall be made over this time interval.'

Appendix E of AS1055-2018 provides an objective method for application of an impulse adjustment to measured receiver noise at receivers where deemed necessary. Impulsive noise is defined in this standard as a sound with a sudden onset. The definition includes only the onset of a sound, not the

sound as a whole. Onset is defined in the standard as a sound having a positive slope time history where the gradient exceeds 10 dB/s.

Section E9 *'Care in the use of methods'* of AS1055-2018 also states that:

"It is recommended that the impulse method only be applied where the occurrence of impulsive sounds caused by a subject source are identified audibly to occur at the receiver locations by attended monitoring."

Two noise sources that occur externally have been identified as potentially exhibiting impulsive characteristics at source as part of the operations. These include:

1. Truck park/trailer brake air release events
2. Forklift loading activities at flush loading docks

Although these noise sources may exhibit a 10 dB(A) increase per second noise at source, when considering the noise environment at the receivers, the prominence of these substantially attenuated events is unlikely to require further adjustment for impulsiveness as per Appendix E of AS1055-2018.

5.3 Sleep disturbance assessment

The EPA NPfI $L_{Aeq(15min)}$ sleep disturbance screening level is 40 dB(A) for residential receivers. As detailed in Section 5.1, the highest predicted night period noise level at the long-term residential receivers (R1.1 tp R1.4 and R7) is 23 dB(A) at receiver R7.

For the residential receivers within the MRP, the predicted night-time period $L_{Aeq(15min)}$ noise levels are 53dB(A) at receiver R2, 49dB(A) at receiver R3 and 45dB(A) at receiver R4 which are above the assessment level. The predicted noise levels at R2 and R3 are also 5dB and 1dB above the WHO guideline recommended level respectively.

Activities such as door slams in carparks, truck loading activities, trucks reversing and trucks stopping and releasing airbrakes may exhibit non-steady noise characteristics with loud instantaneous noise events. As such, maximum noise levels for these activities have been assessed for the potential to disturb sleep, in accordance with the NPfI. The results are presented in Table 5-2 and have been reviewed to determine their potential to cause sleep disturbance at nearby residential receivers. As the maximum noise levels at the closest receivers (R2, R3 and R4) differ significantly depending which lot the noise source is located in, a range of potential maximum noise levels has been provided for these receivers. The range of noise levels was determined by assessing representative worst case source locations within each of the lots.

Table 5-2: Sleep disturbance assessment

Receiver ID	Criteria L_{AFmax}, dB(A)		Predicted noise level, L_{AFmax}, dB(A)			
	Screening level	Awakening reaction	Door slam	Forklift	Truck reverse	Truck airbrake
R1.1	52	65	4	27	4	22
R1.2	52	65	9	30	9	26
R1.3	52	65	8	30	9	26
R1.4	52	65	8	30	9	26
R2	52	65	18 – 45	30 - 66	11 - 60	26 - 71
R3	52	65	11 – 37	41 - 62	21 - 57	36 - 63
R4	52	65	6 - 36	37 - 57	23 - 50	33 - 60
R7	52	65	11	28	27	19

The maximum noise levels predicted to be above the NPfI L_{AFmax} sleep disturbance screening level are highlighted in orange in Table 5-2. The maximum noise levels predicted to be above the trigger level for awakening reactions are highlighted in blue.

Maximum noise levels are predicted to be above the screening criteria at receivers R2, R3 and R4. The L_{Amax} noise levels are predicted to be below the sleep disturbance trigger levels for all other receivers.

Only maximum noise levels due to forklift loading operations and truck airbrakes are predicted to be above the awakening reactions trigger level and only at receiver R2. A detailed review of the noise modelling results at receiver R2 indicates that only maximum noise events from Lot 2 will emit noise levels that have the potential to cause awakening reactions.

Given the current operational assumptions truck reversing, airbrake release and forklift loading events may occur up to 12 times per hour at Lot 2, between 10 pm to 12 am and 4 am to 7 am during the night period. These events are more likely to occur during the early morning shoulder period between 5 am and 7 am.

Reversing and brake air release events are likely to occur within the same minute. Brake air releases have a duration of about 3 seconds. Forklift loading noises are expected generally to occur about 5 minutes after truck movement has ceased. The duration of the loading activity will vary with the load however a typical duration is 1.5 minutes. The distribution of truck arrival events is likely to occur at irregular intervals.

Based on the background noise monitoring results at monitoring location A, L_{AFmax} noise levels in this area are typically up to 55 dB(A) during the 10 pm to 12 am period and typically up to 59 dB(A) during the 4 am to 7 am period. There is a significant ramp up in both L_{AFmax} and L_{Aeq} noise levels between 3 am and 5 am most mornings from existing traffic in the area.

Recommendations for reasonable and feasible noise mitigation and management measures to address the predicted sleep disturbance impacts at receiver R2 are provided in Section 6.

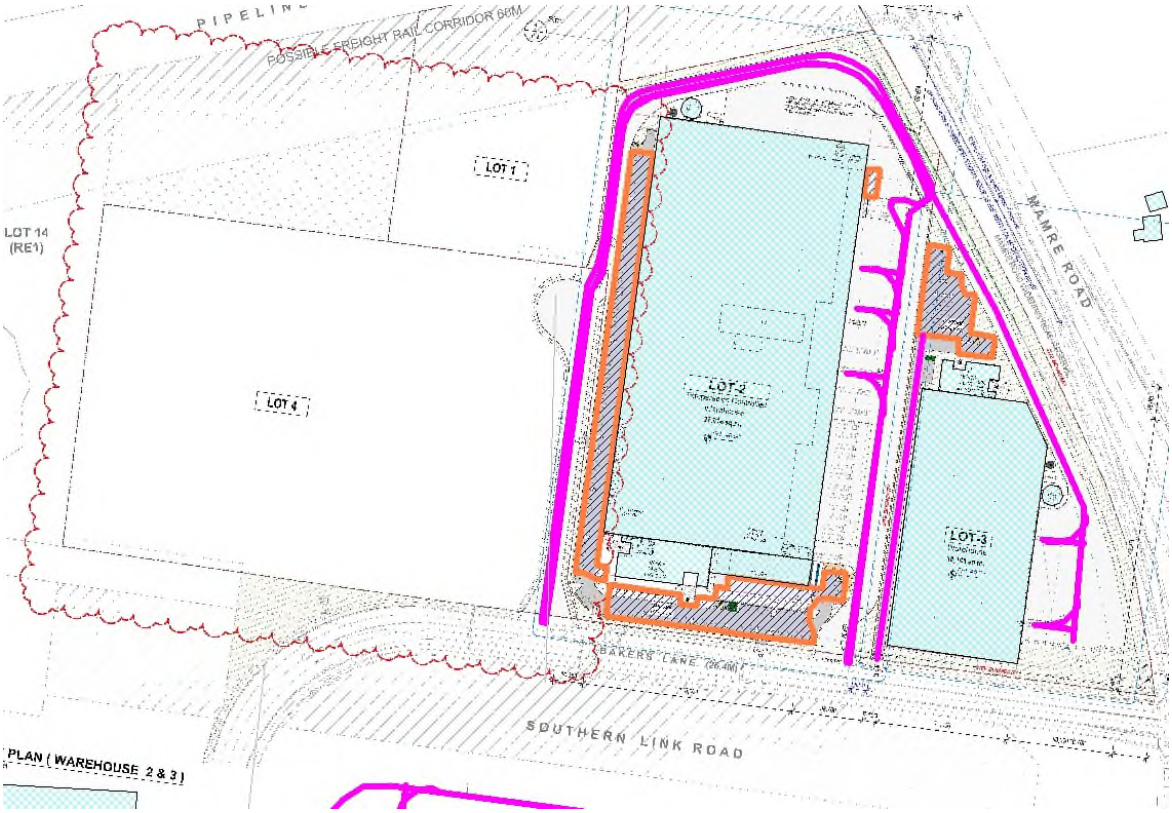
5.4 Predicted operational noise levels during interim period

