ASPECT INDUSTRIAL ESTATE

SSD-10448 MOD 3 and Warehouse 9 SSDA
Noise Impact Assessment

Prepared for:

Mirvac Projects Pty Ltd
Level 28
200 George Street
Sydney NSW 2000

SLR Ref: 610.19127-R07
Version No: -v2.4
September 2022

PREPARED BY

SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
Tenancy 202 Submarine School, Sub Base Platypus, 120 High Street
North Sydney NSW 2060 Australia

T: +61 2 9427 8100
E: sydney@slrconsulting.com www.slrconsulting.com

BASIS OF REPORT

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

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

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

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
610.19127-R07-v2.4	21 September 2022	Joshua Ridgway	Antony Williams	Antony Williams
610.19127-R07-v2.3	20 September 2022	Joshua Ridgway	Antony Williams	Antony Williams
610.19127-R07-v2.2	25 August 2022	Joshua Ridgway	Antony Williams	Antony Williams

CONTENTS

DOCUMENT REFERENCES

TABLES

FIGURES

CONTENTS

APPENDICES

1 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been engaged by Mirvac Projects Pty Ltd (Mirvac) to assess the potential operational noise impacts of the Aspect Industrial Estate (AIE), located within the Mamre Road Precinct (MRP) in Kemps Creek.

Mirvac obtained Development Consent SSD-10448 from the Department of Planning and Environment (DPE) for the Aspect Industrial Estate 'Concept Proposal' and 'Stage 1 Development' in May 2022. The Concept Proposal comprises a 'Masterplan' to guide the staged development of the AIE and core development controls that will form the basis for design and assessment of future development applications for the site.

The following noise impact assessments have been completed:

- A Noise Impact Assessment (SSDA NIA) was prepared as part of the SSD-10448 application (SLR Report *610.19127-R02-v1.4*, dated February 2021).
- Two addendum reports to the SSDA NIA were also prepared, the NIA Addendum (SLR Report *610.19217-M01-v0.1-20210513*, dated May 2021), and the DPIE Locations Operational Noise Predictions Report (DPIE ONPR) (SLR Report *610.19127-M03-v1.0-20210831*, dated August 2021).
- Modification noise assessment prepared for MOD 2 (MOD 2 NIA) (SLR Report *610.19127-R06-v2.1-20220725*).

The design of the development has been updated as part of a modification (MOD 3) to Development Consent SSD-10448. This report presents a review of the potential operational noise impacts for MOD 3 and compares the predicted noise levels to the noise limits for the site, as specified in the Development Consent SSD-10448.

2 MOD 3 Design Changes

The design changes fall into three parts, modification changes to the concept plan, modification changes to Stage 1, and changes to Warehouse 9 associated with the SSDA for that warehouse.

SSD-10488 Concept Modification

The following modifications are proposed, relating to the Warehouse/Lot 6, 7, 8, 9, 10 and 11 area and Access Road 4, located at the south-western portion of the AIE, as set out in the Concept Plan SSD-10448.

- Reconfiguration of the Estate layout south of Access Road 1 and west of Access Road 3 including:
  - Reduction in overall lot numbers across AIE from 11 to 9,
  - Relocation and shortening of Access Road 4,
  - Reconfiguration of warehouse Lots 6-11 into Lots 6-9,
  - New warehouse footprints and heights, hardstand locations, car parking, estate landscaping, and
  - Change in boundary condition to the south including orientation of warehouse hardstand for Warehouse 9 to the south rather than the north.
- Reduction in area of Lot 6 Warehouse GFA to 9,925 sqm and Lot 7 Warehouse GFA to 15,455 sqm.
- Increase in area of Lot 8 Warehouse GFA to 45,150 sqm and Lot 9 Warehouse GFA to 66,341 sqm.

- Reconfiguration of Office and Dock Office areas in accordance with the revised warehouse footprints.
- New hardstand areas along the frontages of the reconfigured lots:
  - 38 m wide east of Warehouse 6,
  - 38 m wide west of Warehouse 7,
  - 40 m south of Warehouse 8, and
  - 36 m wide north and 36 m wide south of Warehouse 9.
- Reconfiguration of carpark areas in support of the modified warehouse layout, to be reconfigured as follows:
  - Warehouse 6 – 73 parking spaces across the lot's northern and southern frontages,
  - Warehouse 7 – 84 parking spaces across the lot's eastern, frontage, within the front setback to Access Road 3,
  - Warehouse 8 – 69 parking spaces across the lot's northern frontage (fronting Access Road 1) and 97 parking spaces across the lot's eastern frontage (fronting Access Road 4), and
  - Warehouse 9 – 266 parking spaces across the lot's north-eastern frontage (fronting Access Road 4).
- Revised vehicular and truck access off Access Road 1, 3 and 4 in accordance with the reconfigured lots and shortened Access Road 4.
- Change in Estate-wide impacts associated with stormwater management, traffic generation, visual impact, noise, earthworks at the boundary and landscaping.

SSD 10448 Stage 1 Modification

The following modification is proposed to the approved road works under the Stage 1 consent, relating to the construction of road works for the realigned Road 4 and associated landscaping.

- Updated subdivision plan to include Road 4 within a separate road lot.
- Civil works and construction of realigned Road 4 including stormwater works.
- Construction of landscaping works in the public domain area of the Road 4 lot.
- Reconfiguration of earthworks for Lots 6 to 9.
- Reconfiguration of boundary retaining walls (Stage 1) and other retaining walls (both Stage 1 and Lot 9).

Warehouse 9 SSDA

The detailed development application will seek consent for earthworks, infrastructure and roads, and the construction, fit out and operation of the warehouse and logistic facility with associated car parking for Lot/Warehouse 9. Specifically, the SSDA will seek consent for:

- Civil works including cut/fill and benching to set the Lot 9 pad levels.
- Construction of new 65,000 sqm building for use as 'warehouse & distribution' to be built to a ridge height of 14.6 m. The following works are proposed in support of the warehouse building operations:
  - 266 parking spaces across the lot's north-and eastern frontages with driveway access to/from Access Road 4,

- Appropriate hardstand areas, 36 m wide north and 36 m wide south of Warehouse 9,
- Internal truck access roads with access from Access Road 3 to the east and egress to Access Road 4 to the north,
- Appropriate loading dock areas at the north and south elevations,
- 266 sqm Dock Office at the north elevation and a 60 sqm Dock Office at the south elevation, and
- 1,350 sqm Main Office at the eastern elevation.

- Fit-out of the warehouse for the proposed use.
- Construction of vehicular crossovers to Access Road 4 (egress) and Access Road 3 (ingress).
- On lot landscaping.
- On lot stormwater management.
- Operation of the warehouse & distribution facility 24 hours a day 7 days a week.

The approved Masterplan design (MOD 2) is shown in **Figure 1**. The proposed MOD 3 Masterplan design is shown in **Figure 2**.

Figure 1 Approved Masterplan Design

Note 1: Figure provided by Mirvac, dated 11 July 2022.

Figure 2 Proposed MOD 3 Masterplan Design

Note 1: Figure provided by Mirvac, dated 18 May 2022.

2.2 Secretary's Environmental Assessment Requirements

The Planning Secretary's Environmental Assessment Requirements were issued for Warehouse 9 in August 2022. The requirements relevant to noise and vibration are shown in **Table 1**.

Table 1 Secretary's Environmental Assessment Requirements

Requirement	Where Addressed
Noise and Vibration – including:	-
– a description of all potential noise and vibration sources during the construction and operational phases of the development, including on- and off-site traffic noise[1]	**Section 4**
– demonstration of compliance with the noise limits set out in condition A16, Schedule 2 of SSD-10448 development consent	**Section 3**, **5** and **6**
– an analysis of all external plant and equipment, including but not limited to, forklifts, air conditioners and refrigeration systems and on-site vehicle movements	**Section 4**
– a cumulative noise impact assessment of all potential noise sources in accordance with relevant Environmental Protection Authority guidelines	**Section 3** and **4**
– details of noise mitigation, management, and monitoring measures to demonstrate the noise limits in Condition A16 can be achieved.	**Section 3**, **4**, **5** and **6**

Note 1: The potential construction impacts and off-site traffic impacts were assessed in the SSDA NIA and are considered representative of impacts from the proposed modification.

3 Operational Noise Limits

The operational noise limits for the AIE Concept Proposal are detailed in Condition A16 of Development Consent SSD-10448. The limits are specified at noise monitoring locations identified in Appendix 3 of the Development Consent and are shown in **Table 2** and **Figure 3**. The noise monitoring locations have been added to the MOD 3 Masterplan in **Figure 4**.

It is noted that the operational noise limits are based on the predicted noise levels during standard weather conditions from the DPIE ONPR report. Noise limits for noise enhancing weather conditions would be higher than the standard weather noise limits specified in the consent. As such, this assessment details the predicted noise levels during standard weather conditions for comparison to the noise limits and the approved development noise levels. The predicted noise levels during noise-enhancing weather conditions have been provided only for information and comparison to the approved development.

Additionally, Condition A16(b) notes that the cumulative noise emission of external fixed mechanical plant for each warehouse building must be no more than 90 dBA and must not exhibit tonal characteristic or strong low frequency content.

