REPORT

ESR WESTLINK STAGE 1

KEMPS CREEK, NSW

NOISE AND VIBRATION IMPACT ASSESSMENT
RWDI # 2101343
6 October 2022

SUBMITTED TO

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GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (LAmax) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

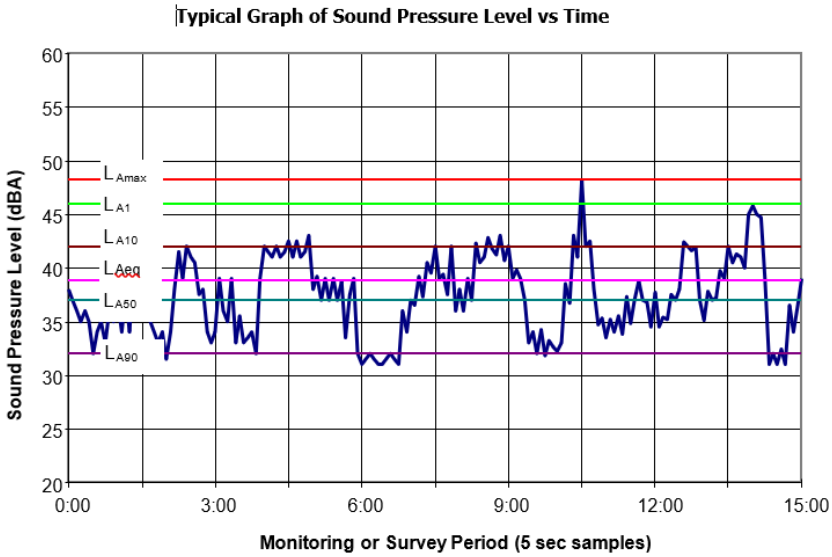
L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.



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1 INTRODUCTION

RWDI was commissioned by ESR Australia to conduct an operational and construction noise and vibration assessment for the proposed warehouse and distribution facility known as the 'ESR Westlink '(the Project) located on the corner of Abbotts Road and Aldington Road, Kemps Creek.

The following report forms part of the State Significant Development Application for a proposed warehouse and distribution development located across three separate allotments: 290-308 Aldington Road, 59-62 Abbotts Road, and 63 Abbotts Road (the Site).

This report addresses the Secretary's Environmental Assessment Requirements (SEARs) relevant to the development (SSD 9138102) issued in September 2020.

The SEARs relevant to this report have been considered and are addressed as outlined in **Table 1-1**.

Table 1-1: Secretary's Environmental Assessment Requirements (SEARs)

Relevant SEARs	Response
a quantitative noise and vibration impact assessment for construction and operation of the development, including traffic noise, undertaken by a suitably qualified person in accordance with the relevant Environment Protection Authority guidelines and including an assessment of nearby sensitive receivers	This report includes a description of potential noise sources associated with the development. Operational noise including on-site traffic noise is addressed in Section 5**.** Construction noise and vibration is addressed in Section 7. Based on the significant setback distances to surrounding receivers, vibrations impacts are expected to be negligible and not considered further.
cumulative impacts of other existing and proposed developments	This assessment includes consideration of the cumulative noise impacts of the potential noise emissions from the development via the Amenity Noise Trigger mechanism of the EPA's *NPfI* (refer to Section 5.7
details and justification of the proposed noise mitigation, management and monitoring measures	Noise mitigation measures are discussed in Section 5.9

Noise from the operation of the proposal has been assessed in accordance with the NSW *Noise Policy for Industry* (NPfI), NSW EPA,2017, which is used to set trigger levels to manage cumulative noise.

- Construction noise has been assessed in accordance with the *Interim Construction Noise Guideline* (ICNG), DECC, 2009.
- Vibration from operation and construction has been assessed in accordance with *Assessing Vibration: A Technical Guideline*, DEC, 2006.
- Traffic noise associated with the site has been assessed in accordance with the NSW *Road Noise Policy* (RNP), DECCW, 2011

1.1 Response to DPE RFI

This report has been updated to address additional RFI from the Department of Planning and Environment (DPE). TABLE XX presents the RFI and how they were addressed.

Table 1-2

Additional RFI	Response
The EIS does not adequately address potential mitigation of noise impacts to existing residential receivers. The SEARs require an assessment of construction and operation noise and vibration impacts on nearby sensitive receivers. The Department notes that the Noise Impact Assessment (NIA) at Appendix X identifies exceedances of operational and construction noise at identified receivers within the MRP. However, the NIA assumes that these receivers will be uninhabited or no longer existing during construction and operation of the development. Existing dwellings on properties that do not currently have a development application approved or lodged must be assessed as a rural residential receiver and cannot be assumed to be uninhabited without clear justification.	The exceedances of the construction noise management levels are typical for standard construction activities associated with this type of development and would be managed through the reasonable and feasible construction noise management strategies discussed in Section 6.4. Operational noise exceedances are limited to receivers within the MRP. It has been informed that some or most of these receivers are in detailed discussion for sale or preparing development applications.
The application does not include sufficient consideration of potential negotiated agreements or mitigation measures for noise impacts. Where construction or operational noise exceeds the relevant criteria, negotiated agreements with each receiver should be considered as well as any other relevant mitigation measures. As such, you are encouraged to engage with the owners of the affected dwellings within the MRP to seek negotiated agreements on noise mitigation/compensation commensurate to the anticipated noise impacts. Outcomes of stakeholder engagement should be provided to facilitate the Department's assessment of noise impacts	The NVIA has been updated to provide consideration of feasible and reasonable noise mitigation measures to manage operational noise emissions. ESR intends to connect with surrounding receivers to manage residual noise impacts.
Section 4.3.1(5) of the MRP DCP states: 'Acoustic Reports for individual developments must assess cumulative noise impacts, including likely future noise emissions from the development and operation of the Precinct. The consultant should liaise with the relevant consent authority to determine acceptable amenity goals for individual industrial developments and background noise levels.' In response to Section 4.3.1(5) of the MRP DCP, the Department requires that all developable industrial zoned land within the Mamre Road Precinct and any existing / approved industrial sites near the precinct must be considered when using section 2.4.2 of the Noise Policy for Industry to derive project amenity noise levels. The night-time project amenity noise level for rural-residential areas in Mount Vernon, Kemps Creek and Luddenham should be no more than 27 dBA.	Receivers N14, N15, N16, and N19 are predicted to experience noise levels above 27 dBA during the night period. ESR is intending to engage with these receivers to manage residual noise impacts. It is noted it is predicted that N15 would experience the highest noise level from the Proposal during the night period ($L_{Aeq,15min}$ 35 dBA). This is 8 dBA less than the night time recommended amenity noise level for rural receivers ($L_{Aeq,15min}$ 43 dBA). It would be reasonable to say that the predicted noise level from the Proposal is sufficiently low such that the recommended amenity noise level will not be exceeded as a result of the Proposal.

2 PROJECT DESCRIPTION

2.1 Site Location

The site is located at 290-308 Aldington Road, 59-62 Abbotts Road, and 63 Abbotts Road as shown in **Figure 2-1** below. Currently, the Site includes scattered residential dwellings (within a rural setting), vacant land and ancillary farm buildings.

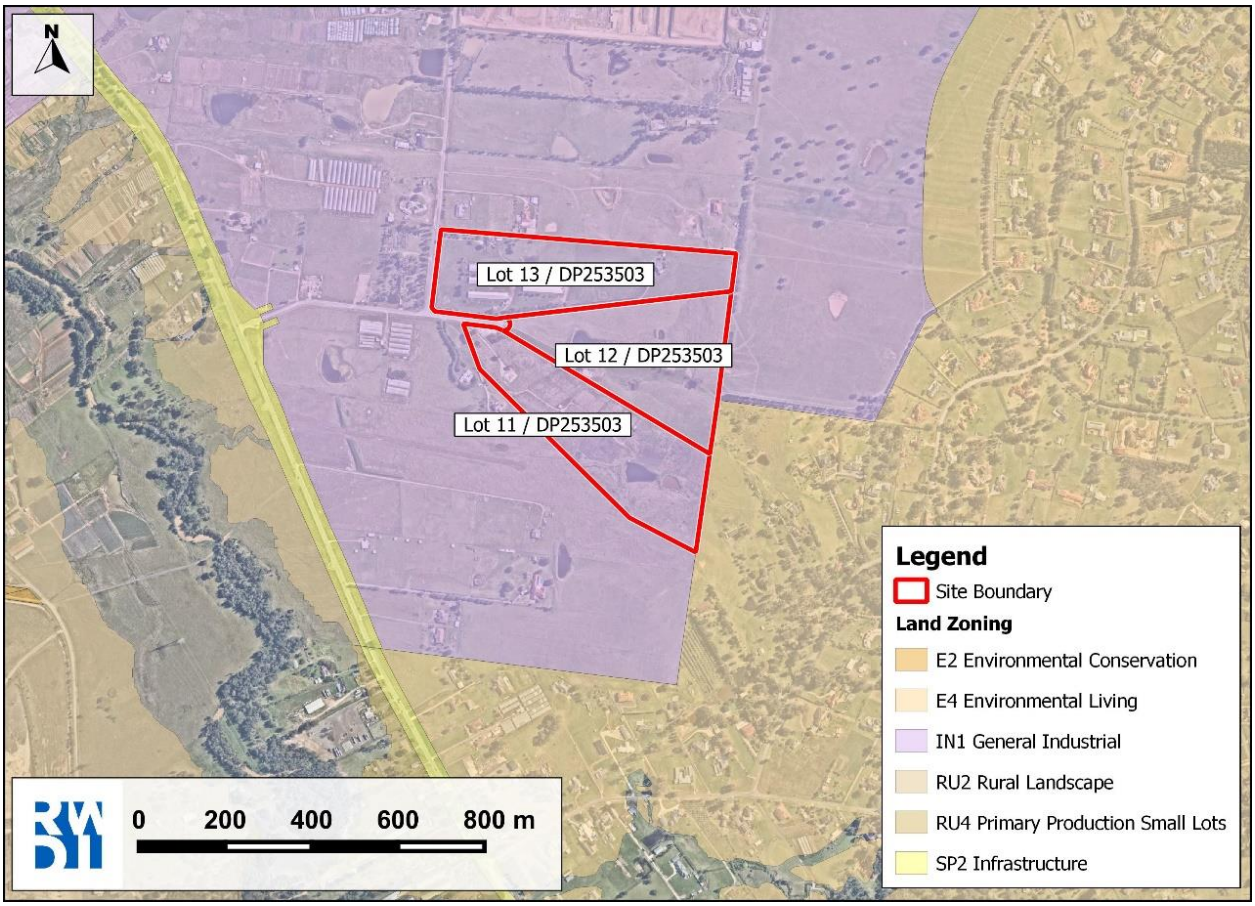


Figure 2-1: Site Aerial

Surrounding land uses currently comprise a predominantly rural typology, with a variety of rural dwellings, rural land, farm dams and scattered vegetation. Beyond this, the Oakdale South industrial estate is located approximately 2.2km to the northeast of the site, and the established large lot residential housing community of Mount Vernon is located to the south east.

Mamre Road is a major arterial road that is located to the west of the Site and this road is planned to be upgraded in the near future in two stages. Investigations for the concept design for Stage 1 (M4 to Erskine Park Road) started in early 2020. Stage 2 will deliver the upgrade in the vicinity of the Site (Erskine Park Road to Kerrs Road); however, a definitive timeline is currently not known.

There are also several infrastructure projects currently being investigated including the Southern Link Road to the north of the Site, the proposed Western Sydney Freight Line and potential Intermodal Terminal located to the west and north-west of the Site along Mamre Road.

Of the many current projects being constructed in the area, the Western Sydney Airport and Aerotropolis will result in increased traffic movements and introduce aircraft movements in the area. This in turn will impact the noise levels in this region.

Furthermore, several other development applications for industrial and/or warehouse facilities have been submitted or approved. **Figure 2-2** presents the currently known applications surrounding the site.

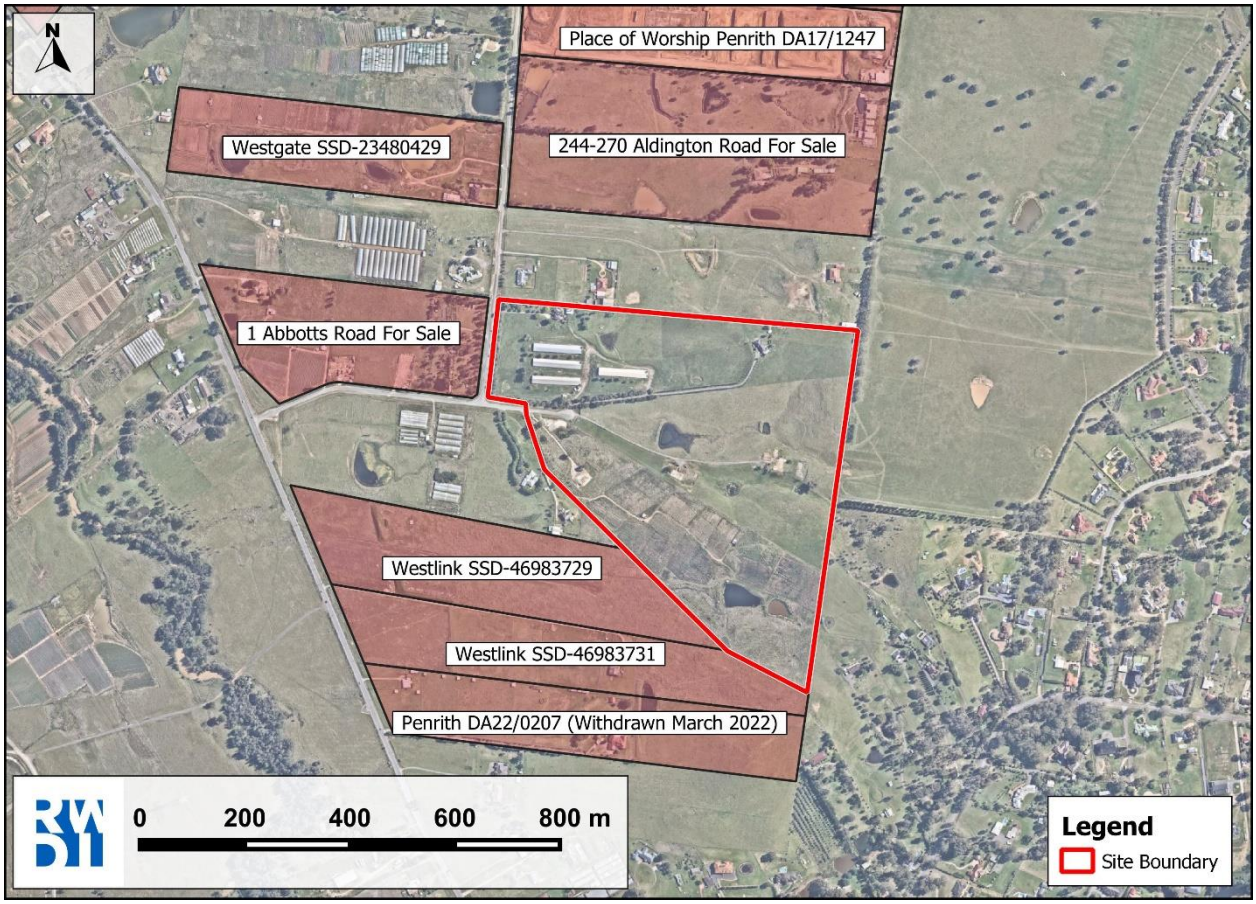


Figure 2-2: Surrounding Developments in Mamre Road Precinct

2.2 Proposed Development

The Development Site is located within the Western Sydney Employment Area (WSEA) and is currently zoned IN1 General Industrial under the Industry and employment 2021 State Environmental Planning Policy (SEPP).

This application seeks approval for the following development:

- Site preparatory works, including:
    - Demolition and clearing of all existing built form structures and vegetation
    - Bulk earthworks including 'cut and fill' to create flat development platforms for the proposed buildings, and topsoiling, grassing and site stabilisation works
- Subdivision of the site into 4 individual lots
- Construction of a new industrial estate at the site comprising 2 industrial allotments and a total gross leasable area of 83,480 m^2 including:
    - 2 new industrial warehousing buildings with ancillary offices across 6 allotments, comprising:
        - 77,943 m^2 of warehousing floorspace
        - 3,386 m^2 of ancillary office and other floorspace
    - Fitout of Lot 1 and Lot 4 warehouses
- Construction of a new internal road layout and parking for 338 vehicles
- Associated site servicing works and ancillary facilities, including OSD detention basin
- Association site landscaping
- Works-in-kind (WIK) arrangements through a Voluntary Planning Agreement (VPA) for external road upgrades including to Aldington and Abbbots Road, and a new signalised intersection at Mamre and Abbotts Road.

The proposed layout is presented in **Figure 2-3.**

Figure 2-3: Site Layout

3 EXISTING NOISE ENVIRONMENT

3.1 Sensitive Receiver Locations and Land Use

The State Environmental Planning Policy (Industry and Employment) 2021 has been subject to a recent amendment extending the controls of the SEPP to include the Mamre Road Precinct and rezoning it primarily for General Industrial (IN1).

Receivers to the south of the site are zoned C4 – Environmental Living. These receivers are located on Mount Vernon Road, Kerrs Road, and Bowood Road. The receivers are located at distances between 70 m to 700 m.

To the north, west, and south west of the site are a number of receivers on land zoned IN1 – General Industrial. Several of these properties include existing residential dwelling that are unlikely to be inhabited during construction or operational stages.

Receivers N36 and N37 were rezoned from RU2 – Rural Landscape to IN1-General Industrial in 2022 as part of an amendment to the SEPP.

Nearest noise sensitive receivers are presented in **Figure 3-1**and summarised in **Table 3-1.**

Table 3-1: Nearest Sensitive Receivers

ID	Address	Suburb	Land Zoning	Distance (m)
N01	45-51 Bowood Rd	Mount Vernon	C4[1]	689
N02	37-43 Bowood Rd	Mount Vernon	C4	658
N03	31-35 Bowood Rd	Mount Vernon	C4	647
N04	23-29 Bowood Rd	Mount Vernon	C4	644
N05	9-21 Bowood Rd	Mount Vernon	C4	644
N06	12-22 Bowood Rd	Mount Vernon	C4	560
N07	2-10 Bowood Rd	Mount Vernon	C4	612
N08	231 Capitol Hill Dr	Mount Vernon	C4	536
N09	237-241 Capitol Hill Dr	Mount Vernon	C4	495
N10	243-247 Capitol Hill Dr	Mount Vernon	C4	463
N11	64 Mount Vernon Rd	Mount Vernon	C4	383
N12	62B Mount Vernon Rd	Mount Vernon	C4	359
N13	62 Mount Vernon Rd	Mount Vernon	C4	315
N14	62A Mount Vernon Rd	Mount Vernon	C4	249
N15	52 Mount Vernon Rd	Mount Vernon	C4	204
N16	50 Mount Vernon Rd	Mount Vernon	C4	212

ID	Address	Suburb	Land Zoning	Distance (m)
N17	48 Mount Vernon Rd	Mount Vernon	C4	227
N18	40-46 Mount Vernon Rd	Mount Vernon	C4	161
N19	30-38 Mount Vernon Rd	Mount Vernon	C4	73
N20	20 Mount Vernon Rd	Mount Vernon	C4	127
N21	54 Kerrs Rd	Mount Vernon	C4	349
N22	44 Kerrs Rd	Mount Vernon	C4	366
N23	37 Kerrs Rd	Mount Vernon	C4	399
N24	30 Kerrs Rd	Mount Vernon	C4	414
N25	1114 Mamre Rd	Mount Vernon	C4	488
N26	1096-1112 Mamre Rd	Mount Vernon	C4	547
N27	1066-1078 Mamre Rd	Kemps Creek	IN1	247
N28	1050-1064 Mamre Rd	Kemps Creek	IN1	179
N29	1016-1028 Mamre Rd	Kemps Creek	IN1	21
N30	1016-1028 Mamre Rd	Kemps Creek	IN1	25
N31	1 Abbotts Rd	Kemps Creek	IN1	69
N32	269 Aldington Rd	Kemps Creek	IN1	61
N33	284-288 Aldingtond Rd	Kemps Creek	IN1	61
N34	282 Aldingtond Rd	Kemps Creek	IN1	59
N35	272 Aldingtond Rd	Kemps Creek	IN1	116
N36	983B Mamre Rd	Kemps Creek	IN1	591
N37	949-965 Mamre Rd	Kemps Creek	IN1	932

Note 1: E4 – Environmental Living was renamed as C4 – Environmental Living in November 2021.