The subject modification relates to Lots 2 and 3 only and we are instructed that the design / construction of Lots 1 and 4 will occur at a later stage. This potentially gives rise to an interim period where the industrial premises at Lots 2, 3, 5, 6 and 8 are built / operational, while Lots 1 and 4 are vacant. During this period, the surrounding receivers will be subject a lower number of noise source as there will be no industrial noise sources and vehicle noise associated with Lots 1 and 4. However, the proposed buildings on Lots 1 and 4 provide shielding of the development to the surrounding receivers (particularly receivers r7 and r8 (A) to the north-west and north of the site respectively). Therefore, some individual industrial / vehicle noise sources may have higher noise emission levels at the surrounding receivers prior to the construction of the buildings on Lots 1 and 4.

We are also instructed that during this interim period, the cul-de-sac along the eastern side of Lot 4 will initially be a private access road for Lots 2 and 3. This result in the vehicles entering / exiting Lots 2 and 3 along the private access road contributing to the operational noise level of the development (rather than being assessed as traffic generated by the development on the public road network).

To determine the noise impact of the development on the surrounding receivers during this interim period, the noise model was amended to remove the buildings and noise sources associated with Lots 1 and 4. The vehicle noise sources of Lots 2 and 3 were also extended along the private access road to meet Bakers Lane. Figure 5-1 presents an aerial view of Lots 1-4 for the interim noise model which illustrates the amendments described above.

Figure 5-1: Vehicle routes and carpark areas for Lots 2 and 3 (interim period)



Similar to the cumulative noise assessment of all seven industrial lots (set out in Section 5.1), this assessment of the interim period includes the noise mitigation and management measures presented in Section 6 and assumes all activities on Lots 2, 3, 5, 6 and 8 to occur simultaneously as a worst-case scenario.

The predicted noise levels of the development during the interim period to the nearby representative receivers are summarised in Table 5-3 below.

Table 5-3: Predicted operational noise levels

Assessment scenario		Daytime (7:00am to 6:00pm)		Evening (6:00pm to 10:00pm)		Night (10:00pm to 7:00am)	
Rec. No.	Receiver type	PNTL	Predicted noise level, $L_{Aeq(15min)}$, dB(A)	PNTL	Predicted noise level, $L_{Aeq(15min)}$, dB(A)	PNTL	Predicted noise level, $L_{Aeq(15min)}$, dB(A)
R1.1	Residential	41	20	38	18	35	19
R1.2	Residential	41	21	38	19	35	20
R1.3	Residential	41	21	38	19	35	20
R1.4	Residential	41	21	38	19	35	20
R2	Residential	48	59	43	52	38	53
R3	Residential	48	52	43	48	38	49
R4	Residential	48	48	43	44	38	45
R5	Industrial	63[1]	34	63[1]	31	63[1]	32
R6	Industrial	63[1]	34	63[1]	30	63[1]	31
R7	Residential	48	25	43	21	38	22
R8	Industrial	70[2]	45	70[2]	41	70[2]	42

Notes: 1.Project specific noise limits only applicable when in use.

The acoustic assessment of noise emission from the development during the interim period (ie. without buildings on Lots 1 and 4) reveal noise emission levels that are less than or equal to the cumulative operation of all seven industrial lots.

6 Noise mitigation and management

6.1 Design mitigation and management measures

A range of feasible and reasonable mitigation and management measures were investigated and identified to achieve the required NPfI project trigger levels and minimise noise emissions from the site.

The mitigation and management measures presented in Table 6-1 should be further reviewed as required so that they can be reasonably incorporated into the Project design where feasible. These are specific recommendations required for the Project, and further operational noise management measures that should be considered are detailed in Section 6.2. For the site to achieve the requirements of the NPfI these mitigation and management measures are required to be implemented or further investigated during further design development.

The predicted noise levels presented in Section 5 incorporate the following operational noise mitigation and management measures presented in Table 6-1.

Table 6-1: Recommended noise mitigation and management measures

Item	Activity / noise source
M1	If, the parameters of the internal activities within the warehouses change, specifically the internal noise levels are expected to be greater than assumed in Section 4.3.4, the design of the warehouse facade shall be reviewed and if necessary modified so that any noise break-out from internal activities would result in a negligible increase in overall noise emissions from the facility at the nearest sensitive receivers to achieve the project trigger noise levels.
M2	When not in use, external roller doors are to be kept closed during the night periods (10:00pm to 7:00am) except as required for ingress/egress. Doors for the temperature controlled Warehouse 2 will generally remain closed to maintain the internal temperature.
M3	Ensure that for all non-enclosed areas of the facility with line-of-sight to the nearest sensitive receivers, the following design elements are incorporated: • All pavement is smooth (ie. no speed bumps) • Transitions from the external public road to the site are smooth, as to not result in jolting, or unnecessary accelerating of the truck the truck is required. • Drainage grates are designed to not result in noise events.
M4	Building services, mechanical plant and plantroom spaces are to be designed to not increase total site noise emissions. This may include: • Selection of quiet plant/equipment. • Strategic positioning of plant away from sensitive neighbouring premises to maximise intervening acoustic shielding between the plant and sensitive neighbouring premises. • Acoustic absorption, acoustically lined and lagged ductwork. • Acoustic barriers between plant and sensitive neighbouring premises. • Partial or complete acoustic enclosures over plant. • The use of acoustic louvres and attenuators as part of the design.

The above recommendations provide solutions to address project acoustic requirements. This information is presented for the purpose of the consent authority approvals process. Assistance of the acoustic consultant must be sought during the detailed design phase of the project to confirm all details, material quantities and performance specifications are consistent with the outcomes of this assessment.

6.2 Operational noise management

Operational noise management measures can be considered to further reduce noise at the source where feasible and reasonable. The NPfI presents the implementation of 'best management practice' (BMP) which is the adoption of operational procedures that minimise noise while retaining productive efficiency. Application of BMP can include the following types of practice where feasible and reasonable:

- Reducing peak 15-minute heavy vehicles movements at each facility by staggering delivery / pickup times, if possible.
- Minimising concurrent use of mobile plant outside warehouses and/or limiting their use to the less sensitive daytime and evening periods.
- Minimising use of reversing alarms by providing forward manoeuvring where practicable.
- Switching vehicles and plant off when not in use.
- Keeping equipment well-maintained and operating it in a proper and efficient manner.
- Training staff and drivers on the effects of noise and the use of quiet work practices (eg. informing drivers of the noise impacts from sudden braking or accelerating, bangs and clangs, etc).