Table 2 Operational Noise Limits for Concept Proposal Development

Location	Noise Limit (dBA)			
	Day $L_{Aeq(15minute)}$	Evening $L_{Aeq(15minute)}$	Night $L_{Aeq(15minute)}$	Night L_{Amax}
NML 1	50	50	47	63
NML 2	62	62	60	79
NML 3	64	64	61	79
NML 4	65	65	62	82
NML 5	66	66	64	82

Note 1: 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).

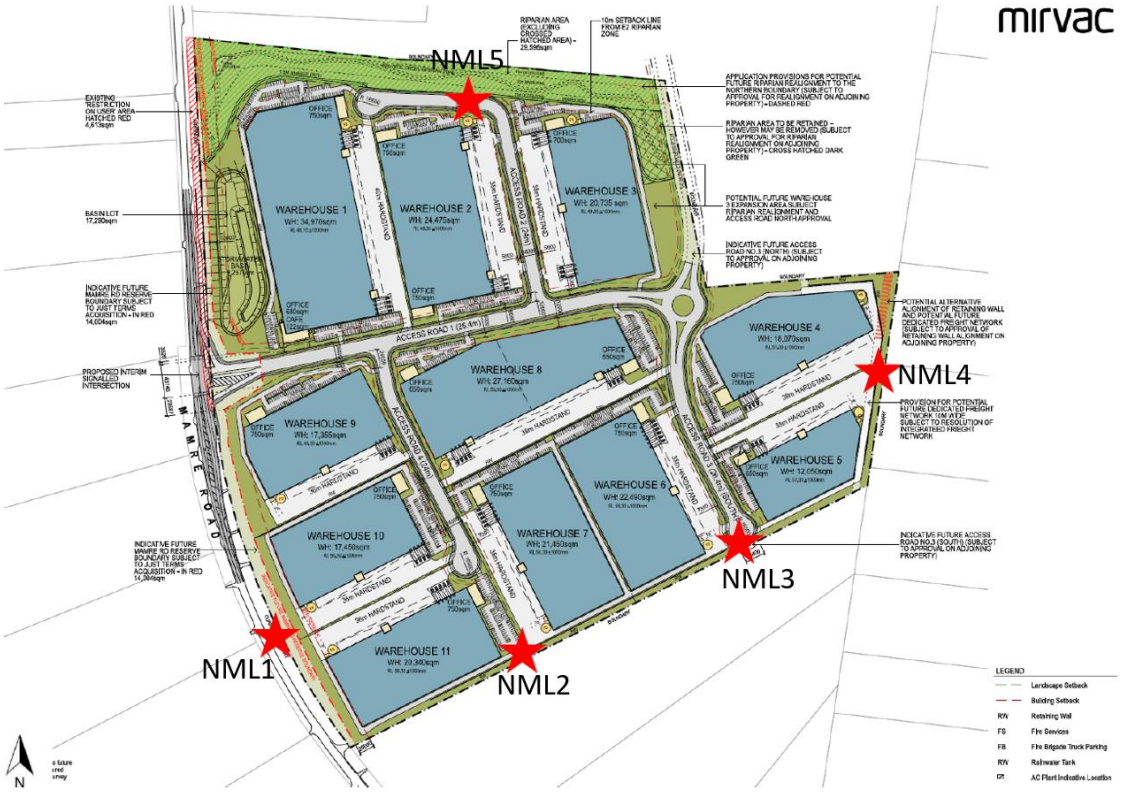
3.1 Revised Noise Monitoring Locations

A number of the NMLs are in locations that are difficult to access to undertake post-construction verification noise monitoring or are in locations that are not considered safe (ie in hardstands at the bottom of retaining walls, etc). The NMLs have been reviewed and repositioned as part of this assessment to locations considered safe and accessible.

The revised NMLs are:

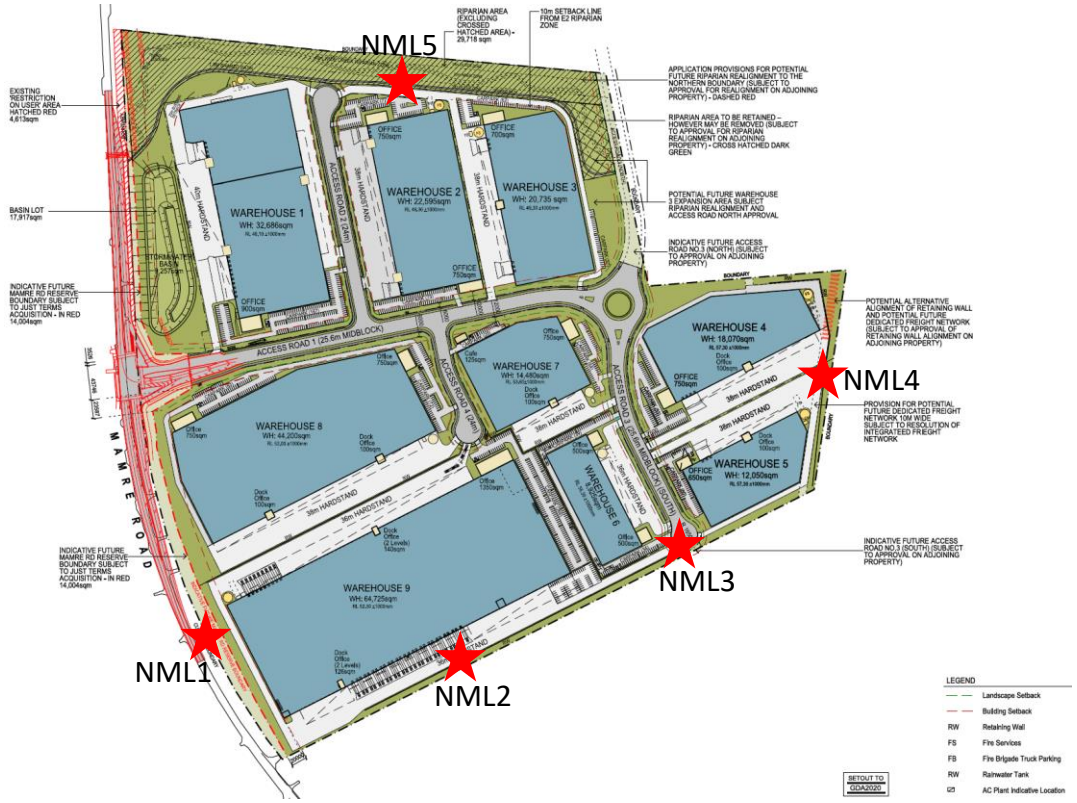
- NML 2 and NML 4 have been relocated to the top of the adjacent retaining wall
- NML 3 has been moved to the edge of the site boundary away from potential truck movements
- No changes have been made to NML 1 and NML 5
- The relocated NMLs are within around 5 m of the original locations.

Figure 3 Noise Monitoring Locations – Development Consent SSD-10448



Note 1: Figure sourced from Appendix 3 of Development Consent SSD-10448.

Figure 4 Noise Monitoring Locations – MOD 3 Masterplan



Note 1: Figure provided by Mirvac, dated 18 May 2022.

4 Operational Noise Assessment

4.1 Operational Noise Modelling

The SoundPLAN noise model prepared for the MOD 2 NIA has been updated for the MOD 3 design and operations.

Consistent with the MOD 2 NIA, the noise model includes standard weather conditions during the daytime, evening and night-time periods, and noise-enhancing weather conditions during the night-time, using an F-class temperature inversion with a 2 m/s source to receiver drainage flow.

4.1.1 Operational Noise Sources

The project is in the early design stages and certain future tenants are currently unknown. Several assumptions have been made by Mirvac regarding the likely future tenants, uses and sources of noise, based on the likely tenants. The main sources of operational noise at the development include:

- On-site light and heavy vehicle movements
- Loading dock activities in hardstands
- Mechanical plant.

A summary of the expected worst-case noise sources associated with the operation of the development is provided below. The tenant for Warehouse 9 is now known and additional information for noise sources on Lot 9 is detailed below.

On-Site Traffic

Hourly vehicle volumes for the estate based on warehouse GFA, including Warehouse 9, were provided by Mirvac. Warehouse 1 volumes are consistent with the MOD 2 NIA.

Based on the provided vehicle information, the peak 1-hour vehicle volumes during the daytime, evening and night-time periods would occur outside the road network morning and evening peak hours. The peak 1-hour volumes are detailed in **Table 3**.

Table 3 Peak 1-Hour Vehicle Volumes

Lot/Warehouse	Peak 1-Hour Vehicle Volumes			
	Daytime / Evening		Night-time	
	Light Vehicles	Heavy Vehicles	Light Vehicles	Heavy Vehicles
1	78	3	78	3
2	45	16	41	11
3	40	14	36	9
4	35	12	32	8
5	24	8	22	6
6	18	7	17	4
7	28	10	26	7

Lot/Warehouse	Peak 1-Hour Vehicle Volumes			
	Daytime / Evening		Night-time	
	Light Vehicles	Heavy Vehicles	Light Vehicles	Heavy Vehicles
8	85	30	77	20
9	123	44	112	29

Note 1: Daytime is 7 am to 6 pm, Evening is 6 pm to 10 pm, Night-time is 10 pm to 7 am.

