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DEVELOPMENT APPROVAL

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Queensland Government

NOISE ASSESSMENT

PROPOSED CHILDCARE CENTRE

LOT 852, AURA ESTATE

NIRIMBA

Prepared for:
Griffith Group

Prepared by:
MWA Environmental

5 December 2024

Max Winders & Associates Pty Ltd tas MWA Environmental
Level 7, 241 Adelaide St, Brisbane GPO BOX 3137, Brisbane Qld 4001
P 07 3002 5500 E mail@mwaenviro.com.au
W mwaenviro.com.au
ABN 94 010 833 084

DOCUMENT CONTROL SHEET

MWA Environmental
Level 7 241 Adelaide Street
GPO Box 3137 Brisbane 4001

Telephone: 07 3002 5500
Facsimile 07 3002 5588
Email: mail@mwaenviro.com.au

Job Name: Nirimba

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1.0 INTRODUCTION

1.1 STUDY BRIEF

MWA Environmental has been engaged to prepare a Noise Assessment for a proposed childcare centre development at Lot 852 Aura Estate, Nirimba. The report has been prepared to support a development application to Economic Development Queensland (EDQ).

This assessment has considered the potential noise amenity impact of the proposed childcare centre upon nearby sensitive land uses. The assessment is based on ambient noise monitoring conducted in the locality, noise measurements previously conducted on typical sources associated with the use and detailed noise propagation modelling.

The assessment also addresses the potential road traffic noise impact upon the childcare centre from adjoining proposed roadways. This assessment includes detailed computer noise modelling considering conservative estimates of design horizon traffic volumes.

1.2 SITE DESCRIPTION

The subject site is located at Lot 852 Aura Estate, Nirimba.

The subject site and adjoining land is currently undeveloped, with operational works underway through the precinct.

As per the overall precinct planning for Aura Estate, the site is intended for a childcare centre development. Nirimba Drive will be located to the west of the site, with a 25 metre wide local access roadway to be located to the north and 17.5 metre wide local access roadways to be located to the east and south. The intended residential allotments on land beyond roadways to the west, east and south of the site have been considered as noise sensitive receptors for the purpose of this assessment. Land to the north is intended to be developed as a neighbourhood centre.

The site location and surrounding land uses are shown on **Figure 1**.

1.3 PROPOSED DEVELOPMENT

The proposed development is for a single level, 130 place childcare centre with associated outdoor play areas and carparking. The development provides 38 car parking bays on the southern part of the site. Outdoor play areas are to the east, north and west of the childcare centre building.

The proposed development plan is included as **Attachment 1**.

The earthworks layout plan for the childcare centre site and adjacent roadways was provided by Egis Group[1].

The proposed operating hours for the childcare centre are 6am to 7pm Monday to Friday.

[1] *Aura – Precinct 11 "Innovative Precinct" Stage 1137 (Part) & 1135 (Part), Project No. 21-000307, dated 11.11.24, Revision A.*

2.0 EXISTING NOISE ENVIRONMENT

Noise measurements have been undertaken in the locality using a noise datalogger located to the south of the subject land over an 8 day period from 14 to 21 November 2024. The noise datalogger location was chosen as a representative location for likely ambient noise levels at the subject site and surrounding uses once the childcare centre, neighbourhood centre located to the north, residential uses surrounding and adjacent roadways including Nirimba Drive are fully developed. The statistical noise levels recorded by the noise datalogger are listed below in **Table 1**, with the free-field datalogger location shown on **Figure 2**.

The noise datalogger used was a Norsonic Nor139 with NATA calibration, programmed to provide statistical analysis results based on 15-minute sampling periods. The datalogger was pre-calibrated to 94 dB at 1kHz using a Bruel & Kjaer Sound Level Calibrator, Type 4231, and displayed a deviation of less than ±0.5 dB from this level at post-calibration. There was noted to be periods of rainfall during the noise monitoring period and thus the minimum recorded $L_{A90,1hr}$ noise level measured during the relevant periods on any weekday have been adopted for the purposes of setting noise criteria for the assessment.

The results of the datalogger noise monitoring are provided in **Table 1.** The recorded noise levels are presented as statistical components, which are described as:

L_{max}: Maximum noise level exceeded during the measurement period, referred to as the maximum sound pressure level.

L_{10}: Noise level exceeded for 10 percent of the measurement period, referred to as the averaged maximum sound pressure level.

L_{90}: Noise level exceeded for 90 percent of the measurement period. AS1055-2018[2] notes that the L_{90} is described as the background sound pressure level.

L_{eq}: An “average” measurement, and as per AS1055–2018 defined as the value of the sound pressure level of a continuous steady sound state, that within a measurement period, has the same mean square sound pressure as a sound under consideration whose level varies with time.

[2] Australian Standard *AS 1055-2018 Acoustics – Description and measurement of environmental noise*

Table 1: **Ranges of Recorded Noise Levels 14 to 21 November 2024**

PARAMETER	PERIOD	RECORDED NOISE LEVELS - dB(A)		
		MINIMUM	MAXIMUM	AVERAGE
L_{max}	Daytime (7am-6pm)	65.7	92.8	77.8
	Evening (6pm-10pm)	60.5	89.4	71.4
	Nighttime (10pm-7am)	44.4	85.3	67.8
L_{10}	Daytime (7am-6pm)	56.2	67.8	62.9
	Evening (6pm-10pm)	50.8	65.5	57.8
	Nighttime (10pm-7am)	36.8	65.0	51.5
L_{90}	Daytime (7am-6pm)	36.8	56.3	45.2
	Evening (6pm-10pm)	39.9	59.2	47.5
	Nighttime (10pm-7am)	32.6	52.0	40.4
L_{eq}	Daytime (7am-6pm)	52.8	67.2	59.7
	Evening (6pm-10pm)	47.8	62.5	55.3
	Nighttime (10pm-7am)	35.3	62.0	50.3

The datalogger recorded noise levels are included as graphical traces of noise level versus time for the statistical noise level descriptors L_{max}, L_{10}, L_{90} and L_{eq} as **Attachment 2**.

Key recorded statistical noise level parameters are presented below for weekdays only.

Minimum $L_{A90,1hr}$ noise level 6am to 7am = 46 dB(A)

Minimum $L_{A90,1hr}$ noise level 7am to 6pm = 42 dB(A)

Minimum $L_{A90,1hr}$ noise level 6pm to 7pm = 43 dB(A)

To provide a conservative assessment, the minimum 42 dB(A) $L_{A90,1hr}$ noise level recorded during the daytime period will also be adopted for the early morning 6am to 7am and early evening 6pm to 7pm periods.

3.0 NOISE IMPACT ASSESSMENT

3.1 RELEVANT NOISE CRITERIA

The proposed development is located within Precinct 11 of the Caloundra South Priority Development Area (PDA). Part 2.5.6 of the PDA Development Scheme requires that noise emissions impacting sensitive uses be managed and minimised generally in accordance with the *Environmental Protection (Noise) Policy 2008.*

3.1.1 ACOUSTIC QUALITY OBJECTIVES

The *Environmental Protection (Noise) Policy 2008* specifies Acoustic Quality Objectives for sensitive receptors to enhance or protect acoustic amenity. The applicable Acoustic Quality Objectives from Schedule 1 of the policy are presented in **Table 2.**

Table 2: Adopted Acoustic Quality Objectives

SENSITIVE RECEPTOR	PERIOD	ACOUSTIC QUALITY OBJECTIVES (MEASURED AT THE RECEPTOR) dB(A)			ENVIRONMENTAL VALUE
		($L_{Aeq,adj,1-hour}$)	($L_{A10,adj,1-hour}$)	($L_{A1,adj,1-hour}$)	
Dwelling (for outdoors)	7am to 10pm	50	55	65	Health and wellbeing
Dwelling (for indoors)	7am to 10pm	35	40	45	Health and wellbeing
	10pm to 7am	30	35	40	Health and wellbeing in relation to the ability to sleep

Previous experience with noise measurements conducted at similar facilities demonstrates that the most stringent of the Acoustic Quality Objective parameter for dwellings are the L_{Aeq} levels for each period of the day.

Comparison of the Acoustic Quality Objectives and the measured existing noise levels at the locality, as presented in **Table 1**, demonstrates that the Acoustic Quality Objectives are expected to be exceeded at the subject site. Therefore, the Acoustic Quality Objectives are not considered an appropriate basis for determination of project noise criteria to prevent environmental nuisance at surrounding residential land uses in this instance.

3.1.2 CONTROLLING BACKGROUND CREEP

Part 4, Section 10 of the *Environmental Protection (Noise) Policy (2008)* provides 'controlling background creep' noise criteria for the assessment of amenity impacts for an activity involving noise from the development (such as vehicle movements, car parking, outdoor play activity and mechanical plant and equipment). These 'background plus excess' noise criteria assess amenity impacts based upon the 'intrusiveness' of noise from the activity above the prevailing background noise.

Considering the nature of noise emissions from a childcare centre, the relevant 'controlling background creep' criteria are those specified for both 'continuous noise and noise that varies over time', as follows:

10 Controlling Background Creep

(1) This section states the management intent for an activity involving noise.

Note—

See section 51 of the Environmental Protection Regulation 2008.

(2) To the extent that it is reasonable to do so, noise from an activity must not be—

(a) for noise that is continuous noise measured by $L_{A90,T}$ – more than nil dB(A) greater than the existing acoustic environment measured by $L_{A90,T}$: or

(b) for noise that varies over time measured by $L_{Aeq,adj,T}$ - more than 5 dB(A) greater than the existing acoustic environment measured by $L_{A90,T}$.

As such, the adopted noise criteria for this assessment of noise impacts from the proposed development are that:

- the noise from **mechanical plant** (continuous steady-state noise) measured as the $L_{A90,adj,T}$ does not exceed the otherwise prevailing $L_{A90,T;}$ and
- the **overall noise** from the use measured as the $L_{Aeq,adj,T}$ including vehicle, carparking and outdoor play activities (noise that varies over time) does not exceed the otherwise prevailing $L_{A90,T}$ by more than 5 dB(A).

The applicable criteria, conservatively based upon minimum recorded Rating Background Levels, are presented in **Table 3**.

Table 3: Adopted Background Creep Noise Criteria

Period	Background Noise Level (L_{A90}) – dB(A)	Mechanical Plant Noise Criteria (L_{A90}) – dB(A)	Overall Noise Criteria (L_{Aeq}) – dB(A)
Daytime (7:00am to 6:00pm)	42	**42**	**47**
Early Evening (6:00pm to 7:00pm)	42	**42**	**47**
Early Morning (6:00am to 7:00am)	42	**42**	**47**

3.1.3 SLEEP DISTURBANCE

As the development will operate during the night period (early morning 6am to 7am), it is appropriate to consider the potential for sleep disturbance at nearby sensitive receptors. Queensland *Ecoaccess Guideline: Noise - Planning for Noise Control* (2016) indicates that unreasonable sleep disturbance impacts due to maximum instantaneous noise levels from events such as car starts and door slams can occur at levels of 45 to 50 dB(A) within a bedroom, depending upon the number of noise events per night. Consideration of potential sleep disturbance noise criteria should also give regard to the existing noise environment i.e. whether existing noise from vehicles on public roads results in noise levels above the default planning criteria.

An internal sleep disturbance noise criterion of 45 dB(A) L_{Amax} within a bedroom has been conservatively adopted for assessment of noise peaks from the development during the 6am to 7am night period. Adopting a typical 7[3] dB(A) noise reduction through an open window relates to a **sleep disturbance criterion of L_{Amax} 52 dB(A) external to a bedroom window**.

[3] AS3671 states approximate 10 dB(A) noise reduction through a façade with 10% open area. Thus approximately 7 dB(A) noise reduction through a façade with 20% open area. A large 1200x1800 sliding window relates to approximately 10% open area. A large 2100x2300 sliding glass door represents approximately 20% open area. Thus, 7dB(A) noise reduction is conservatively adopted based upon a large sliding glass door in the affected façade. Openings larger than 20% open area are unlikely to be necessary for ventilation during the night period.

3.2 NEAREST NOISE SENSITIVE RECEPTORS

The overall precinct planning for Aura Estate has been used to determine locations of the nearest surrounding sensitive land uses, which are future residential uses intended on land to the west, east, southeast and south of the proposed childcare centre site. The following receptor locations have been identified and considered as noise sensitive receptors for the purposes of this assessment:

- R1: Future residential uses on land to the east of the subject site, across a proposed roadway.
- R2: Future residential uses on land to the southeast of the subject site, across a proposed roadway and park land.
- R3: Future residential uses on land to the south of the subject site, across a proposed roadway.
- R4: Future residential uses on land to the west of the subject site, across Nirimba Drive.