In conjunction with BMP, the NPfI refers to 'best available technology economically achievable' (BATEA) with which equipment and plant incorporate the most advanced and affordable technology to minimise noise output. Examples of uses of BATEA include:

- The use of quieter mobile plant.
- Using equipment with efficient muffler design.
- Fitting and maintaining noise reduction packages on plant and equipment.
- Ensure hardstand surfaces, roadways and vehicular access points are smooth as to not result in jolting of the truck (ie. at entrance to site).

It is recommended that noise compliance measurements are conducted once operations commence, to determine that noise emissions are consistent with those documented in this assessment, and to determine that the mitigation measures are effective. The method for measuring the performance and/or noise compliance of the Project should be undertaken in accordance with Section 7 'Monitoring performance' of the NPfI. The results of the noise compliance measurements are to be presented in the Noise Validation Report, as required by Condition B53.

As part of the site's Operational Noise Management Plan, there should be regular reviews of on-site noise mitigation and management practices to incorporate and capture opportunities for reductions of site noise emissions, with considerations of the following:

- Review of noise reduction opportunities during changes or refinements of site noise generating activities.

- Reviewing noise levels of plant, equipment and activities, during both ongoing compliance checks and in response to complaints.
- Improvements in Best Management Practice (BMP).
- Improvements in Best Available Technology Economically Achievable (BATEA).

The above recommendations provide solutions to address project acoustic requirements. This information is presented for the purpose of the consent authority approvals process. Assistance of the acoustic consultant must be sought during the detailed design phase of the project to confirm all details, material quantities and performance specifications are consistent with the outcomes of this assessment.

6.3 Mitigation for receivers R2 – R4

Receivers R2 – R4 are existing residential receivers that remain within the MRP and it is understood that purchasers are being actively sought to redevelop these premises for industrial use. However, this area of the MRP Structure Plan is planned for development in the medium term and therefore, there is potential that the dwellings at these receivers may be occupied at the commencement of operations. Reducing the noise emission of the development to the limits in SSD 9522 Condition B52 Table 5 at these receivers would not be feasible using noise barriers as it would require a substantial increase in the height / extent of the noise barriers. Substantial modifications to the onsite operational would also be required which is not feasible or reasonable.

Considering that such mitigation measures would be for the protection of three receivers that are likely to only remain as residential receivers for the medium term, the substantial cost of any onsite mitigation measures would not be considered reasonable. This is consistent with the feasible and reasonable approach to mitigation in Fact Sheet F of the NPfI.

A feasible and reasonable approach to mitigation for receivers R2 – R4 would involve a negotiated agreement with the residences which may include at-property treatment (such as upgrading the existing glazing and / or the provision of fresh air into the dwelling via mechanical ventilation so that the external windows can remain closed) to manage the potential noise impacts from the operation of the development until the existing residential use ceases.

Consideration of at-property noise mitigation treatments would only be proposed should receivers R2 – R4 be occupied at the commencement of operations.

To implement these agreements and controls, a noise mitigation consultation plan would be prepared and provided to DPE prior as a proposed reasonable method of entering into a negotiated agreement with the receivers R2 – R4.

6.4 Mitigation for sleep disturbance

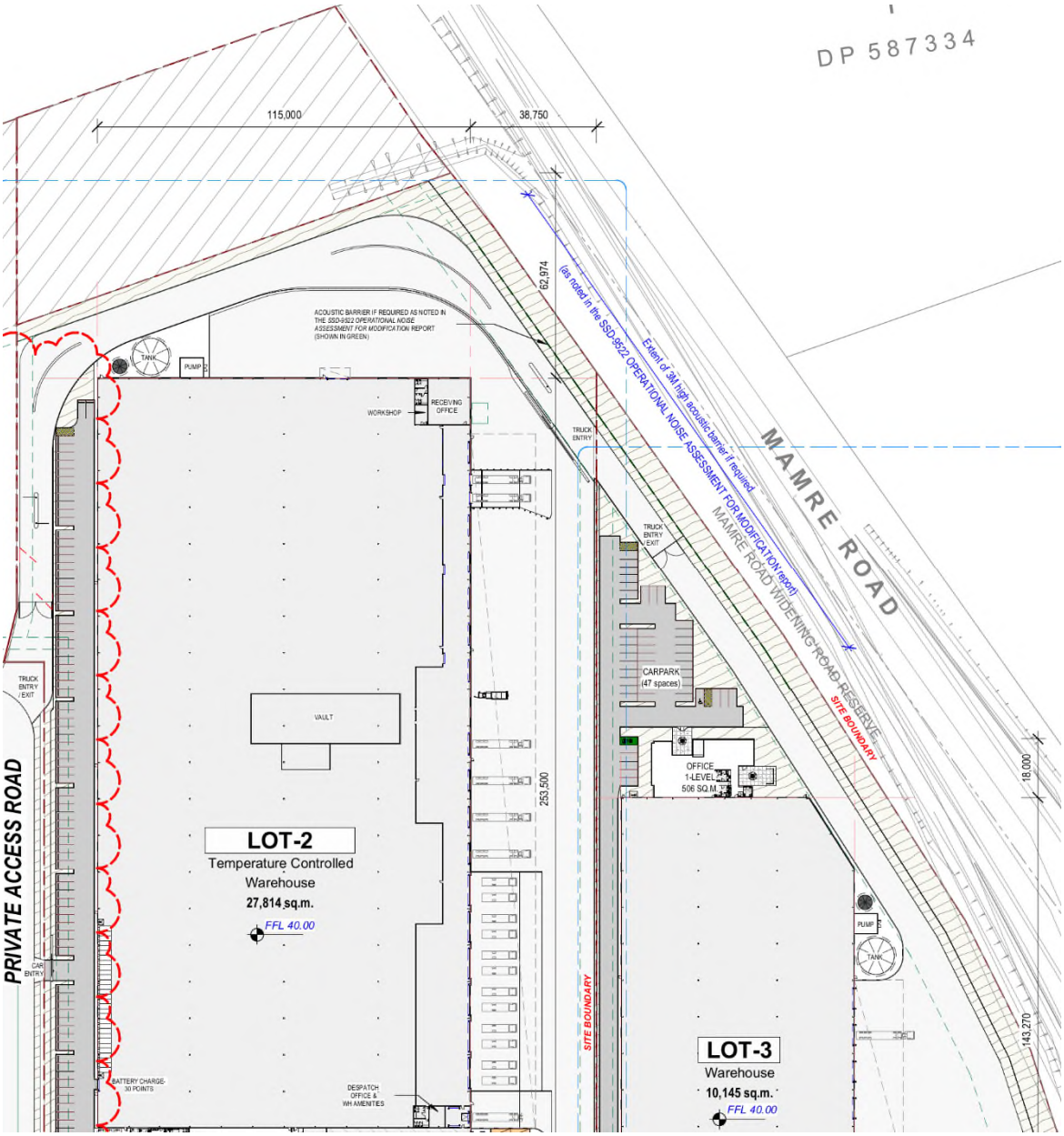
Maximum noise levels due to external forklift loading and truck airbrake events within Lot 2 are predicted to be above the trigger level for awakening reactions at receiver R2. Forklift loading events have the potential to be mitigated through operational management measures such as only allowing direct internal loading via recessed docks and/or restricting side loading with forklifts to only occur within the warehouses during the night period. However, it is not feasible to manage or mitigate truck brake air releases at source to below the trigger level for awakenings.