The peak 1-hour vehicle volumes in **Table 3** have been assumed to be spread evenly across the 1-hour period, and have been divided by four to model the worst-case 15-minute volumes during the daytime/evening and night-time periods.

The relevant sound power levels (SWLs) and modelling assumptions are detailed in **Table 4**. Heavy vehicles for estate are anticipated to be around 66% rigid trucks, 7% semi-trailer trucks, 2% b-double trucks and 25% a-double trucks. The SWL for 'heavy trucks' is representative of trucks with three or more axles. This results in a conservative assessment given the majority of deliveries would be via rigid trucks which are significantly quieter.

Table 4 Vehicle Noise Sources

Vehicle Type	Location	Sound Power Level (dBA)	Vehicle Speed (km/h)
Heavy trucks	Estate roads	108[1]	20
	On-lot truck access and hardstands		5
Light vehicles	Estate roads, car parks and light-vehicle access	96[2]	20

Note 1: Sound power level for 'heavy trucks' based on 106 dBA for trucks at slow speed for 80% of the time and 111 dBA for trucks accelerating for 20% of the time and is representative of trucks with three or more axles. Sound power levels taken from the Federal Highway Administration's Traffic Noise Model.

Note 2: Taken from *Road Traffic Noise Prediction Model "ASJ RTN-Model 2013" Proposed by the Acoustical Society of Japan – Part 2: Study on Sound Emission of Road Vehicles*, OKADA et al, Internoise 2014, and accounts for vehicles accelerating.

Loading Docks

The modelled loading dock noise sources are detailed in **Table 5**. Consistent with the MOD 2 NIA, external forklift movements (ie outside of the warehouses) have been modelled in the at-grade dock areas of the hardstands at a rate of one forklift per heavy vehicle onsite, operating continuously during any one 15-minute period. Refrigerated truck trailers have been modelled for Warehouse 1, operating continuously during any one 15-minute period.

Table 5 Loading Dock Noise Sources

Noise Source	Sound Power Level (dBA)	Typical Duration of Use in Worst-case 15-minute Period
Truck reversing alarm[1]	107[2]	30 seconds
Forklift reversing alarm[1]	102[2]	90 seconds
Truck air brakes	118	1 second
Gas forklift	93	900 seconds
Refrigerated truck trailer[3]	102[4]	900 seconds

Note 1: The operation of this equipment is typically intermittent and a +5 dB modifying correction factor has been added to the night-time noise level in accordance with the NPfI.

Note 2: SWL includes a -3 dB reduction due to alarms being discrete events.

Note 3: Refrigerated truck trailers have been modelled at Warehouse 1,

Note 4: Taken from measurement data and *Sound Power Levels and Directivity Patterns of Refrigerated Transport Trailers*, Roy et al, 2017.

Mechanical Plant

External mechanical plant on Warehouses 2 to 9 has been modelled on the warehouse rooftops with an indicative cumulative SWL of 90 dBA per warehouse, consistent with the MOD 2 NIA. Warehouse 1 has seven VPAC units on the roof, as detailed in the MOD 2 NIA.

4.1.2 Noise Sources with Potential for Sleep Disturbance

As the development would operate 24-hours a day, noise emissions during the night-time require assessment for potential sleep disturbance at the nearest residential receivers. The details of typical activities with the potential to cause sleep disturbance are shown in **Table 6**. These are consistent with the MOD 2 NIA.

Table 6 Sleep Disturbance Noise Events – L_{Amax} Sound Power Levels

Noise Source	Sound Power Level L_{Amax} (dBA)
Accelerating trucks on estate roads, on-lot truck access and hardstands	111
Truck air brakes in hardstands	118
Truck reversing alarm in recessed docks	110
Forklift reversing alarm in hardstands	105
Light vehicle movements on estate roads, carparks and light-vehicle access	100

4.2 Predicted Operational Noise Levels

The predicted operational noise levels at the noise monitoring locations detailed in Condition A16 of the Development Consent for the MOD 3 Masterplan development are summarised in **Table 7**.

The MOD 3 Masterplan noise level predictions and comparison to the noise limits are shown in the table. The MOD 2 NIA noise levels (for the approved Masterplan development) and predicted change from the MOD 2 NIA noise levels are also shown for comparison.

Table 7 Predicted Operational Noise Levels MOD 3 – Masterplan Development

Noise Monitoring Location	Period (weather)	LAeq(15 minutes) Noise Level (dBA)					LAmax Noise Level (dBA)				
		LAeq(15minutes) Noise Limit	MOD 3 Predicted	Exceedance	MOD 2 NIA Predicted	Change	LAmax Noise Limit	MOD 3 Predicted	Exceedance	MOD 2 NIA Predicted	Change
NML 1	Daytime (standard)	50	**62**	**12**	50	+12	n/a	n/a	n/a	n/a	n/a
	Evening (standard)	50	**62**	**12**	50	+12	n/a	n/a	n/a	n/a	n/a
	Night-time (standard)	47	**60**	**13**	47	+13	63	**69**	**6**	63	+6
	Night-time (noise-enhancing)	n/a	61	n/a	50	+11	n/a	69	n/a	64	+5
NML 2	Daytime (standard)	62	**67**	**5**	62	+5	n/a	n/a	n/a	n/a	n/a
	Evening (standard)	62	**67**	**5**	62	+5	n/a	n/a	n/a	n/a	n/a
	Night-time (standard)	60	**66**	**6**	60	+6	79	**84**	**5**	79	+5
	Night-time (noise-enhancing)	n/a	67	n/a	62	+5	n/a	84	n/a	80	+4
NML 3	Daytime (standard)	64	**69**	**5**	64	+5	n/a	n/a	n/a	n/a	n/a
	Evening (standard)	64	**69**	**5**	64	+5	n/a	n/a	n/a	n/a	n/a
	Night-time (standard)	61	**67**	**6**	61	+6	79	**80**	**1**	79	+1
	Night-time (noise-enhancing)	n/a	67	n/a	62	+5	n/a	80	n/a	80	0
NML 4	Daytime (standard)	65	64	-	65	-1	n/a	n/a	n/a	n/a	n/a
	Evening (standard)	65	64	-	65	-1	n/a	n/a	n/a	n/a	n/a
	Night-time (standard)	62	**64**	**2**	62	+2	82	80	-	82	-2
	Night-time (noise-enhancing)	n/a	65	n/a	64	+1	n/a	80	n/a	82	-2
NML 5	Daytime (standard)	66	66	-	66	0	n/a	n/a	n/a	n/a	n/a
	Evening (standard)	66	66	-	66	0	n/a	n/a	n/a	n/a	n/a
	Night-time (standard)	64	64	-	61	+3	82	82	-	82	0
	Night-time (noise-enhancing)	n/a	65	n/a	62	+3	n/a	82	n/a	82	0

Note 1: **Bold red** text indicates an exceedance of the noise limit.

The above shows that operational noise levels from the Masterplan development are predicted to exceed the relevant noise limits at NML 1 on the western site boundary, NML 2 and NML 3 on the southern boundary, and NML 4 on the eastern boundary. Compliance is predicted at NML 5 on the northern boundary.

Noise levels from the MOD 3 design are predicted to be higher than the MOD 2 design during certain periods at all boundary noise limit locations due to the proposed site layout changes. The predicted changes at each boundary noise limit location are discussed below:

- **NML 1** – noise levels are predicted to increase at this location by up to 13 dB for L_{Aeq} and 6 dB for L_{max}. This results from:
  - This location was adjacent to the far end of the hardstands for Warehouses 10 and 11 in the MOD 2 design. In the MOD 3 design this location is now adjacent to the heavy vehicle route around Warehouse 9, while still in line of sight of some of the hardstands for Warehouses 8 and 9.
  - The larger GFA of Warehouses 8 and 9 in MOD 3 results in more heavy vehicle movements in this area compared to Warehouses 10 and 11 in MOD 2. This results in an increase in noise levels at NML 1 compared to MOD 2.
- **NML 2** – noise levels are predicted to increase at this location by up to 6 dB for L_{Aeq} and 5 dB for L_{max}. This results from:
  - This location was adjacent to the southern end of the carpark for Warehouse 11 and the hardstand for Warehouse 7 in the MOD 2 design. In the MOD 3 design this location is now adjacent to the heavy vehicle route and southern hardstand of Warehouse 9.
  - The larger GFA of Warehouse 9 in MOD 3 results in more heavy vehicle movements and loading dock activities in this area compared to the carpark of Warehouse 11 and hardstand of Warehouse 7 in MOD 2. This results in an increase in noise levels at NML 2 compared to MOD 2.
- **NML 3** – noise levels are predicted to increase at this location by up to 6 dB for L_{Aeq} and 1 dB for L_{max}. This results from:
  - This location was adjacent to the hardstand for Warehouse 6 in the MOD 2 design. In the MOD 3 design this location is now adjacent to the heavy vehicle entrance for Warehouse 9 and the hardstand and carpark for Warehouse 6.
  - The larger GFA of Warehouse 9 in MOD 3 results in more heavy vehicle movements in this area compared to MOD 2, while the other sources in the area are similar. This results in an increase in noise levels at NML 3 compared to MOD 2.
- **NML 4** – noise levels are predicted to increase at this location by up to 2 dB for L_{Aeq}. This results from:
  - This location is adjacent to the hardstands for Warehouses 4 and 5 in both the MOD 2 and MOD 3 designs, with line of sight to Access Road 3.
  - While the MOD 2 design in this area does not change, the route to the Warehouse 9 vehicle entrance uses Access Road 3 in MOD 3, which increases heavy vehicle movements in this area compared to MOD 2. This results in a relatively minor increase in noise levels at NML 4 compared to MOD 2.

