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Thursday 31 January 2019

Oar 2 Trust
C/- Kennedy Associates Architects
Level 3, 1 Booth Street
ANNANDALE NSW 2038

Our Reference 160740-01L-DD Rev02

For the attention of Mr Martin Cleary

Noise Assessment – Development Application (DA) Phase
Proposed Mixed-Use Development
101 Nuwarra Road, Moorebank

1.0 INTRODUCTION

Acoustic Consulting Engineers Pty Ltd was engaged by Oar 2 Trust to prepare a noise assessment for the proposed mixed-use development at 101 Nuwarra Road, Moorebank.

This report presents a summary of the noise assessment for the purpose of development application (DA) consideration only.

The findings from the noise assessment and recommendation are site specific and have been prepared for the particular investigation described in this report. The report should not be used in any other context or for any other purposes.

2.0 DESCRIPTION OF SITE AND PROPOSAL

The subject site is located at 101 Nuwarra Road, Moorebank and consists of single-storey and double-storey commercial units. Albeit, the majority of the commercial units are currently un-occupied.

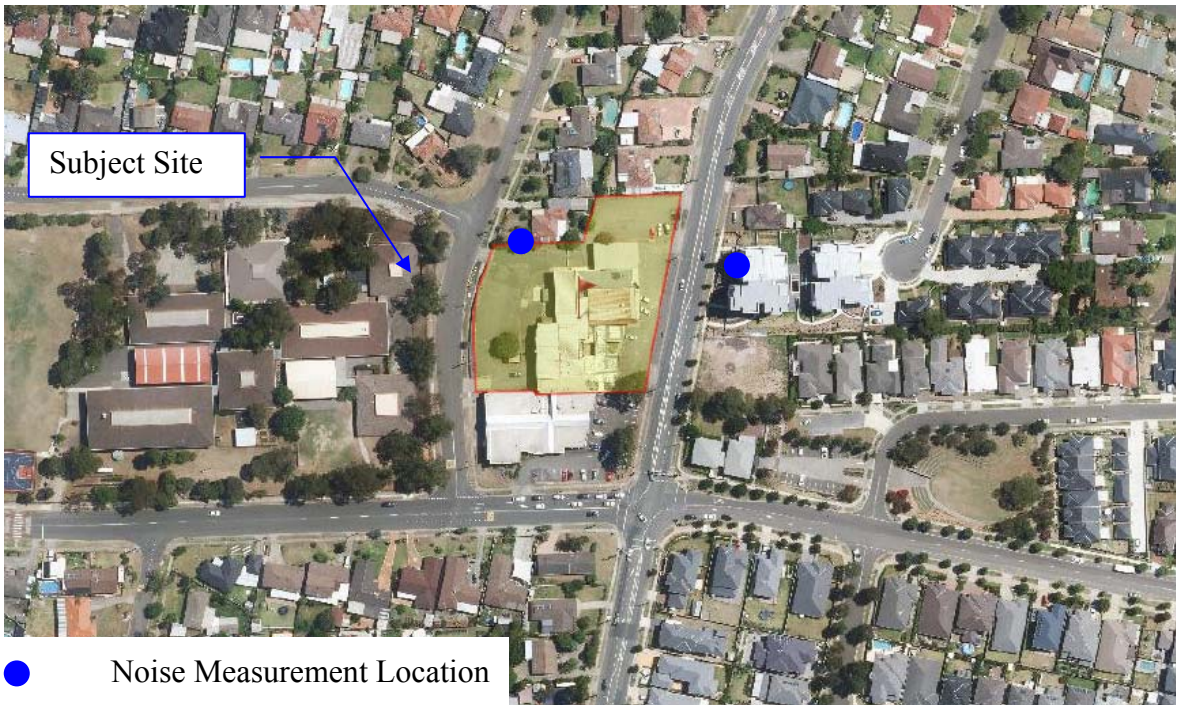
The proposal is to re-develop the site to provide:

- car-parks on the Basement Levels 01 and 02 (Levels -02 and -01);
- car-parks and retail/commercial units Ground Level (Level 00);
- residential units and retail/commercial units Level 1 (Level 01)
- residential units on Levels 02-06

The development site is exposed to road traffic noise from Nuwarra Road to the east. Surrounding the development site are mainly residential development and Moorebank library to the south.

Figure 1 shows the location of the subject site and surrounding. *Appendix 1* provides the conceptual floor plans of the proposed development.

Figure 1 Site Location



3.0 POTENTIAL ACOUSTIC ISSUES

From the site inspections and review of the drawings, potential acoustic issues associated with the proposed development include:

- external road traffic noise intrusion into the residential component of the proposed mixed-use development from Nuwarra Road;
- environmental noise from the proposed development (eg. mechanical services and air-conditioning equipment); and
- acoustic privacy between the sole-occupancies and between the sole-occupancies and common spaces.

4.0 NOISE MEASUREMENT

Existing background and road traffic noise levels were measured from Tuesday 12 April 2016 to Wednesday 20 April 2016

Due to security reason, road traffic noise levels were measured 1m from the façade of the residential building on the opposite side of Nuwarra Road. The measurement location is at similar offset to Nuwarra Road as the proposed development.

Figure 1 shows the noise monitoring locations.

Measurement instrumentation consisted of Type 1 SVAN977 sound and vibration analysers and Type 1 ACO Pacific 7052E prepolarised condenser microphones. The instrumentation was checked before and after the measurements with a SVAN SV30A acoustic calibrator and the drift in calibration was within ±0.3dB.

As environmental noise varies with time and the human ear is not equally sensitive to noise at different frequencies, A-weighted statistical levels are used to describe environmental noise. The common parameters used to describe environmental noise are the L_{Amax}, L_{A1}, L_{A10}, L_{A90} and L_{Aeq} levels measured over 15-minute intervals.

The L_{A90} and L_{Aeq} acoustic parameters are used for the present noise assessment. Other acoustic parameters are provided for information only.

The L_{Amax} level is the maximum A-weighted sound pressure level over the sampling period. The L_{A1}, L_{A10} and L_{A90} levels are the A-weighted sound pressure levels exceeded for 1%, 10% and 90% of the sampling periods respectively. The L_{A90} level is usually referred to as the background noise level. The L_{Aeq} level is the A-weighted continuous equivalent (energy average) sound pressure level over the sampling period.

Appendices 2 and 3 present a graphical summary of the measured statistical noise levels at 15-minute intervals.

Table 1 presents the daytime ($L_{Aeq,15hr}$) and night-time ($L_{Aeq,9hr}$) road traffic noise levels exposed to the most exposed façade of the proposed development. *Table 2* presents the day/evening/night L_{Aeq} ambient and L_{A90} background noise levels.