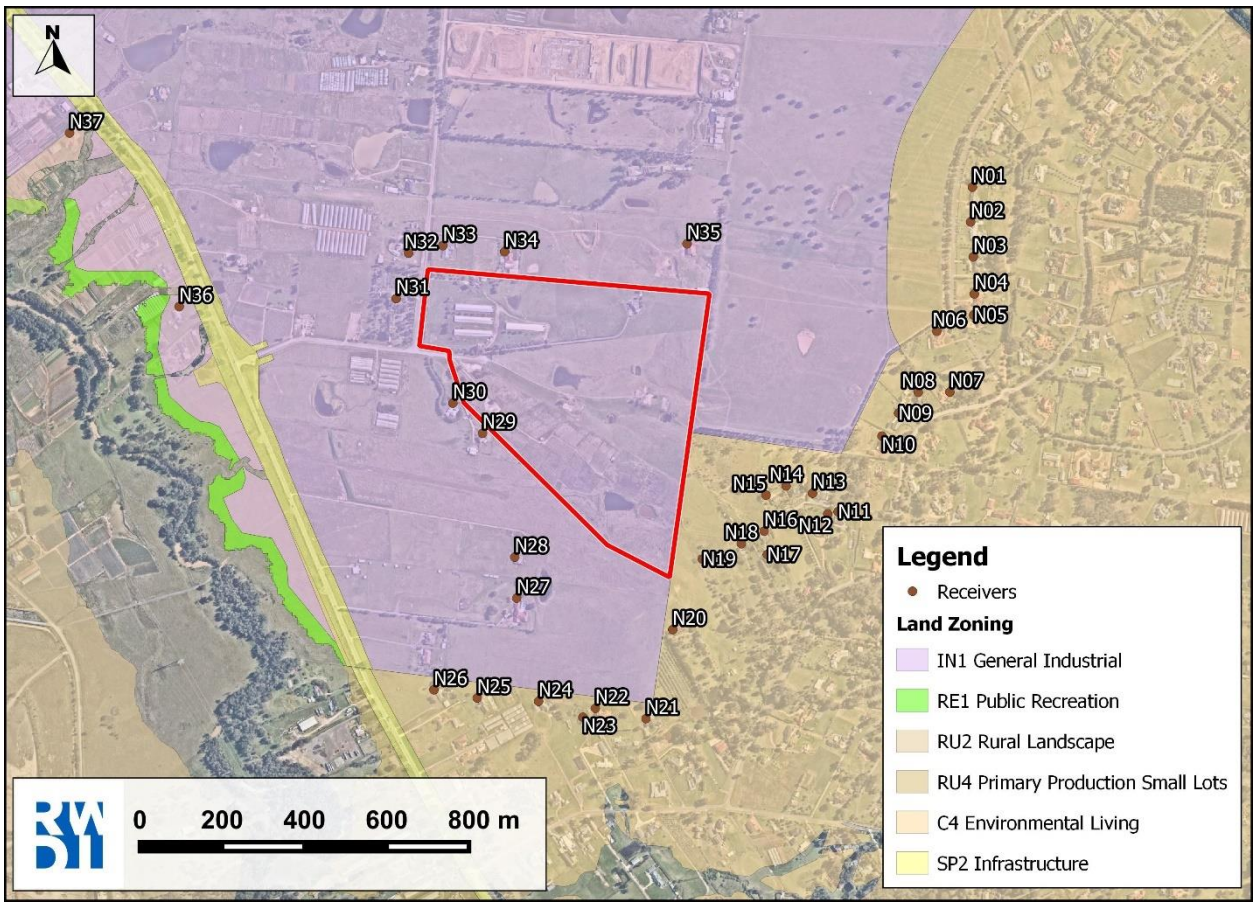


Figure 3-1: Nearest Sensitive Receivers and Land Zoning

3.2 Unattended Noise Monitoring

The surrounding area is primarily affected by road traffic noise from Mamre Road and potentially noise from existing nearby commercial/industrial activities. Unattended noise monitoring was conducted between Thursday 18 and Monday 30 November 2020.

The noise monitoring equipment used for this measurement consisted of two ARL environmental noise loggers set to A-weighted, fast response, continuously monitoring and recording in 15-minute intervals at locations shown in **Figure 3-2**. Equipment calibration was checked before and after the survey and no significant drift was noted.

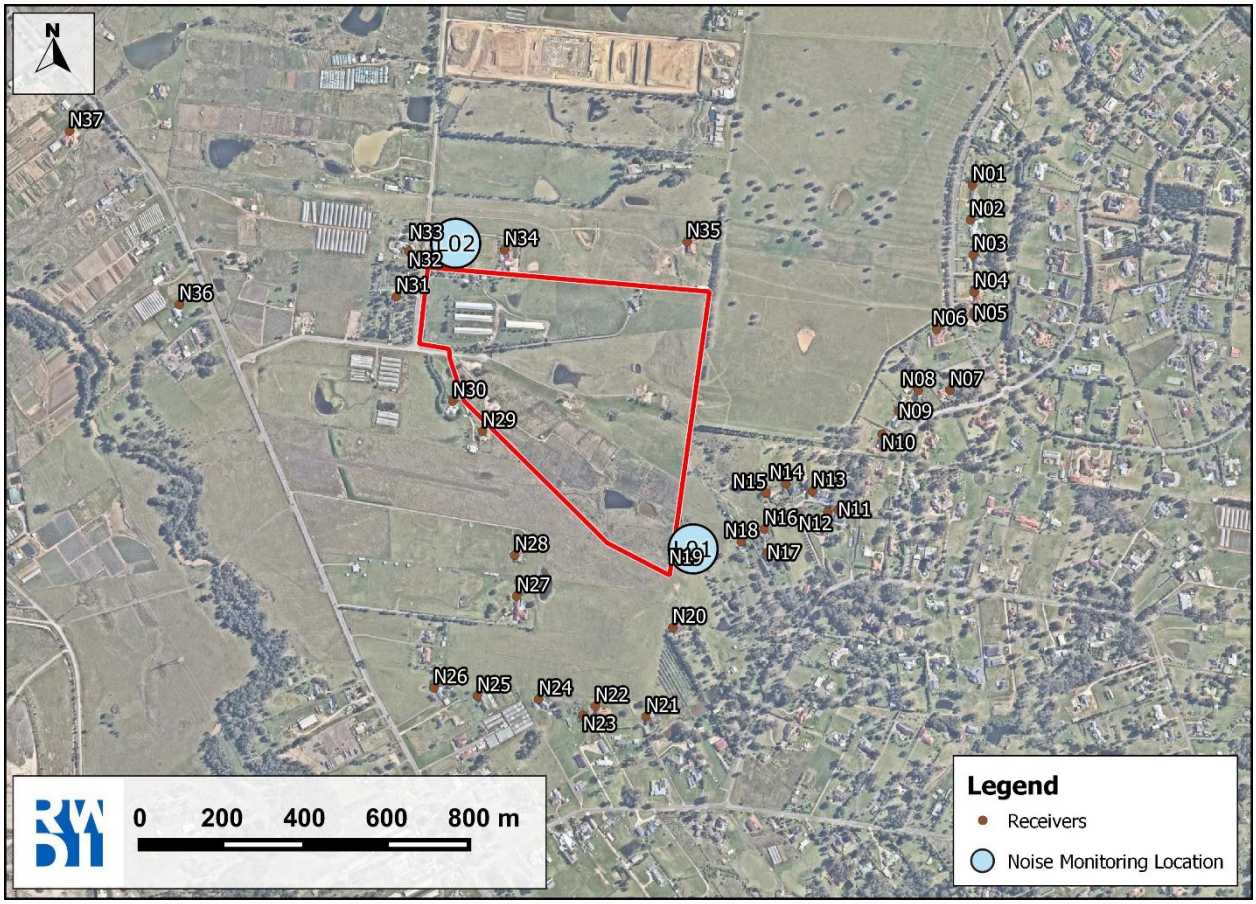


Figure 3-2: Noise Monitoring Locations

The loggers determine L_{Amax}, L_{A10}, L_{A90} and L_{Aeq} levels of the ambient noise. L_{A10} and L_{A90} are the levels exceeded for 10% and 90% of the sample time respectively. The L_{Amax} is indicative of maximum noise levels due to individual noise events. This is used for the assessment of sleep disturbance. The L_{A90} level is normally taken as the background noise level during the relevant period.

To quantify and characterise the existing ambient noise environment around the project site a baseline noise survey was undertaken at sensitive receiver locations to the north and south. The noise monitoring locations detailed in **Table 3-2** were selected to be representative of the surrounding sensitive receivers potentially affected by the construction and operation of the development.

The measured noise levels have been used to establish appropriate noise goals for operation of the development and as a basis for assessing potential noise impacts during construction and operation.

Table 3-2: Unattended noise monitoring details

Noise Monitoring Location ID	Relevant Sensitive Receivers	Equipment Serial Number
L01	N01-N26	ARL-16-707-014
L02	N27-N37	ARL-16-707-015

3.3 Existing Background Noise Levels

The following tables present the measured existing ambient noise levels from the unattended noise survey. Any periods of inclement weather or extraneous noise are omitted from the measured data prior to determining the overall results.

The measured rating background noise levels (RBL) and L_{Aeq}, period were determined in accordance with the NSW Noise Policy for Industry with levels for the different monitoring locations presented in **Table 3-3**. The unattended noise monitoring data has been filtered with meteorological data obtained from Horsley Park weather station as per *NPfI* methodology.

Minimum assumed rating background noise levels have been applied as per *NPfI* methodology. Night-time noise levels influenced by high levels of insect activity and adjusted to be no greater than the Daytime or Evening noise levels as per *NPfI* methodology. Full noise monitoring graphs are provided in **Appendix A**.

Table 3-3: Measured RBL and $L_{Aeq,period}$ levels

Location	Time Period[1]	RBL	$L_{Aeq,period}$ (dBA) [1]
L01	Day	35 (actual 32)[2]	44
	Evening	33	46
	Night	33 (actual 38)[3]	52
L02	Day	35 (actual 34)[2]	47
	Evening	34	48
	Night	33	46

Note 1: Daytime (6am – 7pm), Evening (7pm – 10pm), and Night-time (10pm – 6am) during weekdays and Saturday (8am – 1pm).

Note 2: Minimum assumed rating background noise level have been applied as per NPfI methodology.

Note 3: Adjusted to be no greater than the Daytime or Evening noise levels as per NPfI methodology.

3.4 Meteorological Effects

At relatively large distances from a source, the resultant noise levels at receivers can be influenced by meteorological conditions, particularly temperature inversions and gradient winds. Where these factors are a feature of an area their effect on resultant noise levels should be considered.

The *NPfI* defines standard meteorological conditions and noise-enhancing meteorological conditions to be considered for the assessment. The definition of those conditions is provided in Table D1 of Fact Sheet D, which is reproduced in **Table 3-4** below.

Table 3-4: Standard and Noise-Enhancing Meteorological Conditions

Meteorological conditions	Meteorological parameters
Standard Meteorological Conditions	Day/evening/night: stability categories A-D with wind speed up to 0.5 m/s at 10 m AGL.
Noise-Enhancing Meteorological Conditions	Daytime/evening: stability categories A-D with light winds (up to 3 m/s at 10 m AGL). Night-time: stability categories A-D with light winds (up to 3 m/s at 10 m AGL) and/or stability category F with winds up to 2 m/s at 10 m AGL.

Notes: m/s = metres per second; m = metres; AGL = above ground level; where a range of conditions is nominated, the meteorological condition delivering the highest predicted noise level should be adopted for assessment purposes. However, feasible and reasonable noise limits in consents and licences derived from this process would apply under the full range of meteorological conditions nominated under standard or noise-enhancing conditions as relevant. All wind speeds are referenced to 10m AGL. Stability categories are based on the Pasquill-Gifford stability classification scheme.

The *NPfI* provides two options when considering meteorological effects:

1. Conservatively adopt noise-enhancing meteorological conditions without processing meteorological data local to the site; or
2. Determine the significance of noise-enhancing meteorological conditions based on meteorological data local to the site and adopt significant noise-enhancing conditions for the assessment. Where noise-enhancing meteorological conditions are deemed non-significant, standard meteorological conditions may be adopted.

The second option has been adopted with reference to a previous metrological analysis suitable for the project.

Assessment of prevailing weather conditions was carried for a neighbouring development (*Mirvac Projects Pty Ltd Aspect Industrial Estate*) located 1100 m to the north west by SLR Consulting in 2020 (ref. 610.19127-R2).

Outcomes of the metrological analysis determined that standard weather conditions should be used during the daytime and evening periods, with noise-enhancing weather conditions during the night-time period. The night-time noise-enhancing weather conditions defined as F-class temperature inversion with a 2 m/s source to receiver drainage flow.

4 OPERATIONAL NOISE CRITERIA

4.1 Mamre Road Precinct Development Control Plan

The Mamre Road Precinct Development Control Plan (DCP) 2021 applies to the Mamre Road Precinct within the Industry and Employment State Environmental Planning Policy 2021. Section 4.3.1 relates to Noise and Vibration and is presented below.

4.3.1 Noise and Vibration

Objectives

a) To ensure noise and vibration do not adversely impact human health and amenity
b) To ensure building design adequately protects workers from noise and vibration

Controls

1) *Any machinery or activity considered to produce noise emissions from a premise shall be adequately sound-proofed so that noise emissions are in accordance with the provisions of the Protection of the Environment Operations Act 1997.*
2) *Noise should be assessed in accordance with Noise Policy for Industry (EPA, 2017) and NSW Road Noise Policy (Department of Environment, Climate Change and Water, 2011).*
3) *An acoustic Report by a qualified acoustical engineer must be submitted where proposed development, including traffic generated by that development, will create noise and/or vibration impacts, either during construction or operation, that impacts on adjoining developments or nearby rural-residential areas. The Acoustic Report should outline the proposed noise amelioration strategies and management methods.*
4) *An Acoustic Report shall be prepared for developments within 500m of rural-residential areas and other sensitive receivers, including educational establishments.*
5) *Acoustic Reports for individual developments must assess cumulative noise impacts, including likely future noise emissions form the development and operation of the Precinct. The consultant should liaise with the relevant consent authority to determine acceptable amenity goals for individual industrial developments and background noise levels.*
6) *The use of mechanical plant and equipment may be restricted in areas close to sensitive receivers, such as adjoining rural-residential development and educational establishments.*
7) *Building design is to incorporate noise amelioration features. Roof elements are to control potential breakout noise, having regard to surrounding topography.*
8) *Boundary fences are to incorporate noise amelioration features and control breakout noise having regard to developments adjoining rural-residential areas.*
9) *Development shall comply with the relevant Australian Standards for noise and vibration*
10) *A qualified acoustical consultant is to certify any acoustic design measures have been satisfactorily incorporated into the development at construction certificate stage and validate the criteria at occupation certificate stage.*

Section 2.11 is concerned with Aviation Safeguarding and is presented below:

Noise

3) Development is constructed in accordance with Australian Standards AS2021 – Acoustics Noise Intrusion – Building Siting and Construction.

4.2 AS2021 – Acoustics Noise Intrusion – Building Siting and Construction

With regard to requirement Section 2.11 of the Mamre Road Precinct Development Control Plan (DCP), Table 2.1 of AS 2021:2015 specifies the following requirements for building siting in relation to ANEF contours and is reproduced below in **Table 4-1**.

Table 4-1: AS2021 – Aircraft Noise Intrusion – Building Siting and Construction[1]

Building Type	ANEF Zone of Site		
	Acceptable	Conditionally Acceptable	Unacceptable
Light Industrial	Less than 30 ANEF	30 to 40 ANEF	Greater than 40 ANEF
Other Industrial	Acceptable in all ANEF zones		

Note 1: To be used in conjunction with Table 5.2.

Table 3.3 of AS 2021:2015 sets limits for noise intrusion when a new development is located in an area within ANEF (Aircraft Noise Exposure Forecast) contours and is reproduced below in **Table 4-2**.

Table 4-2: Indoor sound design levels for aircraft noise

Building type and activity	Indoor design sound level (dBA)
Commercial buildings, offices, and shops	
Drafting, open offices	65
Industrial	
Inspection, analysis, precision work	75
Light machinery, assembly, bench work	80

The Project is located across the 20-25 ANEF and 25-30 ANEF contour. As per **Table 4-1**, the Project is acceptable and no further assessment is required.

4.3 Noise Policy for Industry

The *Noise Policy for Industry (NPfI)* guideline is considered appropriate to develop noise criteria to assess the impact from the noise emissions associated with the proposal that may impact the surrounding receivers.

The emission of noise and potential noise impact from the operation of the proposed development is to be assessed with respect to the site-specific noise trigger levels based on the *NPfI*. The assessment procedure has two components: intrusiveness and amenity.

4.3.1 Intrusiveness noise level

For assessing intrusiveness, the background noise level (L_{A90}) is measured and the RBL is determined. The intrusiveness of an industrial noise source may generally be considered acceptable if the equivalent continuous noise level (L_{Aeq}) of the source (measured over a 15-minute period) does not exceed the background noise level (RBL) by more than 5 dBA.

The intrusiveness noise levels for the surrounding residential receivers are presented in **Table 4-3**.

Table 4-3: Project Intrusiveness Noise Level

Receiver	Time of Day	Intrusiveness Noise Level
N01 – N26	Day	40
	Evening	38
	Night	38
N27 – N37	Day	40
	Evening	39
	Night	38

4.3.2 Amenity noise level

The project amenity trigger level sets limits on the total noise level from all industrial noise sources affecting a receiver. Different amenity noise levels apply for different types of receivers (e.g. residential, commercial, industrial – or for areas specifically reserved for passive recreation) and different areas (e.g. urban, suburban, rural). The amenity noise level applies to the $L_{Aeq,period}$ during the full day (or evening or night). To ensure that industrial noise levels remain within the recommended amenity noise levels for an area, a project amenity noise level applies for each new source of industrial noise. This is calculated as the recommended amenity noise level for the receiver type minus 5 dBA. The 5 dBA adjustment is based on a receiver not being impacted by more than three to four individual industrial noise sources equally.

Where noise sources are not continuous for the whole period it is allowable to add 3 dB to convert from a period level to a 15-minute level.

Table 4-4 below presents the relevant project amenity noise levels, determined in accordance with the *NPfI*. Receivers N01 to N26, which are on land zoned C4 – Environmental Living, have been classified as rural residential receivers. For Receivers, N27 to N37, the NPfI notes that the industrial amenity noise level should be applied for isolated residences within an industrial zone.

Table 4-4: Project Amenity Noise Level

Receiver	Time of Day	Recommended Amenity Noise Level $L_{Aeq,period}$ dBA	Project Amenity Trigger Level[1] $L_{Aeq,15min}$ dBA
N01 – N26 Rural	Day	50	48
	Evening	45	43
	Night	40	38
N27 – N37 Industrial	When in use	70	68

Note 1: Recommended Amenity Noise Level minus 5 dBA plus 3 dBA to adjust from a $L_{Aeq,period}$ to a $L_{Aeq,15min}$ level.

4.4 Sleep Disturbance Screening Level

Noise sources of short duration and high level that may cause disturbance to sleep if occurring during the night time need to be considered.

The approach recommended by the *NPfI* is to apply the following initial screening noise levels:

- $L_{Aeq,15min}$ 40 dBA or the prevailing RBL + 5 dB, whichever is the greater; and/or
- L_{AFmax} 52 dBA or the prevailing RBL + 15 dB, whichever is the greater.

The sleep disturbance screening noise levels apply outside bedroom windows during the night period. It should be noted, the sleep disturbance criteria do not apply to receivers within an industrial zone.

Where the screening noise levels cannot be met, a detailed maximum noise level event assessment should be undertaken. It may also be appropriate to consider other guidelines including the NSW *Road Noise Policy* (RNP) which contains additional guidance relating to potential sleep disturbance impacts.

4.5 Project Noise Trigger Level

The resulting project noise trigger levels (PNTL) are shown in **Table 4-5** and include the sleep disturbance (screening) levels.

Section 2.4.3 of the NPfI notes that when land uses in an area are undergoing significant change the background noise levels would be expected to change. Therefore, impacts of noise should be considered using the recommended amenity noise level for the new use. This would mean a $L_{Aeq,15min}$ criteria of 68 dBA would be applicable for receivers N27 to N37. RWDI, however, will consider transitional criteria based on the project intrusiveness noise level.

Table 4-5: Project Noise Trigger Level, dBA

Receiver	Time of Day	PNTL	Noise Descriptor
N01-N26	Day	40	$L_{Aeq,15min}$
	Evening	38	$L_{Aeq,15min}$
	Night	38	$L_{Aeq,15min}$
	Night	52	L_{AFmax}
N27-N37	Day	40	$L_{Aeq,15min}$
	Evening	39	$L_{Aeq,15min}$
	Night	38	$L_{Aeq,15min}$
	Night	52	L_{AFmax}

5 OPERATIONAL NOISE IMPACT ASSESSMENT

5.1 Noise Modelling Methodology

Noise modelling of the development site was undertaken using the CONCAWE noise prediction algorithm in CadnaA modelling software. CONCAWE and CadnaA have both been accepted by the NSW EPA for use in previous environmental noise assessments and has been widely used in Australia.

The noise model was constructed from a combination of aerial photography, existing ground topography, design ground topography for the development. The local terrain, design of the development, receiver buildings and structures have been digitised in the noise model to develop a three-dimensional representation of the operations of the development and surrounding environment. Ground effect area or ground absorption has been modelled as 0% soft ground for hardstand areas and 100% soft ground for soil/grass areas.

Noise modelling was conducted for day, evening and night time as the warehouses would be operating 24 hours per day.

Based on the analysis of prevailing weather conditions discussed in Section 3.4; the noise model includes standard weather conditions during the daytime and evening periods, with noise-enhancing weather conditions during the night time period, using an F-class temperature inversion with a 2 m/s source to receiver drainage flow.

ESR provided an indicative estate plan which includes future proposed developments from ESR and other developers. These developments have been included to best represent the final long term received noise level from the Project after the precinct is established. It has been assumed that all warehouses would be 15 m high. **Figure 5-1** presents the warehouses incorporated in the noise model.