- **NML 5** – noise levels are predicted to increase at this location by up to 3 dB for L_{Aeq} with L_{max} being consistent. This results from:
  - This location is adjacent to the Warehouse 2 carpark and Warehouse 3 light/heavy vehicle entrance in both the MOD 2 and MOD 3 designs, with no direct line of sight to Access Road 1.
  - While the MOD 2 design in this area does not change, the relocation of Access Road 4 further east into the estate, and the route to the Warehouse 9 vehicle entrance using Access Road 3 in MOD 3, results in an increase in heavy vehicle movements along Access Road 1 east of Access Road 2 through the centre of the estate. This results in a minor increase in noise levels at NML 5 compared to MOD 2.

Discussion of exceedances of the noise limits at the on-site noise monitoring locations in the context of existing noise sensitive receivers is detailed in **Section 4.2.1**.

4.2.1 Sensitive Receivers Not Rezoned IN1 Industrial

While exceedances of the on-site noise limits are predicted for the MOD 3 development, it is important to note that the nearby sensitive receivers have been rezoned to IN1 industrial uses as part of the development of the Mamre Road Precinct (MRP).

Conditions D46, D47 and D48 of the Development Consent require Mirvac to enter into an agreement with noise mitigation eligible receivers (identified in Figure 7 in Appendix 4 of Development Consent) prior to commencement of operation of the Stage 1 development. The agreements are intended to provide appropriate noise management to the affected receivers until the existing residential use ceases or a development application for general industrial or employment uses applies to the land.

The nearest sensitive receivers to the site that have not been rezoned to IN1 industrial are located outside the MRP, around 600 m to the south on Mamre Road, and around 1,450 m to the west in Luddenham (refer to **Appendix B**). There is also an isolated place of worship under construction around 1,000 m to the southeast within the MRP. Residences outside the MRP to the north and east of the site are located over 2,000 m away and have not been considered in this assessment.

Noise impacts from the MOD 3 development have been assessed at the receiver areas detailed above and compared to the applicable noise criteria for these areas derived from the intrusiveness and cumulative amenity noise criteria in the *Noise Policy for Industry* (NPfI). The applicable criteria for each area are discussed in detail in **Appendix B**.

The predicted noise levels at these receiver areas are detailed in **Table 8**. As detailed in **Appendix B**, a conservative correction of 10 dB has been subtracted from the predicted noise levels to account for screening from future warehouse structures on other estates between the AIE site and the receiver areas.

The predicted noise levels at the surrounding DPE receiver assessment locations are detailed in **Appendix C**. The comparison of the MOD3 noise levels with the noise levels from the SSDA NIA concludes:

- In terms of noise levels across the various residential receivers, there are some that decrease, some stay the same and some that have a limited increase.
- The majority of changes are between -2 dB and +2dB, with the maximum change being +7dB at R20.
- Many of the receivers experience only a marginal change, meaning the overall noise environment for MOD3 is largely similar to the SSD noise environment.

- Overall, the proposal still meets the applicable noise criteria in the NPfI at all receivers and as such is still considered unlikely to result in noise impacts at the relevant sensitive receivers.

Table 8 Predicted Operational Noise Levels MOD 3 – Receivers Not Zoned IN1 Industrial

Receiver Area	Period (weather)	LAeq(15 minutes) Noise Level (dBA)					LAmax Noise Level (dBA)				
		LAeq(15minutes) Noise Criteria	MOD 3 Predicted	Exceedance	MOD 2 NIA Predicted	Change	LAmax Noise Criteria	MOD 3 Predicted	Exceedance	MOD 2 NIA Predicted	Change
Masterplan Development											
Residences to the South	Daytime (standard)	43	29	-	23	+6	n/a	n/a	n/a	n/a	n/a
	Evening (standard)	38	29	-	23	+6	n/a	n/a	n/a	n/a	n/a
	Night-time (standard)	33	27	-	22	+5	56	36	-	33	+3
	Night-time (noise-enhancing)	n/a	34	n/a	28	+6	n/a	42	n/a	39	+3
Residences to the West	Daytime (standard)	42	24	-	23	+1	n/a	n/a	n/a	n/a	n/a
	Evening (standard)	38	24	-	23	+1	n/a	n/a	n/a	n/a	n/a
	Night-time (standard)	33	24	-	21	+3	52	30	-	30	0
	Night-time (noise-enhancing)	n/a	31	n/a	28	+3	n/a	37	n/a	37	0
Place of Worship	When in use (standard)	42	<20	-	<20	+1	n/a	n/a	n/a	n/a	n/a

Note 1: **Bold red** text indicates an exceedance of the noise limit.

The above shows that operational noise levels for the MOD 3 Masterplan development are predicted to comply with the applicable noise criteria at receivers not rezoned to IN1 industrial during all periods.

The predicted noise levels are generally higher than the MOD 2 noise levels in these receiver areas due to the changes in layout associated with Warehouse 9, which generally provides reduced shielding to the heavy vehicle routes and hardstands in the direction of the receiver areas compared to MOD 2.

The MOD 3 development is predicted to comply with the requirements of the NPfI and considered unlikely to result in noise impacts at the relevant sensitive receivers. As such, the exceedances of the noise limits at the on-site monitoring locations are considered to be of low significance and no specific additional noise mitigation or management measures are recommended.

Feasible and reasonable mitigation that has been applied to the development is discussed further in **Section 5.**

5 Mitigation and Management Measures

All potential feasible and reasonable mitigation measures that have been considered during the various approvals assessments are summarised in **Table 9**.

Table 9 Feasible and Reasonable Mitigation Options

Ref.	Mitigation Option	Noise Impact/Benefit	Reasonable and Feasible to Apply
Source Control			
S1	Optimised site layout to minimise noise emissions from the site	Where possible, the site layout has been designed so that the warehouse buildings screen the noisier areas of the development (ie hardstands and truck routes) from the nearest receivers.	Yes – applied during design of the masterplan
S2	Limit vehicle movements	A reduction in concurrent vehicle movements across the site by staggering delivery/pickup times and/or employee shift change times could reduce noise emissions. In practice, this would occur naturally across the estate due to operational requirements of the different tenants.	No – vehicle volumes used in this assessment are likely needed to meet tenant's requirements. Placing restrictions on allowable vehicle movements across the different tenancies is unlikely to be feasible and reasonable.
S3	Use broadband and/or ambient sensing alarms on trucks and forklifts where they are required to reverse during the night-time.	Reduce potential for annoying noise emissions during the night-time from forklifts and trucks.	Yes – use broadband and/or ambient sensing alarms on forklifts and trucks where they are required to reverse during the night-time.
S4	Appropriate design of site layout to minimise the need for trucks to stop or brake outside of loading docks with line of sight to residential receivers.	Minimise noise emissions, particularly from truck airbrakes.	Yes – applied during design of the concept masterplan
S5	Production of an Operational Noise Management Plan.	This would detail the measures that could be used by the various tenants to minimise general noise emissions from the site. Reference can be made to the Best Management Practice (BMP) and Best Available Technology Economically Available (BATEA) measures listed in the NPfI.	Yes – can form part of consent conditions

Ref.	Mitigation Option	Noise Impact/Benefit	Reasonable and Feasible to Apply
Path Control			
P1	Noise barriers	Construction of noise barriers along boundary fence locations or other strategic locations could be used to reduce noise levels where plant or equipment are in line of sight of the nearest receivers.	Noise barriers are unlikely to be effective in reducing noise impacts from the development due to the distances between potential barrier locations and many of the nearest receivers. Additionally, receivers where impacts have been identified are within the MRP and have been rezoned to industrial. These are expected to be developed into employment land uses, meaning permanent noise barriers to mitigate these receivers are likely unreasonable.
Receiver Control			
R1	Not required	n/a	n/a
Verification Monitoring			
V1	Noise monitoring	Verify post-construction operational noise levels are in-line with predictions.	Yes – verification monitoring would be completed within three months of commencement of operation, as per the requirements of Consent Condition D53.

6 Recommendations

The following recommendations are made based on the results of this assessment.

Condition A16 (Table 2)

The table in this condition details the operational noise limits for the Concept Masterplan development. These noise limits are applicable at the on-site noise monitoring locations detailed in Appendix 3 of the Development Consent and were specific to the site layout of the approved development. Noise levels at sensitive receiver locations are predicted to comply with the relevant NPfI criteria (refer to **Section 4.2.1**).

MOD 3 seeks to modify the approved site layout and it is therefore recommended that the noise limits in Condition A16 be updated to be equal to the predicted noise levels for the MOD 3 Masterplan development (detailed in **Table 7**), where the predicted noise levels are higher than the current on-site noise limits.

7 Conclusion

Operational noise emissions from the MOD 3 Masterplan development have been assessed.