Path mitigation in the form of acoustic barriers has been considered to mitigate the predicted sleep disturbance impacts at receiver R2. If the residence at R2 is to remain occupied once the operation of Lot 2 commences, it has been determined through noise modelling that a 3 m high acoustic barrier constructed on the eastern boundary of the Project site (as shown in Figure 6-1) would reduce noise levels sufficiently to mitigate awakening reactions.

The predicted noise levels at R2 including the proposed barrier are L_{AFmax} 62 dB(A) (a 9 dB reduction) and $L_{Aeq(15min)}$ 50 dB(A) (a 4 dB reduction). The predicted noise levels at R3 including the proposed barrier are L_{AFmax} 62 dB(A) (a 1 dB reduction) and $L_{Aeq(15min)}$ 49 dB(A) (no reduction). The predicted L_{AFmax} noise levels including the barrier comply with sleep awakening trigger level of L_{AFmax} 65 dB(A). The predicted $L_{Aeq(15min)}$ noise levels including the barrier are 1-2 dB above the WHO guideline recommended $L_{Aeq(15min)}$ level of 48 dB(A).

Provision is to be made in the design for the barrier shown in Figure 6-1 and is only required to be constructed should the residence at R2 be occupied at the commencement of operations in Lot 2. If the dwelling at R2 is not occupied at operational commencement, and is not planned to be occupied in the future, the barrier is not required at there is no sleep impact to an unoccupied dwelling.

Figure 6-1: Extent of acoustic barrier to mitigate potential sleep disturbance impacts at receiver R2



7 Operational road traffic

7.1 Project vehicle movements and traffic generation

Heavy vehicle movements for operational traffic to and from the Project site will be along new public roads within the industrial development, then onto Mamre Road and connecting to the nearby major arterial roads.

The traffic volumes used for traffic noise predictions and assessment were based on traffic movement data and route distribution data provided by the project team. The potential routes are detailed in the MOD1 Traffic Impact Assessment [8].

The total traffic generated by the Project for the modified design is predicted to be 171 vehicles per hour during the day period, 126 vehicles per hour during the night period and a total of 1,825 vehicles per day. This is a reduction in traffic movements from the traffic generation predictions for SSD 9522 and MOD1.

7.2 Future context - Mamre Road upgrade (MRU), Elizabeth Drive upgrade (EDU) and M12 Motorway

For vehicles heading north to the M4 via Mamre Road, this section of the road network is due to receive significant road upgrades as part of the Mamre Road Upgrade (MRU) strategy. During August/September 2021, the Review of Environmental Factors (REF) for the proposed Mamre Road upgrade between the M4 Motorway and Erskine Park Road was on public display. As part of the REF, a noise and vibration impact assessment (MRU NVIA) [9] was included. This assessment was based upon the road traffic volumes and modelling presented in the Traffic and transport assessment report (MRU TTAR) [10].

The MRU TTAR Section 2.6.3 states:

The land use in the area is changing rapidly and there are a number of strategic planning documents and proposals that have been accounted for in the traffic volume forecast, namely:

- *Mamre West Precinct*
- *Mamre Road precinct and proposed inter-modal terminal*
- *Horsley Park and Cecil Park Structure Plan*
- *Western Sydney Airport and Aerotropolis in the Western Parkland City*

Appendix D of the MRU NVIA provides the build and no-build traffic volumes for the upgrade project, which includes the contribution from MRP traffic. The traffic volumes along Mamre Road north of the Project as provided in the MRU NVIA are presented in Table 7-1.

Table 7-1: MRU NVIA traffic volumes – Mamre Road (MRU NVIA, Appendix D)

Location	Direction	Average hourly traffic from 7:00am – 10:00pm (15 hour)			Average hourly traffic from 10:00pm – 7:00am (9 hour)		
		Total Vehicles	Light	Heavy	Total Vehicles	Light	Heavy
No Build (without project) 2026							
Between Bakers Ln & James Erskine Dr	Southbound	10,539	9,181	1,358	2,945	2,624	321
	Northbound	9,717	8,501	1,216	1,894	1,637	257
	Both direction	20,256	17,682	2,574	4,839	4,261	578
Erskine Park Road	Eastbound	5,689	4,715	974	1,249	1,017	232
	Westbound	7,528	6,489	1,039	1,772	1,525	247
	Both direction	13,217	11,204	2,013	3,021	2,542	479
Build (with project) 2026							
Between Bakers Ln & James Erskine Dr	Southbound	11,240	9,882	1,358	3,141	2,820	321
	Northbound	10,530	9,314	1,216	2,053	1,796	257
	Both direction	21,770	19,196	2,574	5,194	4,616	578
Erskine Park Road	Eastbound	6,867	5,893	974	1,617	1,385	232
	Westbound	7,528	6,489	1,039	1,772	1,525	247
	Both direction	14,395	12,382	2,013	3,389	2,910	479

For vehicles heading south via Elizabeth Drive, this section of the road network is being upgraded as part of the Elizabeth Drive Upgrade (EDU) and the M12 Motorway project. Traffic generated as part of the MRP has been considered as part of the cumulative impact assessments of the operation of the Elizabeth Drive and Mamre Road upgrades, detailed in Section 4.2.5 of the M12 NVIA. The existing and future build traffic volumes on Elizabeth Drive as provided in the M12 NVIA are replicated in Table 7-2.

Table 7-2: M12 Motorway traffic volumes (M12 NVIA, Appendix D)

Location	Direction	Average hourly traffic from 7:00am – 10:00pm (15 hour)			Average hourly traffic from 10:00pm – 7:00am (9 hour)		
		Total Vehicles	Light	Heavy	Total Vehicles	Light	Heavy
2017 Existing traffic counts							
Elizabeth Drive (East of Mamre Road)	Eastbound	10,539	9,181	1,358	2,945	2,624	321
	Westbound	9,717	8,501	1,216	1,894	1,637	257
	Both direction	20,256	17,682	2,574	4,839	4,261	578
Build (with project) 2026[1]							
Elizabeth Drive (Duff Road to Mamre Road)	Eastbound	10,461	9,340	1,121	2,581	2,283	298
	Westbound	12,341	10,218	2,123	2,606	2,294	312
	Both direction	22,802	19,558	3,244	5,187	4,577	610

Notes: 1. As the M12 Motorway will take some traffic off Elizabeth Drive at this location, the Build (with project) 2026 numbers are shown.

The Southern Link Road (SLR) is proposed as part of the MRP. This will likely substantially alter the traffic patterns in the area, and for traffic generated by developments within the MRP. However, as this has not been approved, this has not been considered further in this assessment.

7.3 Road traffic noise assessment outcome

The site is expected to generate up to 171 vehicles per hour during the day period, 126 vehicles per hour during the night period and a total of 1,825 vehicles per day. The portion of traffic generated by the Project makes up an insignificant amount of traffic compared to the potential future traffic volumes along the Mamre Road and Elizabeth Drive as shown in the data presented in Section 7.2. Additionally, these levels of traffic have already been factored into other proposed major projects along the Project traffic routes. As such, potential impacts from the road traffic generated by the Project on public roads does not require further consideration.