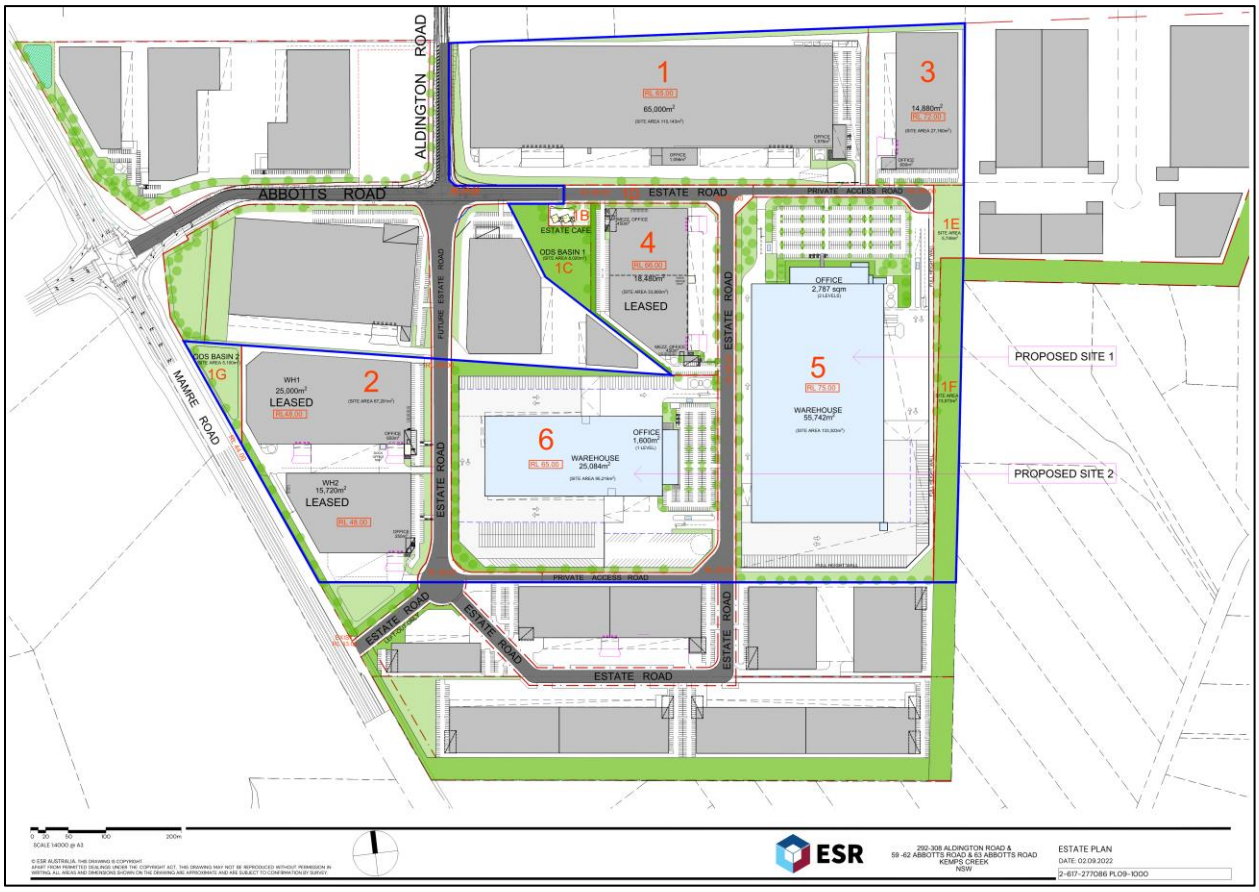


Figure 5-1: Indicative Estate Plan

5.2 Noise Source Levels

The following noise level data for vehicle-related noise sources has been used for the assessment. These noise levels are taken from RWDI's internal database and external assessments of similar subject sites.

Table 5-1: Sound Power Reference Levels (SWL) – dBA

Noise Source	Noise Characteristic	SWL, dBA
Forklift operational on hardstand	Quasi-steady	93 L_{Aeq}
Light Vehicles on site, up to speed of 40 km/h	Quasi-steady	90 L_{Aeq}
Heavy Vehicle[1] @ 25 km/h	Quasi-steady	106 L_{Aeq}
Heavy Vehicle[1], unloaded @ 10 km/h	Quasi-steady	106 L_{Aeq}
Heavy Vehicle[1], reversing[2] @ 5 km/h	Quasi-steady	111 L_{Aeq}
Truck Airbrake Release[2]	Instantaneous	115 L_{Amax}

Note 1: Heavy vehicle defined as any cargo vehicle with three or more axles with gross vehicle weight > 12,000 kg.

Note 2: Assume that reversing operation will not take more than 30 seconds for each vehicle, includes reversing alarm and air brake release.

5.3 Modelled Onsite Vehicle Movements

Estimated onsite vehicle movements were provided by the client on behalf of Ason Group.

The following 1 hour traffic volumes were the hours with the greatest 'A-double' trucks. These hours would represent a worse-case scenario with the highest operational traffic noise emissions.

The vehicle movements have been modelled to reflect realistic operations, with heavy vehicles accessing and manoeuvring hardstand areas to load and unload items via forklift and light vehicles utilising carparking facilities. Summary of vehicle movements is presented below in **Table 5-2**.

Table 5-2: Onsite Vehicle Movements

Warehouse Lot	Assessment Period[1]	Total Vehicles per hour[2]	Light Vehicles per hour[2]	Heavy Vehicles per hour[2]	Heavy Vehicle (HV) Breakdown			
					Rigid	Semi-trailer	B-double	A-double
Lot 1	Day	99	60	38	25	3	1	10
	Eve	39	36	3	8	1	0	3
	Night[3]	124	98	26	17	2	0	7
Lot 4	Day	2	0	2	1	1	1	0
	Eve	7	7	0	0	0	0	0
	Night[3]	15	13	2	1	1	1	0

Note 1: Daytime (7am – 6pm), Evening (6pm – 10pm), Night-time (10pm – 7am).

Note 2: Rounding errors may result in different totals

Note 3: Modelled night time movements are for early morning periods when activity ramps up and is much greater than other hours in the night period.

5.4 Modelled Line Sources

Light vehicles are represented as line sources travelling 40 km/hr with a sound power level (SWL) of 90 dBA and a height of 0.5 m.

Heavy vehicle traffic movements on Access Road are represented as line sources travelling 25 km/hr with a SWL of 106 dBA.

Heavy vehicle movements over hardstand and loading areas within each lot have been modelled travelling at 10 km/hr with a sound power level of 106 dBA. Locations where heavy vehicles require greater engine capacity, such as accelerating from a stationary position, cornering, or accessing entry/exit ramps have been modelled as line sources travelling 5 km/hr with a SWL of 111 dBA.

Heavy vehicles reversing into delivery docks, including reversing alarm and airbrake release have been modelled as a single line source with a SWL of 111 dBA travelling at 5 km/hr at the location most affecting the nearest sensitive receiver within each lot.

Source height for heavy vehicles is 1.5 m with the exception of the reversing alarm and air-brake release modelled at 1 m.

Figures showing the locations of the onsite traffic movements are presented in **Appendix B**.

5.5 Modelled Fixed Sources

Warehouse noise sources such as roof top mechanical plant and forklifts in hardstand areas have been modelled throughout the development.

Consistent with other ESR developments external forklifts have been modelled as point sources with a SWL of 93 dBA at 1 m in height. It has been assumed that forklifts would operate continuously during any one 15-minute period. One forklift for every two heavy vehicles onsite has been modelled operating externally in the hardstand areas for each of the warehouses.

Fixed noise sources with a reference sound power level (80 SWL) have been modelled at rooftop locations around the development to provide a worst-case prediction of noise impacts on the surrounding sensitive receivers. By predicting the noise levels at the sensitive receivers using this method, we are able to determine the maximum SWL of plant items required to meet the noise criteria. It is noted that the warehouses are will be ambient and no significant mechanical ventilation will be required.

Noise emissions associated with internal warehouse activity with a total reverberant sound pressure level of 75 dBA ($L_{Aeq,15min}$) have been modelled inside each warehouse (with roller doors open) to assess potential noise impacts to nearby receivers.

Table 5-3 presents indicative mechanical plant evenly distributed on warehouse rooftops across Lots 1 and 4.

Table 5-3: Rooftop mechanical plant

Lot Number	Rooftop mechanical plant items
Lot 1 Warehouse 1	10
Lot 4 Warehouse 4a and 4b	4

5.6 Predicted Operational Noise Levels

Predicted operational levels at each of the receivers are presented in **Table 5-4.**

Noise contours for the daytime, evening, and night time (adverse meteorological conditions) periods are presented in **Appendix C**.

Table 5-4: Predicted Operational Noise Levels – $L_{Aeq,15min}$

ID	Worst Case Predicted			Project Noise Trigger Level		
	Day	Eve	Night (adverse	Day	Eve	Night
N01	17	11	16	40	38	38
N02	17	11	17	40	38	38
N03	17	11	16	40	38	38
N04	17	10	16	40	38	38
N05	17	10	17	40	38	38
N06	19	11	18	40	38	38
N07	18	10	17	40	38	38
N08	21	13	20	40	38	38
N09	23	14	22	40	38	38
N10	22	14	21	40	38	38
N11	24	16	23	40	38	38
N12	25	16	24	40	38	38
N13	28	20	27	40	38	38
N14	33	24	32	40	38	38
N15	36	27	35	40	38	38
N16	31	23	30	40	38	38
N17	26	18	25	40	38	38
N18	27	19	26	40	38	38
N19	33	25	32	40	38	38
N20	23	14	22	40	38	38
N21	18	10	17	40	38	38
N22	19	11	18	40	38	38
N23	18	10	17	40	38	38
N24	19	11	18	40	38	38
N25	21	14	21	40	38	38
N26	20	12	19	40	39	38
N27	33	26	33	40	39	38
N28	35	27	35	40	39	38

ID	Worst Case Predicted			Project Noise Trigger Level		
	Day	Eve	Night (adverse	Day	Eve	Night
N29	**47**	38	**46**	40	39	38
N30	**52**	**42**	**51**	40	39	38
N31	**52**	**44**	**51**	40	39	38
N32	**47**	**39**	**46**	40	39	38
N33	**51**	**43**	**50**	40	39	38
N34	**48**	**41**	**47**	40	39	38
N35	38	32	38	40	39	38
N36	24	16	23	40	39	38
N37	27	19	26	40	39	38

The predicted noise levels in **Table 5-4** indicate that the project noise trigger level would be achieved for all periods for all rural residential receivers. Receiver N15 is predicted to experience the highest noise levels of 36 dBA, 27 dBA and 35 dBA during the day, evening, and night periods, respectively.

The predicted noise levels for receivers N29 to N34 would exceed the PNTL level by up to 13 dB for some periods. However, these receivers are on IN1 zoned land, and as seen in **Figure 5-1**, would likely be uninhabited or demolished during the operational of the Project. Section 5.9 considers the feasibleness and reasonableness of potential noise mitigation strategies to minimise these residual exceedances.

Predicted noise levels for the night period considered the worst-case hour (6am to 7am) which included 26 heavy vehicle movements on Lot 1. Between the hours of 10pm and 5am, there are only 8 hours heavy movements per hour. Noise levels at surrounding receivers could be up to 5 dBA less during these quieter periods.

5.7 Cumulative Noise

Cumulative noise has been considered for residential receivers outside of the Mamre Road Precinct (N01-N07). The amenity noise level is the main mechanism of the *NPfI* for controlling the total noise level from all industrial noise sources affecting a receiver. **Table 5-5** presents the predicted noise levels and compares them against the recommended amenity noise level for rural residential receivers.

Table 5-5: Cumulative Noise Contribution - $L_{Aeq,15min}$

Receiver	Day	Evening	Night[1]
Recommended Amenity Noise Level (rural)	**53**	**48**	**43**
N15	35	27	35

Receiver N15 was predicted to receive the highest noise levels. The day and evening predicted levels are more than 10 dB below the recommended amenity noise level for rural receivers. This means that noise from the Project would likely be inaudible or undiscernible from other industrial noise and would not result in any significant increase to the amenity noise level.

The night time predicted noise level is 8 dB less than the recommended amenity noise level for rural receivers. It would require an additional seven other sites of equal size and noise contribution to increase noise levels to above the recommended amenity noise level for rural receivers. As such it is unlikely that the noise from the Project would result in noise levels above the NPfI's recommended amenity noise level for rural receivers.

5.8 Sleep Disturbance

As the warehouses operate 24 hours per day, noise emissions during the night time period require an assessment for potential sleep disturbance at the nearest noise sensitive receivers. A summary of the L_{Amax} sound power levels of typical activities that may occur at the facility with the potential to cause sleep disturbance is presented in **Table 5-6**.

Table 5-6: Point Source – L_{Amax} Sound Power Levels

Noise Source	L_{Amax} SWL (dBA)	Source Height
Truck Engine Starting	100	2 m
Airbrake in Truck Parking Area	115	1 m
Reversing Alarm	111	1 m
Roller Door	94	4 m
Forklift loading / unloading	100	2 m

The predicted night time L_{Amax} noise levels at the nearest rural receivers to the development are presented in **Table 5-7.** Night period calculations include noise enhancing metrological conditions as described in Section 3.4. The predictions indicate that L_{Amax} noise levels at the rural residential receivers comply with the screening level of the NPfI.

Three receivers in industrial zoned land are predicted to receive L_{Amax} noise levels above the screening level of 52 dBA. These receivers are located to the south of the Project and are exposed to the hardstand areas where trucks would be reversing into roller doors.

Table 5-7: Summary of Predicted Sleep Disturbance Noise Levels - L_{AFmax}

Receiver ID	Noise Level (dBA)	
	Screening Level	Predicted
N15	52	44
N14	52	40
N16	52	38
N30	52	63
N29	52	58
N28[1]	52	54

Note 1: This receiver is on land owned by ESR and is not currently occupied

The additional guidance relating to potential sleep disturbance impacts contained in the NSW *Road Noise Policy* (RNP) was reviewed to quantify the significance of the potential residual exceedance of the sleep disturbance screening levels.

According to the RNP, research on sleep disturbance indicates that in some circumstances, higher noise levels may occur without significant sleep disturbance. Based on currently available research results, the RNP concludes that:

- "Maximum internal noise levels below 50 dBA to 55 dBA are unlikely to cause awakening reactions."
- "One or two noise events per night, with maximum internal noise levels of 65 dBA to 70 dBA, are not likely to affect health and wellbeing significantly."

Based on the predicted external levels, internal noise levels of around 44 dBA to 53 dBA could be expected within the most exposed dwellings with windows open. On this basis, sleep disturbance appears unlikely.

Further analysis is required post-occupancy to accurately quantify maximum noise emissions and any subsequent mitigation measures required.

5.9 Feasible and Reasonable Noise Mitigation

Section 5.6 of this report indicated that noise levels at receivers N29 to N34, which are on IN1 zoned land, could exceed the nominated PNTL by up to 13 dBA. Of these receivers, only N30 currently is not known to be in detail discussion for sale or have development applications. ESR has noted that receiver N29 is vacant, receiver N31 and N32 are in the process of being sold, receivers N33 and N34 are looking to be sold, and N35 is proposed to be developed by the landowner.

Table 5-8 considers the feasibleness and reasonableness of potential mitigation strategies to minimise noise levels to receiver N30. **Appendix D** presents the noise levels after implementation of potential noise barriers.

Table 5-8: Feasible and Reasonable Mitigation Matrix

Mitigation Option	Feasible Mitigation Test	Reasonable Mitigation Test	Justification for Adopting or Disregarding this Option
Mitigation at the Source			
Location of sources Loud sources towards the centre of site to reduce noise impacts to external receivers.	This option would be feasible.	These receivers are likely to be redeveloped for industrial developments. It is likely that these receivers would no longer exist during the operation of the Project.	This option was implemented with loading areas being directed towards the centre of the larger estate.
Reduction of noise sources Limit heavy vehicle movements during the night period and have all roller shutter doors closed	This option would be feasible however would significantly impact the operation of the facility.	Reductions of up to 5 dB could be expected during quieter periods of heavy vehicle movements. However impacted receivers are likely to be uninhabited and/or redeveloped during the operation of the Project.	This option was not implemented as it's **not** considered reasonable for this project.
Mitigation of the Transmission Path			
Noise barriers on the site	This option would be feasible.	A noise barrier on the southern boundary of the site could expect up to 4 dB in attenuation to receiver N30 and 1 dB to receivers N14 to N19. A noise barrier on the western and northern boundaries could see up to 9 dB in noise reduction to receivers N31 to N34,	This option was not implemented as it's **not** considered reasonable for this project as the impacted receivers are likely to be redeveloped for industrial developments and not exist during the operation of the Project. However, shielding in

Mitigation Option	Feasible Mitigation Test	Reasonable Mitigation Test	Justification for Adopting or Disregarding this Option
		however these receivers are in the process of being sold and/or redeveloped. A 2.5m noise barrier on the eastern boundary of the estate could expect 1-2 dB attenuation to receivers N14 to N19. Further attenuation could be achieved by raising the height of this wall, however would negatively impact the visual amenity of the receivers.	the form of the elevation change of the site is already incorporated in the noise model.
Alternative building arrangement/orientation	Buildings have already been arranged such that noise sources are directed towards the centre of the site	Building arrangement is already optimal in reducing noise emissions to surrounding receivers. Orientating Warehouse 1 such that loading areas face the north would result in increased noise levels to the receivers N31-N35. Only minor reduction in noise levels to receivers N14-N19 would be expected as these receivers would still be exposed to truck entry/exit and trucks travelling around the building.	This option was not implemented as it's **not** considered reasonable for this project.
Mitigation at the Receiver			
Noise barriers at receiver	These would not be feasible to build as it would require approval from the landowner and likely affect visual amenity.	Noise benefit would be minimal and would require a significant barrier to achieve worthwhile results, These receivers are likely to be redeveloped for industrial developments. Permanent fixtures to mitigate noise	This option was not implemented as it's **not** considered reasonable for this project.

Mitigation Option	Feasible Mitigation Test	Reasonable Mitigation Test	Justification for Adopting or Disregarding this Option
		would not be considered reasonable.	
Architectural treatment to receivers	These would be feasible to build.	Noise benefits of this approach would only be applicable to internal spaces. Outdoor amenity would not benefit and not considered reasonable. These receivers are likely to be redeveloped for industrial developments. Permanent fixtures to mitigate noise would not be considered reasonable.	This option was not implemented as it's **not** considered reasonable for this project.

6 CONSTRUCTION NOISE CRITERIA

The *Interim Construction Noise Guideline* (ICNG) provides the noise goals for construction noise to be achieved for the Project.

All construction works will be carried out during the daytime period only and it is expected that the approval will typically condition standard construction hours. Standard construction hours per the *ICNG* are typically Monday to Friday 7.00am-6.00pm, and Saturday 8.00am-1.00pm.

On this basis and specifically for residences, the construction Noise Management Level (NML) is that the noise should not exceed the RBL by more than 10 dBA.

It should be noted, the NML are considered as guidelines and not necessarily numeric noise levels to be complied with. The *ICNG* also prescribes a noise limit of 75 dBA. This limit represents the likelihood of a strong reaction from surrounding receivers. **Table 6-1** presents the application of the NML.

Table 6-1 Noise at Residences using Quantitative Assessment

Time	NML	How to Apply
Recommended Standard Hours: Mon to Fri: 7am-6pm Sat: 8am-1pm Sun/Public Holidays: No Work	Noise Affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. • Where the predicted or measure L_{AEQ} is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. • The proponent should also inform all potentially affected residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly Noise Affected 75 dBA	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours the very noisy activities can occur, taking into account: 1. Times identified by community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning, mid-afternoon for works near residences. 2. If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.

Based on the recommended NML, **Table 6-2** presents the applicable NML for construction activities.

Table 6-2 Construction NML for Residential Receivers, $L_{Aeq,15min}$ dBA

Receiver ID	Day RBL	Day NML
R01-R26	35	45
R27-R37	35	45

7 CONSTRUCTION NOISE ASSESSMENT

7.1 Noise Modelling

Noise modelling methodology is consistent with what was applied for operational noise assessment, see Section 5.1.

Construction is proposed to only occur during the standard hours and so only daytime predictions have been completed.

7.2 Proposed Construction Activities

7.2.1 Proposed Works

This report provides an assessment of the potential noise and vibration impacts associated with the proposed activities, specifically the construction of all two warehouse facilities and the supporting road network. The construction noise and vibration assessment has considered the following construction activities:

- Site preparatory works, including:
  - Demolition and clearing of all existing built form structures and vegetation
  - Bulk earthworks including 'cut and fill' to create flat development platforms for the proposed buildings, and topsoiling, grassing and site stabilisation works
- Subdivision of the site into 4 individual lots
- Construction of a new industrial estate at the site comprising 2 industrial allotments and a total gross leasable area of 83,480 m^2 including:
  - 2 new industrial warehousing buildings with ancillary offices across 6 allotments, comprising:
    - 77,943 m^2 of warehousing floorspace
    - 3,386 m^2 of ancillary office and other floorspace
  - Fitout of Lot 1 and Lot 4 warehouses
- Construction of a new internal road layout and parking for 338 vehicles

7.2.2 Construction Hours

Where possible, works would be completed during the standard daytime construction hours of Monday to Friday 7.00am to 6.00pm and Saturday 8.00am to 1.00pm. Where Out-of-Hours Works (OOHWs) are required (for emergency works, oversized equipment delivery, etc) it is likely that they would require separate approval.

7.3 Construction Equipment Noise Source Levels

Maximum sound power levels (SWLs) for the typical operation of construction equipment applied in the modelling are listed in **Table 7-1**. To assess construction noise levels against the NMLs, the maximum noise levels have been converted to equivalent $L_{Aeq,15min}$ noise emissions. Based on previous experience on large construction proposals, suitable adjustments of between 2 dB to 5 dB have been applied to convert the L_{Amax} noise levels in to L_{Aeq} noise levels for assessment against the NMLs.

Table 7-1: Construction noise sources

Stage No	Stage	Equipment	Operating minutes in 15-min period	Number of items in same location	Sound Power Level (dB)		
					Maximum Item (SWL)	L_{Aeq} Activity	L_{Amax} Activity
1	Site Clearing and Excavation	Piling (Bored)	7.5	1	108	**117**	123
		Dozer (D10)	15	1	115		
		Dump Truck (15 t)	15	1	100		
		Excavator (40 t)	15	2	109		
2	Construction of Access Roads	Scraper	15	2	108	**118**	121
		Grader	15	2	108		
		Compactor	15	2	108		
		Asphalt Paver	15	1	111		
		Concrete Truck	15	1	106		
		Vibratory Roller (10-12 t)	15	1	109		
3	Building Construction and Fit out	Concrete Truck / Agitator	7.5	2	106	**111**	114
		Forklift	2	2	101		
		Concrete Pump	15	1	106		
		Truck (12-15 tonne)	15	1	103		
		Crane	15	1	100		

Consistent with the requirements of the *ICNG*, and to inform the scheduling of construction activity and management of noise during the detailed design phase, the construction noise impacts are based on a worst-case assessment. The *ICNG* recommends that the realistic worst-case or conservative noise levels from the source should be predicted for assessment locations representing the most noise exposed residences or other sensitive land uses. For each receiver area the noise levels are predicted at the most noise-exposed location, which would usually be the closest receiver.