Table 1 Measured Façade $L_{Aeq,15hr}$ and $L_{Aeq,9hr}$ Noise Levels, dB(A)

Date	Measured Façade Road Traffic Noise Level, dB(A)	
	Daytime ($L_{Aeq,15hr}$)	**Night-time ($L_{Aeq,9hr}$)**
Tuesday 12 April 2016		64.4
Wednesday 13 April 2016	68.2	64.5
Thursday 14 April 2016	68.4	64.4
Friday 15 April 2016	68.0	62.4
Saturday 16 April 2016	66.7	60.4
Sunday 17 April 2016	65.6	64.5
Monday 18 April 2016	68.3	65.1
Tuesday 19 April 2016	68.5	64.4
Logarithmic Average	**68**	**64**

Notes: 1. $L_{Aeq,15hr}$ is daytime road traffic noise level from 7:00am to 10:00pm

2. $L_{Aeq,9hr}$ is night-time road traffic noise level from 10:00pm to 7:00am

Table 2 Measured Existing Background and Ambient Noise Environment, dB(A)

Date	Measured Existing Noise Environment, dB(A)					
	L_{A90}			L_{Aeq}		
	Day[1]	Evening[2]	Night[3]	Day	Evening	Night
Front of Subject Site						
Tuesday 12 April 2016		49.8	37.3		66.2	64.4
Wednesday 13 April 2016	48.1	46.6	38.5	68.8	66.2	64.5
Thursday 14 April 2016	49.5	44.8	39.2	69.0	66.3	64.4
Friday 15 April 2016	50.2	46.8	39.6	68.6	66.0	62.4
Saturday 16 April 2016	47.9	46.0	35.3	67.1	65.4	60.4
Sunday 17 April 2016	46.2	46.1	37.9	66.2	64.4	65.4
Monday 18 April 2016	49.5	47.0	39.5	68.9	66.1	65.1
Tuesday 19 April 2016	48.7	45.7	37.9	69.1	66.0	64.4
Rating L_{A90} Background Level	**48**	**46**	**38**	**N/A**		
Logarithmic Average	**N/A**			**68**	**66**	**64**
Rear of Subject Site						
Tuesday 12 April 2016		44.6	38.7		54.0	53.2
Wednesday 13 April 2016	46.2	45.5	40.4	57.2	55.3	52.3
Thursday 14 April 2016	46.6	44.3	38.8	58.4	57.3	53.0
Friday 15 April 2016	47.0	46.1	38.2	57.8	57.8	51.4
Saturday 16 April 2016	45.3	45.0	35.7	55.8	53.6	49.0
Sunday 17 April 2016	45.5	45.5	40.3	56.2	53.8	54.5
Monday 18 April 2016	46.6	45.7	42.9	58.3	55.0	55.6
Tuesday 19 April 2016	46.3	45.3	40.8	59.2	61.6	52.6
Rating L_{A90} Background Level	**46**	**45**	**39**	**N/A**		
Logarithmic Average	**N/A**			**58**	**57**	**53**

Notes: 1. Day is from 7:00am-6:00pm, Monday to Saturday and 8:00am-6:00pm, Sunday
2. Evening is from 6:00pm-10:00pm
3. Night is from 10:00pm-7:00am, Monday to Saturday and 10:00pm-8:00am, Sunday

5.0 NOISE ASSESSMENT OBJECTIVES

5.1 Environmental Noise

The Environment Protection Authority (EPA) Noise Policy for Industry (NPfI, October 2017) recommends project noise trigger level as a benchmark for assessing and managing noise from large industrial and agricultural sources. The project noise trigger level is not a noise limit, but a trigger level above which feasible and reasonable mitigation measure should be identified.

In the event that feasible and reasonable mitigation measure cannot reduce noise from the development under consideration to within the project noise trigger level, the residual noise level (noise level above the trigger level) should be assessed and reported.

Although the EPA:NPfI states that project noise trigger level as a benchmark for assessing and managing noise from large industrial and agricultural sources that may not be applicable to the types of noise sources councils need to address, in the absence of Council's specific guidelines, the EPA:NPfI is used as a reference to assess environmental noise from mechanical plant such as air-conditioning equipment associated with the proposed mixed-use development.

The EPA:NPfI recommends the:

- $L_{Aeq,15min}$ noise levels from mechanical plant associated with a proposed development not to exceed the day/evening/night rating background L_{A90} noise levels by more than 5dB(A) at the residential receivers; and
- $L_{Aeq,period}$ noise levels (period being entire day/evening/night) from a proposed development to be at least 5dB below the recommended amenity noise levels from existing and/or future industrial sources for the particular receiver areas.

Due to different averaging periods, the intrusiveness noise level (determined over 15-minute period) and amenity noise level (determined over an assessment period (day/evening/night)) may lead to situations where the same numerical value does not necessarily represent the same amount of noise for different time periods. To standardise the time periods for the intrusiveness and amenity noise levels, the NPfI assumes a default correction of +3dB to convert the $L_{Aeq,period}$ to $L_{Aeq,15min}$ noise level.

Table 3 provides the recommended $L_{Aeq,15min}$ noise levels from mechanical plant associated with the proposed mixed-use development, established from the measured background noise levels presented in *Table 1* and the EPA:NPfI guideline. The recommended amenity noise levels are based on an urban residential area.

The project noise trigger levels are the lower of the intrusive and amenity noise levels. That is, noise from the development will achieve with both the intrusive and amenity noise levels, provided that the project noise trigger levels are achieved.

Table 3 Recommended Environmental Noise Assessment Level, dB(A)

Time of Day		Recommended $L_{Aeq,15min}$ Noise Level		
		Intrusiveness Level	**Amenity Level**	**Trigger Level**
Day	(7:00am-6:00pm)	51	58	51
Evening	(6:00pm-10:00pm))	50	48	48
Night	(10:00pm-7:00am)	43	43	43

Notes: 1. Day is from 7:00am-6:00pm, Monday to Saturday and 8:00am-6:00pm, Sunday
2. Evening is from 6:00pm-10:00pm
3. Night is from 10:00pm-7:00am, Monday to Saturday and 10:00pm-8:00am, Sunday

5.2 Indoor Road Traffic Noise Levels

For residential developments affected by noise from existing roads, the Environmental Protection Authority (EPA) Road Noise Policy (RNP) refers to the State Environmental Planning Policy (SEPP) (Infrastructure) 2007 and Department of Planning "*Development near Rail Corridors and Busy Roads – Interim Guideline*" to set appropriate indoor noise levels.

The requirements of Clause 102 of State Environmental Planning Policy (SEPP) (Infrastructure) 2007 are as follows:

> "*If the development is for the purposes of a building for residential use, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following L_{Aeq} levels are not exceeded:*
>
> - *35dB(A) at any time between 10:00pm and 7:00am in any bedroom in the building; and*
> - *40dB(A) at any time anywhere else in the building (other than a garage, kitchen, bathroom or hallway)*".

The acoustic requirements of the Department of Planning "*Development near Rail Corridors and Busy Roads – Interim Guideline*" are the same as those in SEPP (Infrastructure) 2007.