The nominated receptors are shown on an aerial image base on **Figure 3**.

Two storey receptor heights have been considered for all surrounding future residential receptors.

In the noise model, the receiver point locations were placed at indicative minimum residential building setbacks from future residential allotment boundaries.

3.3 MECHANICAL PLANT NOISE

No detailed specification for external mechanical plant associated with the development is available at this stage. However, external mechanical plant is likely to include split system air-conditioning units and exhaust fans for the kitchen and amenities.

The appropriate noise criteria for the assessment of plant noise impact from any external plant and equipment is 42 dB(A) for the approved operating hours.

The relevant noise criteria apply to surrounding sensitive land uses which include future residential uses to the west, east, southeast and south. Any mechanical plant and equipment associated with the development should thus be selected, located and acoustically treated and/or shielded to achieve the relevant noise criteria.

The relevant noise criteria do not necessarily apply to a single item of plant, but rather should constitute the additive noise component levels of all plant and equipment in operation during the assessed period, measured at the nearest sensitive receptors.

Experience dictates that appropriate modern air conditioning and exhaust ventilation systems achieve noise emission levels capable of ensuring that residential amenity is not adversely impacted by the required plant and equipment.

Indicative air-conditioning plant have been considered in the overall noise modelling assessment presented in **Section 4.3** and are noted to readily comply with the identified noise criteria for mechanical plant noise at all surrounding residential uses.

More detailed assessment of acoustic treatments required for the plant and equipment installations should be undertaken at the detailed design stage of the development. Experience with many other similar developments and given the proximity to sensitive land uses dictates that appropriate noise controls are feasible to ensure that plant and equipment can achieve the noise limits. This is considered a matter for future detailed design and can be readily conditioned in a development approval.

3.4 TIME VARYING NOISE ASSESSMENT

Noise emissions from carparking, vehicles, servicing and outdoor play areas associated with the proposed childcare centre have been assessed using the SoundPLAN 9.0 computer noise model.

The source noise levels for the childcare outdoor play area were determined using the *Association of Australian Acoustical Consultants Technical Guideline Child Care Centre Noise Assessment* (September 2020, Version 3).

As per the guideline, the noise levels of children playing can vary depending on the age of the children and the type of activity. Sound power levels of children are presented in the guideline as per **Table 4** below.

Table 4: Typical Sound Power Levels for Children Playing as per AAAC Technical Guideline

AGE GROUP	NUMBER OF CHILDREN	SOUND POWER LEVEL DB(A) ($L_{EQ\ 15MIN}$)
0 to 2 years	10	78
2 to 3 years	10	85
3 to 5 years	10	87

Assessment noise emissions from outdoor play areas has been conservatively based upon an indicative 75% outdoor play area occupation coinciding with peak carparking activity during the 7am to 6pm period. For the early morning 6am to 7am and early evening 6pm to 7pm, attendance will be lower and an indicative 25% outdoor play area occupation has been considered.

The relevant outdoor play area sound power level for the proposed development is:

Classrooms 1 and 2, 24 children (0-2 years):	81.8 dB(A) SWL
Classrooms 4 and 5, 40 children (2-3 years):	91.0 dB(A) SWL
Classrooms 6, 7 and 8, 66 children (4-5 years):	95.2 dB(A) SWL
TOTAL outdoor play noise level, 130 children:	**96.7 dB(A) SWL**

The noise from outdoor play was modelled as an area source in the SoundPLAN noise model.

The modelled peak hour traffic volumes through the site have been based on traffic engineering advice provided by Q Traffic Engineering Consultants, the project traffic engineers. The peak traffic through site is projected to be as follows:

AM Peak:	86 trips per hour (total in and out)
PM Peak:	63 trips per hour (total in and out)

For the purpose of the noise modelling, the childcare centre traffic has been conservatively assessed as a peak hour traffic of 86 trips per hour between 7am and 6pm. Additionally, 25% of the daytime peak has been considered for the early morning 6am to 7am and early evening 6pm to 7pm periods.

Servicing of the centre will generally be via vans which do not generate materially different noise to passenger vehicles. The modelled trip volumes adequately account for van deliveries of approximately 2 per day which are unlikely to coincide with peak drop off and pick up periods.

Refuse collections are not likely to coincide with peak hour traffic through the development. Typically, 2 to 3 refuse collections per week are likely to occur for childcare centres with the overall noise amenity impact negligible.

Carparking vehicle movements were represented as a line[4] source with the following sound power levels:

6am to 7am and 6pm to 7pm:	L_{Aeq} 62 dB(A)/m[5] SWL
7am to 6pm:	L_{Aeq} 68 dB(A)/m[6] SWL
All hours:	L_{Amax} 89 dB(A) SWL

For carparking noise the parking lot area source was represented in the model for car parking areas with source noise levels based upon peak parking rates of 86 vehicle movements per hour during the day and 22 vehicle movements per hour during the early evening and early morning periods. These parking rates are consistent with the adopted carpark trips for each period of the day.

Noise emissions from external mechanical plant have been represented as point sources as follows:

Air-Conditioning Units (x2):	L_{Aeq} 73 dB(A) SWL

[4] moving point source

[5] Based upon an instantaneous maximum level of 89 dB(A) and an average speed of 10 km/h extrapolated to represent 22 vehicle movements as the peak hour between 6am and 7am and 6pm and 7pm.

[6] Based upon an instantaneous maximum level of 89 dB(A) and an average speed of 10 km/h extrapolated to represent 86 vehicle movements as the peak hour between 7am to 6pm.

The air-conditioning units have been represented at the court area located adjacent the southern façade of the childcare centre building.

The noise modelling has included existing topographical representations for surrounding areas, along with design earthworks levels for the site and adjacent roadways. The noise modelling has considered the childcare centre building, access driveway, carparking areas and outdoor play areas as per the development application plan included as **Attachment 1**.

The assessment has determined whether overall noise levels from the vehicle movements through the site, car parking activities, outdoor play area noise and mechanical plant noise will comply with the noise criteria as per **Section 3.1** at the nearest surrounding sensitive receptors.

To satisfy the noise criteria at the nearest surrounding residential land uses, a **2.0 metre high acoustic barrier is recommended to the east, south and west perimeters of the eastern part of the proposed outdoor play area.**

The proposed acoustic barriers are presented on **Figure 4**.

The acoustic barrier elements should be gap free and constructed of materials achieving a minimum surface density of 12.5kg/m^2.

The predicted noise levels at the nearest surrounding residences are summarised in **Table 5** below.

The results of the overall development noise modelling are also presented in **Attachment 3** as contours of the predicted L_{Aeq} and L_{Amax} noise levels across the model domain.

Table 5: **Predicted Noise Levels – Overall Development Noise**

RECEPTOR	FLOOR LEVEL	PREDICTED NOISE LEVEL L_{Aeq} dB(A) 7AM-6PM	PREDICTED NOISE LEVEL L_{Aeq} dB(A) 6AM-7AM / 6PM-7PM	PREDICTED NOISE LEVEL L_{Amax} dB(A) 6AM-7AM
R1	Ground	44	39	41
	Upper	47	43	44
R2	Ground	39	35	40
	Upper	42	37	40
R3a	Ground	44	40	50
	Upper	47	43	50
R3b	Ground	44	41	51
	Upper	46	42	51
R3c	Ground	44	41	51
	Upper	45	41	51
R4a	Ground	43	38	47
	Upper	43	39	47
R4b	Ground	45	41	47
	Upper	46	41	47
CRITERIA		**47**	**47**	**52**

The predicted resultant noise levels satisfy the relevant noise criteria at the nearest surrounding residential uses with the recommended acoustic barriers. Two storey residential uses have been considered on the nearest land uses intended for residential development on land to the west, east, southeast and east of the site. In the noise model, the receiver point locations were placed at typical minimum residential building setbacks from residential allotment boundaries. All other surrounding sensitive land uses are predicted to experience lower noise levels than those summarised in **Table 5**.

4.0 ROAD TRAFFIC NOISE ASSESSMENT

4.1 TRAFFIC NOISE CRITERIA

Evolve Planning has advised that the following acoustic considerations are relevant to the Childcare Centre development with reference to the Plan of Development (PoD) approved by Economic Development Queensland (EDQ):

- *Buildings are to meet the requirements of Australian Standard 2107:2016 Acoustics - Recommended noise and reverberation design criteria within buildings to ensure a healthy, comfortable and productive environment for the occupants and users.*

- *The external noise criteria at all facades of the building envelope shall be ≤58 dB(A) L10 (1 hour) façade corrected (maximum hour during normal opening hours), and*

- *The external noise criteria in each outdoor education area or outdoor play area shall be ≤63 dB(A) L10 (12 hour) free field (between 6am and 6pm).*

MWA Environmental notes that the 58 dB(A) $L_{10\ (1\ hour)}$ noise criterion level at building facades is drawn from PO45 of State Code 1 SDAP v3.1. This criterion has previously been shown to not directly address road traffic noise amenity at indoor or outdoor educational areas and has been deemed by SARA on other projects as non-essential to achieve the Purpose Statement of State Code 1.

Based on experience in conducting road traffic noise assessments for similar developments, it is not considered appropriate to construct large walls around the childcare building to achieve a noise criterion level at building facades (i.e. 58 dB(A) $L_{10\ (1\ hour)}$) <u>and</u> to also acoustically treat the building facades to achieve relevant internal noise criteria (i.e. AS2107:2016). It is considered that achievement of the relevant traffic noise criteria at outdoor play areas and at internal childcare spaces such as play and sleeping areas will ensure that suitable traffic noise amenity is provided to occupants. As such, the following traffic noise criteria have been adopted for this assessment:

Outdoor play areas:	***≤63 dB(A) $L_{10\ (12\ hour)}$ free field (6am and 6pm)***
Indoor play and sleeping areas:	***35 dB(A) $L_{Aeq\ (1\ hour)}$ façade reflection adjusted***

4.2 TRAFFIC VOLUME DATA

Given that the adjacent roadways have not yet been constructed, estimates of design horizon traffic volumes for adjacent roadways have been used for the purposes of this assessment. It is considered that the traffic volumes adopted for this assessment are conservative and actual traffic volumes will likely be lower than those considered in the traffic noise modelling.

Future traffic volumes for Nirimba Drive to the west of the site have been estimated by BDO Australia to be approximately 1,400 vehicles per based upon the latest version of the traffic models provided by Scyne. BDO Australia further advised that modelling provided by TMR, noted to be based upon erroneous land use assumptions that result in over-forecasting of traffic volumes, related to up to 3,000 vehicles per day on Nirimba Drive. To provide a conservative assessment, the higher 3,000 vehicles per day has been adopted for Nirimba Drive.

It is considered that other roadways adjacent the site to the north, east and south will carry lower traffic volumes than Nirimba Drive. There were no available relevant estimates for ultimate traffic volumes for these roadways however conservative volumes have been adopted for the purposes of this assessment. A volume of 1,500 vehicles per day has been adopted for the adjacent roadway to the north of the site and volumes of 1,000 vehicles per day have been adopted for the adjacent roadways to the east and south of the site.

The commercial vehicle percentage was modelled as 3.0% for all adjacent roadways which is considered conservative for typical local access roadways

In accordance with typical assumptions, the estimated daily volumes were converted to 1 hour peak hour traffic volumes as 10% of the daily volume and 12 hour (6am to 6pm) traffic volumes as 75% of the daily volume.

The relevant traffic volumes for adjacent roadways past the proposed childcare centre site are summarised in **Table 6**.

Table 6: **Design Horizon Traffic Volumes Used for Assessment**

ROADWAY	ESTIMATED DESIGN HORIZON TRAFFIC VOLUMES			ASSESSED SPEED LIMIT (KM/HR)	ASSESSED CV%
	Daily Traffic Volume	Peak Hour Traffic Volume	12hr 6am to 6pm Traffic Volume		
Nirimba Drive	3,000	300	2,250	60	3
Roadway to North of Site	1,500	150	1,125	50	3
Roadway to East of Site	1,000	100	750	50	3
Roadway to South of Site	1,000	100	750	50	3

4.3 TRAFFIC NOISE MODELLING

Road traffic noise levels from Nirimba Drive and adjacent local roadways proposed to the north, east and south of the site have been predicted using the SoundPLAN 9.0 computer noise model applying the CoRTN methodology for traffic noise prediction. This method is accepted by regulatory bodies in Queensland.