For most construction activities, it is expected that the construction noise levels would frequently be lower than predicted at the most-exposed receiver as the noise levels presented in this report are based on a realistic worst-case assessment.

7.4 Predicted Construction Noise Levels

In the area surrounding the development site, the noise impacts have been quantitatively assessed for several construction activities. The activities considered are described in **Table 7-1**.

The typical $L_{Aeq,15min}$ noise levels at the surrounding noise sensitive receivers are provided in **Table 7-1** for each of the construction activities and are representative of the 'noisiest' construction periods allowing for the simultaneous operation of noise intensive construction plant in close proximity.

ID	Worse Case Predicted		
	Stage 1	Stage 2	Stage 3
N01	25	25	18
N02	26	25	18
N03	26	26	19
N04	27	27	20
N05	27	28	22
N06	30	30	25
N07	29	29	23
N08	32	33	27
N09	33	35	29
N10	34	35	30
N11	31	30	24
N12	31	30	25
N13	35	34	28
N14	39	38	32
N15	42	41	34
N16	39	38	32
N17	34	32	27
N18	36	34	28
N19	**54**	45	40
N20	32	31	25
N21	27	26	20

ID	Worse Case Predicted		
	Stage 1	Stage 2	Stage 3
N22	28	27	22
N23	27	27	21
N24	30	32	28
N25	31	33	29
N26	32	35	31
N27	42	44	41
N28	**47**	**52**	**53**
N29	**55**	**61**	**61**
N30	**53**	**61**	**50**
N31	**46**	**50**	**46**
N32	44	**48**	44
N33	**47**	**51**	**48**
N34	**52**	**56**	**52**
N35	44	43	38
N36	34	38	33
N37	29	33	27

During standard construction hours, exceedances of up to 9 dB are predicted at rural residential dwellings that are likely to occupied. The most affected receivers are located in the industrial zoned land and are in close proximity to the site. Exceedances of up to 16 dB are predicted however these sites are unlikely to be inhabited during construction, however this should be assessed at a future date and documented with the CNVMP.

There are no noise sensitive receivers that are considered to be Highly Noise Affected, i.e. with predicted noise levels exceeding 75 dB L_{Aeq}.

The *ICNG* describes strategies for construction noise mitigation and control that are applicable to this proposal. The strategies are designed to minimise, to the fullest extent practicable, noise during construction.

Where reasonable and feasible, preference should be given to scheduling construction works within the standard construction hours of:

- Monday to Friday 7.00am to 6.00pm.
- Saturday 8.00am to 1.00pm

Typically, any OOHWs would be subject to separate approval on a case-by-case basis.

Where construction noise levels are predicted to exceed the NMLs it is recommended that construction noise mitigation measures should be considered, where reasonable and feasible. Typical construction noise mitigation measures include the following:

- Avoiding the coincidence of noisy plant working simultaneously close together would result in reduced noise emissions.
- Equipment which is used intermittently is to be shut down when not in use.
- Where possible, equipment with directional noise emissions should be oriented away from sensitive receivers.
- Regular compliance checks on the noise emissions of all plant and machinery used for the proposal would indicate whether noise emissions from plant items were higher than predicted.

This also identifies defective silencing equipment on the items of plant.

- Where possible, heavy vehicle movements should be limited to standard construction hours.
- Non-tonal reversing alarms should be used on all items of plants and heavy vehicles used for construction.

7.5 Construction Noise & Vibration Mitigation Measures

Without mitigation, noise levels from construction activities have been predicted to exceed the noise management levels nominated in the guidelines at some surrounding receivers. Therefore, noise control measures are recommended to ensure that noise is reduced where feasible. The following project-specific mitigation measures are recommended.

- Selection of quietest feasible construction equipment;
- Use of saw cutting in preference to rock-breakers where feasible; and
- Localised treatment such as barriers, shrouds, and the like around fixed plant, such as pumps, generators, and concrete pumps.
- In addition, the following measures should be included in a Noise & Vibration Management Plan.
- *Plant Noise Audit* – Noise emission levels of all critical items of mobile plant and equipment should be checked for compliance with noise limits appropriate to those items prior to the equipment going into regular service. To this end, testing should be established with the contractor.
- *Operator Instruction* – Operators should be trained in order to raise their awareness of potential noise problems and to increase their use of techniques to minimise noise emission.
- *Equipment Selection* – All fixed plant at the work sites should be appropriately selected, and where necessary, fitted with silencers, acoustical enclosures, and other noise attenuation measures in order to ensure that the total noise emission from each work site complies with EPA guidelines.
- *Site Noise Planning* – Where practical, the layout and positioning of noise-producing plant and activities on each work site should be optimised to minimise noise emission levels.

The adoption of the above measures is aimed at working towards achieving the noise management levels established at surrounding receivers.

7.5.1 Community Liaison and General Approaches to Mitigation

An effective community relations programme should be put in place to keep the community that has been identified as being potentially affected appraised of progress of the works, and to forewarn potentially affected groups (e.g. by letterbox drop, meetings with surrounding owners/tenants, etc) of any anticipated changes in noise and vibration emissions prior to critical stages of the works, and to explain complaint procedures and response mechanisms. This programme should include a *Community and Stakeholder Engagement Strategy* developed specifically for the Project.

Close liaison should be maintained between the communities overlooking work sites and the parties associated with the construction works to provide effective feedback in regard to perceived emissions. In this manner, equipment selections and work activities can be coordinated where necessary to minimise disturbance to neighbouring communities, and to ensure prompt response to complaints, should they occur.

7.5.2 Noise & Vibration Management Plan

A Construction Noise & Vibration Management Plan for the site is recommended which should be prepared by the successful contractor. The plan should reference the findings of this assessment. Areas that should be addressed in plan include:

- Noise and vibration mitigation measures;
- Noise and vibration monitoring;
- Response to complaints**;**
- Responsibilities;
- Monitoring of noise emissions from plant items;
- Reporting and record keeping;
- Non-compliance and corrective action; and
- Community consultation and complaint handling.

8 ROAD TRAFFIC NOISE CRITERIA

Additional guidance for the assessment of noise from traffic on public roads are set out in the *RNP* (Department of Environment, Climate Change and Water, 2011).

Table 3 of the *RNP* is reproduced in **Table 8-1** and presents the relevant criteria for road use within the Project.

Table 8-1: Road traffic noise assessment criteria for residential land uses

Type of Development	Assessment Criteria	
	Day (7am–10pm)	Night (10pm–7am)
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)

As Mamre Road is an arterial road, the following relative increase criterion applies.

Table 8-2: Relative increase criteria for residential land uses

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

9 ROAD TRAFFIC NOISE ASSESSMENT

The surrounding road network servicing the proposed development is located within the Mamre Road Precinct Structure Plan (the MRP Structure Plan). Transport for New South Wales (TfNSW) is currently in the process of more detailed investigations into the transport network infrastructure required for the rezoning of the MRP, and specifically road network requirements. The TfNSW investigations include detailed traffic modelling of the MRP and its connectivity to the broader regional road network.

It is expected that the outcomes these key planning policies and strategies will determine the potential for traffic noise impacts at sensitive receiver locations. It is expected that traffic volumes on the surrounding road network would significantly increase due to the increased industrial development in the MRP as well as the Western Sydney Airport Aerotropolis. Assessment of offsite road traffic noise associated with the project is premature at this design stage.

Notwithstanding, estimates of projected traffic volumes associated with the development are taken from the Ason Group *'Transport & Accessibility Management Plan'* dated 12 May 2021. Potential traffic noise impacts for receivers located on Mamre Road are assessed below.

Operational activity associated with the project is expected to generate an additional 1,780 vehicles per day. The existing annual average daily traffic volume for Mamre Road is approximately 18,000 vehicles per day as per RMS report '*Mamre Road upgrade*', dated 2017.

Based on the hourly breakdown of site generated movements, approximately 78% of the traffic volume occurs during the day period of 7.00am to 10.00pm, this results in approximately 14,000 vehicle movements during the day and 4,000 movements during the night period of 10.00pm to7.00am

Table 9-1 below presents the existing traffic volume, additional traffic volume, and the estimated noise level increase.

Table 9-1: Relative Increase in Off-Site Road Noise Levels

Period	Traffic Volume/period		Increase in Road Traffic Noise dB
	Existing	Additional	
Day 7am-10pm	14,000	1,250	<1
Night 10pm-7am	4,000	530	<1

Based on **Table 9-1**, the predicted increase in road traffic noise levels for receivers near Mamre Road is calculated to be 1 dB for both assessment periods and compliant with the road traffic noise criteria of the RNP. Noise impacts due to traffic generation associated with the proposed development is therefore expected to be negligible.

10 CONCLUSIONS AND RECOMMENDATIONS

RWDI has prepared a noise and vibration impact assessment to form part of a State Significant Development Application (SSDA) for the warehouse development at the corner of Abbotts Road and Aldington Road, Kemps Creek.

The application seeks approval for the subdivision of the site into 4 lots, construction of a new internal road and two new industrial warehouse buildings. The assessment concludes the following:

Operational Noise Impact Assessment

- Predicted noise levels are expected to comply with the PNTLs at all rural residential receivers (N01-N26) for all assessment periods.
- The predicted noise levels for receivers N29 to N34 would exceed the PNTL levels by up to 13 dB for some periods. However, these receivers are on IN1 zoned land. The noise levels are predominantly due to heavy vehicle movements entering and exiting the estate on the access road. These properties are unlikely to be inhabited during construction or operational stages.
- Sleep disturbance assessment deemed the project to comply with the night time sleep disturbance screening criteria at all receivers with the exception of residential properties located within the General Industrial (IN1) zone surrounding the development. Review of the external noise levels indicates that internal noise levels would be acceptable and unlikely to cause sleep disturbance.

Traffic Noise Assessment

- The predicted relative increase in daytime $L_{Aeq,15hr}$ and night-time $L_{Aeq\ 9hr}$ traffic noise levels for receivers near Mamre Road is calculated to be less than 1 dB. Noise impacts due to traffic generation associated with the proposed development is therefore expected to be negligible.

Construction Noise and Vibration Impact Assessment

- During standard construction hours, exceedances of up to 9 dB are predicted at rural residential receivers (N01-N26). Exceedances of up to 16 dB are predicted at receivers on IN1 zoned land (N27-N37). There are no noise sensitive receivers that are considered to be Highly Noise Affected, i.e. with predicted noise levels exceeding 75 dB L_{Aeq}.

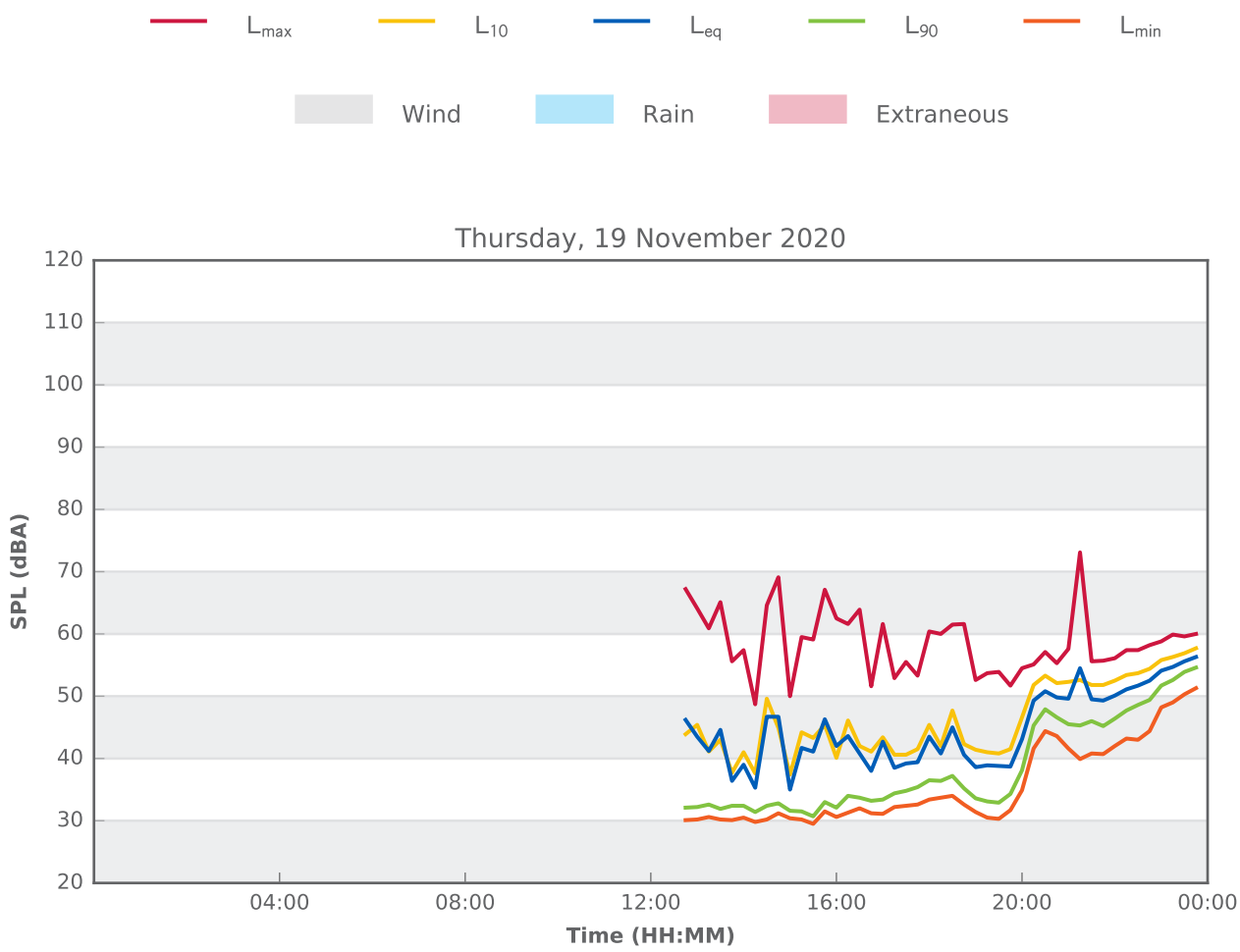
Aircraft Noise Assessment

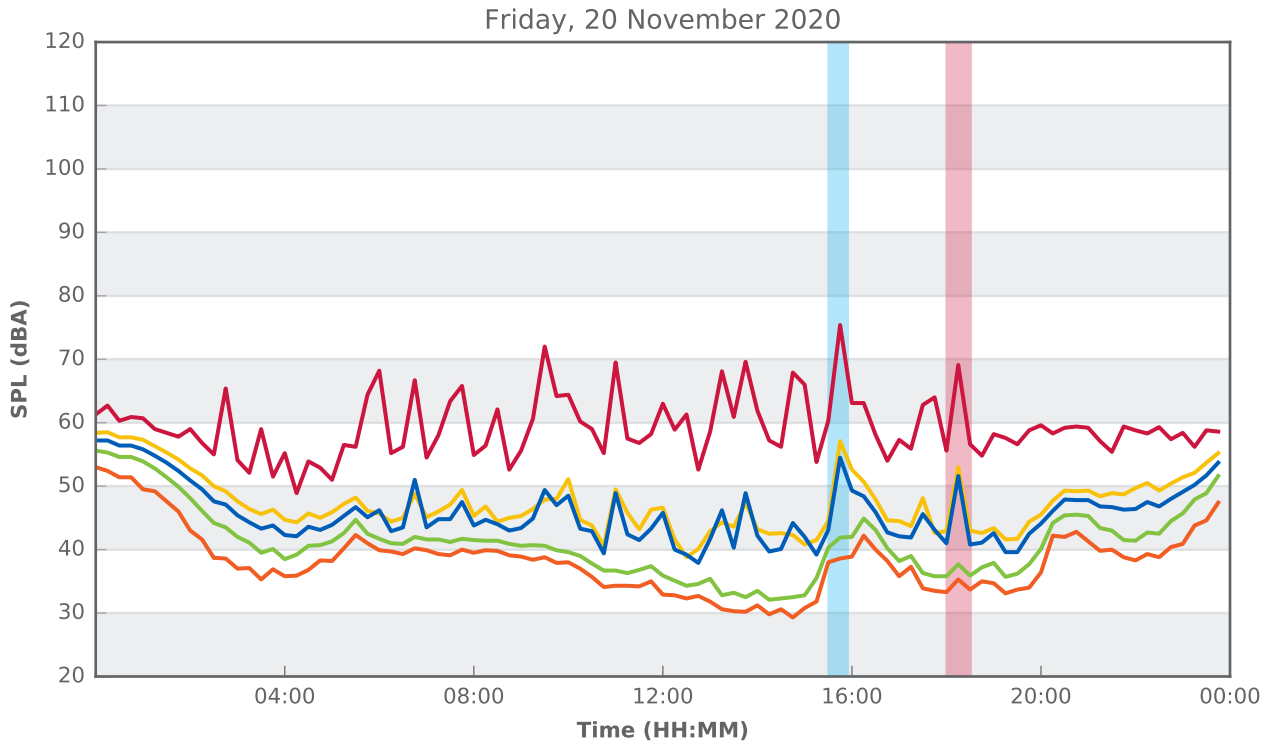
- The Project is located across the 20-25 ANEF and 25-30 ANEF contour. As per **Table 4-1**, the Project is acceptable and no further assessment is required.