With reference to the Department of Planning "*Development near Rail Corridors and Busy Roads – Interim Guideline*", airborne noise is calculated as $L_{Aeq,9hr}$ (night-time) and $L_{Aeq,15hr}$ (daytime).

Table 4 presents the recommended indoor design noise objectives for the residential component of the proposed mixed-use development with windows and doors closed.

Table 4 Indoor Noise Design Objectives – SEPP (Infrastructure) 2007

Type of Occupancy	Indoor Design L_{Aeq} Noise Objective, dB(A)	Assessment Period
Bedrooms	35	10:00pm to 7:00am
Other habitable areas (other than garage, kitchen, bathroom and hallway)	40	any time

6.0 ASSESSMENT

6.1 Environmental Noise

As the proposal is conceptual and development application has not been approved, mechanical plant has not been selected or finalised and details of equipment noise levels are not available at this time.

Based on the site location and similar development, it is considered that with appropriate equipment selection based on acoustic performance and siting, noise from air-conditioning equipment would be controlled to within the environmental noise assessment objectives presented in *Table 3*.

6.2 External Road Traffic Noise Intrusion

In order to achieve the indoor noise assessment objectives recommended in *Section 5.2*, the following noise reductions across the building envelop are required:

- 29dB for sleeping areas and 28dB for other habitable areas (other than garage, kitchen, bathroom and hallway) on the eastern façade (Nuwarra Road frontage);
- 26dB for sleeping areas and 25dB for other habitable areas (other than garage, kitchen, bathroom and hallway) on the northern and southern façades of the front buildings (nearest to Nuwarra Road); and
- 23dB for sleeping areas and 22dB for other habitable areas (other than garage, kitchen, bathroom and hallway) on the northern and southern façades of the rear buildings.

The above noise reductions may be achieved by employing appropriate building construction elements/systems.

6.3 Acoustic Privacy between Sole-Occupancies

Acoustic privacy between the residential units and between the residential units and common spaces relates to airborne sound insulation and impact sound isolation for walls and floors and control of noise from waste services.

The acoustic privacy between spaces can be controlled by incorporating:

- appropriate construction materials/systems to control air-borne noise;

- appropriate floor covering and/or isolation of plasterboard ceiling and ceiling cavity insulation to control floor impact sound; and
- wrapping services/waste pipes with acoustic lagging and/or construction of appropriate ceiling and ceiling cavity insulation to control noise from waste services.

7.0 RECOMMENDATION

7.1 Environmental Noise

It is recommended that a qualified acoustic consultant be engaged during the design phase of the project, when details of mechanical plant and equipment and noise emission levels are available, to review the potential environmental noise impact from the development.

Measures that could be considered to reduce noise from mechanical plant and equipment associated with the project include:

- appropriate equipment specification and selection based on acoustic performance;
- incorporating engineering measures such as acoustic attenuators and acoustic treatment of ductwork;
- appropriate equipment siting (eg. air-conditioning outdoor condenser units located on balconies facing away from the adjoining residences); and
- locating noisy plant and equipment within purpose-built plant room(s).

Additionally, it is recommended that separate Development Applications and noise assessments be submitted to Council for the use of the retail/commercial units when the types of activities and tenants are known.

7.2 External Noise Intrusion

With typical residential building constructions, the weakest path for external noise instruction into the development would be the exposed windows/doors.

To reduce the indoor road traffic noise levels to within the recommended levels of 35dB(A) $L_{Aeq,9hr}$ for sleeping areas and 40dB(A) $L_{Aeq,15hr}$ for other habitable areas (other than garage, kitchen, bathroom and hallway), external glazed windows/ doors shall achieve the weighted sound reduction indices (R_W) of not less than those recommended values shown in *Table 5*.

It should be noted that the acoustic performances shall be specified to achieve the recommended values for the entire window/door systems (including detailing, framing and sealing), not just the glazing.

Table 5 Recommended Minimum Weighted Sound Reduction Index (R_w) for External Façade Glazing

Unit Number	Location	Recommended Weighted Sound Reduction Index for External Façade Glazing (R_w)	
		Sleeping Areas	**Other Habitable Areas**
Level 01			
01-01, 01-04 and 01-06 to 01-10	Eastern façade	29	28
	Northern façade		
Level 02			
02-01, 02-04 and 02-06 to 02-10	Eastern façade	29	28
	Northern façade		
	Southern façade		
02-11, 02-14 to 02-17 and 02-20 to 02-23	Eastern façade	35	34
	Northern façade	32	31
	Southern façade		
Level 03			
03-11, 03-14 to 03-17 and 03-20 to 03-23	Eastern façade	35	34
	Northern façade	32	31
	Southern façade		
Level 04			
04-11, 04-14 to 04-17 and 04-20 to 04-23	Eastern façade	35	34
	Northern façade	32	31
	Southern façade		
Level 05			
05-11, 05-14 to 04-17 and 05-19 to 04-21	Eastern façade	35	34
	Northern façade	32	31
	Southern façade		
Level 06			
06-01, 06-03, 06-04 to 06-06	Eastern façade	35	34
	Northern façade	32	31
	Southern façade		

Typically, glazing configurations to achieve the weighted sound reduction indices recommended in *Table 5* could consist of:

- **R_w34-35** 5mm float glass/50-100mm air gap/4mm float glass (acoustic construction). Alternatively, propriety upgraded/double glazing window/door systems may be employed provided that a weighted sound reduction index of not less than **R_w35** is achieved;
- **R_w31-32** 6.38mm laminated glass (acoustic construction); and
- **R_w28-29** 6mm float glass (acoustic construction)

If necessary, the types of door/window systems shall be changed and selected to achieve the recommended R_w ratings in *Table 5*.

Additionally, the following detailing will be necessary to achieve the required acoustic performances for the window/door systems:

- glazing configurations shall achieve the minimum weighted sound reduction indices recommended above;
- approved Q-lon acoustic rated seals or equivalent shall be fitted to all acoustic rated windows/doors. Mohair/fin/felt/brush seals are not satisfactory for acoustic performance.
- window/door acoustic rated seals shall be set to full closure and under slight compression with even pressure all round when windows/doors are closed.
- glasswool acoustic insulation should be packed between the frames and windows of the double/secondary glazing window/door systems prior to the installation of architrave/trim.
- all gaps around/between the door/window frames and façade openings shall be sealed air-tight with silicon or similar non-hardening mastic prior to fitting any weather strips.
- all open extrusions forming perimeter frames to aluminium windows/doors shall be detailed to ensure that the frames do not de-rate the acoustic performance of the windows/doors.

7.3 Acoustic Privacy

It is recommended that acoustic privacy between sole-occupancies should be reviewed by a qualified acoustic consultant during the design phase of the project and appropriate construction systems should be incorporated into the design and construction to ensure the Building Code of Australia (BCA) acoustic requirements for sole-occupancies are achieved.

8.0 SUMMARY

The assessment has shown that external road noise intrusion into the residential component of the proposed mixed-use development at 101 Nuwarra Road, Moorebank can be controlled with appropriate building constructions.