The earthworks layout plan for the childcare centre site and adjacent roadways was provided by Egis Group[7] and has been considered in the traffic noise modelling.

Adjustment of CoRTN predictions has been made for Australian roads as per the Department of Transport and Main Roads - *Transport Noise Management Code of Practice*. Corrections of -0.7 dB for free-field predictions and -1.7 dB for façade adjusted predictions have been applied.

The traffic noise modelling has considered the proposed building structure and outdoor play area locations as per the development application plan included as **Attachment 1**. The traffic noise modelling has also considered the recommended acoustic barriers as described in **Section 3.4** and shown on **Figure 4**.

The traffic noise model was used to predict $L_{10\ (12\ hour)}$ traffic noise levels at outdoor play areas for assessment against the adopted 63 $L_{10\ (12\ hour)}$ traffic noise criterion. The graphical noise contours of the predicted $L_{10\ (12\ hour)}$ traffic noise levels at outdoor play areas are presented in **Attachment 4** and demonstrate that the 63 dB(A) $L_{10\ (12\ hour)}$ free field noise level will be achieved at all proposed outdoor play areas.

Assessment has also been conducted to determine measures required to achieve suitable internal noise amenity such that the childcare centre indoor educational, sleeping and play areas are designed and constructed to achieve maximum internal noise level of 35 dB(A) $L_{eq\ (1\ hour)}$.

The SoundPLAN model was used to predict the external $L_{eq\ (1\ hour)}$ traffic noise levels[8] for the exposed indoor educational, sleeping and play areas facades under conservative estimated design horizon traffic flow conditions for Nirimba Drive and other adjacent roadways to the north, east and south.

A summary of the predicted traffic noise levels external to proposed educational, sleeping and play areas of the proposed childcare centre is provided in **Table 7** below including a summary of the required façade transport noise reduction to achieve an indoor noise level of 35 dB(A) $L_{eq\ (1\ hour)}$.

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[7] *Aura – Precinct 11 "Innovative Precinct" Stage 1137 (Part) & 1135 (Part), Project No. 21-000307, dated 11.11.24, Revision A.*

[8] Adjustment from $L_{A10(1\ hour)}$ to $L_{Aeq\ (1hour)}$ as per CoRTN methodology

Table 7: **Traffic Noise Level Predictions**
Childcare Centre Façades (Includes Façade Reflection)

Room	Façade	Predicted External Noise Level $L_{Aeq,1hr}$ dB(A)*	Façade Transport Noise Reduction Required To Achieve 35 dB(A) $L_{Aeq,1hr}$ Criteria at Indoor Education/Sleeping Areas
Classroom 1	North	58	23
Classroom 2	North	57	22
Classroom 4	North	57	22
Classroom 5	North	56	21
Classroom 6	North	56	21
Classroom 7	North	56	21
Classroom 8	East	51	16
	North	55	20
	South	51	16
Sleep room	West	59	24
Yoga room	North	57	22

*façade reflection adjusted

As such, in order to achieve appropriate internal traffic noise levels, childcare building facades to indoor activity and sleeping rooms will need to achieve traffic noise reductions of up to 24 dB(A).

Australian Standard AS3671-1989 – Acoustics – Road traffic noise intrusion – Building siting and construction states that a traffic noise reduction of approximately 25 dB(A) is expected through standard construction materials, with doors and windows closed. Therefore, no specific acoustic upgrades are required in this instance by the relevant Australian Standard. Notwithstanding, it is **recommended that glazing (doors and windows) to educational and sleeping rooms be specified to achieve minimum Rw 27** which will assist in minimising road traffic noise intrusion and noise breakout from internal childcare spaces.

Otherwise, standard construction materials will suffice, with the provision of mechanical ventilation and/or air-conditioning allowing doors and windows to be shut as deemed appropriate by staff.

5.0 CONCLUSION

MWA Environmental has been engaged to prepare a Noise Assessment for a proposed childcare centre development at Lot 852 Aura Estate, Nirimba. The report has been prepared to support a development application to Economic Development Queensland (EDQ).

This assessment has considered the potential noise amenity impact of the childcare centre upon nearby sensitive receptors. The assessment has also addressed the potential road traffic noise impact upon the childcare centre from adjoining roadways.

To satisfy the noise criteria at the nearest surrounding residential land uses, a **2.0 metre high acoustic barrier is recommended to the east, south and west perimeters of the eastern part of the proposed outdoor play area.**

The proposed acoustic barriers are presented on **Figure 4**.

The acoustic barrier elements should be gap free and constructed of materials achieving a minimum surface density of 12.5kg/m^2.

Traffic noise levels using conservative estimates of design horizon traffic volumes on adjacent roadways were predicted at outdoor play areas and external to childcare centre facades. The traffic noise modelling demonstrated that the relevant outdoor play area noise criterion will be satisfied without any requirement for acoustic barriers.

It is **recommended that glazing (doors and windows) to educational and sleeping rooms be specified to achieve minimum Rw 27** which will assist in minimizing road traffic noise intrusion and noise breakout from the internal spaces. Otherwise, standard construction materials will suffice, with the provision of mechanical ventilation and/or air-conditioning allowing doors and windows to be shut as deemed appropriate by staff.

The noise assessment undertaken demonstrates that the development will satisfy the relevant noise amenity criteria subject to provision of the recommended acoustic barriers and minimum glazing specifications.

MWA Environmental
5 December 2024

FIGURES

LEGEND

SITE LOCATION

DRAWING REFERENCE

© THE STATE OF QUEENSLAND (DEPARTMENT OF RESOURCES) QLDGLOBE.

CLIENT

GRIFFITH GROUP

PROJECT

NOISE ASSESSMENT

PROPOSED CHILDCARE CENTRE DEVELOPMENT LOT 852, AURA ESTATE NIRIMBA QLD

TITLE

SITE LOCATION AND SURROUNDING LAND USES

JOB	NIRIMBA	FIGURE 1
JOB NO.	24132	
DATE	05/12/24	DWG NUMBER
SCALE	1:3000 (A4)	24132-1
REV.		

Max Winders & Associates Pty Ltd tas MWA Environmental
Level 7, 241 Adelaide St, Brisbane. GPO BOX 3137, Brisbane Qld 4001
P 07 3002 5500 E email@mwaenviro.com.au
W www.mwaenviro.com.au
ABN 94 010 833 084

LEGEND

SITE LOCATION

NOISE DATALOGGER LOCATION

DRAWING REFERENCES

- © THE STATE OF QUEENSLAND (DEPARTMENT OF RESOURCES) QLDGLOBE.
- URBIS, JOB P0004909, AURA - PRECINCT 11,12&14 (PARTS), RECONFIGURING OF A LOT-OVERALL PLAN. DWG ROL-00, 11.06.2024.

0 10 20 30 40 50m

CLIENT

GRIFFITH GROUP

PROJECT

NOISE ASSESSMENT

PROPOSED CHILDCARE CENTRE DEVELOPMENT LOT 852, AURA ESTATE NIRIMBA QLD

TITLE

NOISE MONITORING LOCATION

JOB	NIRIMBA	FIGURE 2
JOB NO.	24132	
DATE	05/12/24	DWG NUMBER
SCALE	1:1500 (A4)	24132-2
REV.		

Max Winders & Associates Pty Ltd tas MWA Environmental
Level 7, 241 Adelaide St, Brisbane. GPO BOX 3137, Brisbane Qld 4001
P 07 3002 5500 E email@mwaenviro.com.au
W www.mwaenviro.com.au
ABN 94 010 833 084

LEGEND

- SITE LOCATION
- SENSITIVE RECEPTOR LOCATIONS (R1-R4b)

DRAWING REFERENCES

- © THE STATE OF QUEENSLAND (DEPARTMENT OF RESOURCES) QLDGLOBE.
- URBIS, JOB P0004909, AURA - PRECINCT 11,12&14 (PARTS), RECONFIGURING OF A LOT-OVERALL PLAN. DWG ROL-00, 11.06.2024.

0 10 20 30 40 50m

CLIENT
GRIFFITH GROUP

PROJECT

NOISE ASSESSMENT

PROPOSED CHILDCARE CENTRE DEVELOPMENT LOT 852, AURA ESTATE NIRIMBA QLD

TITLE

SENSITIVE RECEPTOR LOCATIONS

JOB	NIRIMBA	FIGURE 3
JOB NO.	24132	
DATE	05/12/24	DWG NUMBER
SCALE	1:1500 (A4)	24132-3
REV.		

mwa ENVIRONMENTAL

Max Winders & Associates Pty Ltd tas MWA Environmental
Level 7, 241 Adelaide St, Brisbane. GPO BOX 3137, Brisbane Qld 4001
P 07 3002 5500 E email@mwaenviro.com.au
W www.mwaenviro.com.au
ABN 94 010 833 084

LEGEND

2.0m BARRIER HEIGHT ACOUSTIC BARRIER

0 5 10m

CLIENT
GRIFFITH GROUP

PROJECT

NOISE ASSESSMENT

PROPOSED CHILDCARE CENTRE DEVELOPMENT LOT 852, AURA ESTATE NIRIMBA QLD

TITLE

ACOUSTIC BARRIER LOCATIONS

JOB	NIRIMBA	FIGURE 4
JOB NO.	24132	
DATE	05/12/24	DWG NUMBER
SCALE	1:400 (A4)	24132-4
REV.		

Max Winders & Associates Pty Ltd tas MWA Environmental
Level 7, 241 Adelaide St, Brisbane. GPO BOX 3137, Brisbane Qld 4001
P 07 3002 5500 E mail@mwaenviro.com.au
W www.mwaenviro.com.au
ABN 94 010 833 084

elevation architecture

Contact
(07) 3251 6900
20 Prospect St, Fortitude Valley QLD 4006
info@elevationarchitecture.com.au

Revision

A	Consultant Coordination Issue	5/11/2024
B	Consultant Coordination Issue	8/11/2024

Project Aura Early Learning Centre, Nirimba Drive, Nirimba

Client Griffith Group

Stage Development Application

Status Preliminary NOT FOR CONSTRUCTION

Architect BL

Drawn AM

Project No. 1149-33

Scale 1:200 at A1

Site Context Plan

A-DA-01.02 B

Attachment 1

Development Application Plan

elevation architecture

Contact
(07) 3251 6900
20 Prospect St, Fortitude Valley QLD 4006
info@elevationarchitecture.com.au

Revision

A	Consultant Coordination Issue	5/11/2024
B	Consultant Coordination Issue	8/11/2024