APPENDIX A

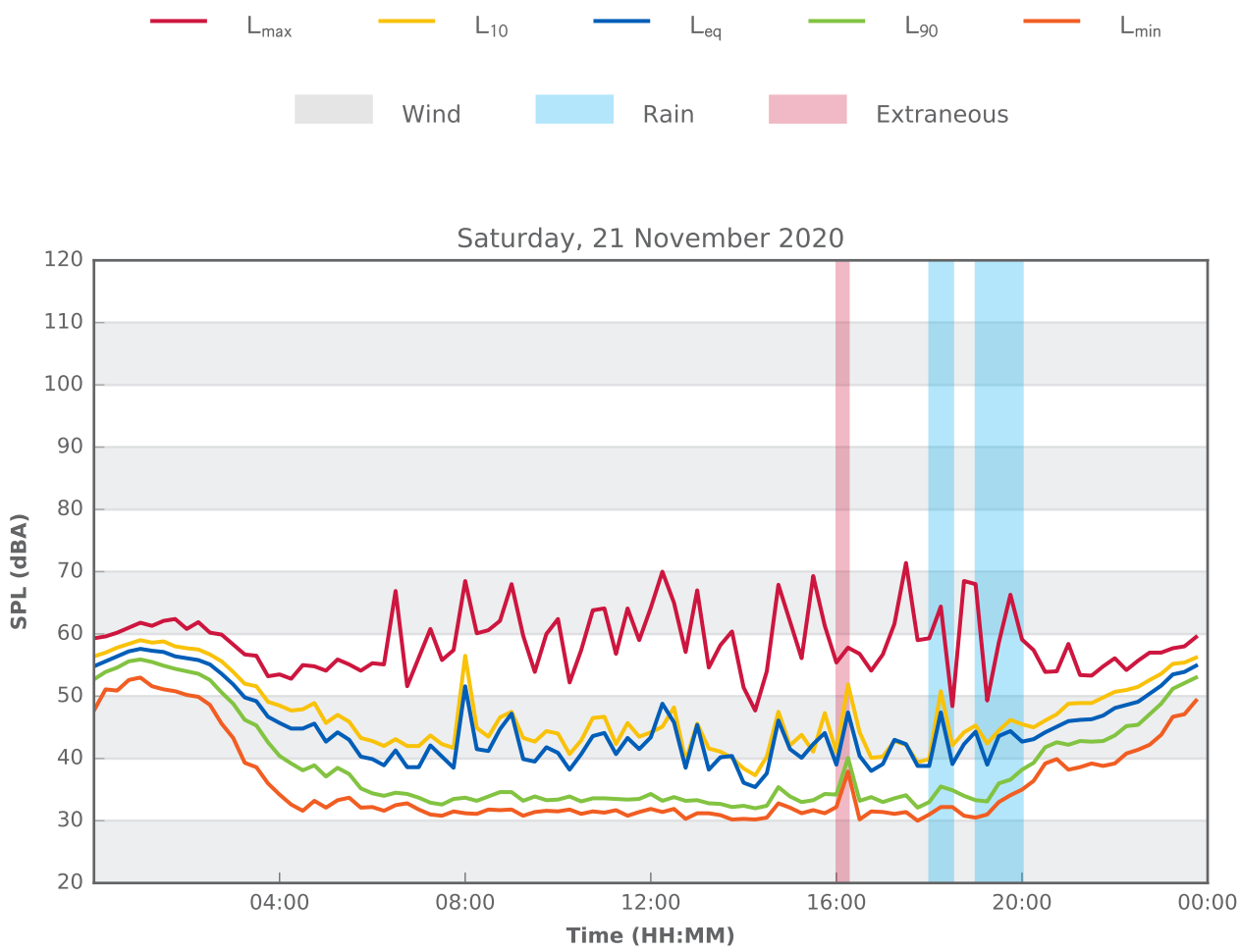
UNATTENDED NOISE MEASUREMENT GRAPHS

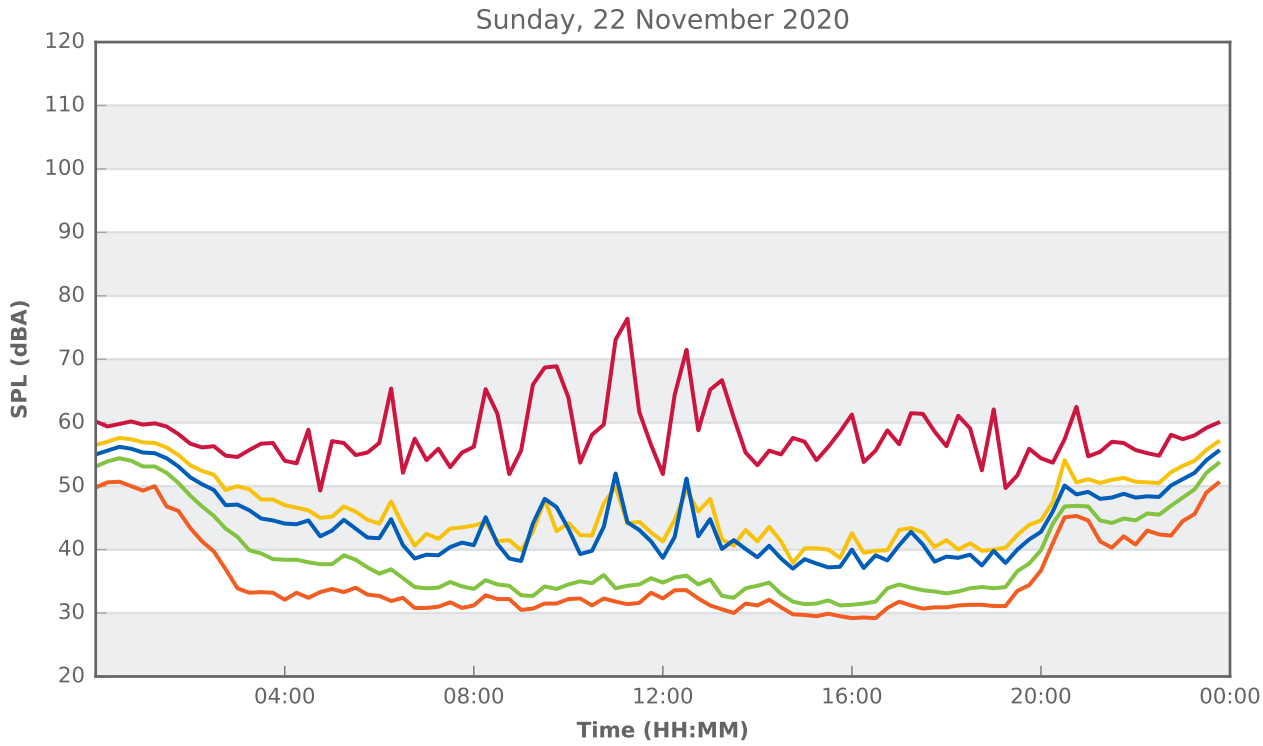
L01 - 30-38 Mount Vernon Rd





L01 - 30-38 Mount Vernon Rd





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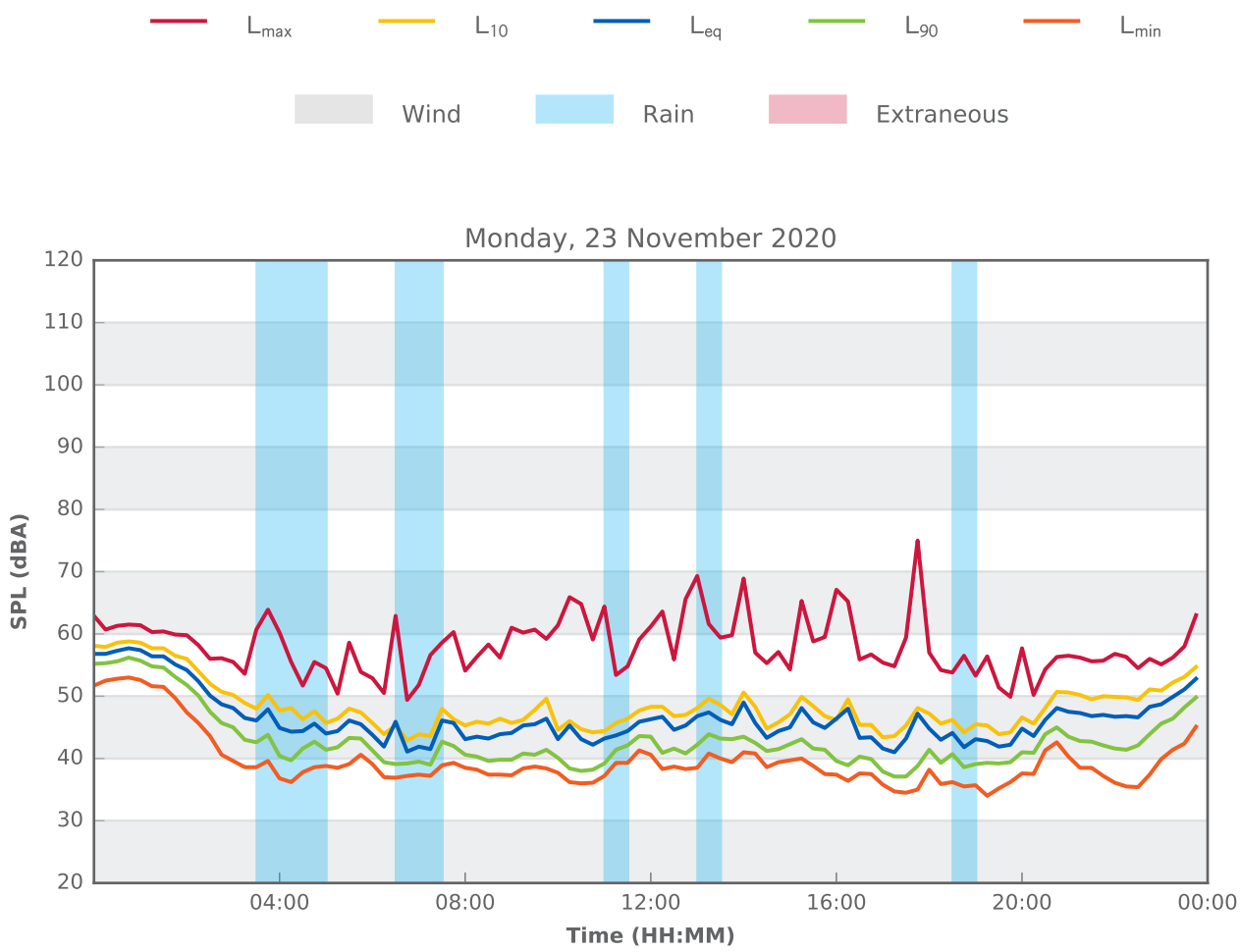

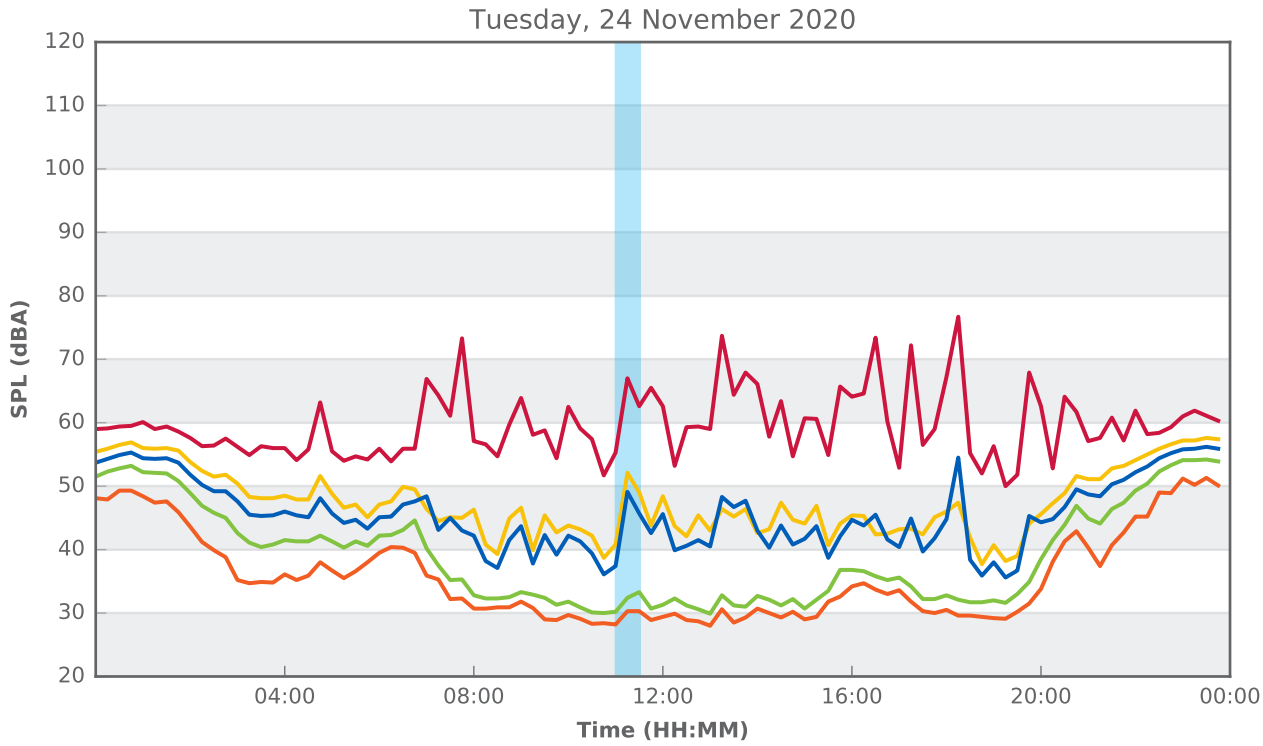

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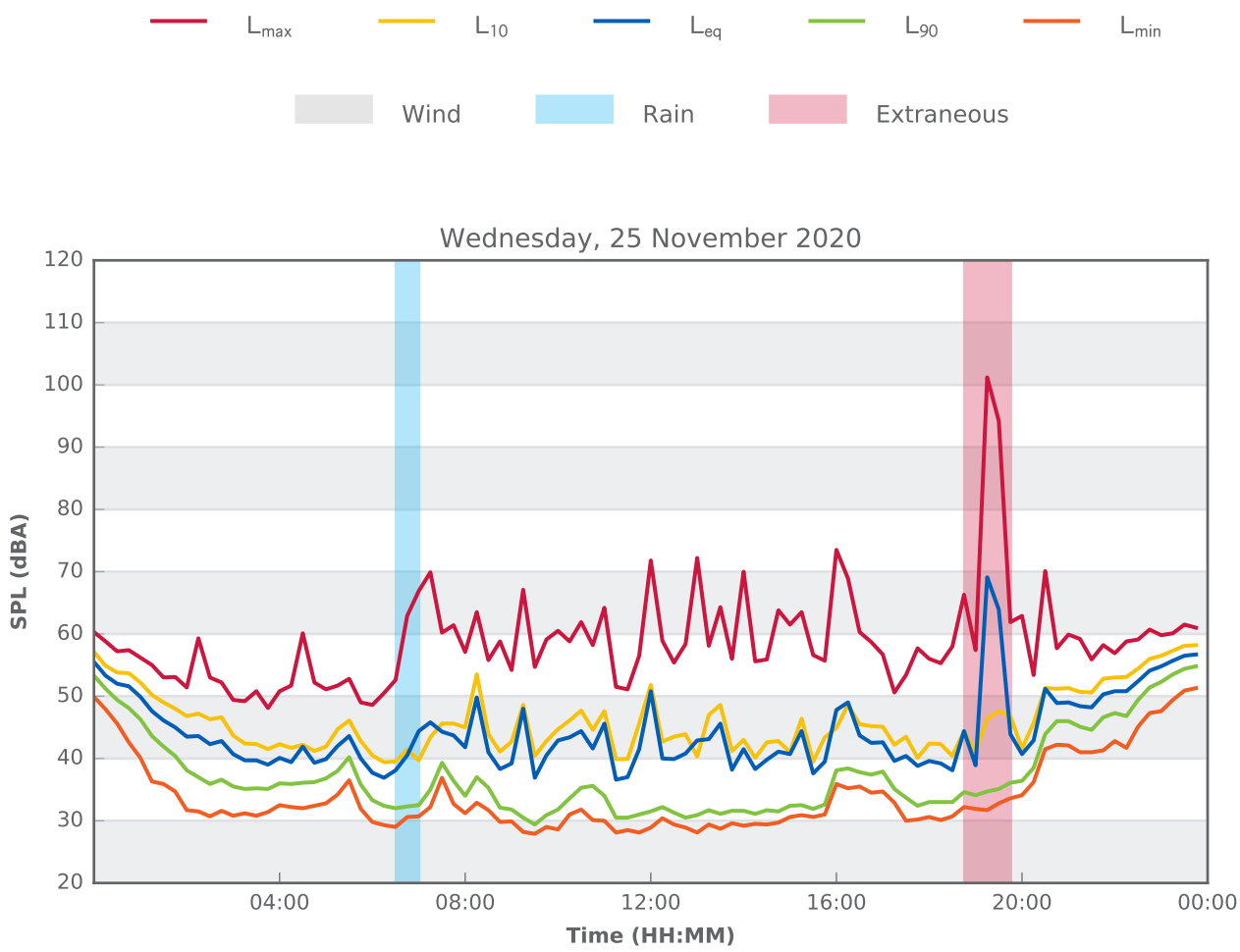