8 Conclusion

Renzo Tonin & Associates was engaged by Frasers Property Industrial and Altis Property Partners JV to undertake an operational noise impact assessment for the modified design of the proposed Kemps Creek Warehouse, Logistics and Industrial Facilities Hub at 657 - 769 Mamre Road, Kemps Creek.

Operational noise impacts from the proposed warehouse facilities have been assessed, potential noise impacts identified, and a range of feasible and reasonable mitigation measures recommended for the Project to minimise potential impacts on sensitive receivers surrounding the Project site.

Since the SSD-9522 lodgement, the residential receivers at R2 – R6 have been rezoned as an IN1 Industrial Zone for the purpose of future industrial development. At the present point in time, the dwellings at receivers R5 and R6 have been demolished. As these residences no longer exist, R5 and R6 are to be reclassified as industrial receivers and the project trigger levels established in Condition B52 Table 5 of Approval are required to be amended as per below.

Table 5 *Noise Limits dB(A)*

Location	Day $L_{Aeq(15minute)}$	Evening $L_{Aeq(15minute)}$	Night $L_{Aeq(15minute)}$
Receiver 1: residences on Medinah Avenue, Luddenham	41	38	35
Receiver 2: 654-674 Mamre Road, Kemps Creek	48	43	38
Receiver 3: 676-702 Mamre Road, Kemps Creek	48	43	38
Receiver 4: 706-752 Mamre Road, Kemps Creek	48	43	38
Receiver 5: 754-770 Mamre Road, Kemps Creek	63	63	63
Receiver 6: 771-781 Mamre Road, Kemps Creek	63	63	63
Receiver 7: 579-649 Mamre Road, Orchard Hills	48	43	38
Receiver A: Altis Warehouse and Distribution Hub, 585- 649 Mamre Road, Orchard Hills	70	70	70

Note: Noise generated by the development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Noise Policy for Industry (EPA, 2017) (as may be updated or replaced from time to time).

The assessment has predicted the potential noise impacts from the reasonable worst case site operations under noise-enhancing meteorological conditions. The assessment demonstrated that the predicted noise levels from the Project comply with the $L_{Aeq(15min)}$ project noise trigger levels at the long-term residential and industrial receivers that surround the site.

With respect to the residential receivers at R2 – R4 that have been rezoned as an IN1 Industrial Zone and are likely to only remain as residential receivers for the medium term, the project trigger noise levels in Condition B52 Table 5 cannot be met using all feasible and reasonable onsite noise mitigation measures. As set out in Section 6.3, at-property treatment could be provided to these dwellings if they are occupied during the commencement of operations. The implementation of such controls would be

subject to a separate acoustic assessment and consultation with the residences to determine the required level at-property treatment.

In terms of potential sleep disturbance from night time activities, the L_{Amax} noise levels are predicted to generally be below the sleep disturbance assessment trigger levels. One residence within the industrial zoned MRP (receiver R2) has been identified as potentially being affected. It is recommended that Condition B54 be updated to require the provision of the noise barrier in Figure 6-1, to be constructed only should the residence at 654-674 Mamre Road (R2) remain habited once the Lot 2 operations commence.

The total traffic generated by the Project for the modified design is predicted to be 171 vehicles per hour during the day period, 126 vehicles per hour during the night period and a total of 1,825 vehicles per day. The portion of traffic generated by the Project is insignificant compared to the potential future traffic volumes along the arterial roads that the Project operations will use. As the surrounding area and the associated road networks are undergoing substantial change, potential road noise impacts on receivers adjacent to these road corridors are generally being identified and addressed as part of larger state projects, such as the Mamre Road Upgrade. As such, the Project traffic noise levels will meet the RNP requirements.

References

[1] Acoustic Works, 657 – 769 Mamre Road, Kemps Creek (SSD 9622), report reference 1018022 R01AF Mamre Road Kemps Creek ENV, 6/08/2020
[2] Manning C.J. (1981), The Propagation of Noise from Petroleum and Petrochemical Complexes to Neighbouring Communities, CONCAWE report 4/81
[3] NSW Department of Climate Change and Water (2011), Road Noise Policy (RNP)
[4] NSW Environment Protection Authority (2017), Noise Policy for Industry (NPfI)
[5] Standards Australia (2018), Acoustics—Description and measurement of environmental noise, AS1055:2018
[6] World Health Organisation (2009), Night Noise Guidelines for Europe
[7] World Health Organisation (2018), Environmental Noise Guidelines for the European Region: A systematic Review on Environmental Noise and Effects on Sleep
[8] Ason, Transport Assessment - Modification 1 - Warehouse, Logistics and Industrial Facilities Hub 657-769 Mamre Road, Kemps Creek, ref: P1565r02v3, 04/03/2021
[9] SLR, Mamre Road Upgrade - Stage 1 Noise and Vibration Assessment, report reference 610.30064-R02-v1.0, 23/07/2021
[10] Aurecon/SMEC, Mamre Road Upgrade - Stage 1 Concept Design, REF and Detailed Design – Traffic and Transport Assessment Report, report reference 509458, Rev G, 17/08/2021

APPENDIX A Glossary of terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Assessment period	The period in a day over which assessments are made.
Assessment Point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of common sounds in our daytime environment:
dB(A)	A-weighted decibels. The A- weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.
dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz), but is less effective outside these frequencies.

threshold of hearing	0 dB	The faintest sound we can hear
	10 dB	Human breathing
almost silent	20 dB	
	30 dB	Quiet bedroom or in a quiet national park location
generally quiet	40 dB	Library
	50 dB	Typical office space or ambience in the city at night
moderately loud	60 dB	CBD mall at lunch time
	70 dB	The sound of a car passing on the street
loud	80 dB	Loud music played at home
	90 dB	The sound of a truck passing on the street
very loud	100 dB	Indoor rock band concert
	110 dB	Operating a chainsaw or jackhammer
extremely loud	120 dB	Jet plane take-off at 100m away
threshold of pain	130 dB	
	140 dB	Military jet take-off at 25m away

Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L_{Max}	The maximum sound pressure level measured over a given period.
L_{Min}	The minimum sound pressure level measured over a given period.
L_1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L_{90}	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
L_{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.

APPENDIX B Noise source levels

Points sources/stationary source levels used for the modelling are as follows:

Table 8-1: Noise sources - Point source levels/ stationary sources

Noise generating operation/activity	Plant/ equipment item	Individual source/ activity $L_{Aeq,t}$				Individual source/ activity $L_{Amax,t}$	
		Sound power $L_{Aeq,t}$[1], dB(A)	Duration[2]	Sound power $L_{Aeq,15\ min}$, dB(A)	Model source height, metres	Sound power$L_{Amax,t}$[1] dB(A)	Modelled source height, metres
Delivery and loading dock activities (see Section 4.3.2)							
Delivery truck (idling)	All truck types	97	15 min	97	2.5	N/A	N/A
Refrigerated truck (idling)	Refrigeration plant	101	15 min	101	3.8	N/A	N/A
Airbrake full release	Semi-trailer (trailer) or Tanker	116	3 sec	90	0.5	122	0.5
Truck loading activity	Forklift	97	84	90	2	116	2
Office and carparking activities (see Section 4.3.3)							
Carparking activities	Car door slams and engine starts	93	1 sec	65	1	97	1
Fixed plant (see Section 4.3.5)							
Rooftop HVAC	VPAC180	86	15 min	86	1.5[3]	N/A	N/A
Rooftop HVAC	VPAC135	84	15 min	84	1.5[3]	N/A	N/A
Rooftop HVAC	Office AC	81	15 min	81	1.5[3]	N/A	N/A
Backup generators	Staunch 706Kva Scania Super Silent	97	15 min	97	2.5	N/A	N/A
Compactor	Lot 2 compactor	107	15 min	107	2.0	N/A	N/A
Pumps	Lot pump rooms	97	15 min	97	1.0	N/A	N/A