Project
Aura Early Learning Centre
Nirimba Drive, Nirimba

Client
Griffith Group

Stage
Development Application

Status
Preliminary
NOT FOR CONSTRUCTION

Architect
BL

Drawn
AM

Project No.
1149-33

Scale
1:200 at A1

Site Context Plan

A-DA-01.02

B

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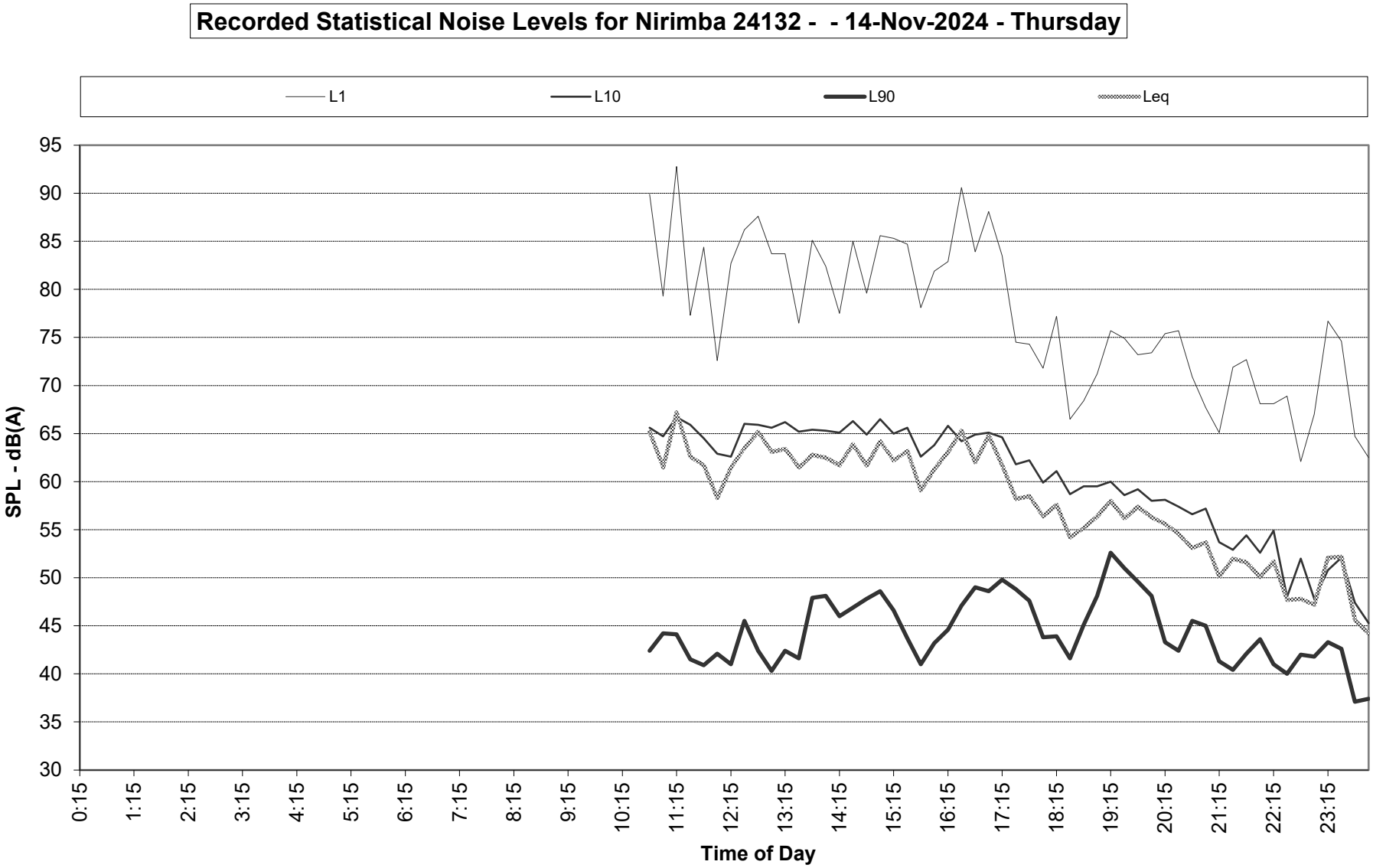
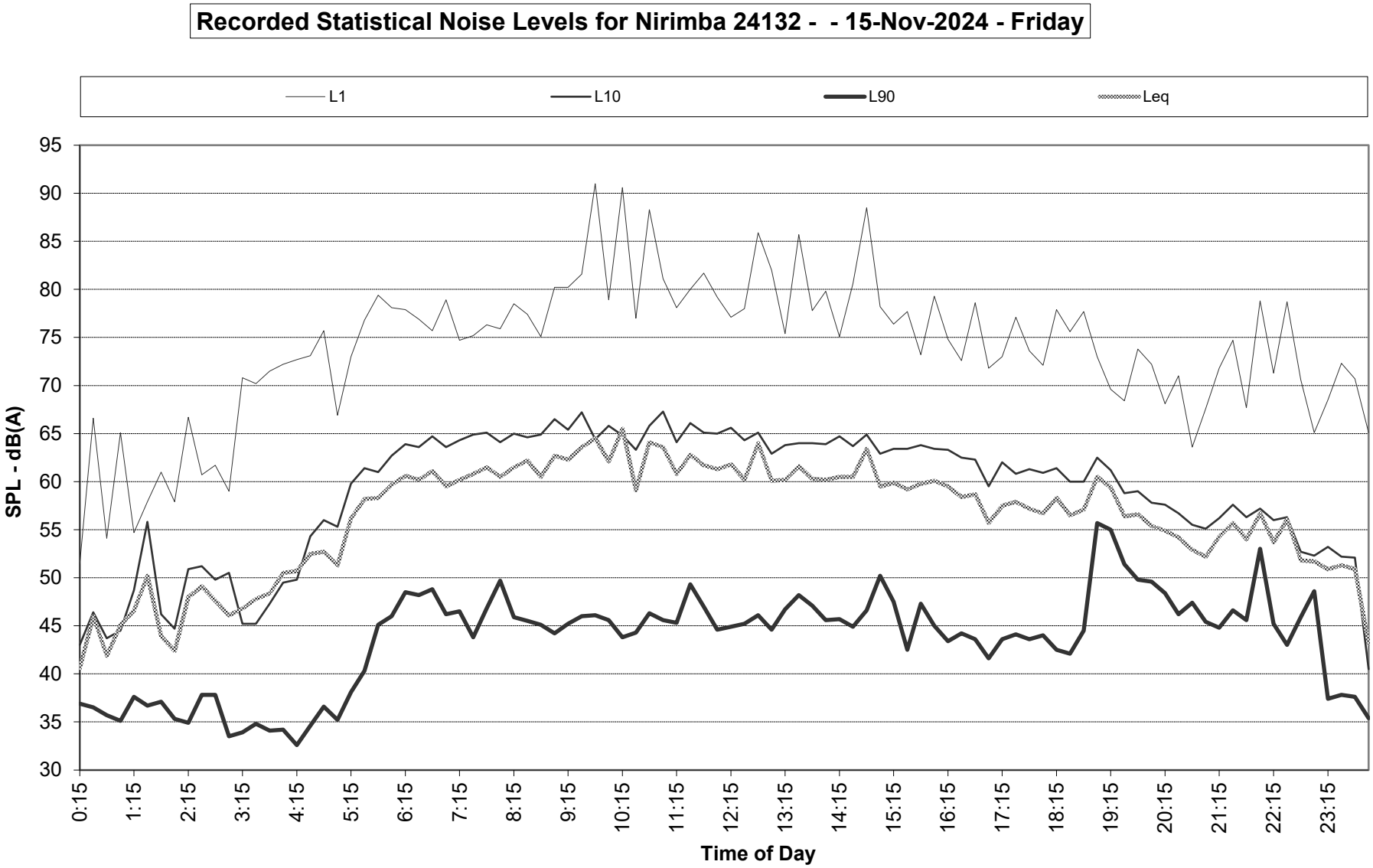
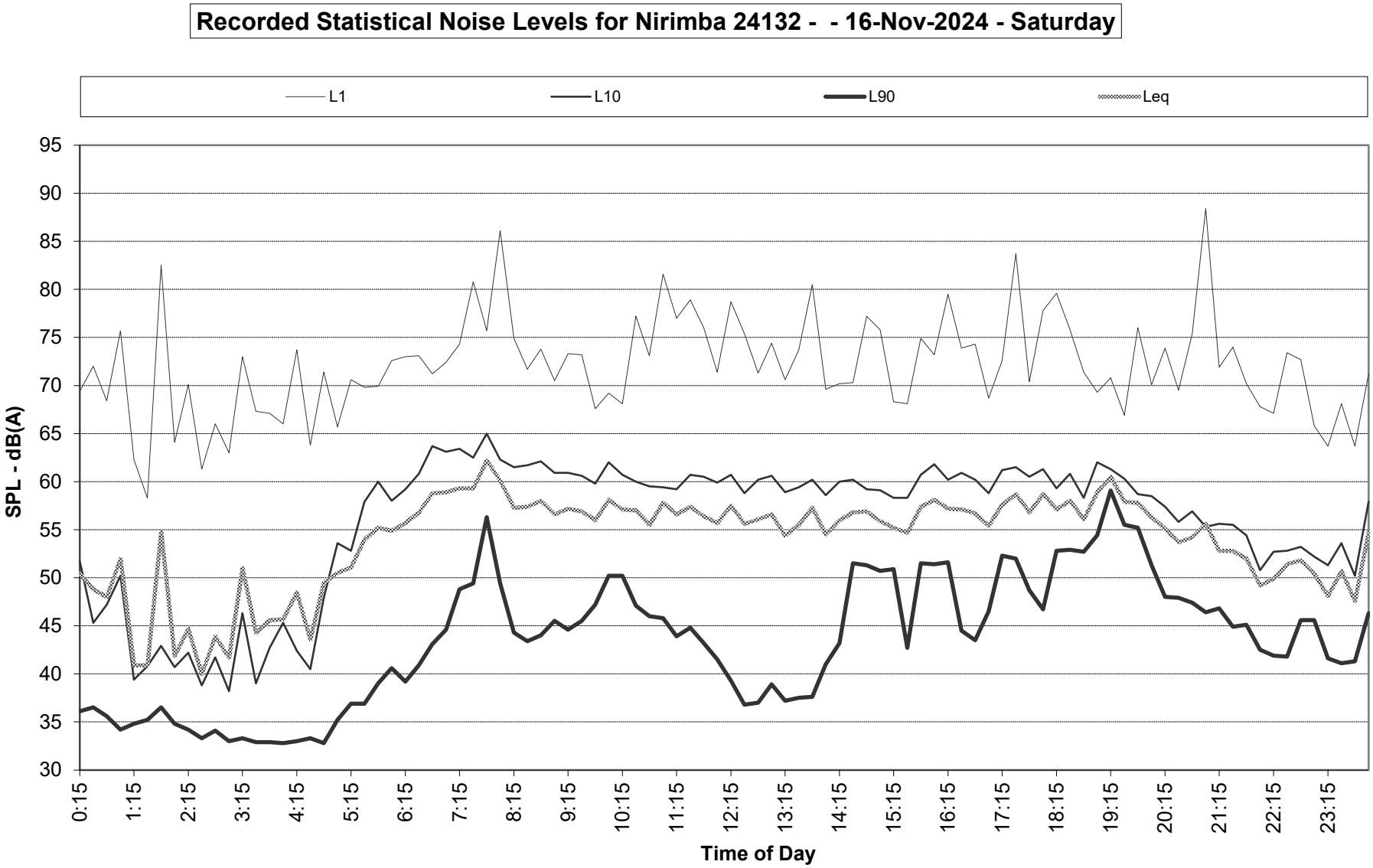
P:\Data 1\1149-33 Aura Early Learning Centre\5.2 Development Application\1149-33_Master DA 27 - Verandah.pln