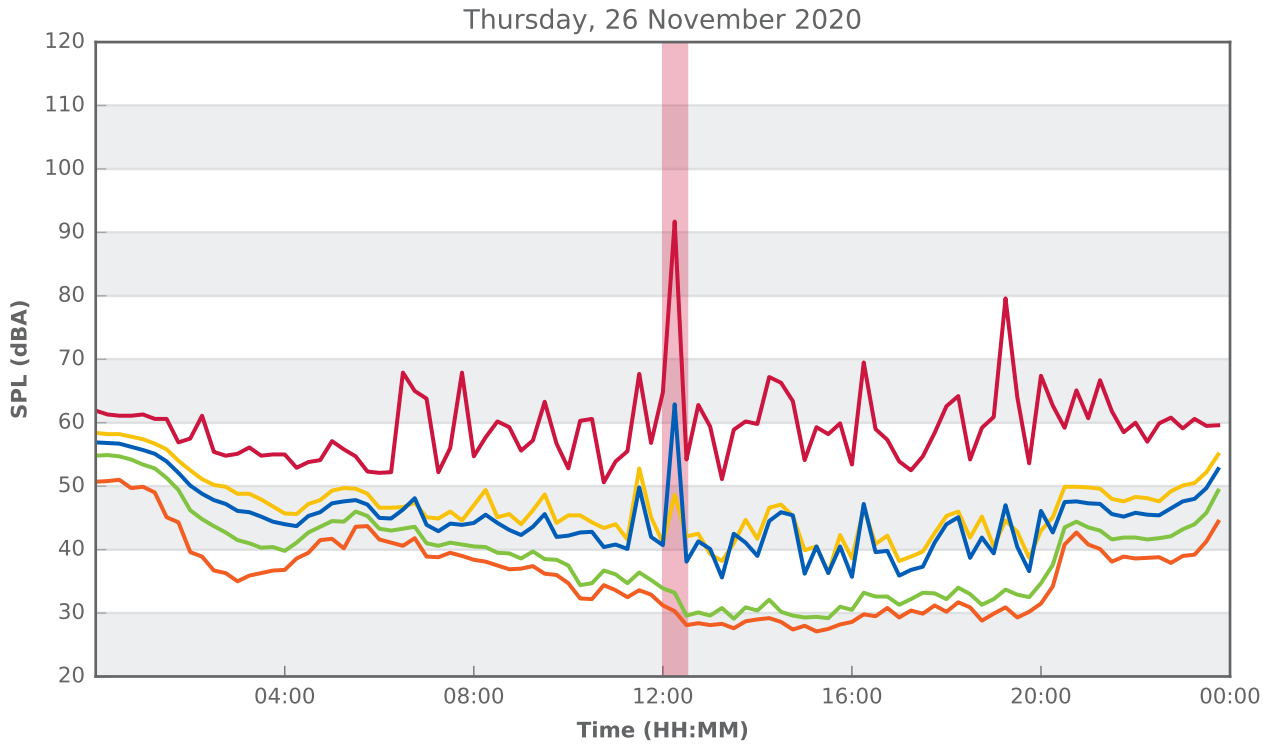

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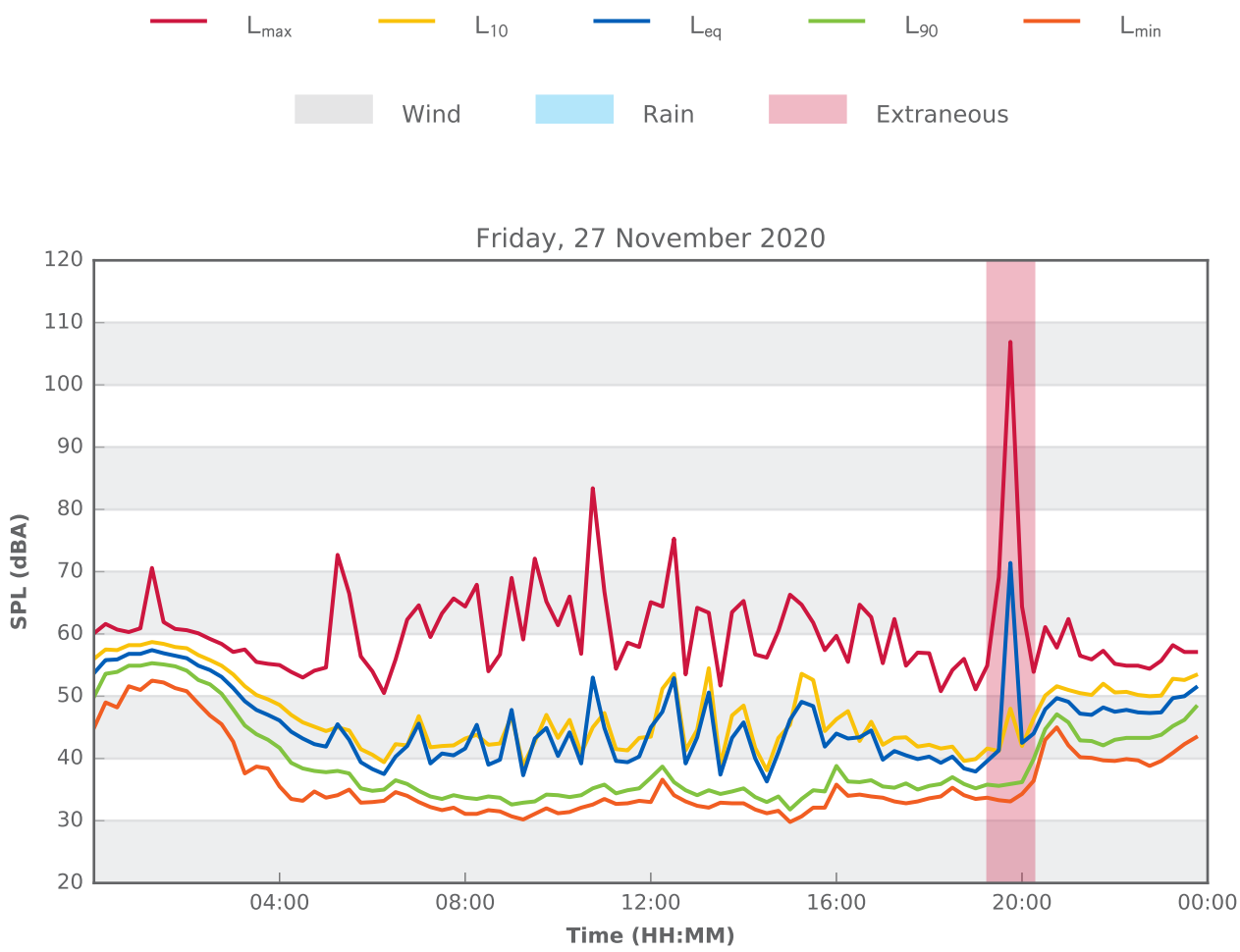
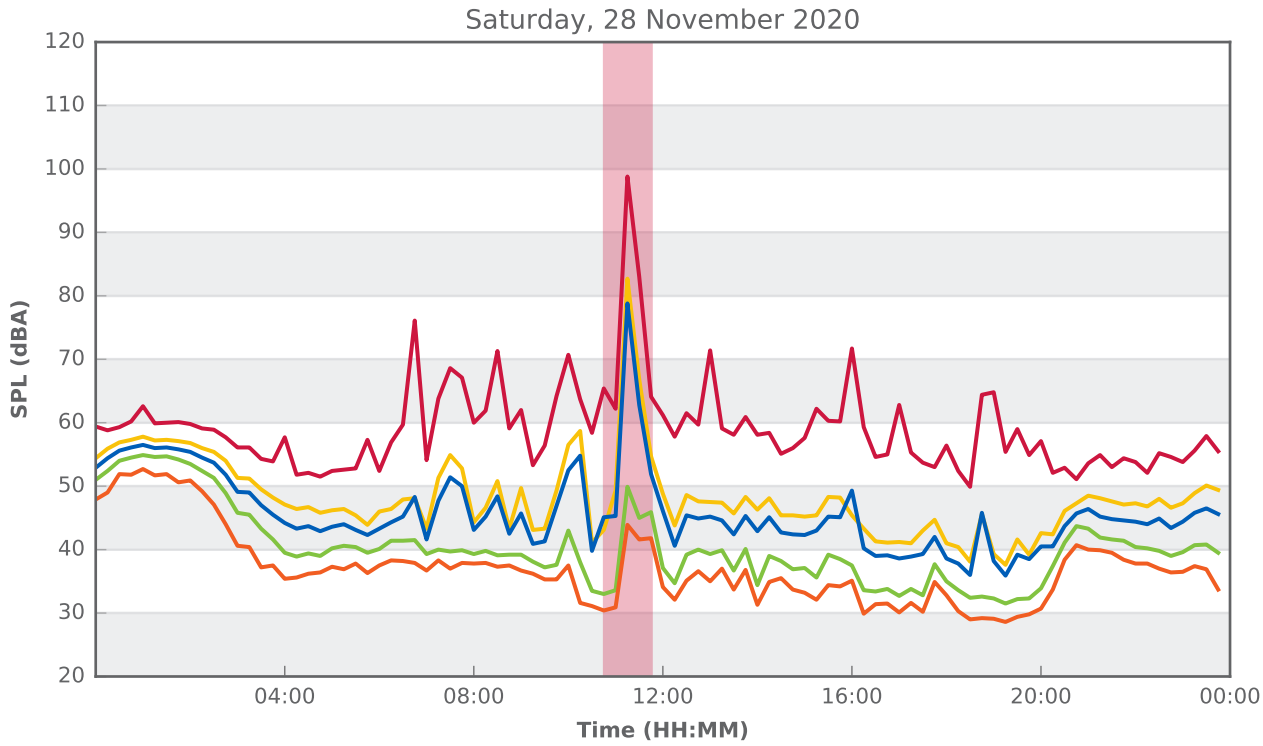
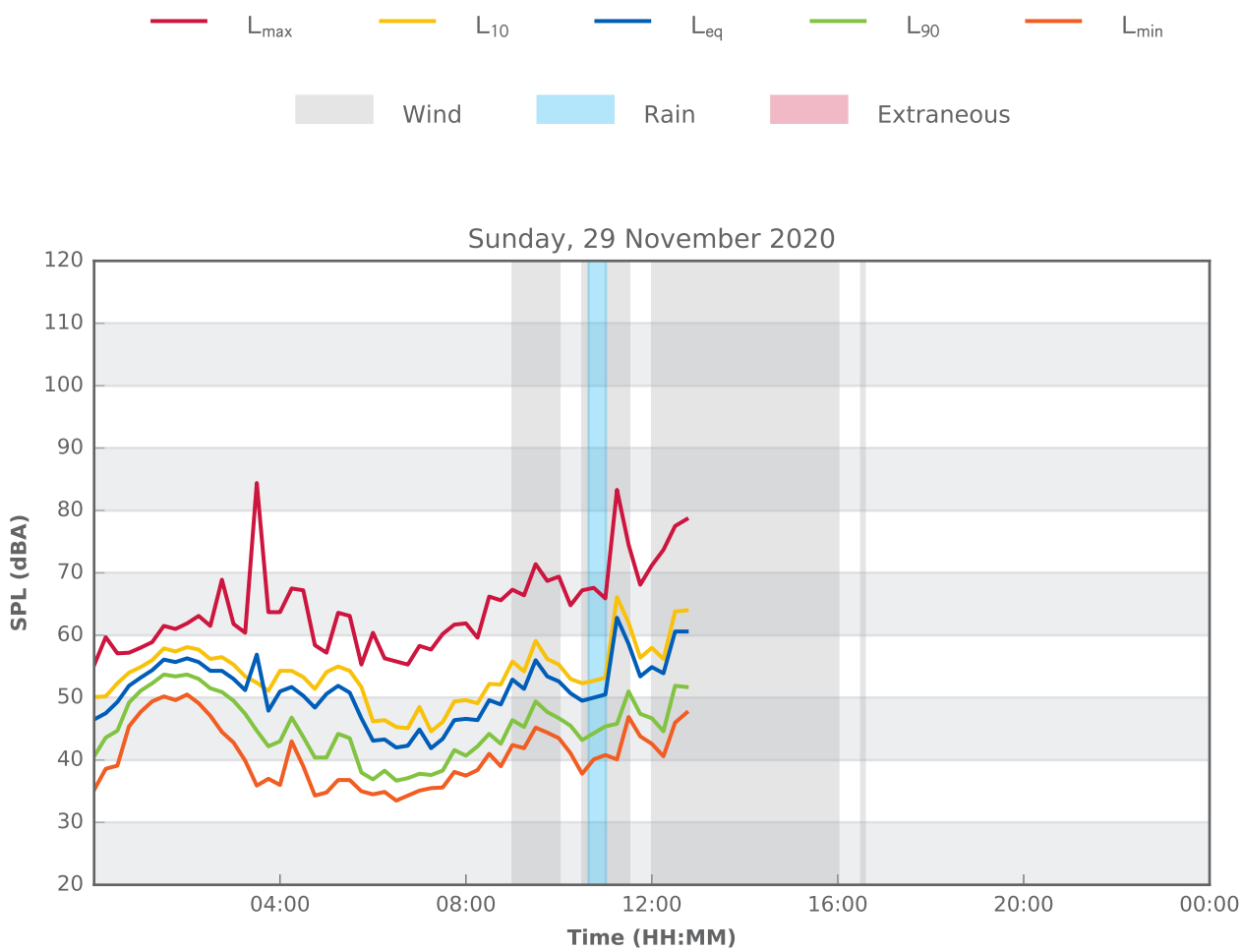
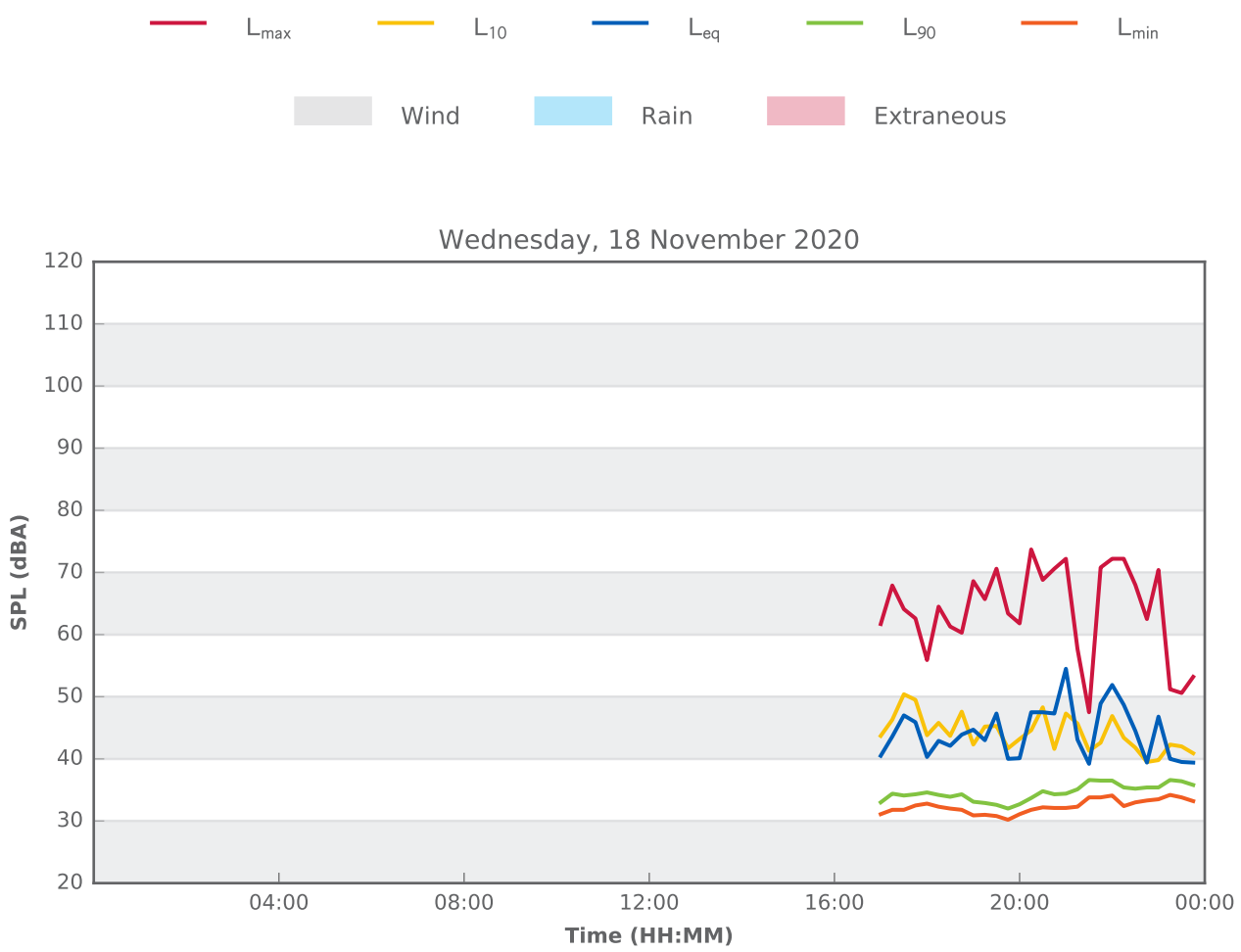


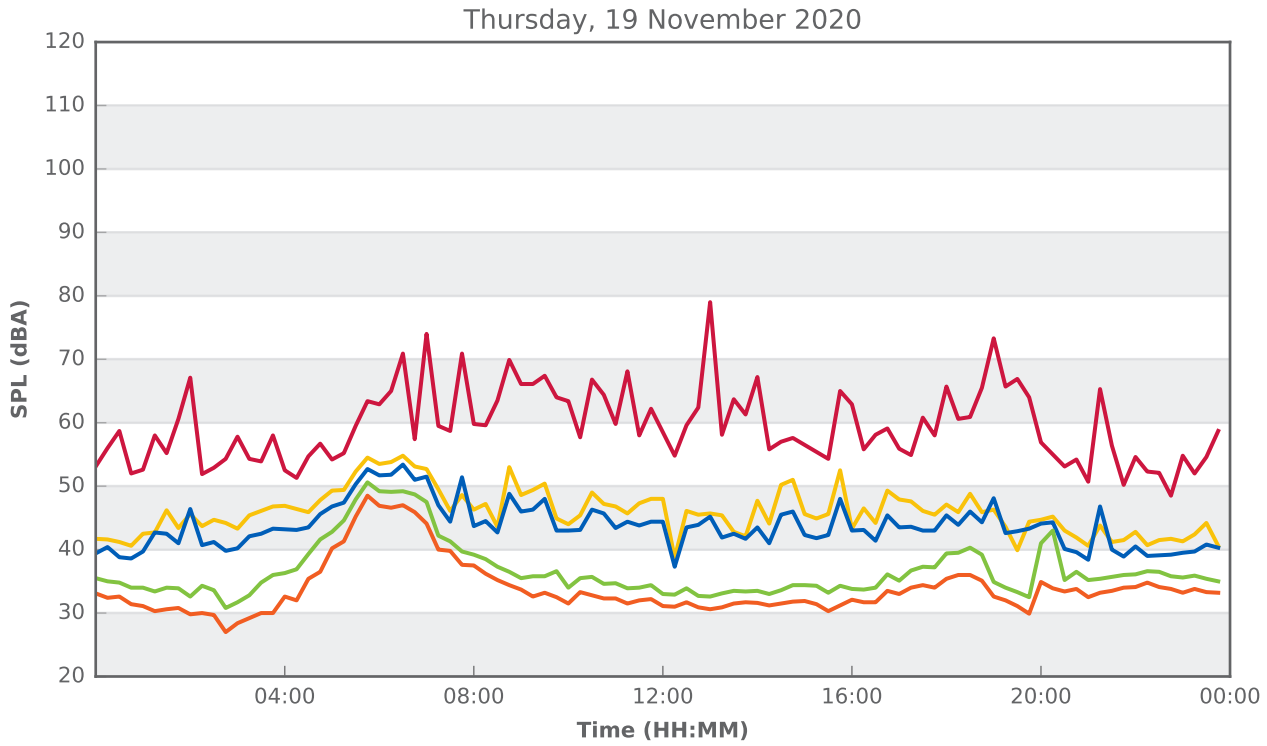


L01 - 30-38 Mount Vernon Rd



L02 - 284 Aldington Road, Kemps Creek





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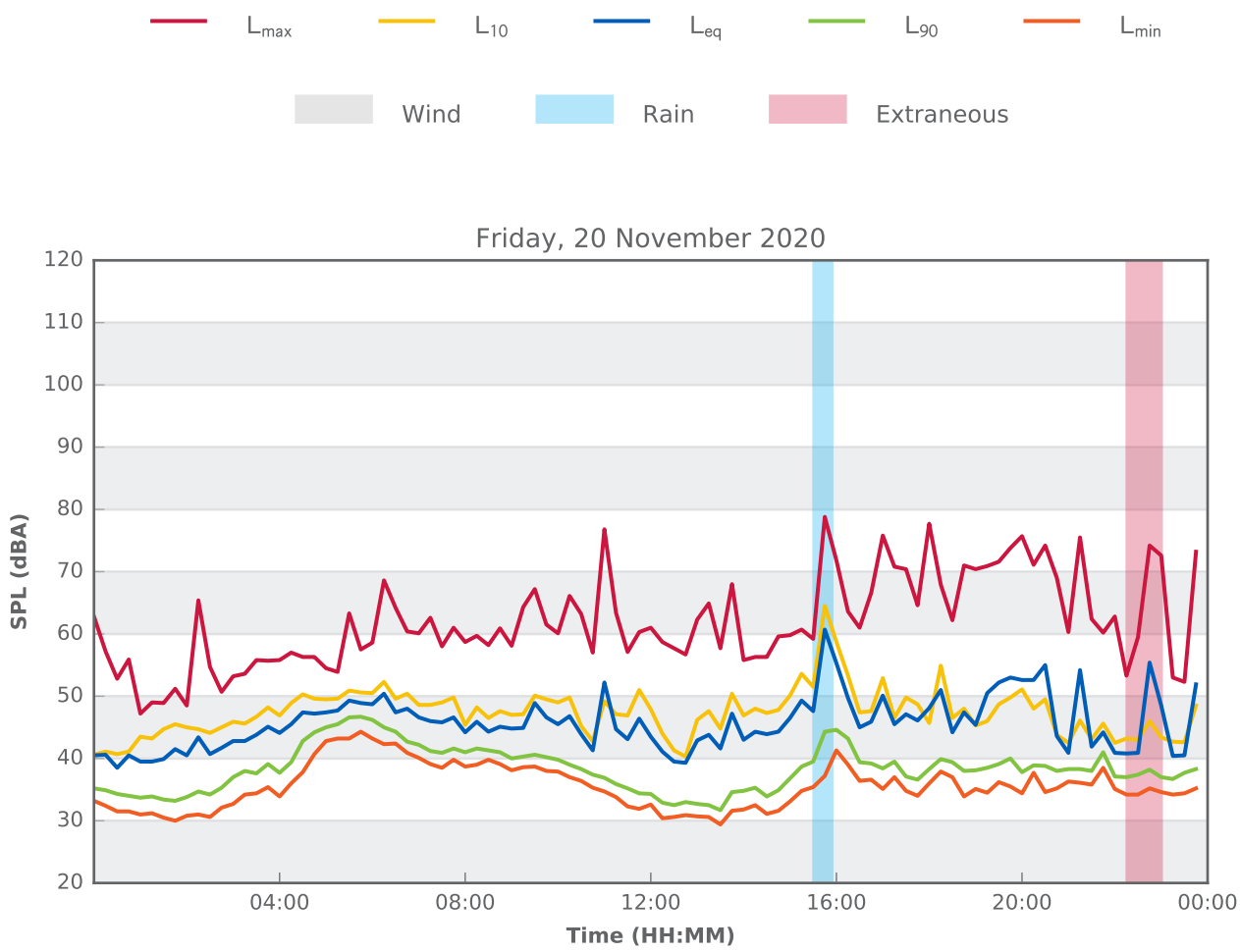

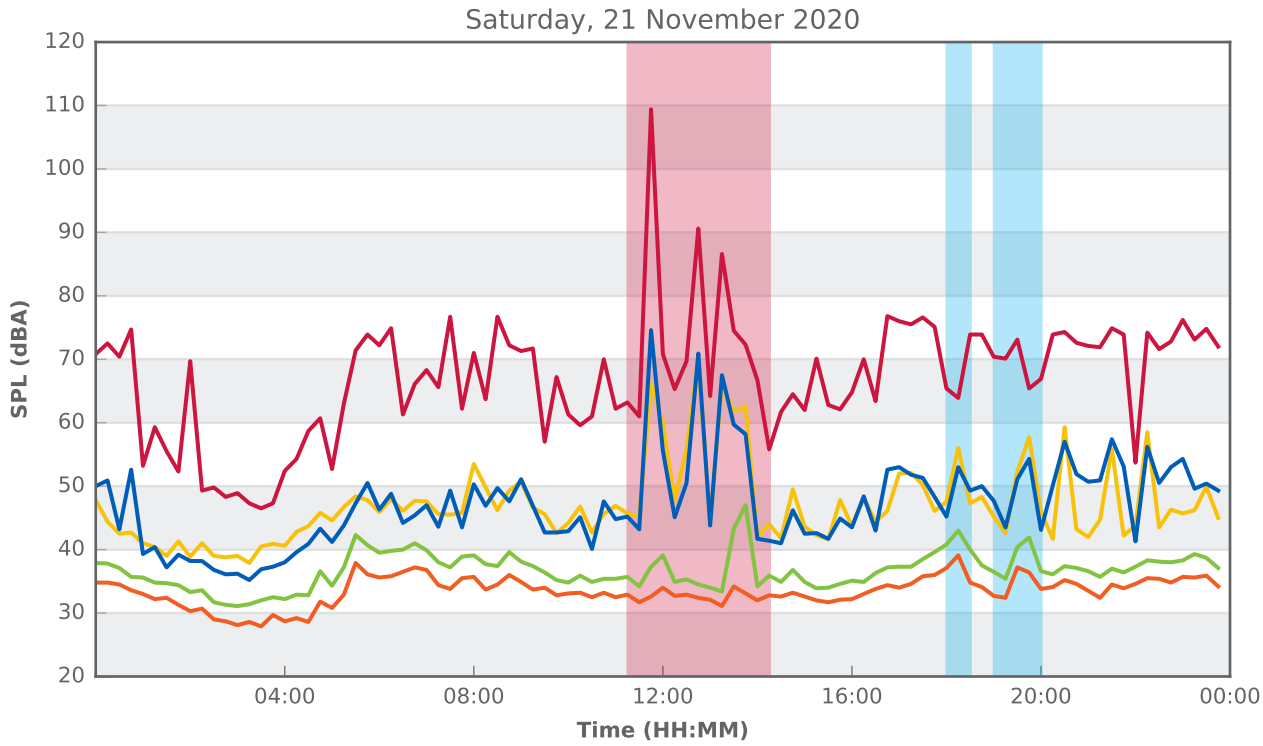

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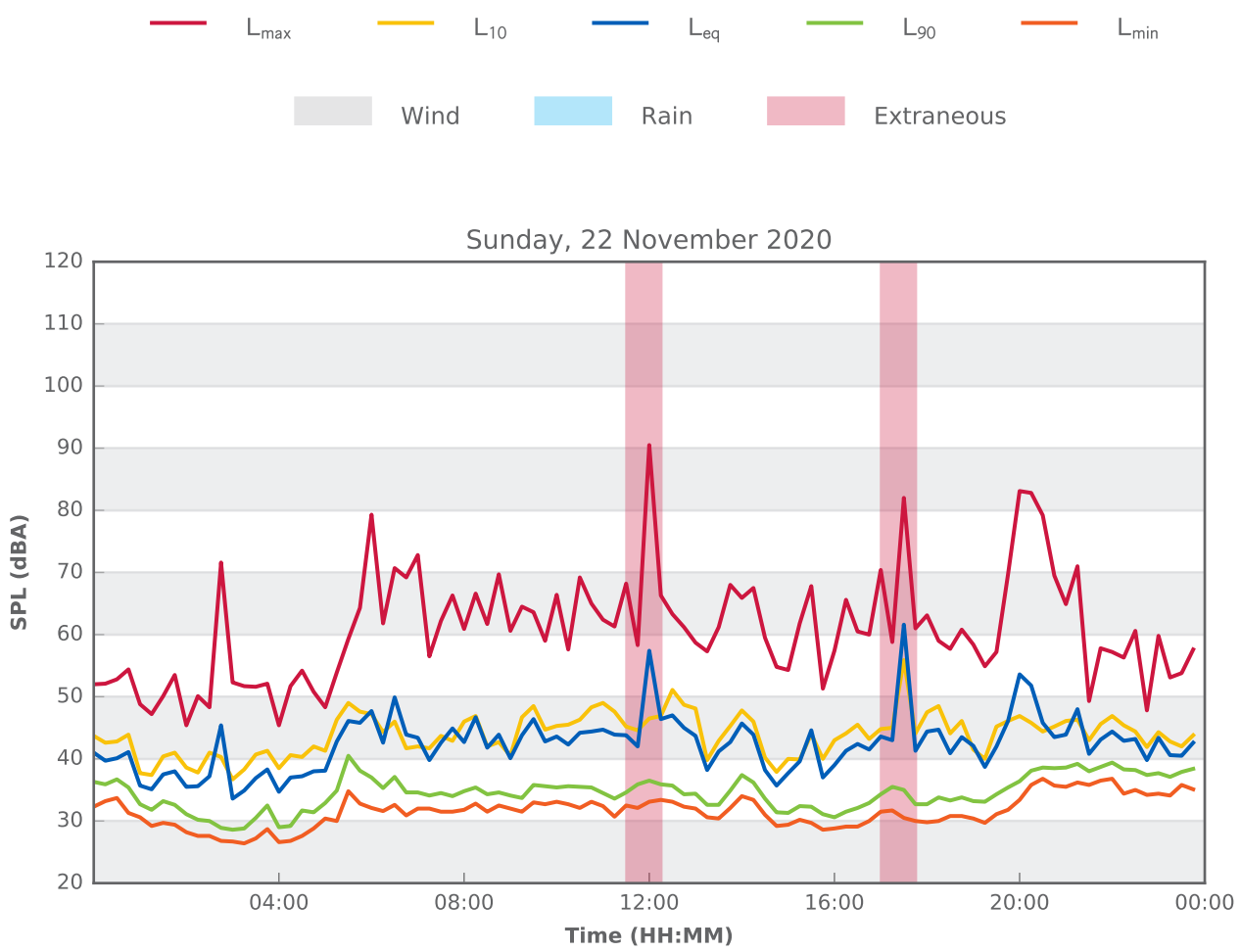