Operational noise levels from the MOD 3 Masterplan development are predicted to exceed the relevant noise limits at the on-site noise monitoring locations. Exceedances are predicted at NML 1 to NML 3 due to the changes to the layout associated with Warehouse 9. The larger GFA of Warehouse 9 in MOD 3 results in more heavy vehicle movements and loading dock activities adjacent to the on-site noise monitoring locations. Minor exceedances are predicted during the night-time period at NML 4 due to the change in the route heavy vehicles take to Warehouse 9, which moves them much closer to NML 4. Noise levels at NML 5 are predicted to comply with the relevant noise limits.

The predicted noise levels are higher than MOD 2 (and previous SSDA NIA) at NML 1 to NML 3 for the reasons listed above. At NML 4 and NML 5 noise levels during the night-time are marginally higher than MOD 2 (and previous SSDA NIA) due to the changes in the Warehouse 9 heavy vehicle route through the estate.

While exceedances of the on-site noise limits are predicted for the MOD 3 development, noise levels at the nearest sensitive receivers not zoned IN1 Industrial are predicted to comply with the relevant noise criteria for those receiver areas. The predicted noise levels are higher than the MOD 2 (and previous SSDA NIA) noise levels in these receiver areas due the changes in layout associated with Warehouse 9, which generally provides reduced shielding to the heavy vehicle routes and hardstands in the direction of the receiver areas compared to the approved development.

The MOD 3 development is predicted to comply with the requirements of the NPfI and no specific additional noise mitigation or management measures are required.

Modifications to Condition A16 relating to the on-site noise limits are recommended.

APPENDIX A

Acoustic Terminology

1. Sound Level or Noise Level

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

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

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

2. 'A' Weighted Sound Pressure Level

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

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

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

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

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

3. Sound Power Level

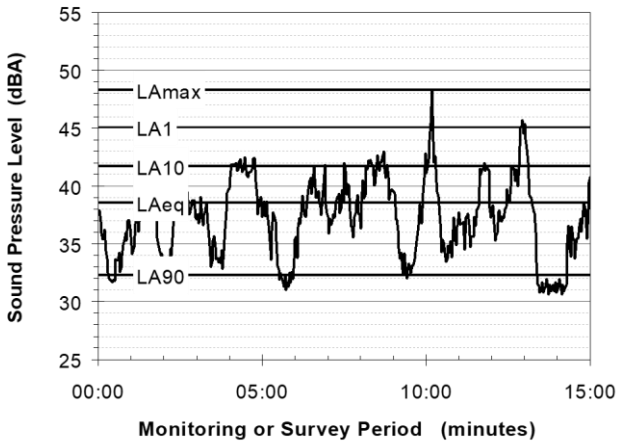
The Sound Power of a source is the rate at which it emits acoustic energy. As with Sound Pressure Levels, Sound Power Levels are expressed in decibel units (dB or dBA), but may be identified by the symbols SWL or LW, or by the reference unit 10^{-12} W.

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

4. Statistical Noise Levels

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

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



Of particular relevance, are:

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

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

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

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

5. Frequency Analysis

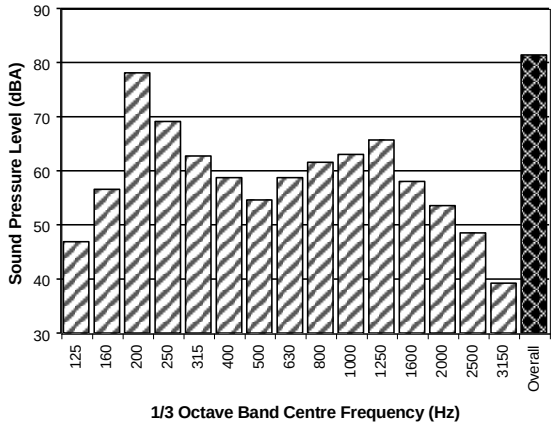
Frequency analysis is the process used to examine the tones (or frequency components) which make up the overall noise or vibration signal.

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

Frequency analysis can be in:

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

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



6. Annoying Noise (Special Audible Characteristics)

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

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

7. Vibration

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

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

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

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

8. Human Perception of Vibration

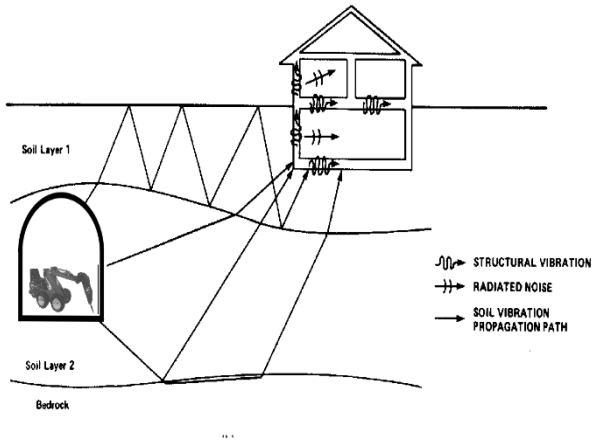
People are able to 'feel' vibration at levels lower than those required to cause even superficial damage to the most susceptible classes of building (even though they may not be disturbed by the motion). An individual's perception of motion or response to vibration depends very strongly on previous experience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

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

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

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

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



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

APPENDIX B

Cumulative Amenity Criteria

1 Introduction

The Aspect Industrial Estate (AIE) is a development located within the Mamre Road Precinct (MRP) in Kemps Creek. Mamre Road runs along the western boundary of the site, with proposed industrial estates surrounding the development. The nearest sensitive receivers to the site that have not been rezoned to IN1 industrial uses are located outside the MRP, to the south on Mamre Road, and to the west in Luddenham. There is also an isolated place of worship under construction within the MRP.

The MRP is shown in **Figure 1** and the known State Significant Development Applications (SSDAs), Development Applications (DAs) and existing industrial estates in the area are shown in **Figure 2**.