With appropriate equipment selection based on acoustic performance, siting and provision of mitigation measures, noise from mechanical plant and equipment would be controlled to within the environmental noise assessment objectives.

The NCC/BCA acoustic privacy requirements between spaces can be controlled by incorporating appropriate construction materials/systems to control air-borne noise and floor covering and/or isolation of plasterboard ceiling and ceiling cavity insulation to control floor impact sound. Noise from waste services can be controlled by wrapping services/waste pipes with acoustic lagging and/or construction of appropriate ceiling and ceiling cavity insulation below the services/waste pipes.

It is recommended that separate Development Applications and noise assessments be submitted to Council for the use of the retail/commercial units when the types of activities and tenants are known.

The assessment and recommendations in this report relate to acoustic considerations and for the purpose of development application (DA) only. Any other requirements should be addressed by others.

It is recommended that a qualified acoustic consultant be engaged during the design phase of the project to review the acoustic requirements for the project.

We trust the information in this letter is satisfactory. Please do not hesitate to contact our office should further information or clarification be required.

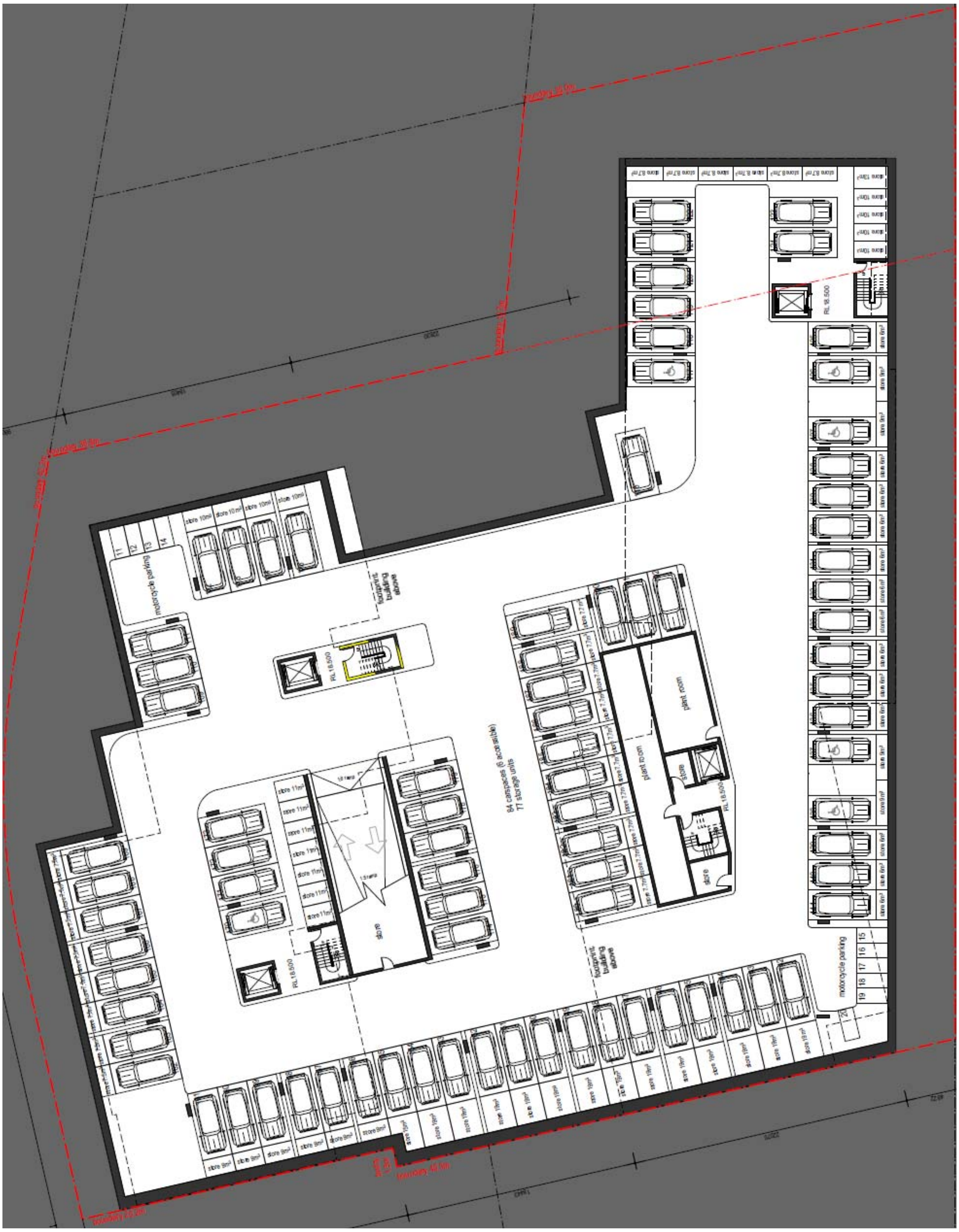
Yours sincerely,

Dan Dang
Principal Acoustic Engineer
Acoustic Consulting Engineers Pty Ltd

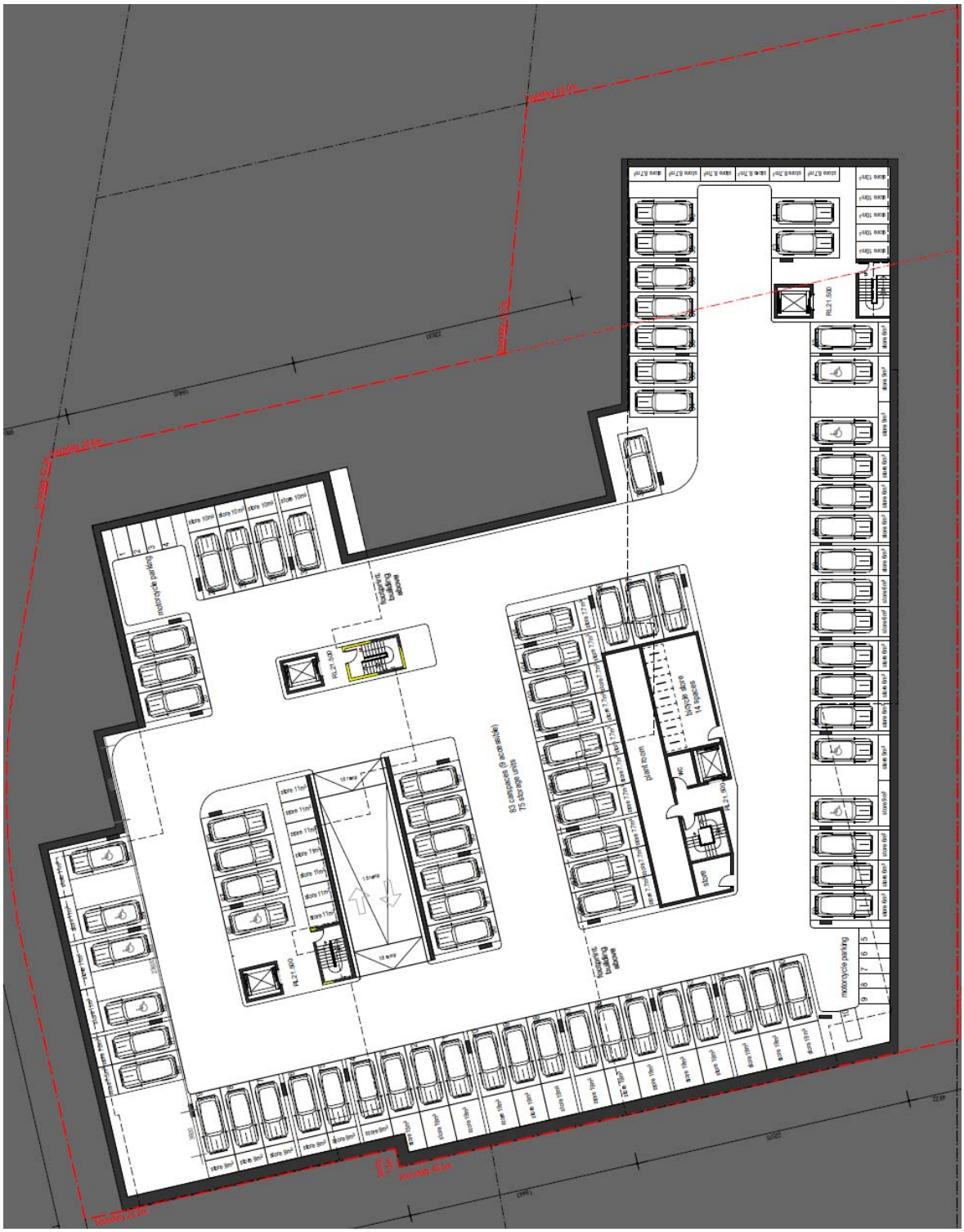
Appendix 1

CONCEPT FLOOR PLANS

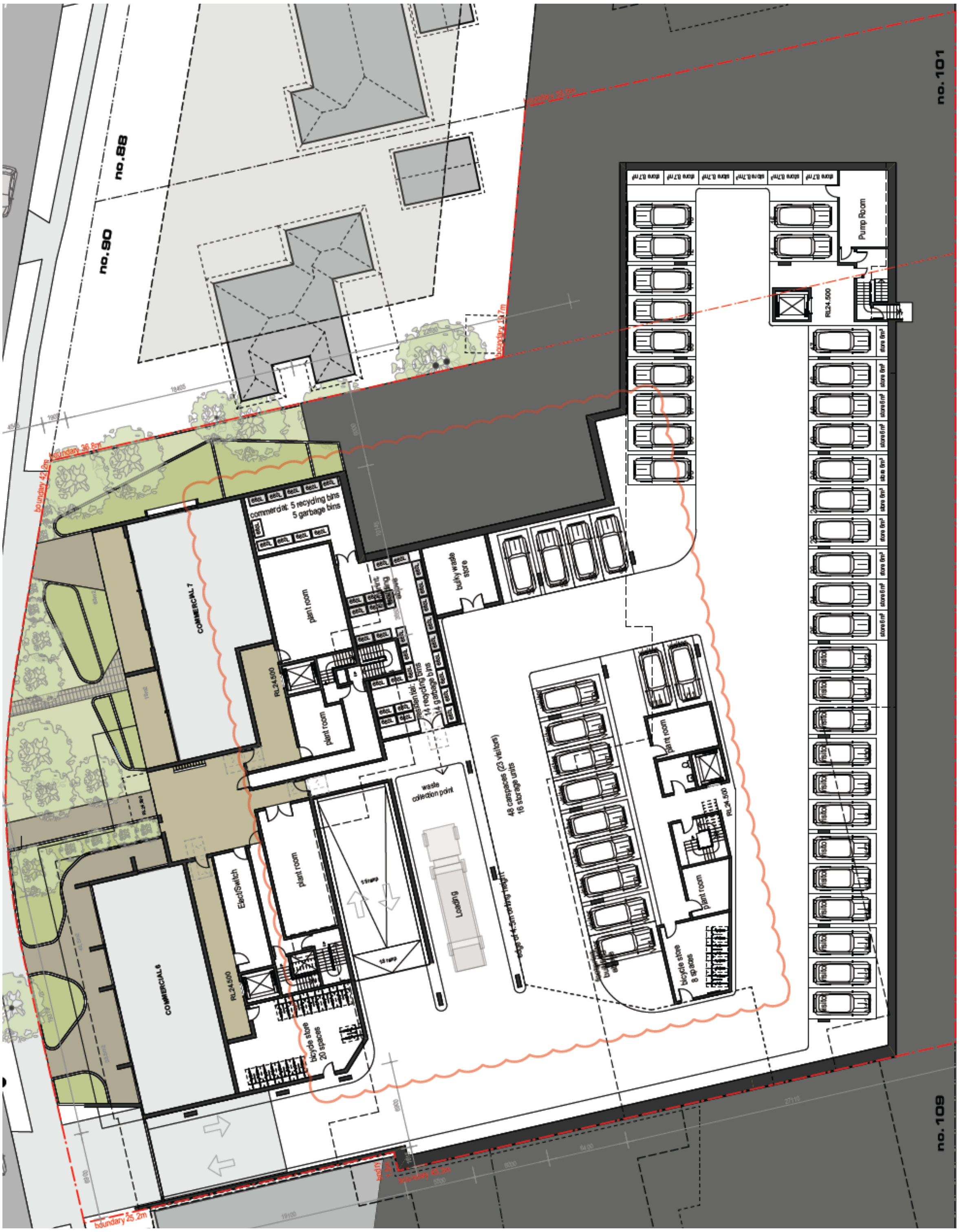
Level -02



Level -01



Level 00


no.88
no.90
no.101
no.109
COMMERCIAL 7
COMMERCIAL 6
plant room
bulky waste store
Pump Room
waste collection point
Loading
48 carparks (23 visitors)
16 storage units
bicycle store 20 spaces
bicycle store 8 spaces
Elect/Switch
commercial: 5 recycling bins 5 garbage bins
boundary 25.2m

Level 01


no.88
no.90
no.109
COMMERCIAL 1
COMMERCIAL 2
COMMERCIAL 3
COMMERCIAL 4
COMMERCIAL 5
6m setback up to 4 storeys
outline of deep soil space
walkaway 1.20
walkaway 1.20