Notes:
1. Sound power level L_w re. 1pW, dB(A)
2. Duration of this level within 15-minutes (minutes)
3. Relative to roof level

Line sources / moving sources used for the modelling are as follows:

Table 8-2: Noise sources - Line sources / moving sources

Noise generating operation/activity	Plant/equipment item	Individual source/ activity $L_{Aeq,t}$			Individual source / activity $L_{Amax,t}$	
		Sound power, dB(A)	Modelled source height, metres	Speed (km/h)	Sound power $L_{Amax,t}$, dB(A)	Modelled source height, metres
Truck movements (see Section 4.3.1)						
Moving onsite	Rigid & Semi-trailer (Class 3/6)	106	2	15	N/A	N/A
Moving onsite	B-Double (Class 9/10)	107	2	15	N/A	N/A
Moving onsite	Refrigerated truck	108	2	15	N/A	N/A
Reversing operations (including tonal reversing beeper)	Used for all truck types	108	2	2	117	2
Accelerating from stationary (ie. dock)	Used for all truck types	109	2	10	N/A	N/A
Delivery and loading dock activities (see Section 4.3.2)						
Warehouse loading moving product	Forklift	95	1.5	5	N/A	N/A
Office and carparking activities (see Section 4.3.3)						
Moving to/from/in carpark	Car (Class 1)	79	1	10	N/A	N/A

Notes: 1. Sound power level L_w re. 1pW, dB(A)

Internal noise level sources used for the modelling are as follows:

Table 8-3: Noise sources - internal noise levels

Noise generating operation/activity	Plant/ equipment item	Individual source/ activity $L_{Aeq,t}$			Individual source / activity $L_{Amax,t}$	
		$L_{Aeq,t}$, dB(A)	Duration[3]	$L_{Aeq,15\ min}$, dB(A)	$L_{Amax,t}$, dB(A)	Modelled source height, metres
Internal levels / Noise breakout		**Sound pressure level, L_p[2]**				
Delivery and loading dock activities (see Section 4.3.2)						
Internal warehouse activity noise at facade	Warehouse area	70	15 min	70	N/A	N/A

Notes: 1. Sound pressure level Lp re. 20µPa, dB(A)

2. Duration of this level within 15-minutes (minutes)

APPENDIX C Surrounding land use

The following is provided as evidence that the receivers nearest to the Project development are intended to be developed for industrial purposes:

- Brochure for 654-702 Mamre Road, Kemps Creek (receivers R2 and R3), offered for sale by private treaty.
- Issued Critical State Significant Infrastructure Standard Secretary's Environmental Assessment Requirements (SEARs) for industrial development of 706-752 Mamre Road, Kemps Creek (receiver R4).
- Aerial imagery (Nearmap, dated 17 October 2021) showing 772-782 Mamre Road, Kemps Creek (receiver R5) demolished.

CORNER MAMRE ROAD AND BAKERS LANE, KEMPS CREEK

Western Sydney

FOR SALE VIA PRIVATE TREATY

INFORMATION MEMORANDUM

INTRODUCTION

Savills is delighted to bring to market for sale a rare opportunity to acquire a significant industrial zoned property.

Located on the corner of Mamre Road and Bakers Lane, the property presents a unique opportunity appealing to both owner occupiers and developers. The flexibility and scale of this offering, along with the development potential (STCA) offers the purchaser an opportunity to occupy or develop in a precinct which is experiencing upward growth and returns. Key highlights of this opportunity include:

- Total site area of 31.13 hectares*
- 500 metre* frontage to Mamre Road
- 440 metre* frontage to Bakers Lane
- Adjoins the established industrial precinct of Erskine Park
- 13 kilometres* from the future Western Sydney Airport

Corner of Mamre Road and Bakers Lane, Erskine Park will be offered for Sale by Private Treaty.

Savills welcome your interest. Should you require any additional information, or wish to arrange an inspection, please contact the exclusive selling agents.

*approximately
** STCA

EXECUTIVE SUMMARY

The Property
654-674 Mamre Road, Kemps Creek
676-702 Mamre Road, Kemps Creek
21-43 Bakers Lane, Kemps Creek

Description
31.13 hectares of industrial development site known as Lots 1, 2 and 3 in Deposited Plan 587334.
The property is regular in shape with two street access points and exposure to both Mamre Road and Bakers Lane. The frontage to Mamre Road is 500 metres* and 440 metres* to Bakers Lane.

Location
The property is located on the corner of Mamre Road and Bakers Lane, Kemps Creek adjoining the prime industrial suburb of Erskine Park. The property offers direct access to the M4 Motorway, Elizabeth Drive, Erskine Park Road and Lenore Drive which has direct access to the M7 Motorway.

Total Site Area
31.13 hectares*

Individual Sites
654-674 Mamre Road: 10.14 hectares*
676-702 Mamre Road: 10.13 hectares*
21-43 Bakers Lane: 10.86 hectares*

Title Details
Lot 1 in Deposited Plan 587334
Lot 2 in Deposited Plan 587334
Lot 3 in Deposited Plan 587334

Zoning
IN1 General Industrial
SP2 Infrastructure
E2 Environmental Conservation

Outgoings (per annum)

Water rates & usage	$ 2,740.00
Council rates	$ 45,243.00
Insurances	$ 5,578.00
Land Tax	Nil
Total	$ 53,561.00*

Inspection
Strictly by appointment only

Method of Sale
For sale via Private Treaty

Exclusive Selling Agents

Ray Trimboli
Director, Industrial and Logistics
M: 0418 694 201
E: rtrimboli@savills.com.au

Michael Fenton
National Head, Industrial and Logistics
M: 0404 853 624
E: mfenton@savills.com.au

*approximately

THE OPPORTUNITY

This offering presents a rare opportunity to acquire a significant 31.13 hectare* parcel of industrial zoned land within Kemps Creek, adjoining the prime industrial suburb of Erskine Park.

The property comes to the market at a time where there is a very limited supply of industrial zoned sites in core locations. With the gentrification of infill industrial areas such as South Sydney, and more recently Home-bush, Strathfield and Lidcombe, Mamre Road and Bakers Lane will appeal to developers and owner occupiers.