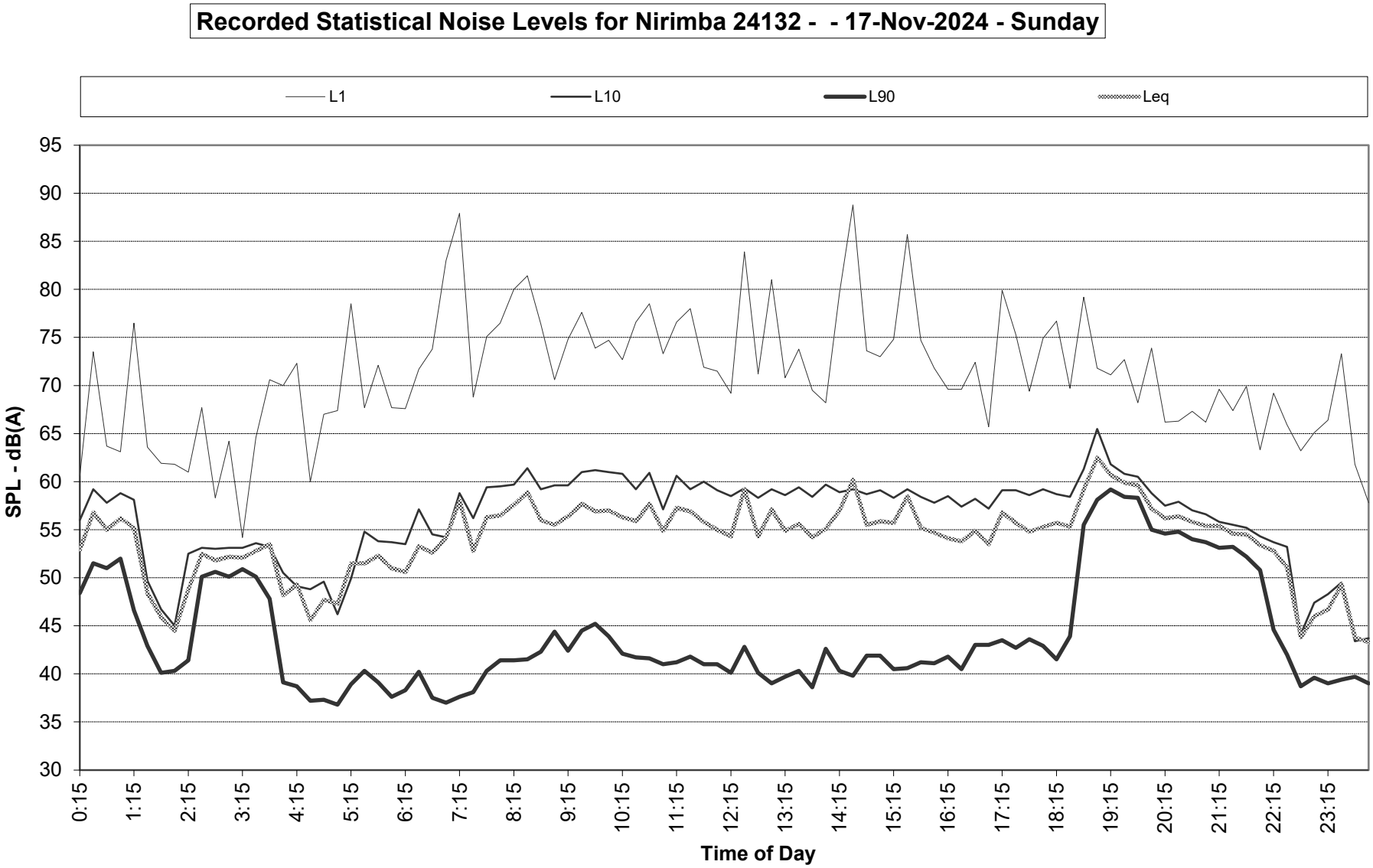
Attachment 2

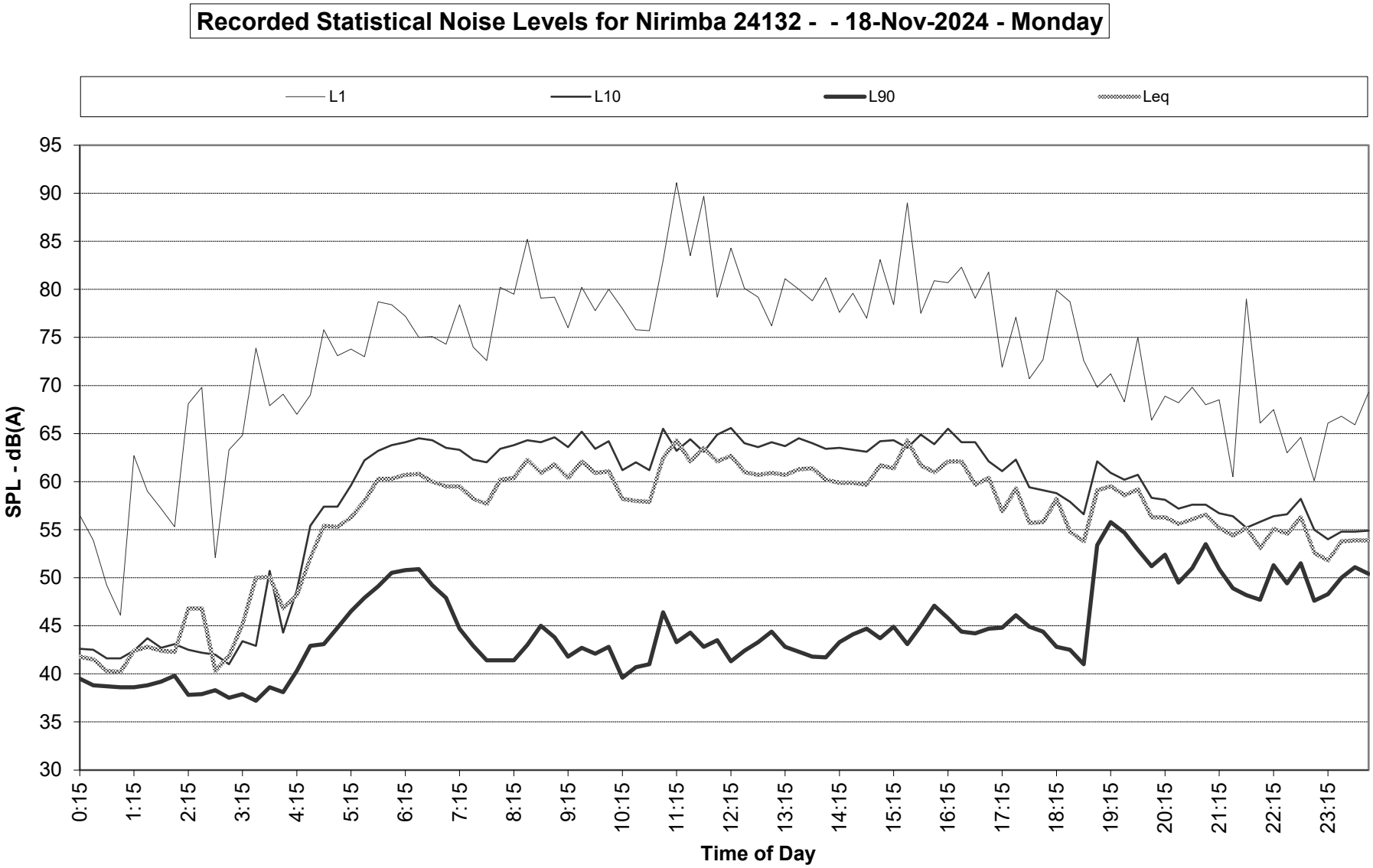
Noise Data Logger Results

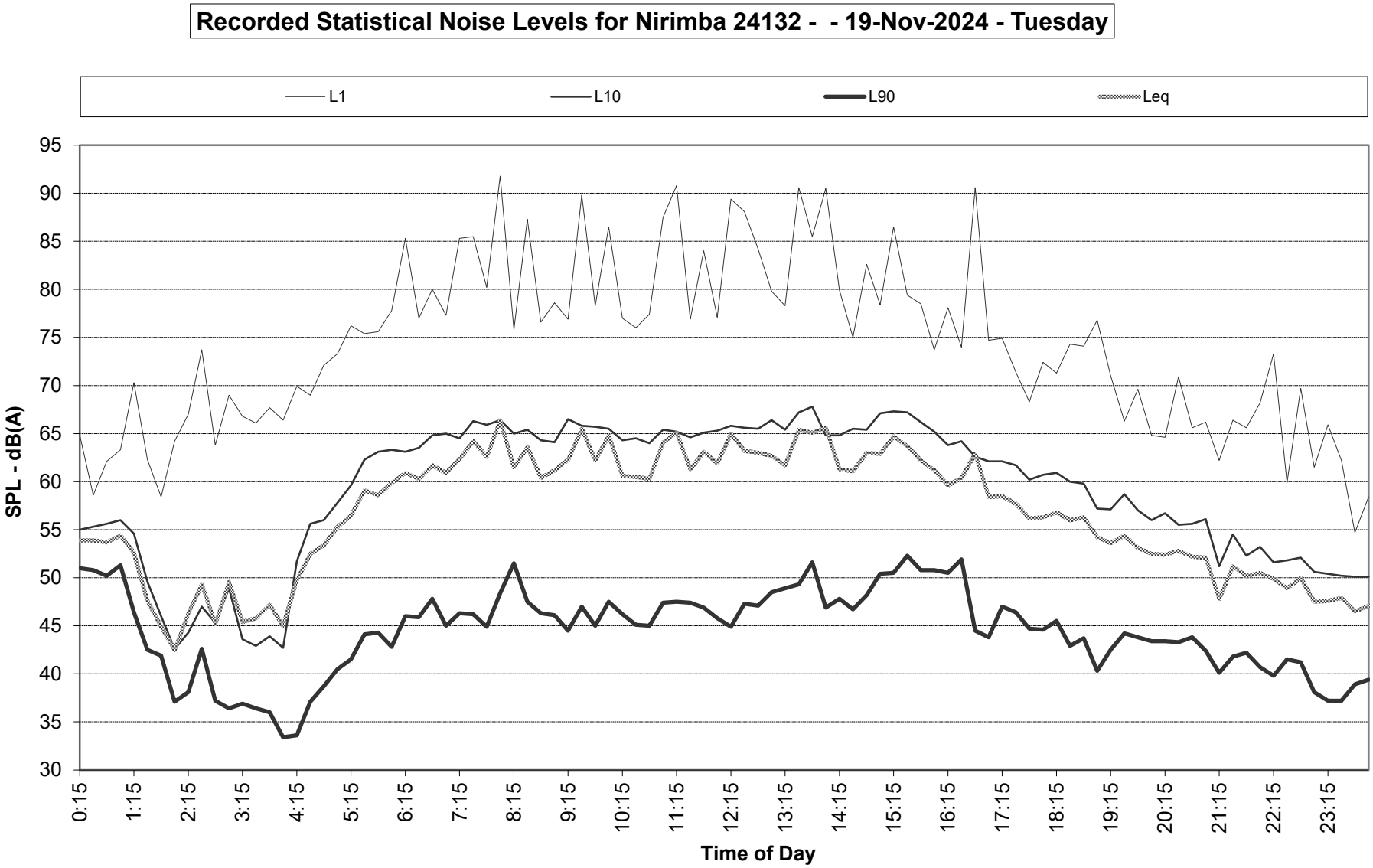

Recorded Statistical Noise Levels for Nirimba 24132 - - 14-Nov-2024 - Thursday
L1
L10
L90
Leq
SPL - dB(A)
95
90
85
80
75
70
65
60
55
50
45
40
35
30
0:15
1:15
2:15
3:15
4:15
5:15
6:15
7:15
8:15
9:15
10:15
11:15
12:15
13:15
14:15
15:15
16:15
17:15
18:15
19:15
20:15
21:15
22:15
23:15
Time of Day


Recorded Statistical Noise Levels for Nirimba 24132 - - 15-Nov-2024 - Friday
L1
L10
L90
Leq
SPL - dB(A)
95
90
85
80
75
70
65
60
55
50
45
40
35
30
0:15
1:15
2:15
3:15
4:15
5:15
6:15
7:15
8:15
9:15
10:15
11:15
12:15
13:15
14:15
15:15
16:15
17:15
18:15
19:15
20:15
21:15
22:15
23:15
Time of Day

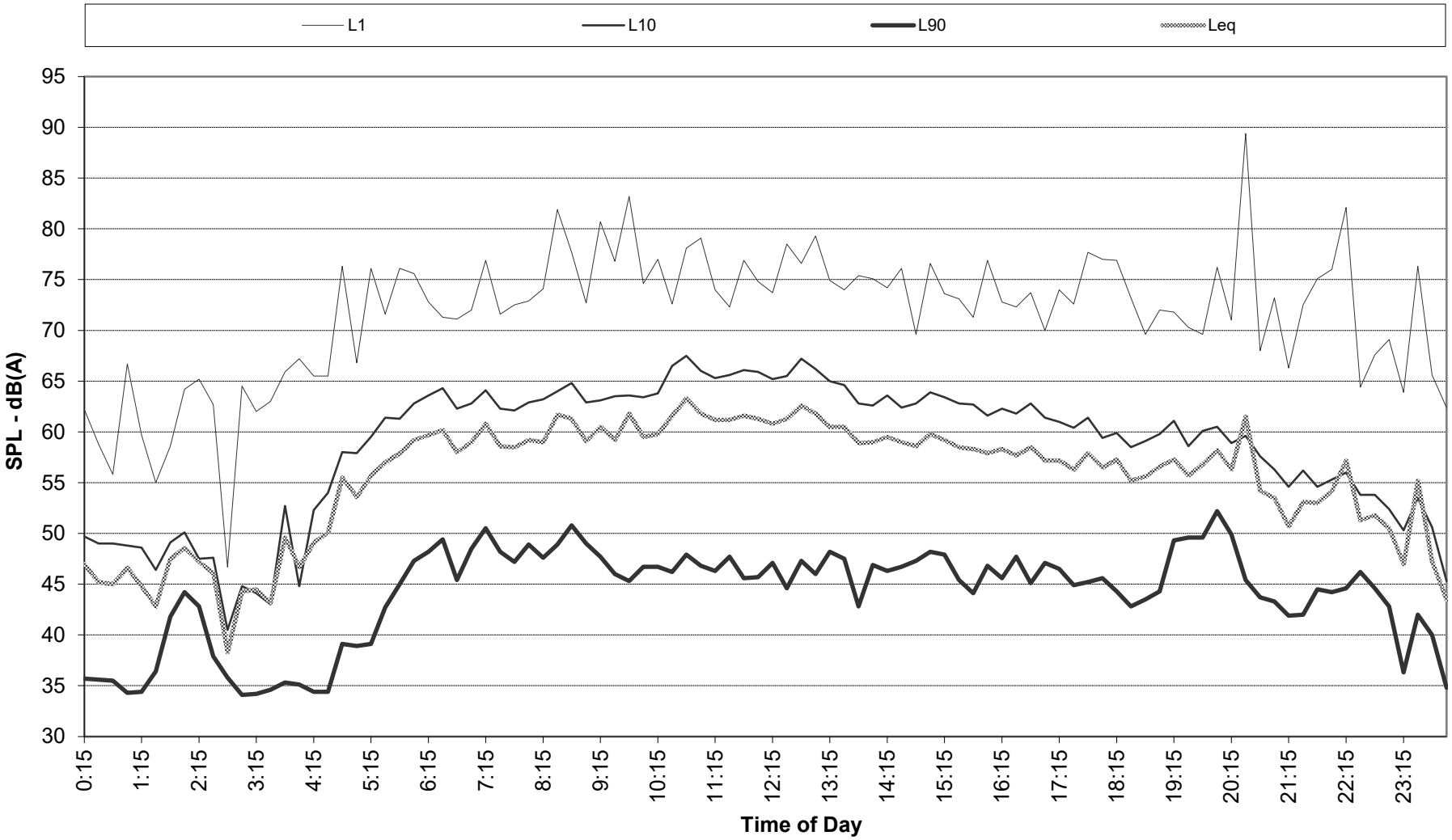

Recorded Statistical Noise Levels for Nirimba 24132 - - 16-Nov-2024 - Saturday
L1
L10
L90
Leq
SPL - dB(A)
95
90
85
80
75
70
65
60
55
50
45
40
35
30
0:15
1:15
2:15
3:15
4:15
5:15
6:15
7:15
8:15
9:15
10:15
11:15
12:15
13:15
14:15
15:15
16:15
17:15
18:15
19:15
20:15
21:15
22:15
23:15
Time of Day