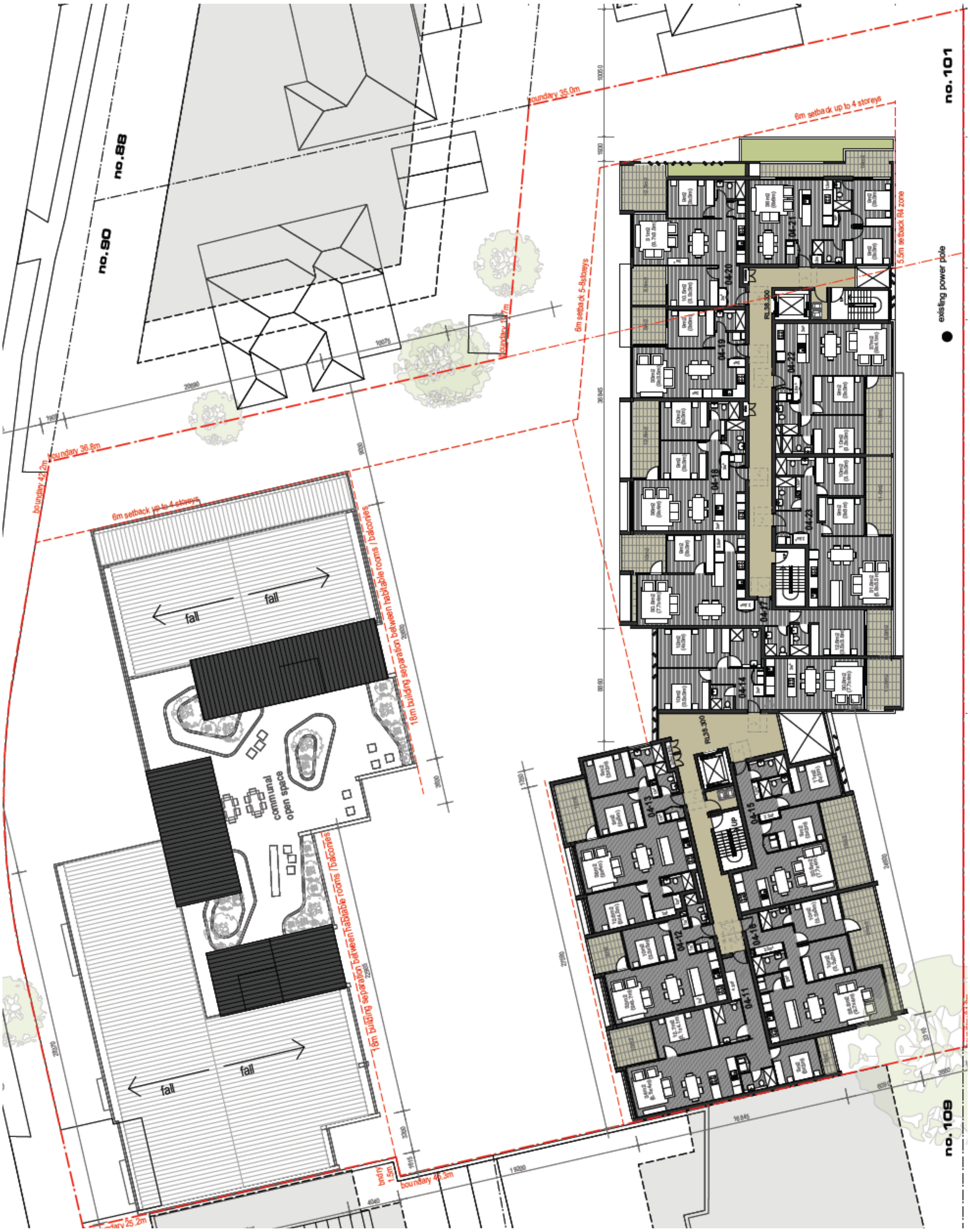
Level 02


no.88
no.90
no.101
no.109
boundary 35.0m
boundary 36.8m
boundary 45.2m
boundary 46.3m
6m setback up to 4 storeys
6m setback 5-8storeys
existing power pole
16m building separation between habitable rooms / balconies
operable skylight above

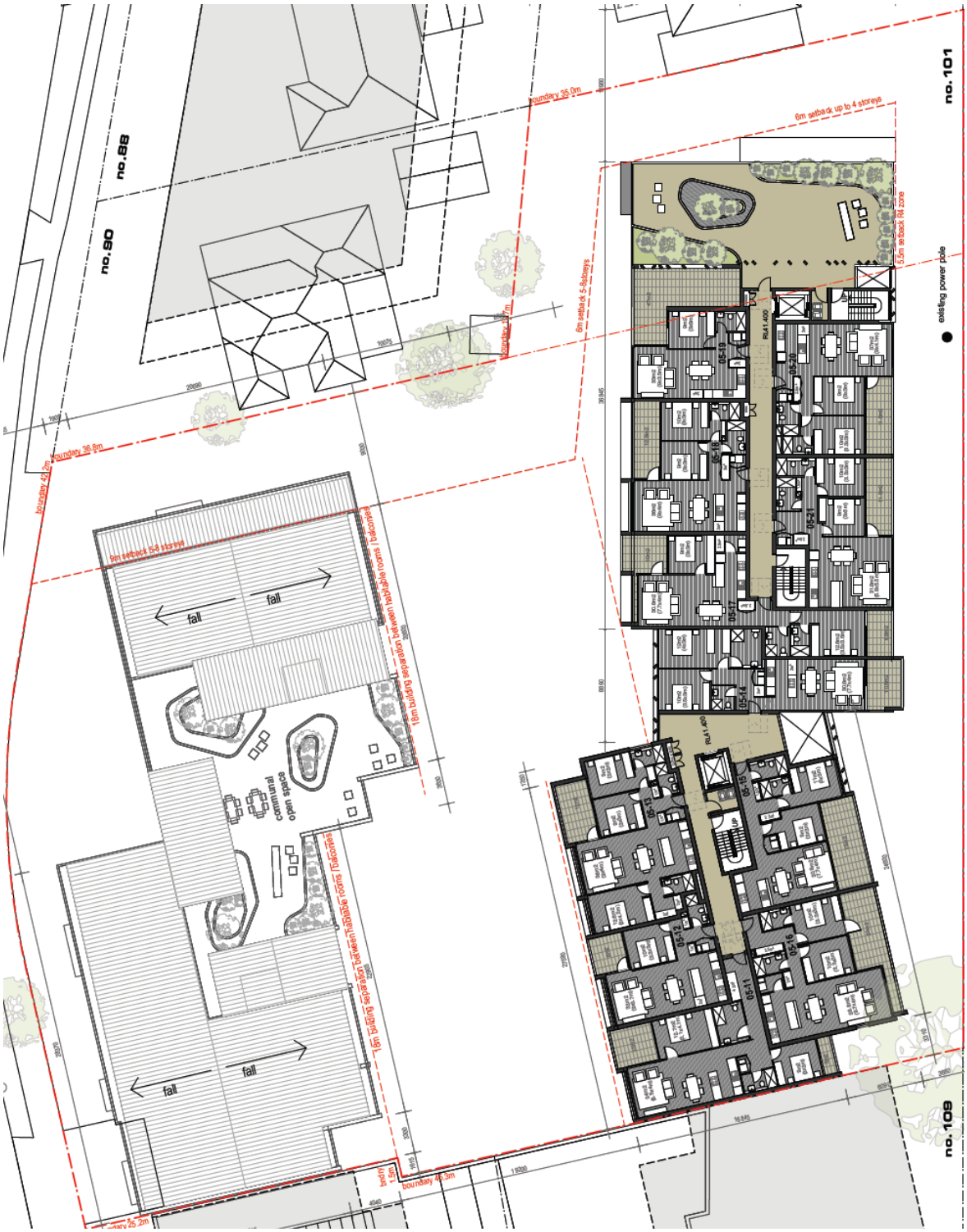
Level 03


no.88
no.90
no.101
no.109
communal open space
existing power pole
6m setback up to 4 storeys
18m building separation between habitable rooms / balconies