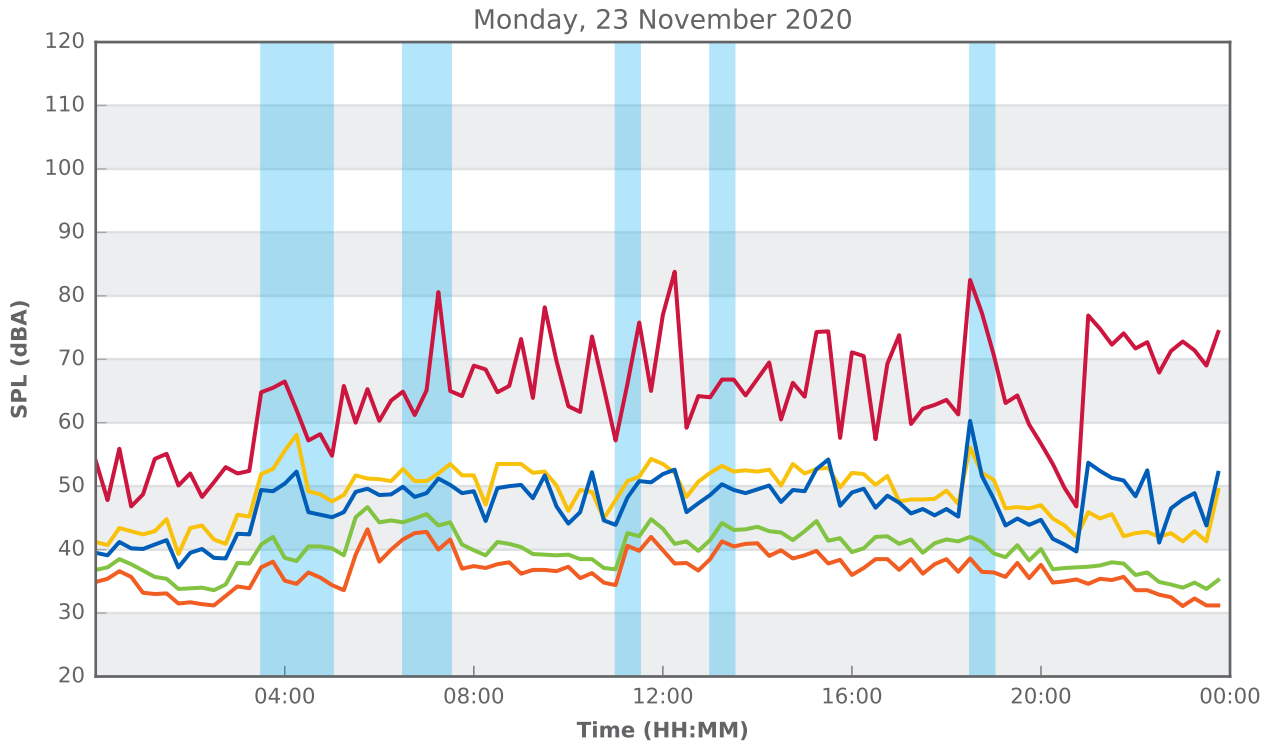

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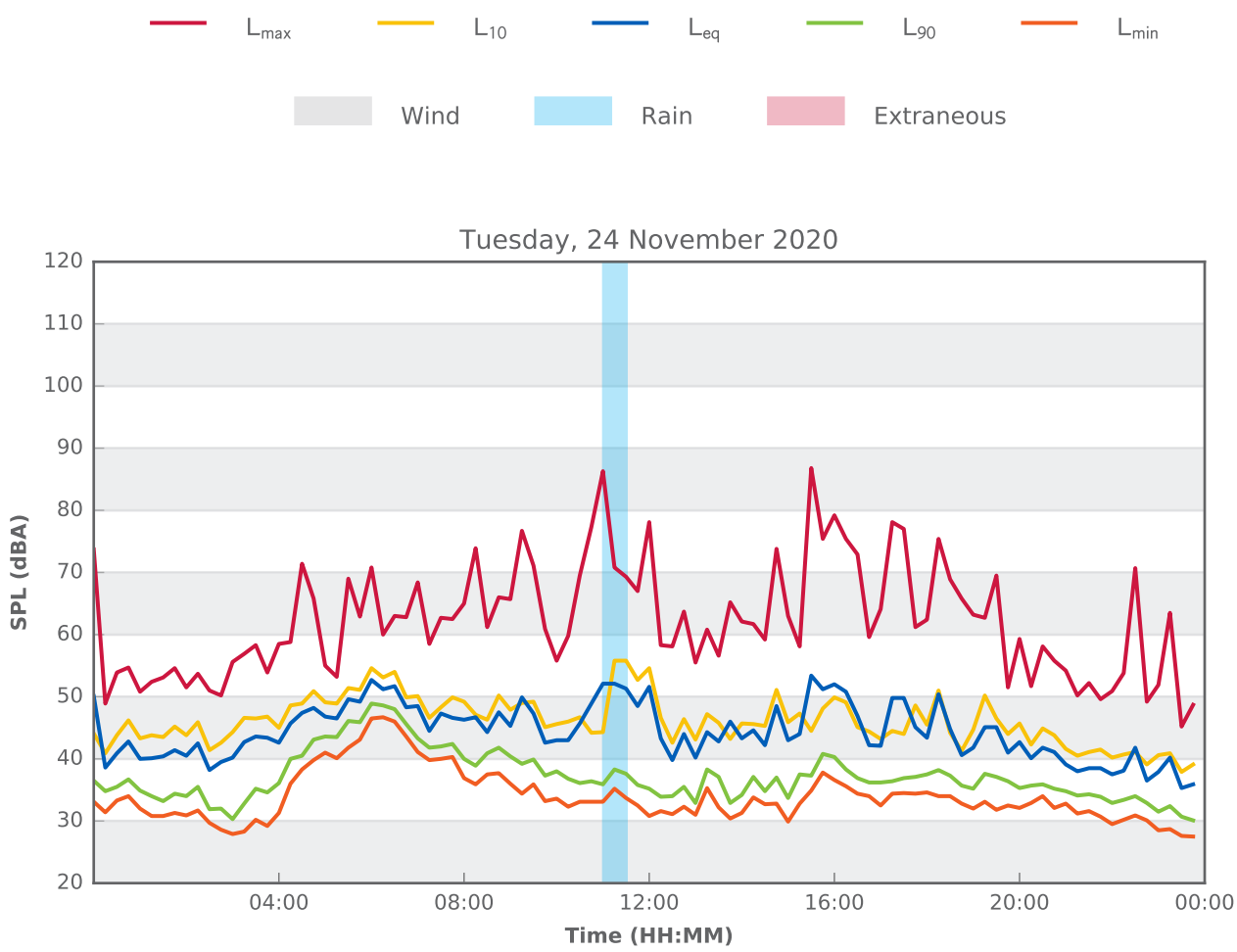
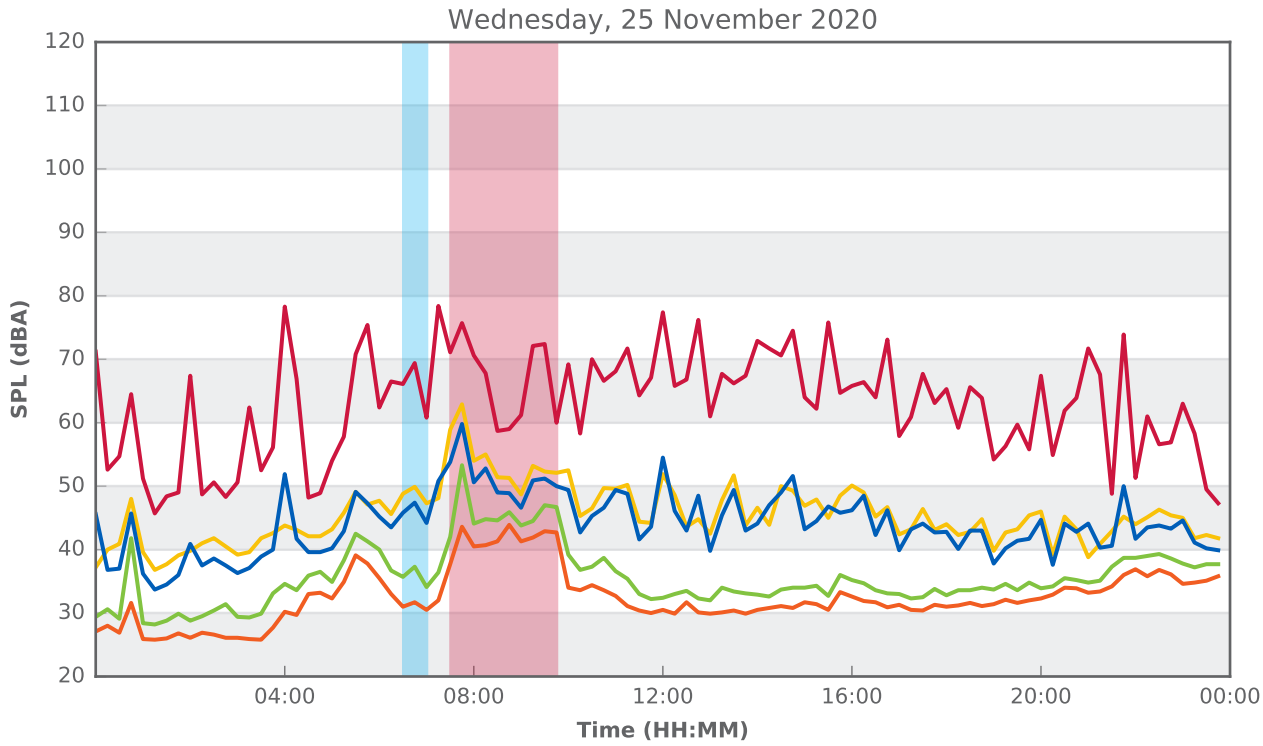
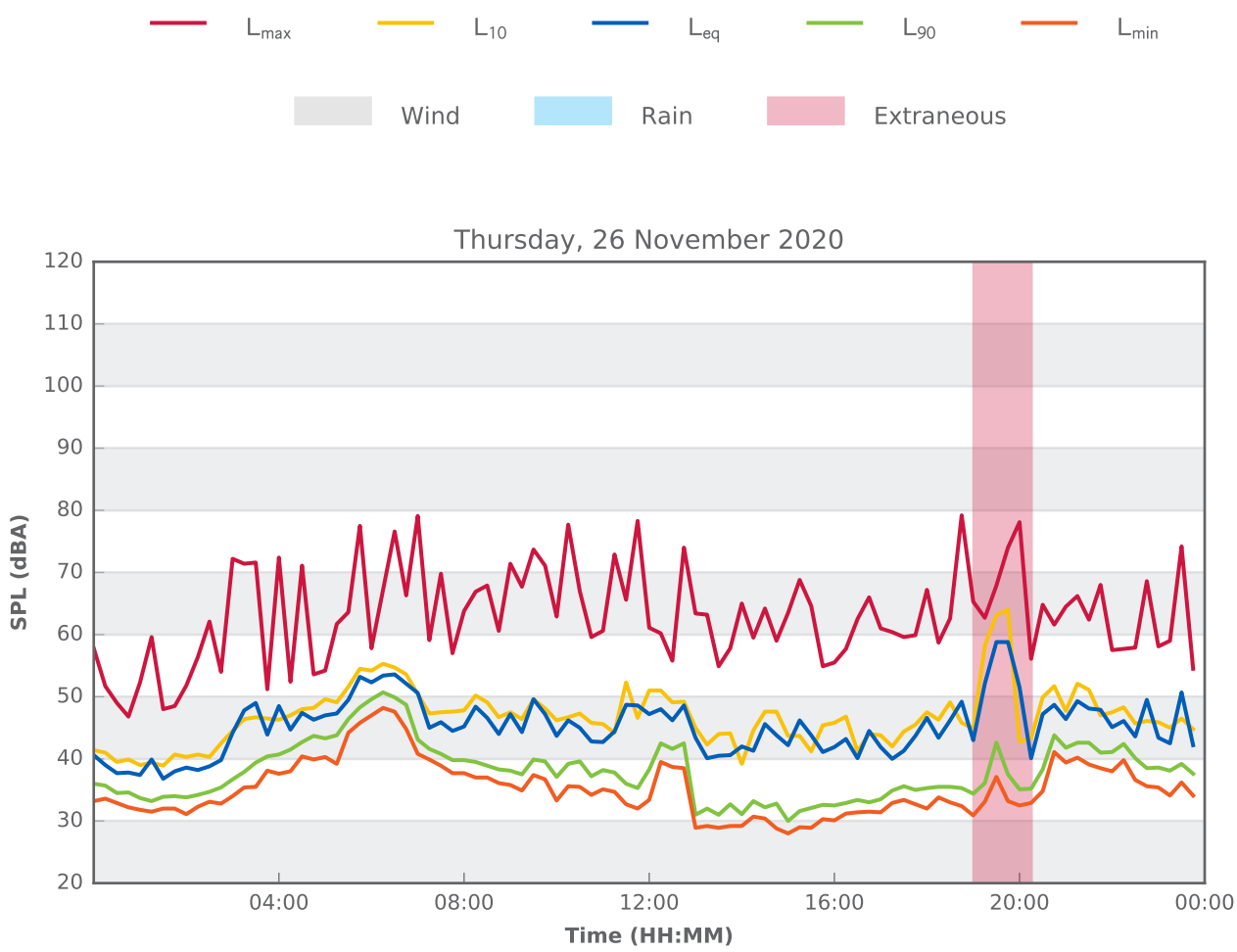
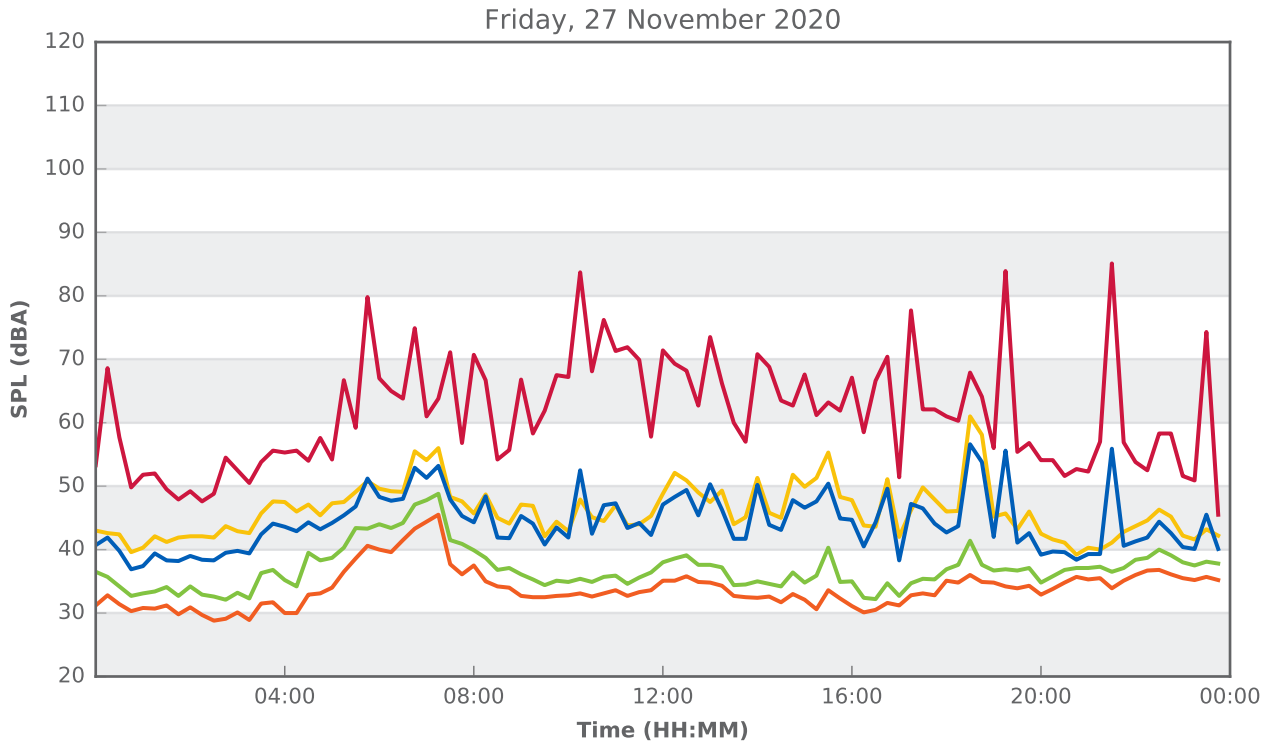