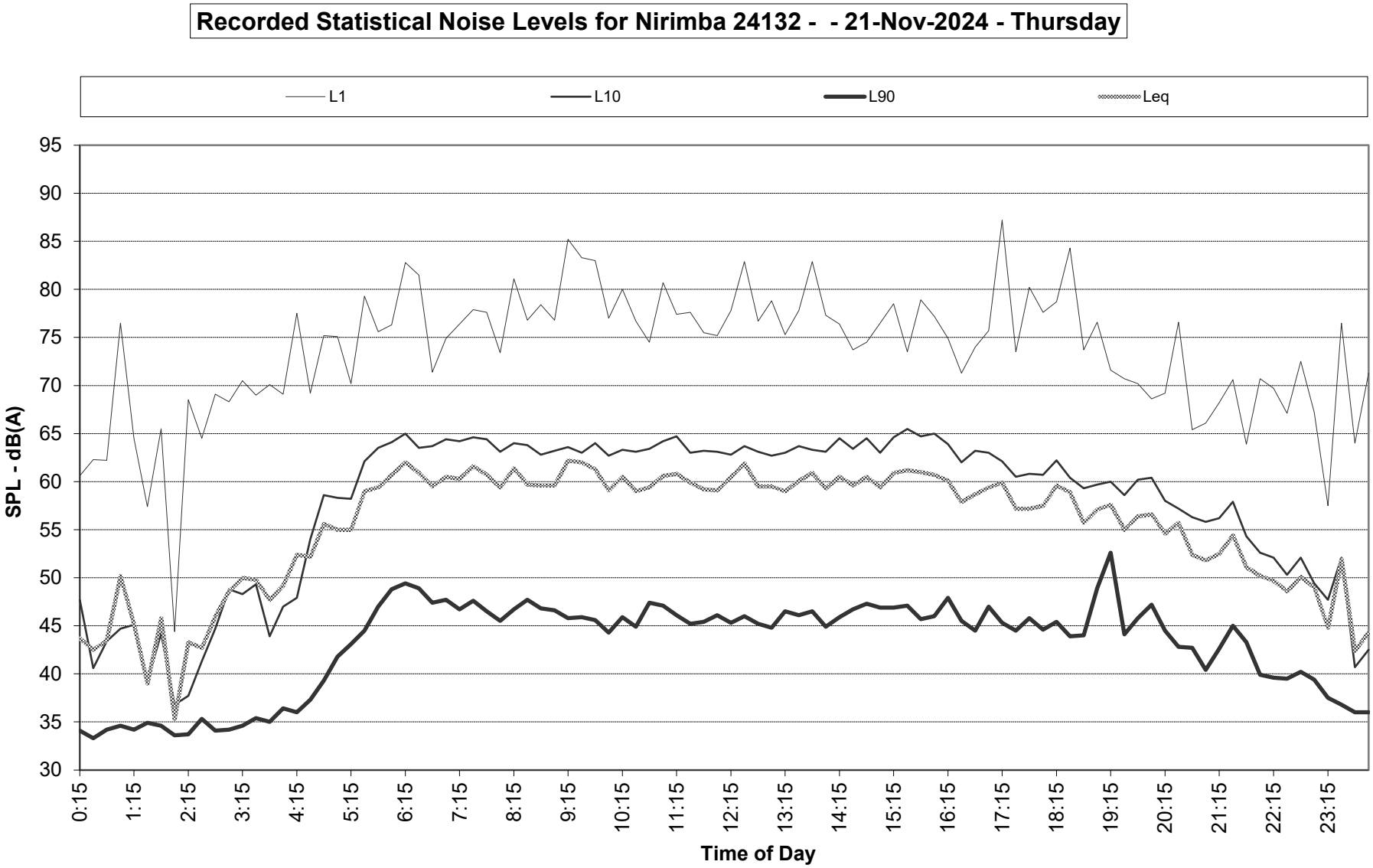

Recorded Statistical Noise Levels for Nirimba 24132 - - 17-Nov-2024 - Sunday
L1
L10
L90
Leq
SPL - dB(A)
95
90
85
80
75
70
65
60
55
50
45
40
35
30
0:15
1:15
2:15
3:15
4:15
5:15
6:15
7:15
8:15
9:15
10:15
11:15
12:15
13:15
14:15
15:15
16:15
17:15
18:15
19:15
20:15
21:15
22:15
23:15
Time of Day


Recorded Statistical Noise Levels for Nirimba 24132 - - 18-Nov-2024 - Monday
L1
L10
L90
Leq
SPL - dB(A)
95
90
85
80
75
70
65
60
55
50
45
40
35
30
0:15
1:15
2:15
3:15
4:15
5:15
6:15
7:15
8:15
9:15
10:15
11:15
12:15
13:15
14:15
15:15
16:15
17:15
18:15
19:15
20:15
21:15
22:15
23:15
Time of Day


Recorded Statistical Noise Levels for Nirimba 24132 - - 19-Nov-2024 - Tuesday
L1
L10
L90
Leq
SPL - dB(A)
95
90
85
80
75
70
65
60
55
50
45
40
35
30
0:15
1:15
2:15
3:15
4:15
5:15
6:15
7:15
8:15
9:15
10:15
11:15
12:15
13:15
14:15
15:15
16:15
17:15
18:15
19:15
20:15
21:15
22:15
23:15
Time of Day

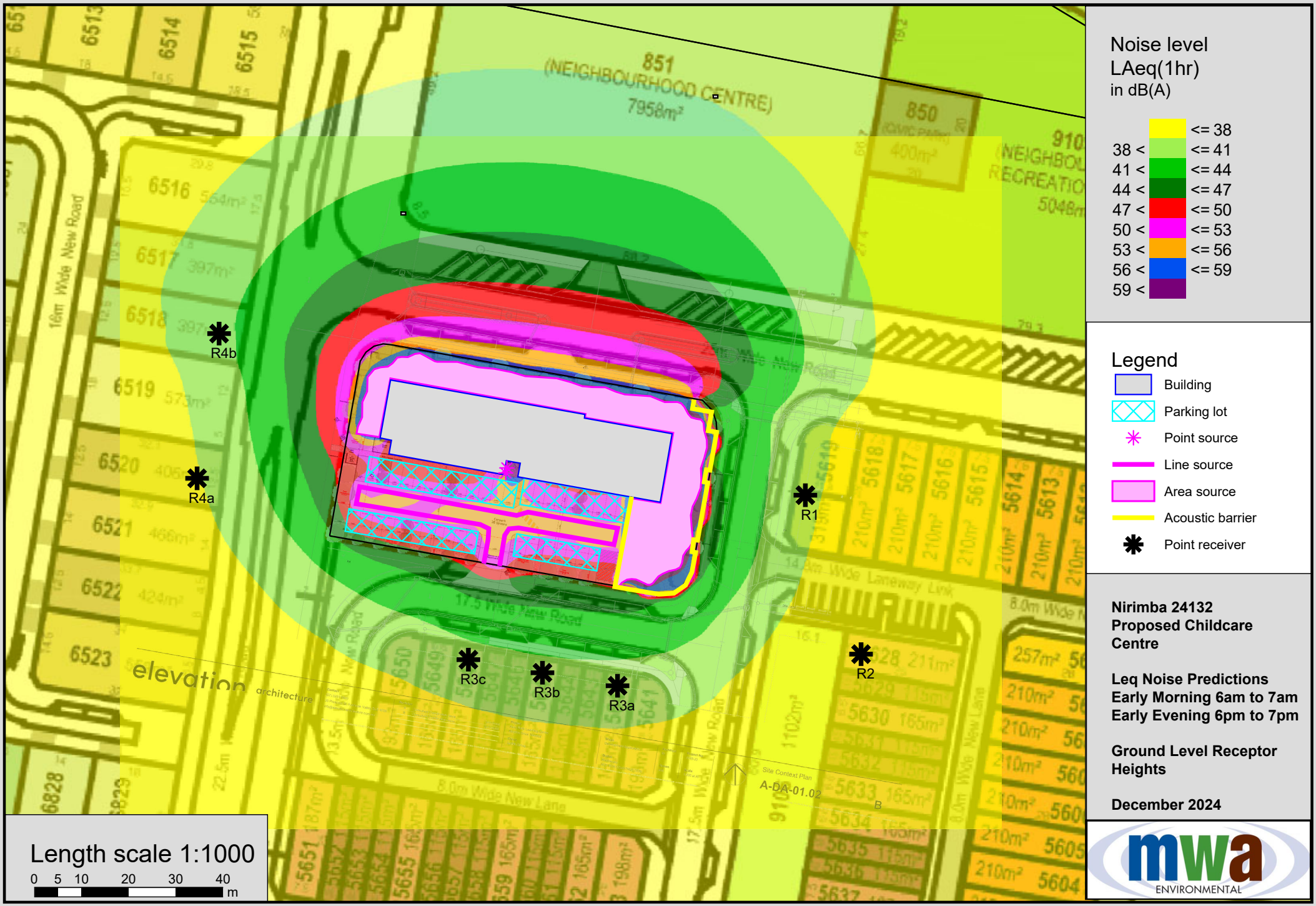
Recorded Statistical Noise Levels for Nirimba 24132 - - 20-Nov-2024 - Wednesday