Figure 1 Mamre Road Precinct Structure Plan

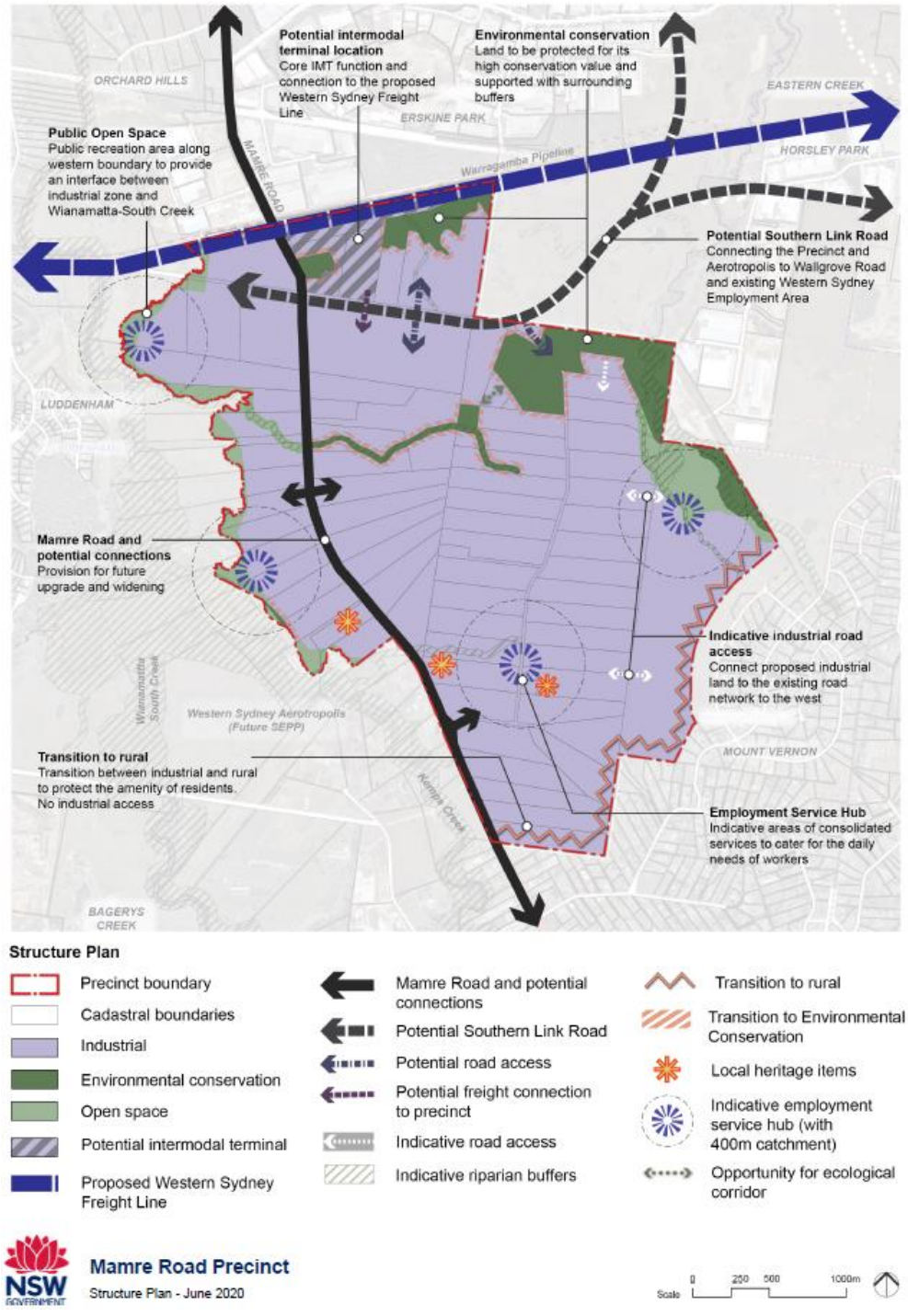
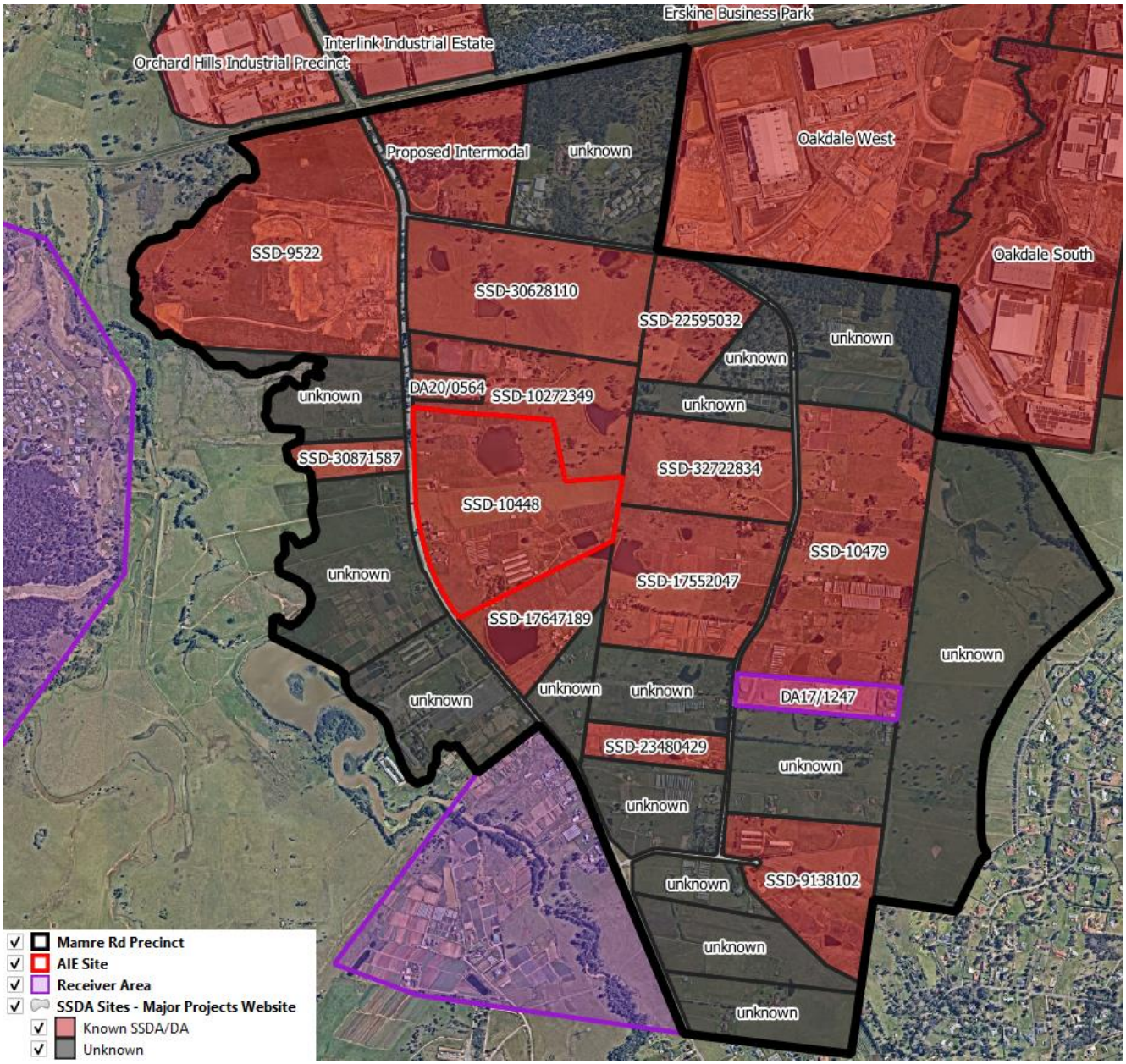


Figure 2 Proposed and Existing Developments



Note: AIE development site shown with a red outline, Mamre Road Precinct shown with a black outline, existing and proposed developments shown in transparent red, unknown developments within the MRP shown in transparent grey, nearest receiver areas to AIE shown in transparent purple (refer to **Section 2**).

2 Nearest Sensitive Receivers

The nearest sensitive receivers which have not been rezoned to IN1 industrial uses are detailed below:

- Residences around 600 m to the south on Mamre Road, Kemps Creek.
- Residences around 1,450 m to the west on Medinah Avenue, Luddenham.
- An isolated place of worship is located around 1,000 m to the southeast within the MRP (shown as DA17/1247 in **Figure 2**).
- The residential receivers to the north and east of the site are located over 2,000 m away and have not been considered in this assessment.

3 Noise Monitoring

Noise monitoring was undertaken in the receiver areas to the south on Mamre Road and the west in Luddenham as part of other projects in this area. The noise monitoring locations are detailed in **Table 1**.

Table 1 Noise Monitoring Locations

Noise Monitoring Location	Date of Monitoring	Comments
Residences to the South Mamre Road, Kemps Creek	November 2019	This monitoring was undertaken as part of the SSD-17647189 noise assessment (AcousticWorks report *1020168 R01N 884-928 Mamre Road Kemps Creek ENV Revision R01N*, dated September 2021).
Residences to the West Medinah Avenue, Luddenham	November 2020	This monitoring was undertaken as part of the SSD-10101987 noise assessment (ARUP report *SYD05-06-07_Y-R-0000 Revision 3*, dated July 2021).

4 Methodology for Cumulative Amenity Noise Criteria

Consistent with DPE advice on other developments within the MRP, amenity criteria for receivers outside the MRP has been determined using the approach to cumulative noise impacts detailed in Section 2.4.2 of the NPfI *"Amenity noise levels in areas near an existing or proposed cluster of industry"*.

This approach essentially divides the total industrial amenity noise criteria among the number of developments contributing to the noise levels experienced at a particular receiver location, specifying an allowable amenity noise level for each development so that the total industrial noise emissions do not exceed the overall amenity noise criteria.

The following equation is used: *Individual project amenity noise level* = $10Log(10^{(ANL-5dB/10)}/N)$, where ANL is the relevant recommended amenity noise level, and N is the number of contributing developments.

The NPfI also notes that where a greenfield development is proposed and it can be demonstrated that existing levels of industrial noise are more than 5 dB lower than the relevant recommended amenity noise levels, the equation can be modified to reflect ANL rather than ANL-5dB. This assessment has included all existing estates in the number of contributing developments, where relevant. As such, the equation has used ANL.

Where noise emissions from the development do not exceed the amenity criteria determined using this approach, it is considered that the development does not exceed its allowance of the overall amenity criteria for existing and proposed clusters of industry in the area, and therefore cumulative noise impacts are considered to be sufficiently addressed.

Where proposed industrial estates within the MRP are located between the development site and the receivers, a conservative 10 dB has been subtracted from the modelled results to account for screening provided by these future estates. This is applicable for the residences to the south (on Mamre Road), the residences to the west (in Luddenham), and the place of worship within the MRP.

5 Operational Noise Criteria

The operational noise assessment criteria for the receivers outside the MRP and the place of worship within the MRP are detailed in **Table 2**.

Table 2 Operational Project Noise Trigger Levels

Receiver	Period	Recommended Amenity Noise Level LAeq(period) (dBA)	Measured Noise Level (dBA)		Number of Contributing Developments[2]	Project Noise Trigger Levels LAeq(15minute) (dBA)		Sleep Disturbance Screening Level[5] (LAmax dBA)
			RBL[1]	LAeq (period)		Intrus-iveness	Amenity [3,4]	
Residences to the South (on Mamre Road)[7]	Day	50	46	-[6]	10	51	**43**	n/a
	Evening	45	46	-[6]		51	**38**	n/a
	Night	40	41	-[6]		46	**33**	56
Residences to the West (in Luddenham)[7]	Day	50	37	49	10	**42**	43	n/a
	Evening	45	36	45		41	**38**	n/a
	Night	40	33	45		38	**33**	52
Place of Worship to the Southeast[8]	When in use	50	n/a	n/a	12	n/a	**42**	n/a

Note 1: RBL = Rating Background Level.

Note 2: Number of existing and proposed industrial developments potentially contributing to the industrial noise levels in this NCA (refer to **Section 5.1.1**).

Note 3: The recommended amenity noise levels have been reduced based on the NPfI formula for clusters of industry (refer to **Section 4**). This is discussed in further detail for each location in **Section 5.1.1**.

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

Note 5: Sleep disturbance screening level is RBL+15 dB or 52 dBA, whichever is higher.

Note 6: Measured LAeq(period) not specified in source report for this location.

Note 7: Recommended amenity level for "Rural" has been used for residential receivers to the south and west.

Note 8: The criterion is specified as an internal noise level for this receiver category. As the noise model predicts external noise levels, it has been conservatively assumed that the place of worship has openable windows and external noise levels are 10 dB higher than the corresponding internal level, which is generally considered representative of windows being partially open for ventilation.