Level 04


no.88
no.90
no.101
no.109
6m setback up to 4 storeys
communal open space
fall
fall
fall
fall
18m building separation between habitable rooms / balconies
existing power pole
6m setback 5-8storeys

Level 05


no.88
no.90
no.101
no.103
boundary 35.0m
6m setback up to 4 storeys
6m setback 5-8storeys
5.5m setback RM zone
existing power pole
boundary 39.9m
boundary 43.0m
9m setback 5-8 storeys
fall
fall
fall
fall
communal open space
16m building separation between habitable rooms / balconies
16m building separation between habitable rooms / balconies
boundary 46.3m
RL41.400
RL41.400
05-19
05-20
05-18
05-21
05-17
05-14
05-13
05-16
05-15
05-12
05-11

Level 06


no.88
no.90
no.101
no.109
boundary 35.0m
boundary 36.8m
9m setback 5-8 storeys
communal open space
fall
fall
fall
fall
18m building separation between habitable rooms / balconies
5.5m setback R4 zone
existing power pole
operable skylight above
boundary 46.3m
06-01
06-02
06-03
06-04
06-05
06-06

Appendix 2

NOISE MEASUREMENT RESULTS

ROAD TRAFFIC NOISE

Measurement Location Location 1
Road Traffic Noise Measurement

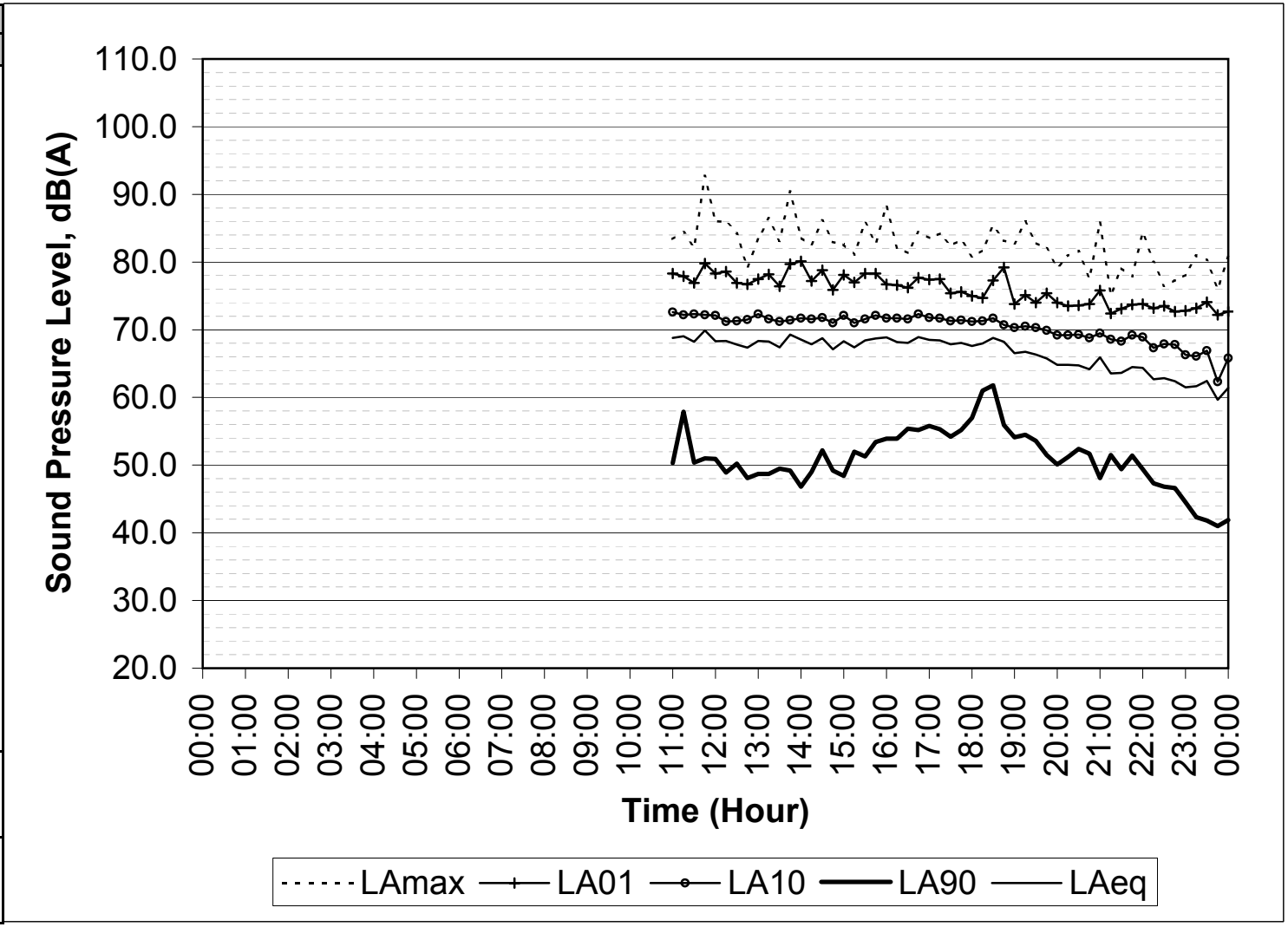
Project Title Proposed Residential Development
101 Nuwarra Road, Moorebank

Measurement Date Tuesday, 12 April 2016

Notes

1. Tabulated L_{Aeq} are logarithically averaged
2. Tabulated L_{A01} and L_{A10} are arithmetically averaged
3. Tabulated L_{A90} are the lowest 10-percentile levels