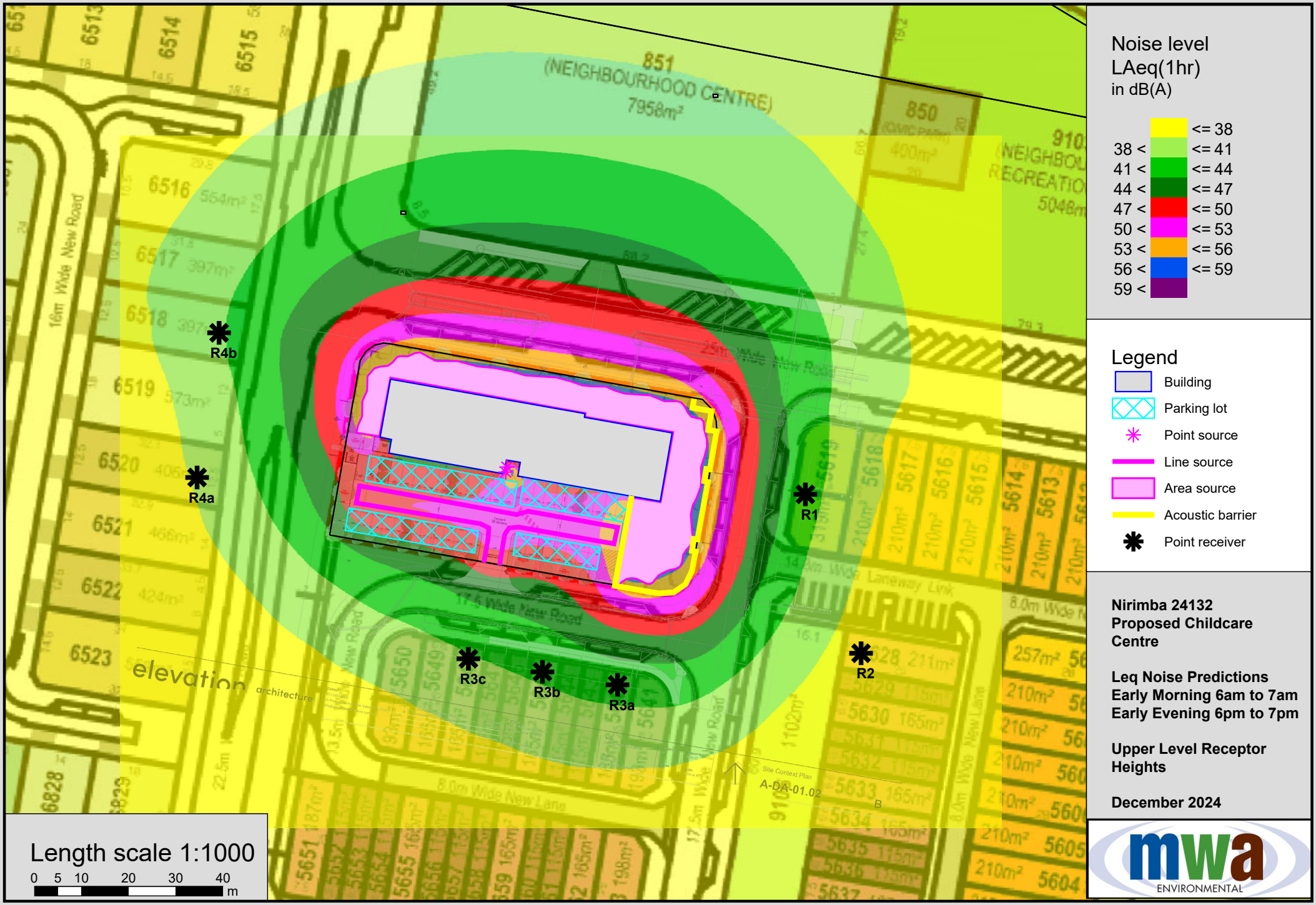



Recorded Statistical Noise Levels for Nirimba 24132 - - 21-Nov-2024 - Thursday
L1
L10
L90
Leq
SPL - dB(A)
95
90
85
80
75
70
65
60
55
50
45
40
35
30
0:15
1:15
2:15
3:15
4:15
5:15
6:15
7:15
8:15
9:15
10:15
11:15
12:15
13:15
14:15
15:15
16:15
17:15
18:15
19:15
20:15
21:15
22:15
23:15
Time of Day

Attachment 3

SoundPLAN
Noise Impact Assessment Model Results


Noise level
LAeq(1hr)
in dB(A)
<= 38
38 < <= 41
41 < <= 44
44 < <= 47
47 < <= 50
50 < <= 53
53 < <= 56
56 < <= 59
59 <
Legend
Building
Parking lot
Point source
Line source
Area source
Acoustic barrier
Point receiver
R1
R2
R3a
R3b
R3c
R4a
R4b
851
(NEIGHBOURHOOD CENTRE)
7958m²
850
16m Wide New Road
17.5 Wide New Road
8.0m Wide New Lane
14.0m Wide Laneway Lwk
elevation architecture
Site Context Plan
A-DA-01.02
B
Length scale 1:1000
0 5 10 20 30 40 m
Nirimba 24132
Proposed Childcare Centre
Leq Noise Predictions
Early Morning 6am to 7am
Early Evening 6pm to 7pm
Ground Level Receptor Heights
December 2024
mwa ENVIRONMENTAL