Key Selling features:

- Impressive site area of 31.13 hectares*
- Extensive dual street exposure with 500 metre* street frontage to Mamre Road and 440 metres to Bakers Lane
- Proximity to the M4 and M7 Motorways
- Adjoins the existing Erskine Park industrial hub
- High growth location
- Ability to develop or subdivide

*approximately

Planning Secretary's Environmental Assessment Requirements

Section 4.12(8) of the *Environmental Planning and Assessment Act 1979*
Schedule 2 of the Environmental Planning and Assessment Regulation 2000

Application Number	SSD-30628110
Project Name	Summit at Kemps Creek
Development	Concept Masterplan comprising seven industrial buildings with a total gross floor area (GFA) of 238,290m^2 and Stage 1 works including: • demolition and vegetation clearing, bulk earthworks, retaining walls, construction of internal roads and external connections • construction of three warehouse buildings with a GFA of 76,570m^2 warehouse space and 3,700m^2 of ancillary office space, a 150m^2 food and drink premises (café), • car parking, stormwater infrastructure, landscaping and services.
Location	Lot 1 DP104958, 706-752 Mamre Road, Kemps Creek within the Penrith City Local Government Area
Applicant	Aliro Management Pty Limited
Date of Issue	22 November 2021
General Requirements	The Environmental Impact Statement (EIS) for the development must meet the form and content requirements in clauses 6 and 7 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (the Regulation) and must have regard to the State Significant Development Guidelines. In addition, the EIS must include: • a detailed description of the development, including: – an accurate history of the site, including development consents – the need and justification for the proposed development – alternatives considered including a description of feasible options within the development which may include a layout options analysis – likely staging of the development – likely interactions between the development and existing, approved and proposed operations in the vicinity of the site – plans of any proposed building works – contributions required to offset the proposal and – infrastructure upgrades or items required to facilitate the development, including measures to ensure these upgrades are appropriately maintained. • consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments • consideration of issues discussed in the public authority responses to request for key issues (see **Attachment 2**)

	• a risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment • a detailed assessment of the key issues specified below, and any other significant issues identified in this risk assessment, which includes: – a description of the existing environment, using sufficient baseline data – an assessment of the potential impacts of all stages of the development, including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes and – a description of the measures that would be implemented to avoid, minimise, mitigate and if necessary, offset the potential impacts of the development, including proposals for adaptive management and/or contingency plans to manage significant risks to the environment. • a consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS. The EIS must also be accompanied by a report from a qualified quantity surveyor providing: • a detailed calculation of the capital investment value (CIV) of the proposal (as defined in clause 3 of the Regulation), including details of all assumptions and components from which the CIV calculation is derived. The report shall be prepared on company letterhead and indicate the applicable GST component of the CIV • an estimate of the jobs that will be created by the development during the construction and operational phases of the proposed development • certification that the information provided is accurate at the date of preparation.
Key issues	The EIS must include an assessment of the potential impacts of the proposal (including cumulative impacts) and develop appropriate measures to avoid, mitigate, manage and/or offset these impacts. The EIS must address the following specific matters: • **Statutory and Strategic Context** – including: – detailed justification that the proposed land use is permissible with consent – details of any proposed consolidation or subdivision of land – a detailed description of the history of the site, including the relationship between the proposed development and all development consents and approved plans previously and/or currently applicable to the site – demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, adopted precinct plans, draft district plan(s), development control plans and adopted management plans and justification for any inconsistencies. This includes, but is not limited to: o State Environmental Planning Policy (State and Regional Development) 2011 o State Environmental Planning Policy (Infrastructure) 2007 o State Environmental Planning Policy (Western Sydney Employment Area) 2009 o State Environmental Planning Policy (Western Sydney Aerotropolis) 2020 o State Environmental Planning Policy No 33 - Hazardous and Offensive Development o State Environmental Planning Policy No 55 – Remediation of Land

	○ State Environmental Planning Policy No 64 – Advertising and Signage ○ Greater Sydney Region Plan: A Metropolis of Three Cities ○ Our Greater Sydney 2056: Western City District Plan ○ Future Transport Strategy 2056 ○ Mamre Road Precinct Structure Plan ○ Mamre Road Precinct Development Control Plan 2021 (MRP DCP) ○ Western Sydney Aerotropolis Plan ○ Draft Cumberland Plain Conservation Plan. • **Suitability of the Site** – including: – a detailed justification for the proposal and that the site can accommodate the proposed development having regard to its potential environmental impacts, permissibility, strategic context and existing site constraints, including: ○ the future Southern Link Road ○ widening and upgrade of Mamre Road ○ the integrated freight network identified in the Mamre Road Precinct Structure Plan and MRP DCP ○ an options analysis of the proposed bulk earthworks to seek to deliver balanced cut and fill and minimise the height and visual impact of proposed retaining walls, with consideration of proposed works and levels on adjoining properties. – a detailed description of the history of the relationship between the proposed development, other proposed developments and all development consents and approved plans previously and/or currently applicable to the site and surrounding sites – an analysis of site constraints. • **Community and Stakeholder Engagement** – a community and stakeholder participation strategy identifying key community members and other stakeholders, including: – details and justification for the proposed consultation approach(es) – clear evidence of how each stakeholder identified in the community and stakeholder participation strategy has been consulted – issues raised by the community and surrounding landowners and occupiers – clear details of how issues raised during consultation have been addressed and whether they have resulted in changes to the development – details of the proposed approach to future community and stakeholder engagement based on the results of consultation. • **Traffic and Transport** – a quantitative traffic impact assessment prepared in accordance with relevant Roads and Maritime Services and Austroads guidelines, that includes: – details of all daily and peak traffic volumes likely to be generated during all key stages of construction and operation, including a description of key access / haul routes, vehicle types and potential queuing impacts. Traffic flows are to be shown diagrammatically to a level of detail sufficient for easy interpretation – an assessment of the predicted impacts of this traffic on road safety and the capacity of the road network, including consideration of cumulative traffic impacts at key intersections using SIDRA or similar traffic model. This is to include the identification and consideration of approved and proposed developments/planning proposals/road upgrades in the vicinity of the site in the 2026, 2031 and 2036 scenarios

	– consideration of clause 33C of the Western Sydney Employment Area State Environmental Planning Policy, specifically integration with the Mamre Road Precinct dedicated freight corridor, including consultation with TfNSW – details of road upgrades, infrastructure works or new roads or access points required for the development. Provide details of consultation with adjoining landowners with regard to road connections on the site boundary – clearly describe the proposed interim site access arrangement via Bakers Lane and ultimate access via the Southern Link Road. This is to include details on how other landowners and users on Bakers Lane have been consulted on the proposed works and the potential traffic and access impacts – plans demonstrating how all vehicles likely to be generated during construction and operation and awaiting loading, unloading or servicing can be accommodated on the site to avoid queuing in the street network – details and plans of any proposed the internal road network, loading dock servicing and provisions, on-site parking provisions, and sufficient pedestrian and cyclist access and facilities, in accordance with the relevant Australian Standards – detailed plans of all proposed site access points, justification for their location and an assessment of potential traffic impacts from the proposed access points – details of the largest vehicle anticipated to access and move within the site, including swept path analysis – swept path diagrams depicting vehicles entering, exiting and manoeuvring throughout the site. • **Soils and Water** – a surface and groundwater assessment that includes: – a topographic assessment and justification the proposed earthworks are site responsive and contextually appropriate – an assessment of potential surface and groundwater impacts associated with the development, including potential impacts on watercourses, riparian areas, groundwater, and groundwater-dependent communities nearby – a detailed site water balance including a description of the water demands and breakdown of water supplies, and any water licensing requirements – a site-specific integrated water management strategy with details of stormwater/wastewater management system including how it will be designed, operated and maintained, including the capacity of onsite detention system(s) – characterisation of water quality at the point of discharge to surface and/or groundwater against the relevant water quality criteria (including proposed mitigation measures to manage any impacts to receiving waters and monitoring activities and methodologies) – assessment of the impacts of the development on downstream flood behaviour – description of the proposed erosion and sediment controls during construction – consideration of salinity and acid sulphate soil impacts. • **Urban Design and Visual, including:** – demonstration of how the development will achieve design excellence in accordance with any relevant EPI provisions and the objectives for good design in Better Placed (Government Architect NSW, 2017)