5.1.1 Discussion of Amenity Noise Criteria

As detailed in **Section 4**, the recommended amenity noise levels for the surrounding receivers have been reduced based on the NPfI formula for clusters of industry. The developments considered to be potential contributors to the industrial noise levels in each receiver area are detailed below. Where development estate boundaries are unknown, typical estate boundaries have been assumed based on the cadastral lots and the size of adjacent development estates.

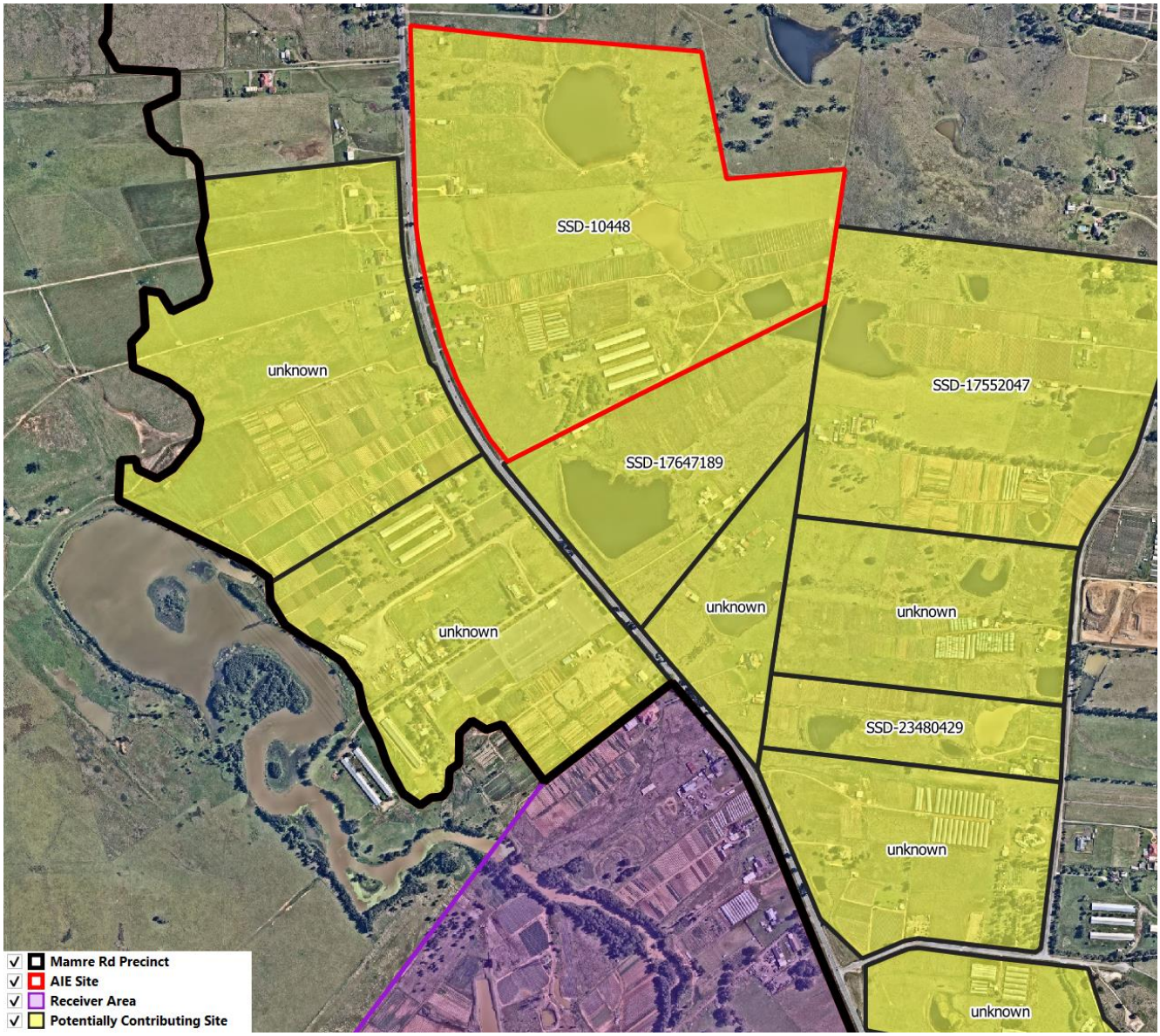
The potential contributors to a particular receiver have typically been limited to the nearest development estates as warehouses and structures within these estates would typically screen the receivers from noise emissions from estates further away, reducing them to a level that does not significantly contribute to the overall industrial noise level.

The AIE development site has been added to the number of potential contributors even if it is not one of the nearest development estates.

Residences to the South

Residences to the south of the site on Mamre Road are considered to be potentially affected by industrial noise from ten development estates including the AIE development site. **Figure 3** shows the development estates considered to be primary contributors to the industrial noise levels in this receiver area.

Figure 3 Potentially Contributing Estates to Industrial Noise Levels at Residences to the South

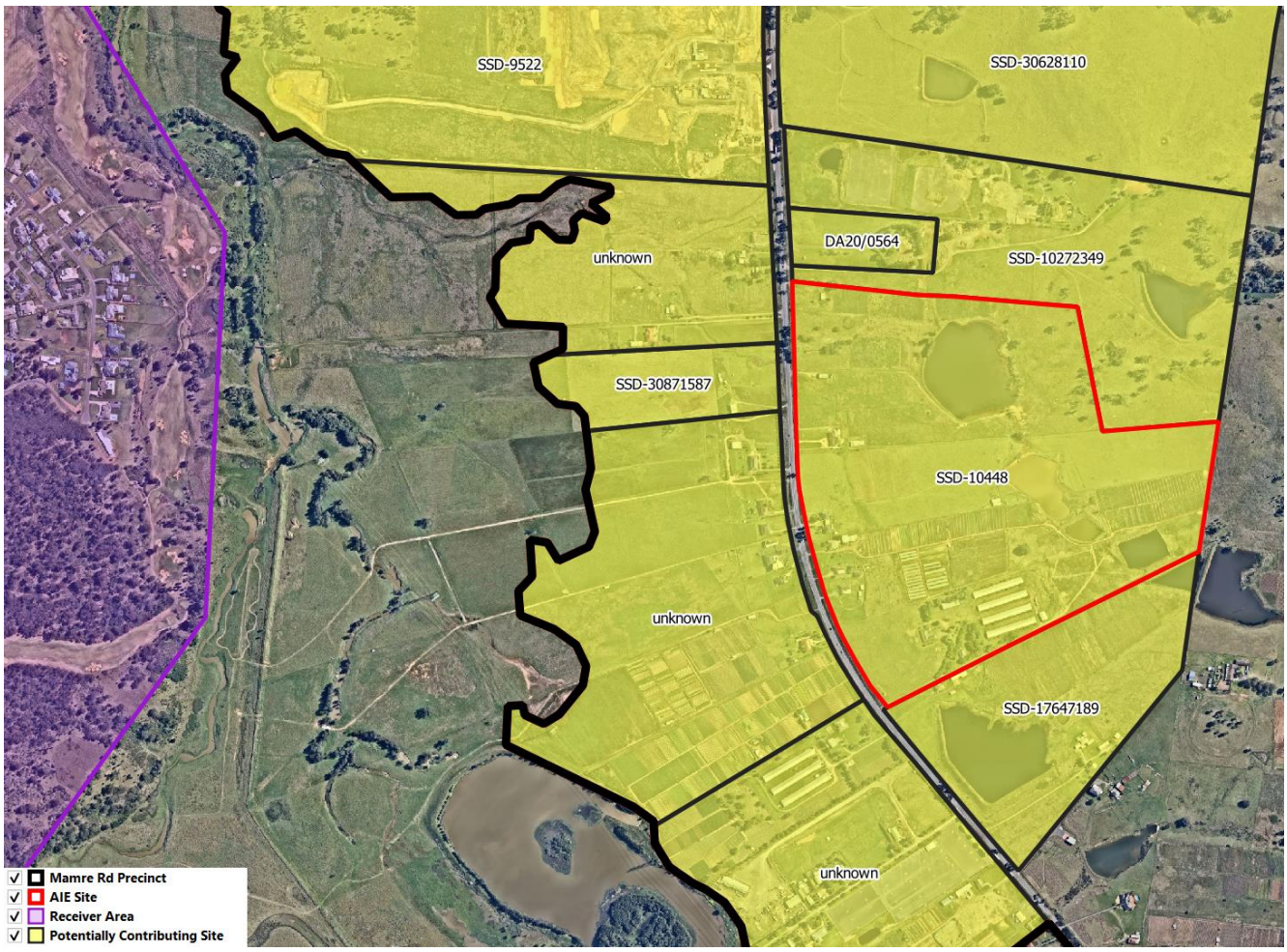


Note: AIE development site shown with a red outline, Mamre Road Precinct shown with a black outline, relevant receiver area shown in transparent purple, potentially contributing development estates shown in transparent yellow.

Residences to the West

Residences to the west of the site in Luddenham are considered to be potentially affected by industrial noise from ten development estates including the AIE development site. **Figure 4** shows the development estates considered to be primary contributors to the industrial noise levels in this receiver area.