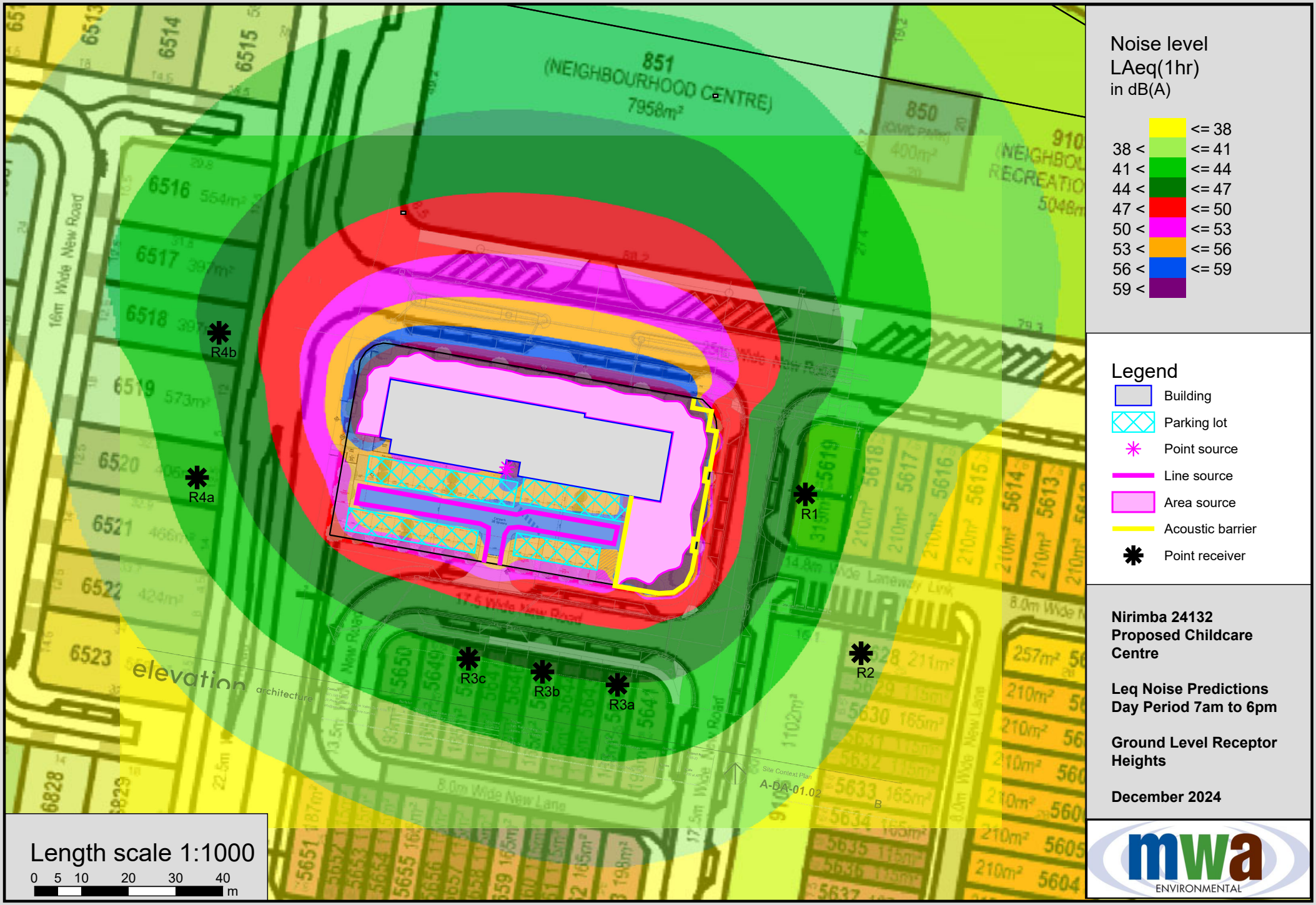


Nirimba 24132
Proposed Childcare Centre

Leq Noise Predictions
Early Morning 6am to 7am
Early Evening 6pm to 7pm

Upper Level Receptor Heights

December 2024



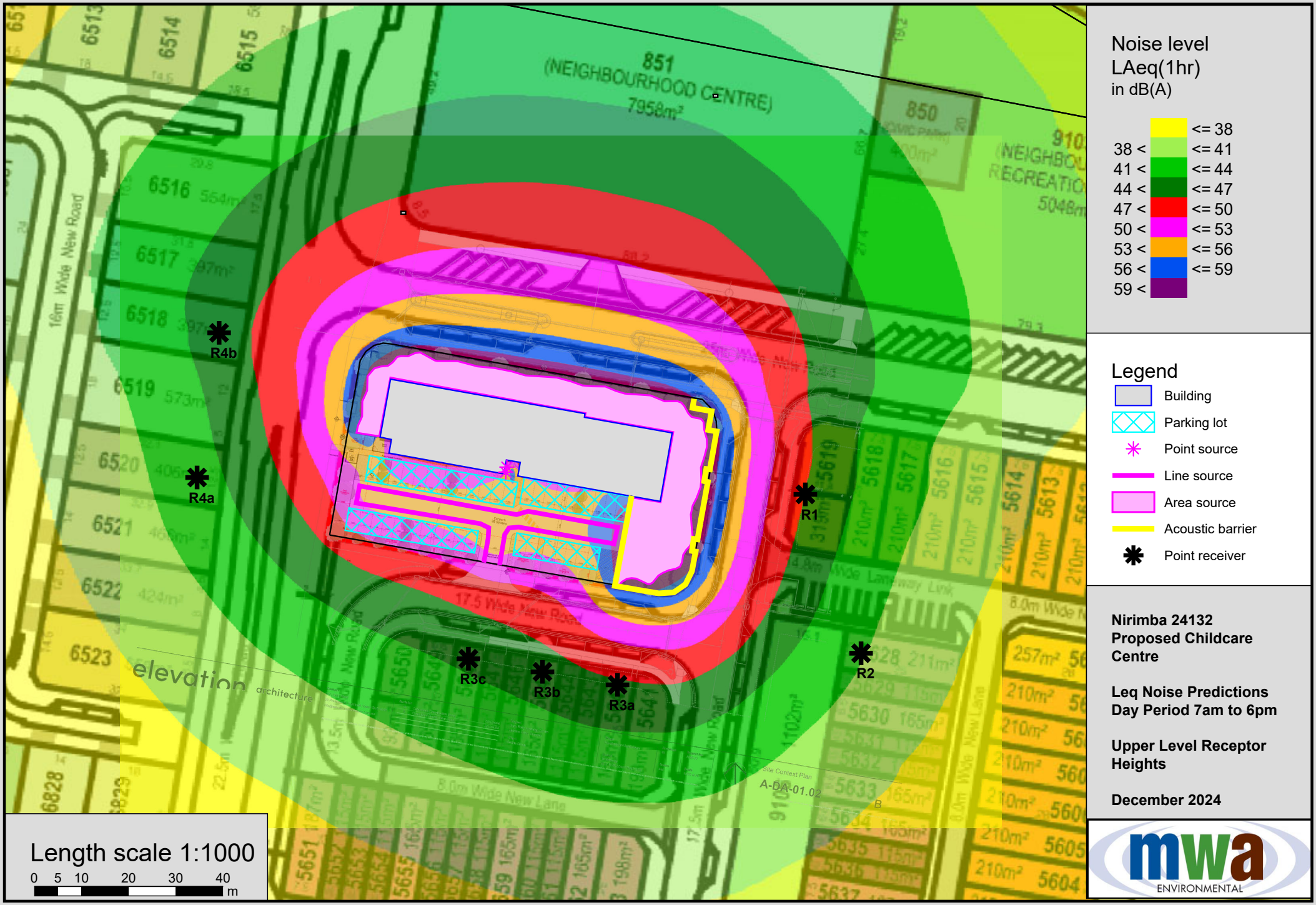
Nirimba 24132
Proposed Childcare Centre

Leq Noise Predictions
Day Period 7am to 6pm

Ground Level Receptor Heights

December 2024

mwa ENVIRONMENTAL



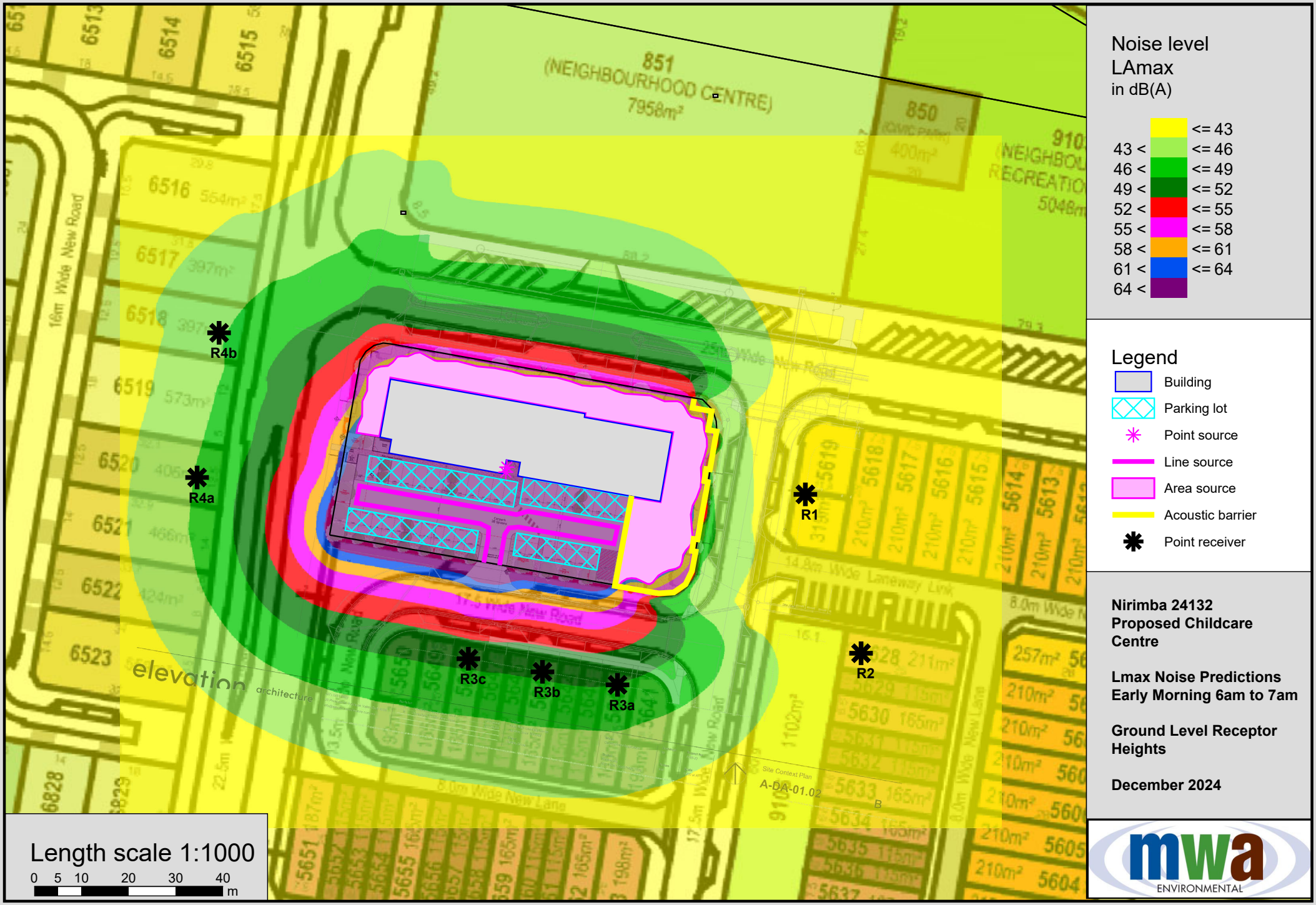
Nirimba 24132
Proposed Childcare Centre

Leq Noise Predictions
Day Period 7am to 6pm

Upper Level Receptor Heights

December 2024

mwa ENVIRONMENTAL

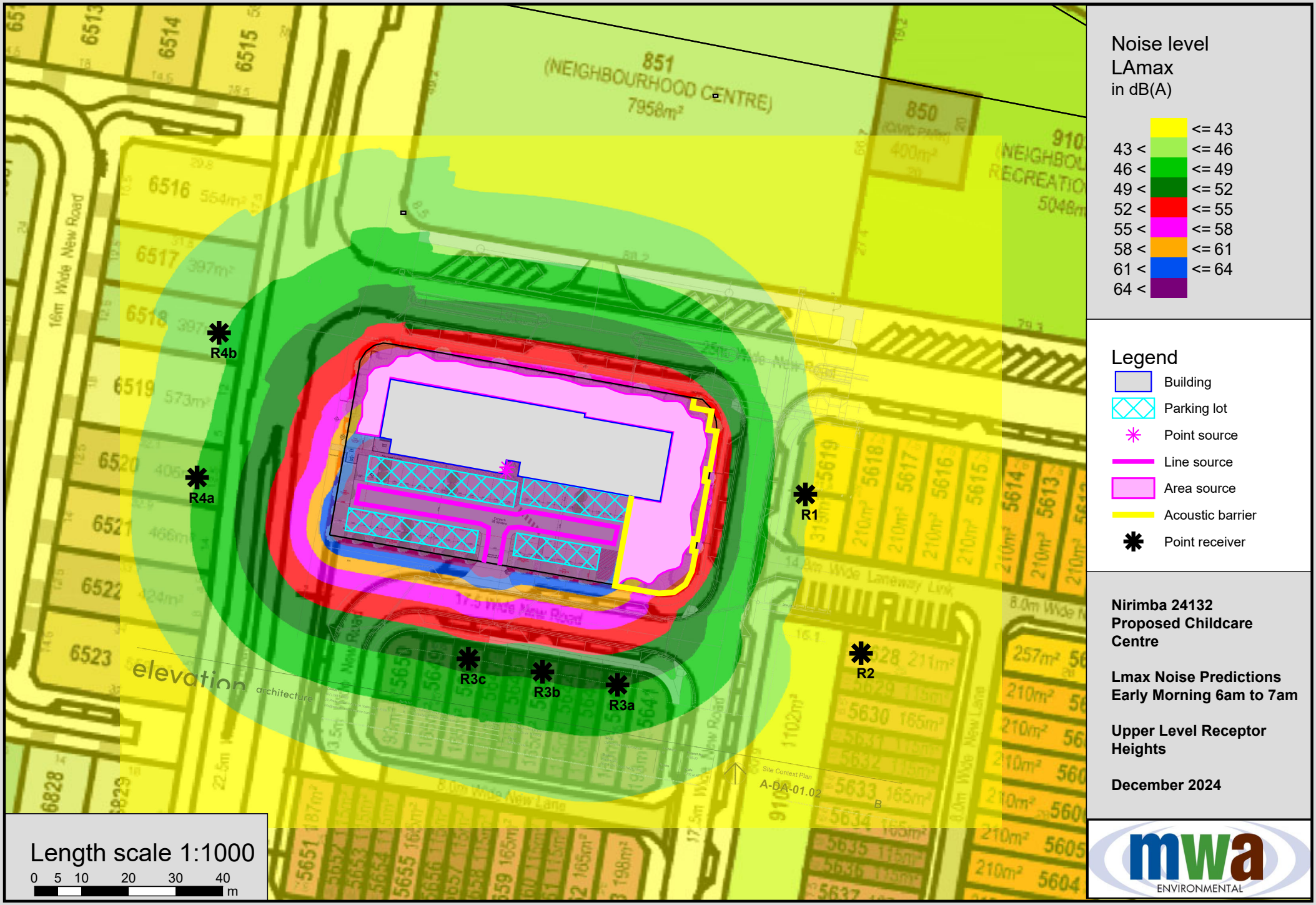


Nirimba 24132
Proposed Childcare Centre

Lmax Noise Predictions
Early Morning 6am to 7am

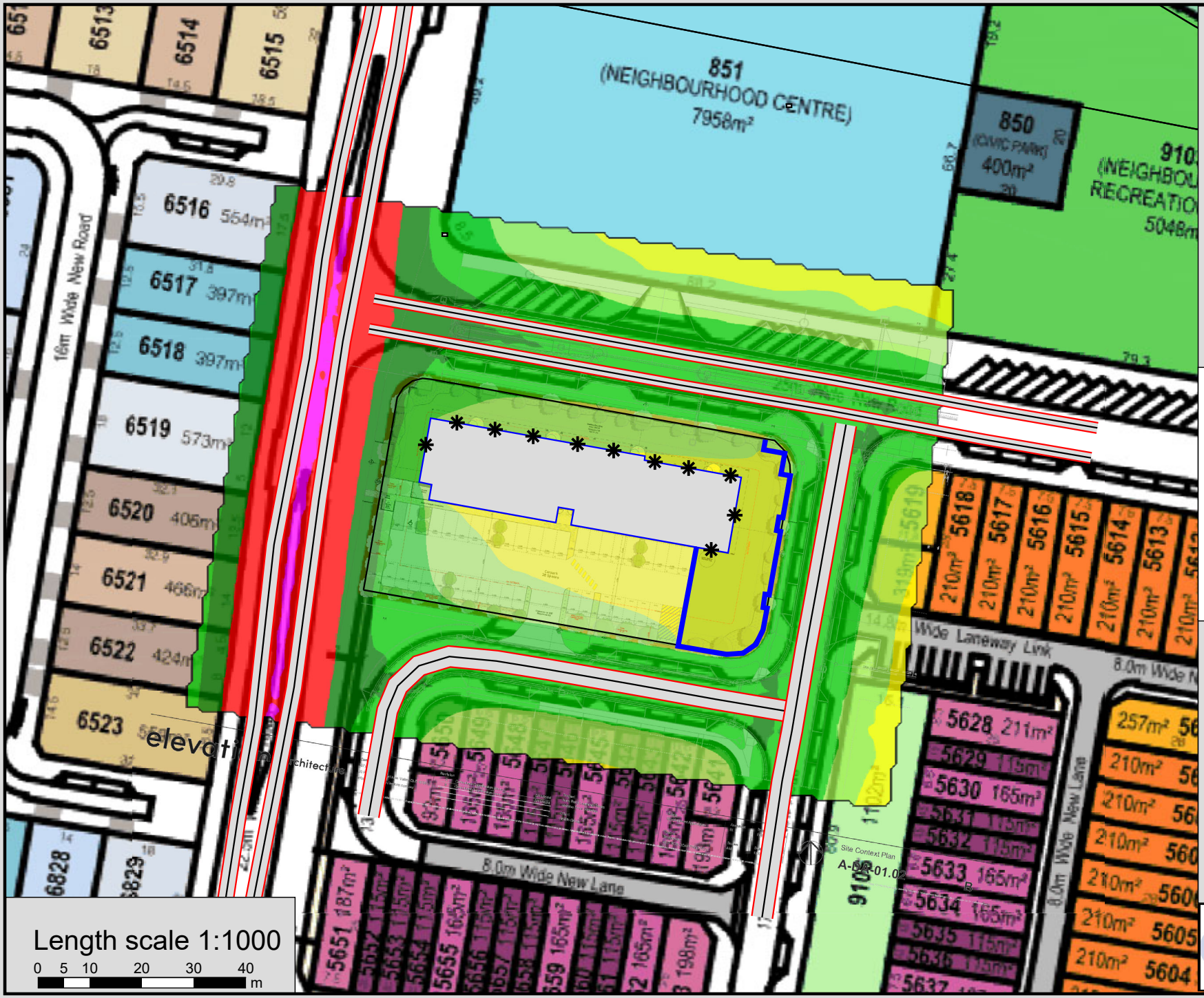
Ground Level Receptor Heights

December 2024


Noise level
LAmax
in dB(A)
<= 43
43 < <= 46
46 < <= 49
49 < <= 52
52 < <= 55
55 < <= 58
58 < <= 61
61 < <= 64
64 <
Legend
Building
Parking lot
Point source
Line source
Area source
Acoustic barrier
Point receiver
R1
R2
R3a
R3b
R3c
R4a
R4b
851
(NEIGHBOURHOOD CENTRE)
7958m²
850
16m Wide New Road
17.5 Wide New Road
elevation architecture
Site Context Plan
A-DA-01.02
Length scale 1:1000
0 5 10 20 30 40 m
Nirimba 24132
Proposed Childcare Centre
Lmax Noise Predictions
Early Morning 6am to 7am
Upper Level Receptor Heights
December 2024
mwa ENVIRONMENTAL

Attachment 4

SoundPLAN
Traffic Noise Assessment Model Results



Noise level
L10(12hr)
free field
in dB(A)

	<= 54
54 <	<= 57
57 <	<= 60
60 <	<= 63
63 <	<= 66
66 <	<= 69
69 <	<= 72
72 <	<= 75
75 <	

Legend

- Road
- Road axis
- Surface
- Building
- Acoustic barrier
- Point receiver

Nirimba 24132
Proposed Childcare Centre

Traffic Noise Predictions At Outdoor Play Areas

December 2024

mwa ENVIRONMENTAL