	– a visual impact assessment (including photomontages and perspectives) of the development layout and design (buildings and storage areas), including: • details of staging, site coverage, setbacks, open space, landscaping, height, colour, scale, building materials and finishes, façade design, retaining walls, signage and lighting, particularly in terms of potential impacts on: o nearby public and private receivers o significant vantage points in the broader public domain • consideration of the layout and design of the development having regard to the surrounding vehicular, pedestrian and cycling networks • detailed plans showing suitable landscaping which incorporates endemic species – demonstrate that adequate landscaping can be achieved along the site boundaries fronting the ultimate Mamre Road and the Southern Link Road designs and that the required landscaped setback and planting is achieved with consideration of the location and design of the OSD basins. • **Noise and Vibration** – a quantitative noise and vibration impact assessment undertaken by a suitably qualified acoustic consultant in accordance with the relevant Environment Protection Authority guidelines and Australian Standards which includes: – the identification of impacts associated with construction, site emission and traffic generation at noise affected sensitive receivers, including the provision of operational noise contours and a detailed sleep disturbance assessment – details of noise monitoring survey, background noise levels, noise source inventory and 'worst case' noise emission scenarios – consideration of annoying characteristics of noise and prevailing meteorological conditions in the study area – a cumulative impact assessment inclusive of impacts from other developments – details and analysis of the effectiveness of proposed management and mitigation measures to adequately manage identified impacts, including a clear identification of residual noise and vibration following application of mitigation these measures and details of any proposed compliance monitoring programs. • **Infrastructure Requirements** – an infrastructure management plan that includes: – a detailed written and/or graphical description of infrastructure required on the site, including upgrades required – details of the existing capacity of the site to service the proposed development and any extension or augmentation, property tenure or staging requirements for the provision of utilities, including arrangements for electrical network requirements, drinking water, wastewater and recycled water – a description of how any upgrades will be co-ordinated, funded and delivered on time and be maintained to facilitate the development – identification of any existing infrastructure or easements on or off the site which may be impacted by construction or operation of the development and details of measures to be implemented to address any impacts. • **Aboriginal Cultural Heritage** – an Aboriginal Cultural Heritage Assessment Report (ACHAR) prepared in accordance with the Code of

	Practice for Archaeological Investigation in NSW (DECCW 2010), and guided by the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in New South Wales (OEH 2011). The ACHAR must: – identify, describe and assess impacts on the Aboriginal cultural heritage values that exist across the development – provide evidence and details of consultation with Aboriginal people in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW 2010) – include results of a surface survey and any test excavations and an unexpected finds protocol. • **Non-Aboriginal Cultural Heritage** – a non-Aboriginal cultural heritage assessment (including both cultural and archaeological significance) which must detail potential impacts on heritage assets and any proposed management and mitigation measures. • **Biodiversity** – an assessment of the proposal's biodiversity impacts in accordance with the *Biodiversity Conservation Act 2016*, including the preparation of a Biodiversity Development Assessment Report (BDAR) where required under the Act, except where a waiver for preparation of a BDAR has been granted. • **Socio-Economic** – including: – a social impact assessment in accordance with the Department's Social Impact Assessment Guideline – an analysis of any potential economic impacts of the development, including a discussion of any potential economic benefits to the local and broader community. • **Ecologically Sustainable Development** – including: – a description of how the proposal will incorporate the principles of ecologically sustainable development in the design, construction and ongoing operation of the development – consideration of the use of green walls, green roofs and/or cool roofs in the design of the development – a description of the measures to be implemented to minimise consumption of resources, especially energy and water. • **Air Quality** – including a quantitative assessment of the potential air quality, dust and odour impacts of the development (construction and operation) on surrounding landowners, businesses and sensitive receptors, in accordance with relevant Environment Protection Authority guidelines, including details of proposed mitigation, management and monitoring measures. • **Waste** – including details of the quantities and classification of waste streams generated during construction and operation and proposed storage, handling and disposal requirements. • **Contamination** – including an assessment of site suitability under the provisions of SEPP 55. • **Bush Fire** – a bush fire assessment report that addresses the aims and objectives of Planning for Bushfire Protection 2019. • **Hazards and Risk** – a preliminary risk screening completed in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* and 'Applying SEPP 33' (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should preliminary screening indicate that the project is "potentially hazardous" a Preliminary Hazard Analysis (PHA) must be prepared in accordance with 'Hazardous

	Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis' (DoP, 2011) and 'Multi-Level Risk Assessment' (DoP, 2011). • **Greenhouse Gas and Energy Efficiency –** including an assessment of the energy use of the proposal and all reasonable and feasible measures that would be implemented on site to minimise the proposal's greenhouse gas emissions (reflecting the Government's goal of net zero emissions by 2050). • **Airport Safeguarding** – including a risk assessment of the proposed development on Western Sydney Airport operations and addressing related matters in the Western Sydney Aerotropolis Plan and *State Environmental Planning Policy (Western Sydney Aerotropolis) 2020*. • **Planning Agreement/Development Contributions** – including consideration of any applicable Section 7.11/7.12 Contribution Plan and/or details of any Voluntary Planning Agreement (VPA) and demonstration that satisfactory arrangements have been or would be made to provide, or contribute to the provision of, necessary local and regional infrastructure as required by clause 270 of the Regulation, SEPP WSEA, the Proposed Aerotropolis Special Infrastructure Contribution and/or any other policy or plan. During preparation of the EIS, consultation must be undertaken with the relevant parties regarding any VPA required.
Engagement	During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. In particular you must consult with: • Penrith City Council • Department of Planning, Industry and Environment, specifically the: – Central (Western) team, Place Design and Public Spaces Group – Environment, Energy and Science Group – Water Group (including the Natural Resources Access Regulator) • Transport for NSW • NSW Rural Fire Service • Sydney Water • WaterNSW • Western Sydney Airport Corporation • surrounding local landowners, businesses and stakeholders, including: – Emmaus Catholic College – Trinity Catholic Primary School – Mamre Anglican School – Catholic Healthcare Emmaus Retirement Village – Catholic Healthcare Emmaus Residential Aged Care Home – Little Smarties Learning Centre • any other public transport, utilities or community service providers. The EIS must detail the engagement undertaken and demonstrate how it was consistent with the Undertaking Engagement Guide: Guidance for State Significant Projects. The EIS must detail how issues raised and feedback provided have been considered and responded to in the project. Where amendments have not been made to address an issue, a short explanation should be provided.
Expiry Date	SEARs will expire two years after the date of issue (or the date they were last modified).

References	The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. While not exhaustive, **Attachment 1** contains a list of some of the guidelines, policies, and plans that may be relevant to the environmental assessment of this proposal.

Aerial map showing R5 and R6 demolished