L02 - 284 Aldington Road, Kemps Creek





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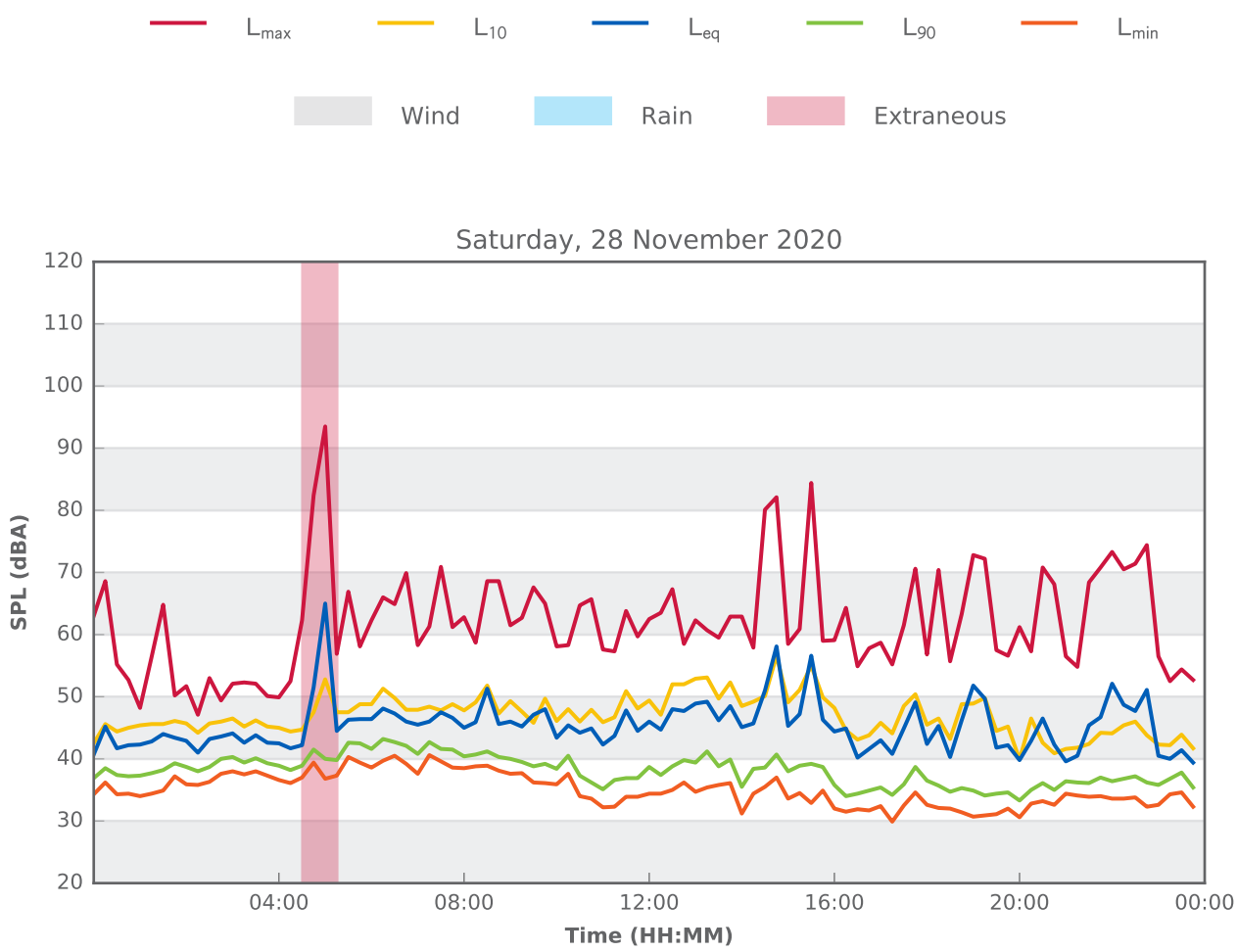
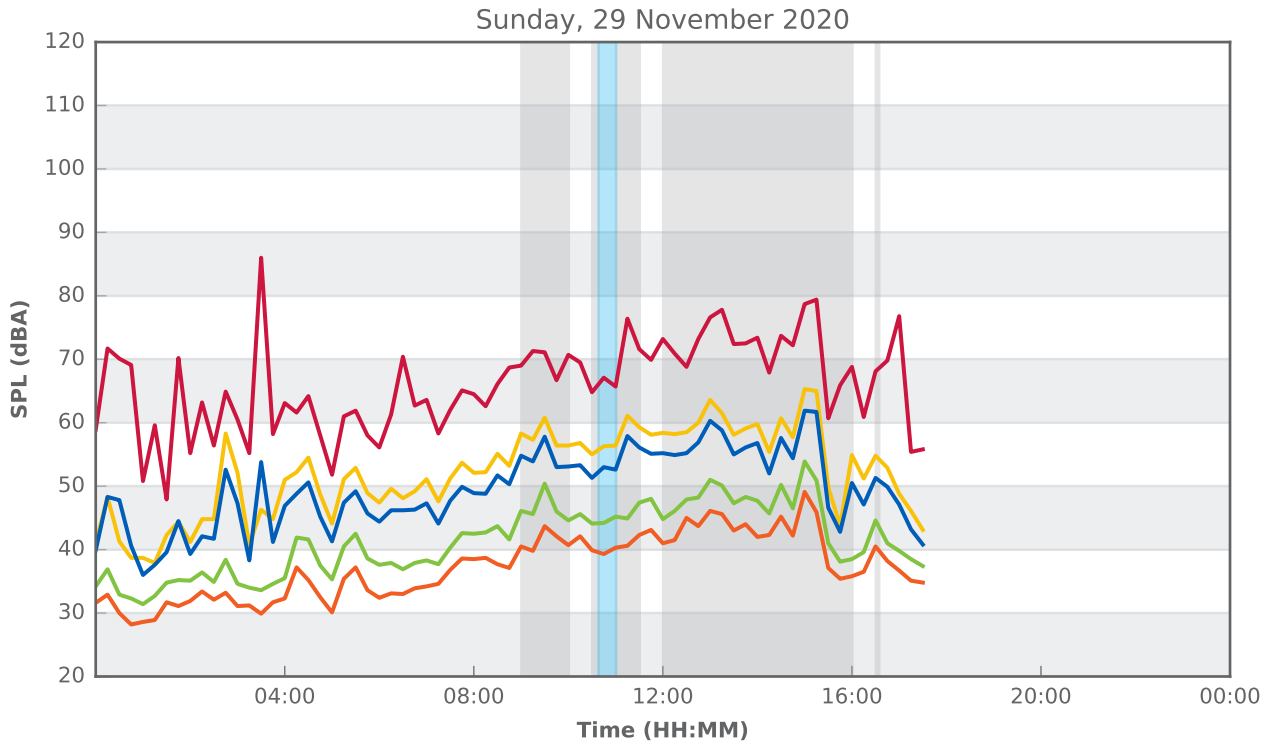
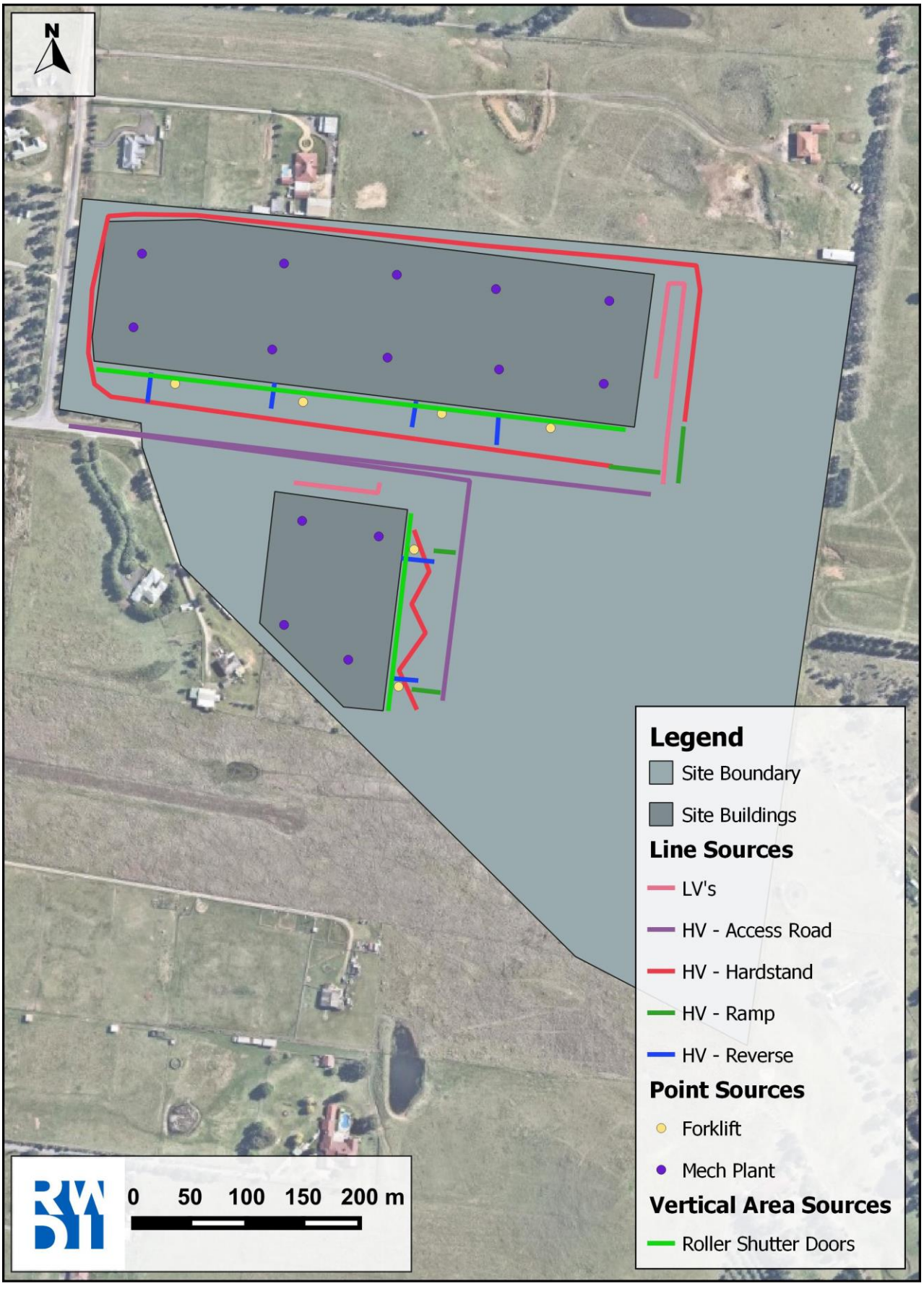




APPENDIX B

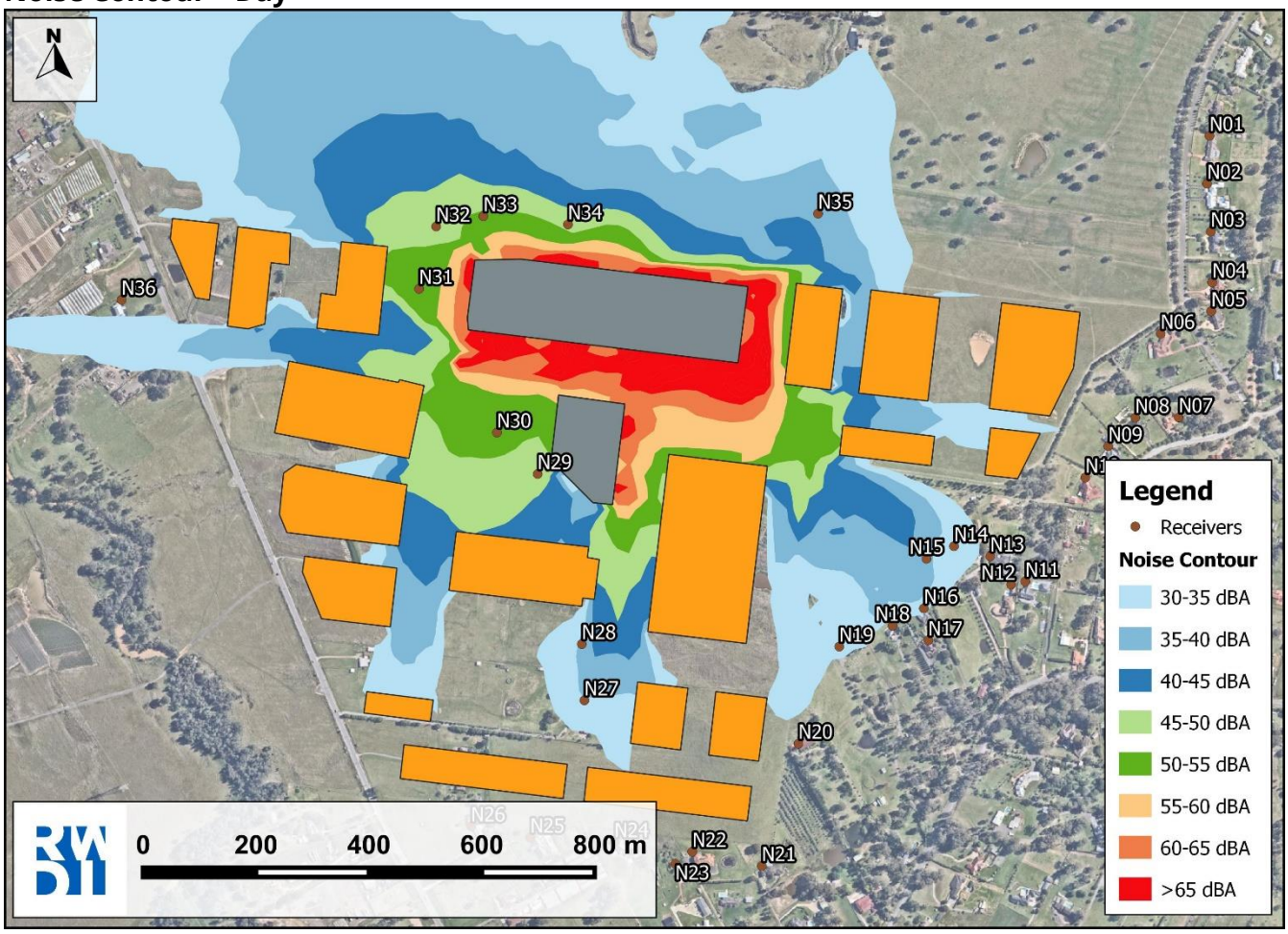
MODELLED NOISE SOURCE LOCATIONS


N
Legend
Site Boundary
Site Buildings
Line Sources
LV's
HV - Access Road
HV - Hardstand
HV - Ramp
HV - Reverse
Point Sources
Forklift
Mech Plant
Vertical Area Sources
Roller Shutter Doors
0 50 100 150 200 m

APPENDIX C

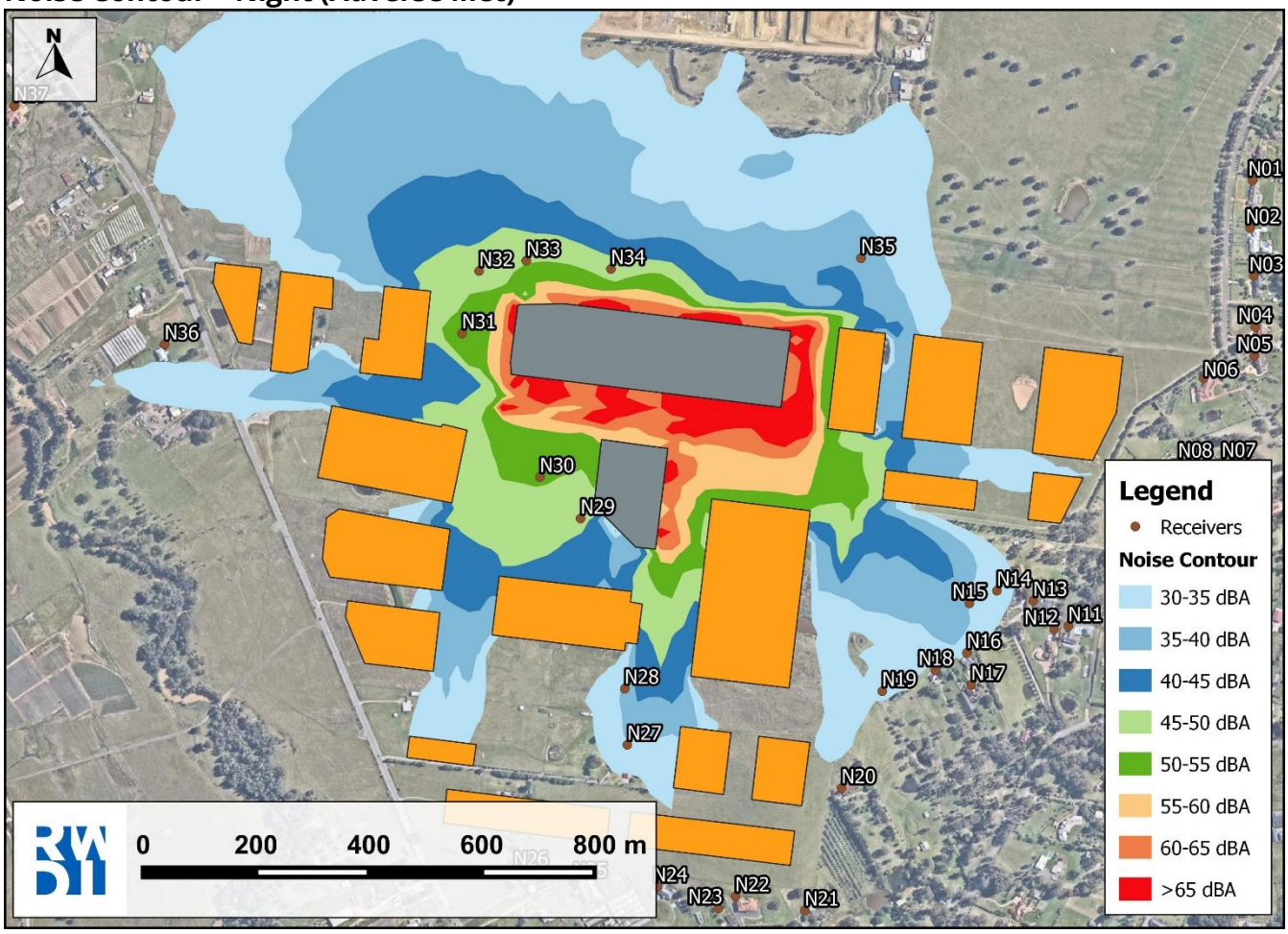
OPERATIONAL NOISE CONTOURS

Noise Contour – Day



Noise Contour – Evening

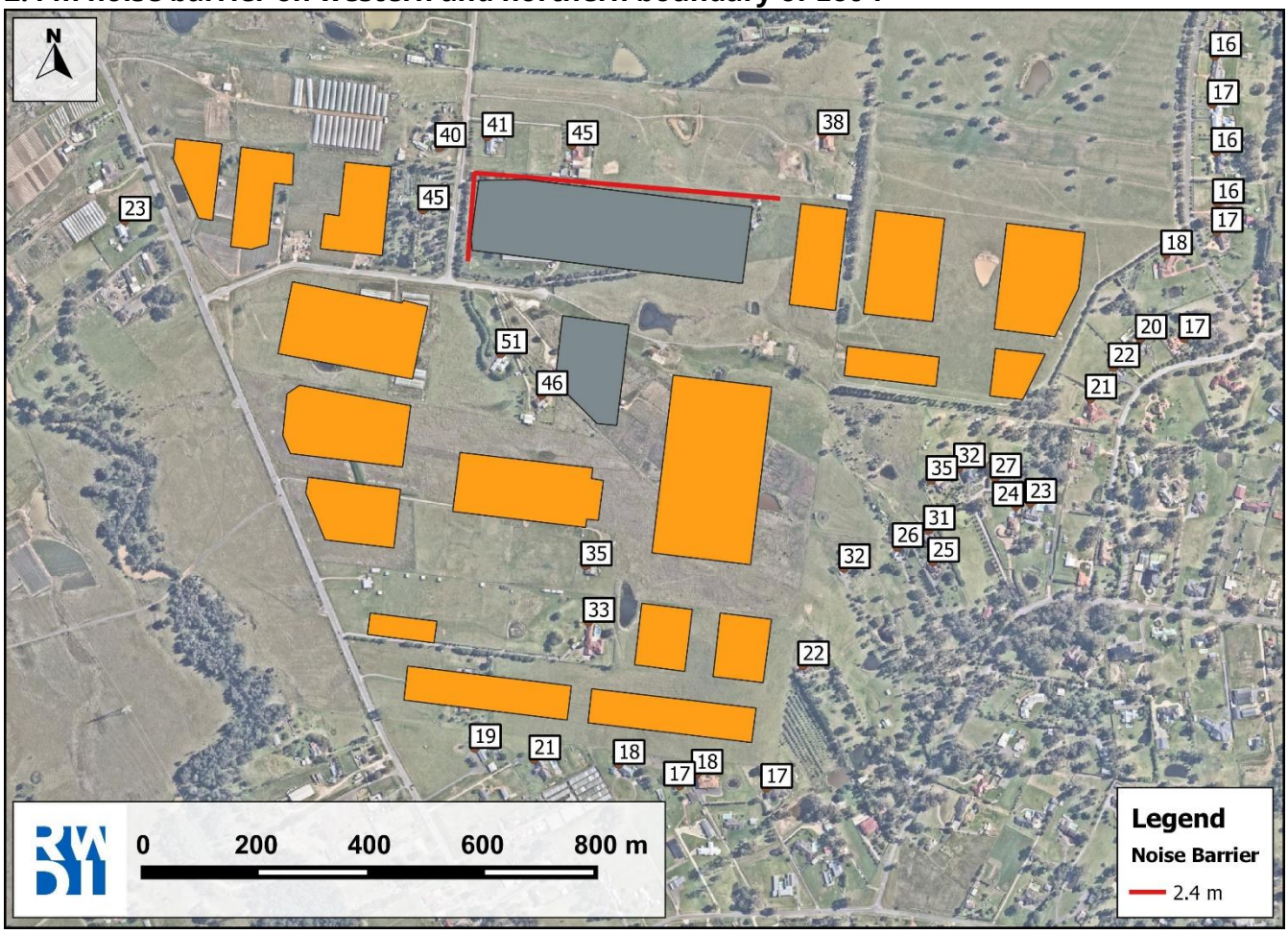
Noise Contour – Night (Adverse Met)



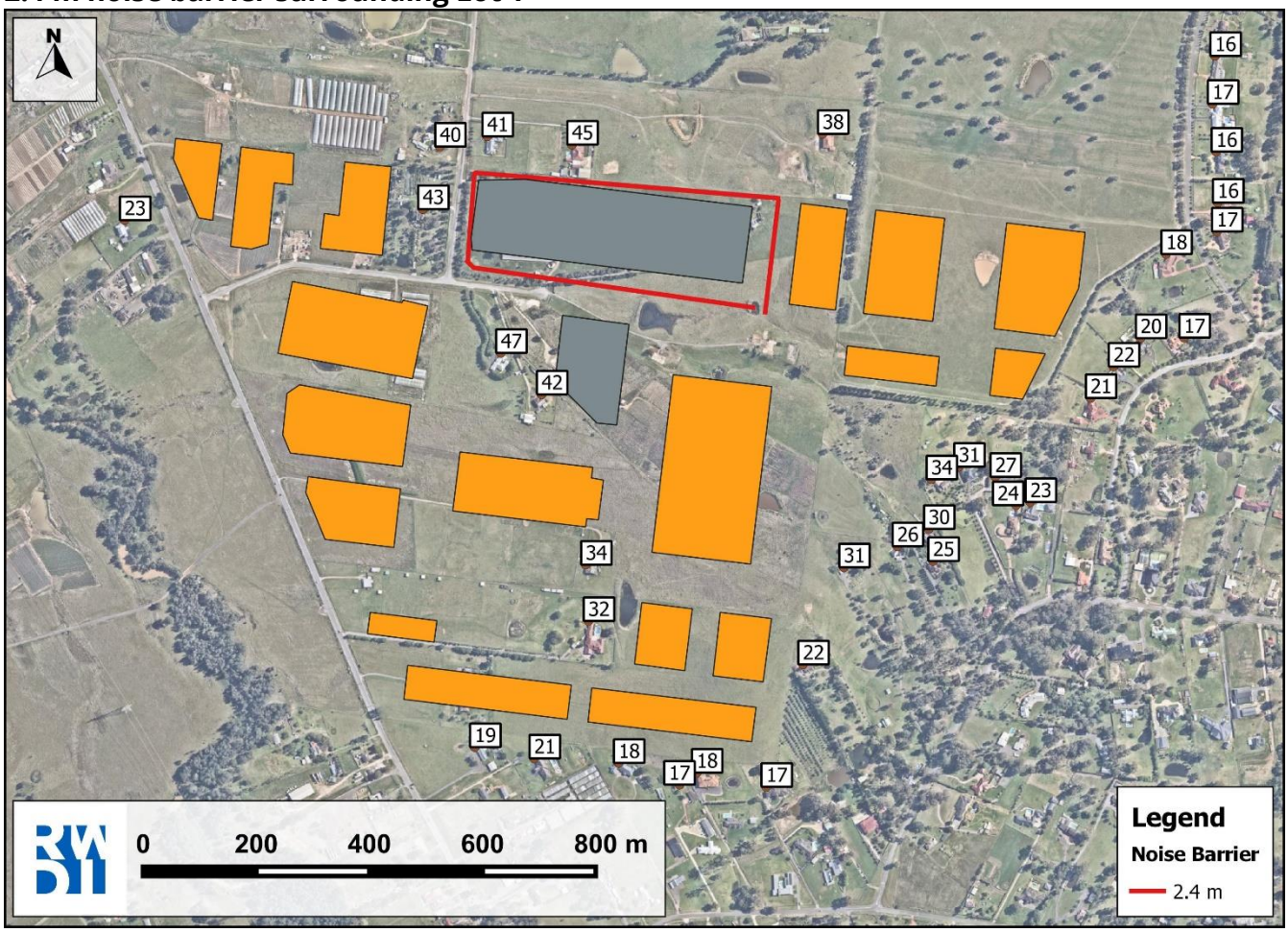
APPENDIX D

POTENTIAL OPERATIONAL NOISE MITIGATION

2.4 m noise barrier on western and northern boundary of Lot 1



2.4 m noise barrier surrounding Lot 1



2.5 m noise barrier on eastern boundary of estate

5 m noise barrier on eastern boundary of estate

10 m noise barrier on eastern boundary of estate