Figure 4 Potentially Contributing Estates to Industrial Noise Levels at Residences to the West

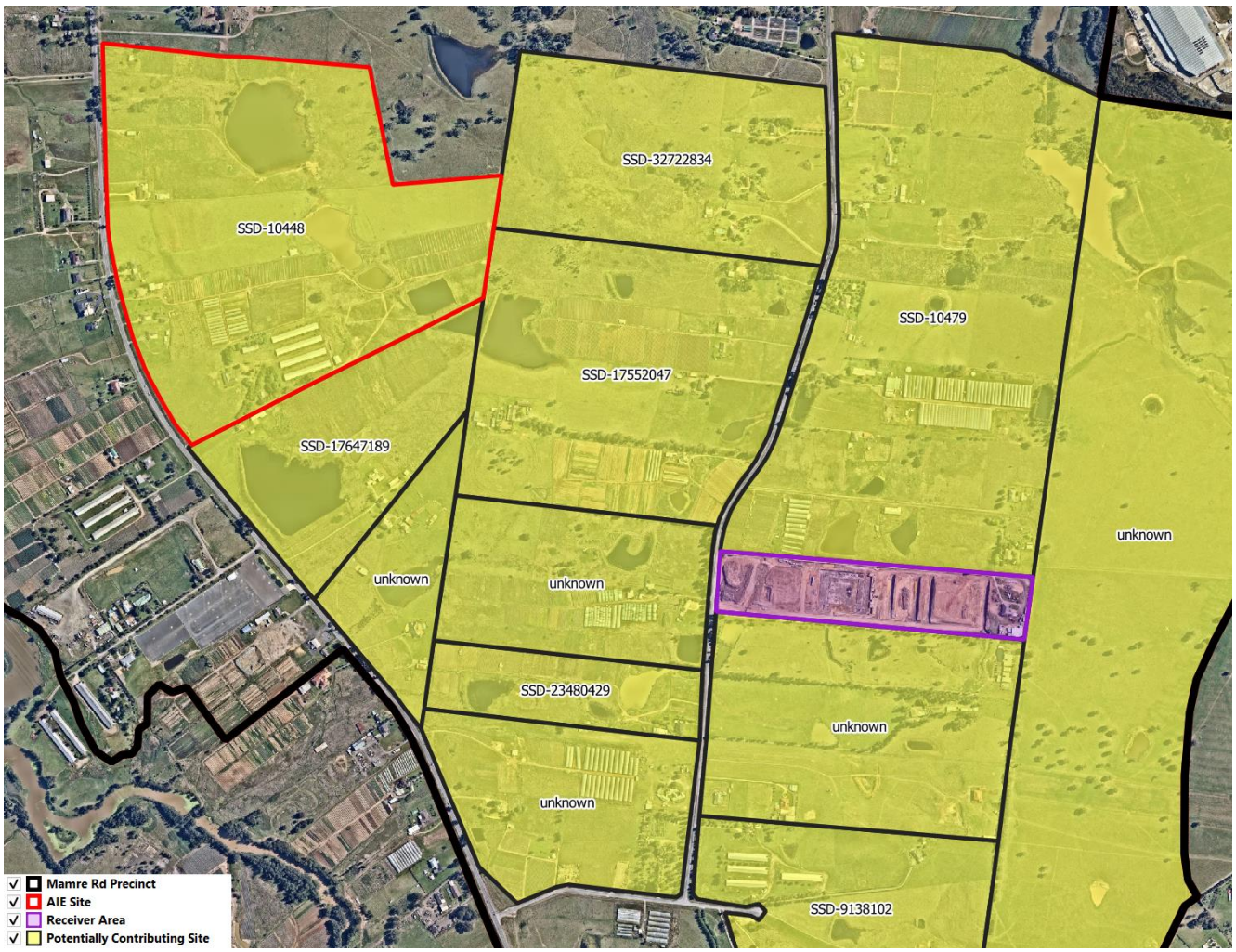


Note: AIE development site shown with a red outline, Mamre Road Precinct shown with a black outline, relevant receiver area shown in transparent purple, potentially contributing development estates shown in transparent yellow.

Place of Worship to the Southeast

The place of worship to the southeast of the site is considered to be potentially affected by industrial noise from twelve development estates including the AIE development site. **Figure 5** shows the development estates considered to be primary contributors to the industrial noise levels in this receiver area.

Figure 5 Potentially Contributing Estates to Industrial Noise Levels at Place of Worship to the Southeast



Note: AIE development site shown with a red outline, Mamre Road Precinct shown with a black outline, relevant receiver area shown in transparent purple, potentially contributing development estates shown in transparent yellow.

APPENDIX C

DPE Receiver Locations

Receiver ID	LAeq(15 minutes) Noise Level (dBA)						LAmax Noise Level (dBA)			
	Daytime/Evening (standard weather)		Night-time (standard weather)		Night-time (noise-enhancing weather)		Night-time (standard weather)		Night-time (noise-enhancing weather)	
	SSDA NIA	MOD 3	SSDA NIA	MOD 3	SSDA NIA	MOD 3	SSDA NIA	MOD 3	SSDA NIA	MOD 3
R01	11	11	9	10	16	17	23	23	30	30
R02	10	11	8	10	15	17	22	22	29	29
R03	10	12	7	11	14	17	18	18	25	25
R04	11	13	7	11	14	18	18	16	25	23
R05	11	12	9	11	16	18	24	22	31	29
R06	13	14	11	13	18	20	25	24	32	32
R07	15	16	13	15	20	22	25	26	33	32
R08	1	1	0	0	5	8	6	5	13	12
R09	2	3	0	2	6	9	7	9	15	16
R10	16	16	13	15	20	22	24	23	31	30
R11	8	6	5	5	12	12	16	12	23	19
R12	11	12	9	11	16	18	23	23	31	30
R13	12	12	10	11	17	18	23	23	31	30
R14	7	8	6	7	12	14	21	18	28	25
R15	13	15	10	13	17	20	22	21	29	28
R16	23	29	22	27	27	34	33	36	39	42
R17	18	23	16	21	23	28	27	33	34	39
R18	19	22	16	21	23	28	26	25	33	32
R19	18	21	14	20	21	27	23	24	31	31
R20	21	24	17	24	24	31	28	30	35	37
R21	19	20	17	18	24	25	29	30	36	37
R22	16	16	14	15	21	22	28	25	35	32
R23	11	11	10	10	17	17	27	27	34	34
R24	19	17	18	16	25	23	31	27	38	34
R25[1]	-	-	-	-	-	-	-	-	-	-
R26	8	10	7	9	14	16	23	20	30	27
R27	13	15	9	13	16	20	19	20	26	27
R28	11	13	7	12	14	18	17	17	24	24

Note 1: Receiver removed from assessment as on land subject to SSDA.

ASIA PACIFIC OFFICES

ADELAIDE
60 Halifax Street
Adelaide SA 5000
Australia
T: +61 431 516 449

BRISBANE
Level 16, 175 Eagle Street
Brisbane QLD 4000
Australia
T: +61 7 3858 4800
F: +61 7 3858 4801

CAIRNS
Level 1 Suite 1.06
Boland's Centre
14 Spence Street
Cairns QLD 4870
Australia
T: +61 7 4722 8090

CANBERRA
GPO 410
Canberra ACT 2600
Australia
T: +61 2 6287 0800
F: +61 2 9427 8200

DARWIN
Unit 5, 21 Parap Road
Parap NT 0820
Australia
T: +61 8 8998 0100
F: +61 8 9370 0101

GOLD COAST
Level 2, 194 Varsity Parade
Varsity Lakes QLD 4227
Australia
M: +61 438 763 516

MACKAY
21 River Street
Mackay QLD 4740
Australia
T: +61 7 3181 3300

MELBOURNE
Level 11, 176 Wellington Parade
East Melbourne VIC 3002
Australia
T: +61 3 9249 9400
F: +61 3 9249 9499

NEWCASTLE CBD
Suite 2B, 125 Bull Street
Newcastle West NSW 2302
Australia
T: +61 2 4940 0442

NEWCASTLE
10 Kings Road
New Lambton NSW 2305
Australia
T: +61 2 4037 3200
F: +61 2 4037 3201

PERTH
Grd Floor, 503 Murray Street
Perth WA 6000
Australia
T: +61 8 9422 5900
F: +61 8 9422 5901

SYDNEY
Tenancy 202 Submarine School
Sub Base Platypus
120 High Street
North Sydney NSW 2060
Australia
T: +61 2 9427 8100
F: +61 2 9427 8200

TOWNSVILLE
12 Cannan Street
South Townsville QLD 4810
Australia
T: +61 7 4722 8000
F: +61 7 4722 8001

WOLLONGONG
Level 1, The Central Building
UoW Innovation Campus
North Wollongong NSW 2500
Australia
T: +61 2 4249 1000

AUCKLAND
Level 4, 12 O'Connell Street
Auckland 1010
New Zealand
T: 0800 757 695

NELSON
6/A Cambridge Street
Richmond, Nelson 7020
New Zealand
T: +64 274 898 628

WELLINGTON
12A Waterloo Quay
Wellington 6011
New Zealand
T: +64 2181 7186

SINGAPORE
39b Craig Road
Singapore 089677
T: +65 6822 2203