Time	Average Noise Level			
	L_{Aeq}	L_{A01}	L_{A10}	L_{A90}
00:00-01:00				
01:00-02:00				
02:00-03:00				
03:00-04:00				
04:00-05:00				
05:00-06:00				
06:00-07:00				
07:00-08:00				
08:00-09:00				
09:00-10:00				
10:00-11:00				
11:00-12:00	68.9	78.2	72.2	50.6
12:00-13:00	68.0	77.4	71.6	48.3
13:00-14:00	68.4	78.6	71.5	47.4
14:00-15:00	68.0	77.5	71.6	48.6
15:00-16:00	68.4	77.6	71.6	51.5
16:00-17:00	68.4	77.0	71.9	54.3
17:00-18:00	68.0	75.9	71.4	54.5
18:00-19:00	68.0	76.3	71.0	54.6
19:00-20:00	66.0	74.6	70.0	50.5
20:00-21:00	65.0	74.2	69.2	49.0
21:00-22:00	64.0	73.3	68.8	49.4
22:00-23:00	62.4	73.1	67.3	45.1
23:00-24:00	61.4	73.1	65.3	41.2
Day				
Evening	66.2	74.7	69.9	49.8
Night	64.4	73.8	64.0	37.3
LAeq,15hr LAeq,9hr LAeq,24hr	64.4			



Measurement Location Location 1
Road Traffic Noise Measurement

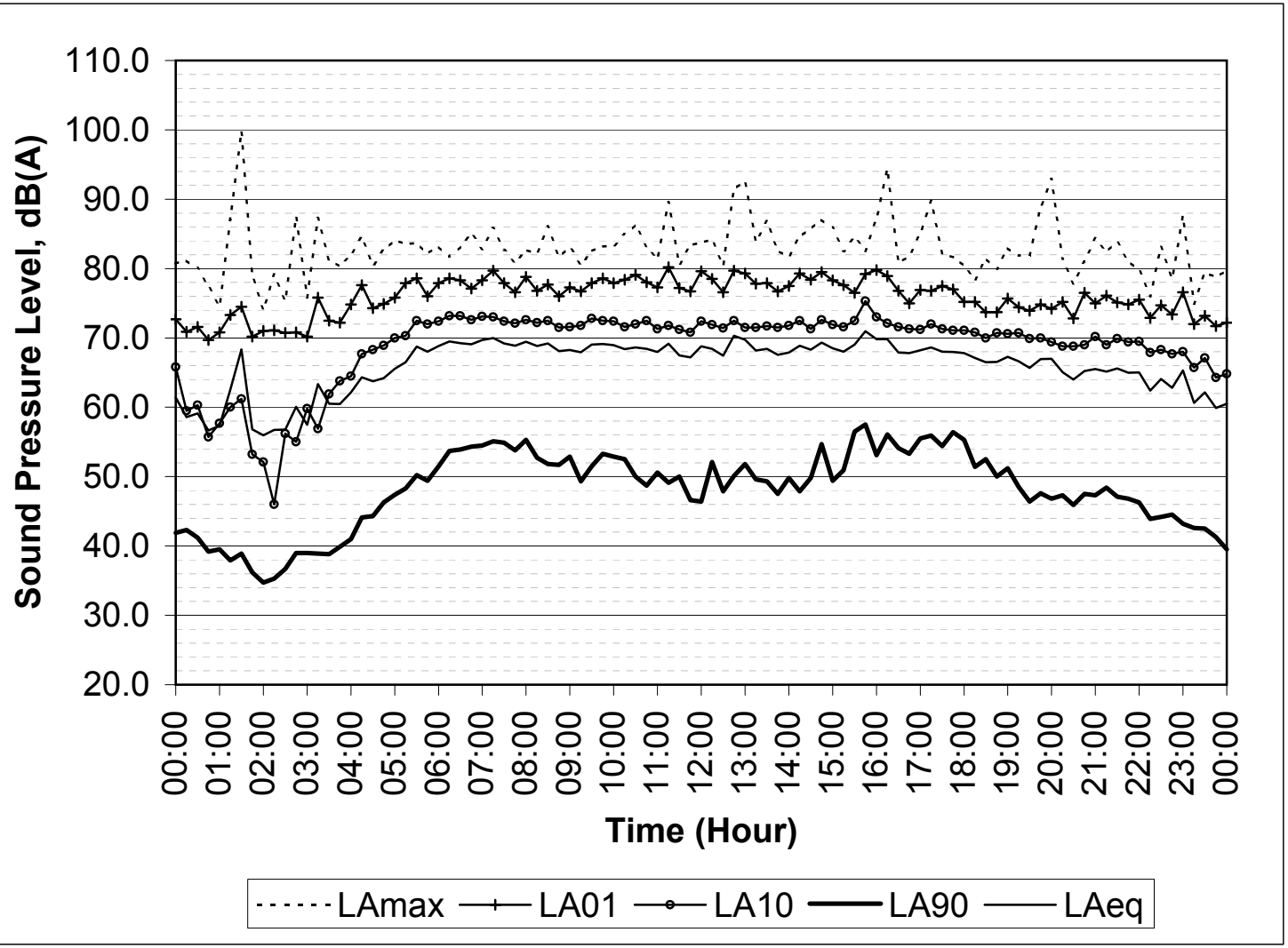
Project Title Proposed Residential Development
101 Nuwarra Road, Moorebank

Measurement Date Wednesday, 13 April 2016

Notes

1. Tabulated L_{Aeq} are logarithically averaged
2. Tabulated L_{A01} and L_{A10} are arithmetically averaged
3. Tabulated L_{A90} are the lowest 10-percentile levels

Time	Average Noise Level			
	L_{Aeq}	L_{A01}	L_{A10}	L_{A90}
00:00-01:00	58.0	70.8	58.3	39.3
01:00-02:00	63.8	72.3	56.6	35.2
02:00-03:00	58.0	70.7	54.3	35.7
03:00-04:00	61.8	73.8	61.8	38.8
04:00-05:00	64.5	75.7	68.7	44.2
05:00-06:00	68.1	77.6	71.8	48.6
06:00-07:00	69.4	78.1	73.0	53.8
07:00-08:00	69.4	78.3	72.5	54.1
08:00-09:00	68.6	77.0	72.0	51.7
09:00-10:00	68.8	77.8	72.4	50.0
10:00-11:00	68.4	78.2	71.9	49.1
11:00-12:00	68.2	78.4	71.6	46.5
12:00-13:00	69.1	78.5	71.8	48.6
13:00-14:00	68.0	77.5	71.6	48.0
14:00-15:00	68.8	78.9	72.1	48.4
15:00-16:00	69.6	78.3	73.1	51.6
16:00-17:00	68.5	76.9	71.6	53.5
17:00-18:00	68.1	76.6	71.4	54.7
18:00-19:00	66.9	74.6	70.5	50.4
19:00-20:00	66.6	74.3	70.0	46.5
20:00-21:00	65.0	74.9	69.2	46.3
21:00-22:00	65.2	75.4	69.5	46.5
22:00-23:00	63.8	74.4	68.0	43.4
23:00-24:00	60.9	72.3	65.5	40.0
Day	68.8	77.9	72.0	48.1
Evening	66.2	74.8	69.9	46.6
Night	64.5	74.1	64.8	38.5
LAeq,15hr		68.2		
LAeq,9hr		64.5		
LAeq,24hr		67.3		



Measurement Location Location 1
Road Traffic Noise Measurement

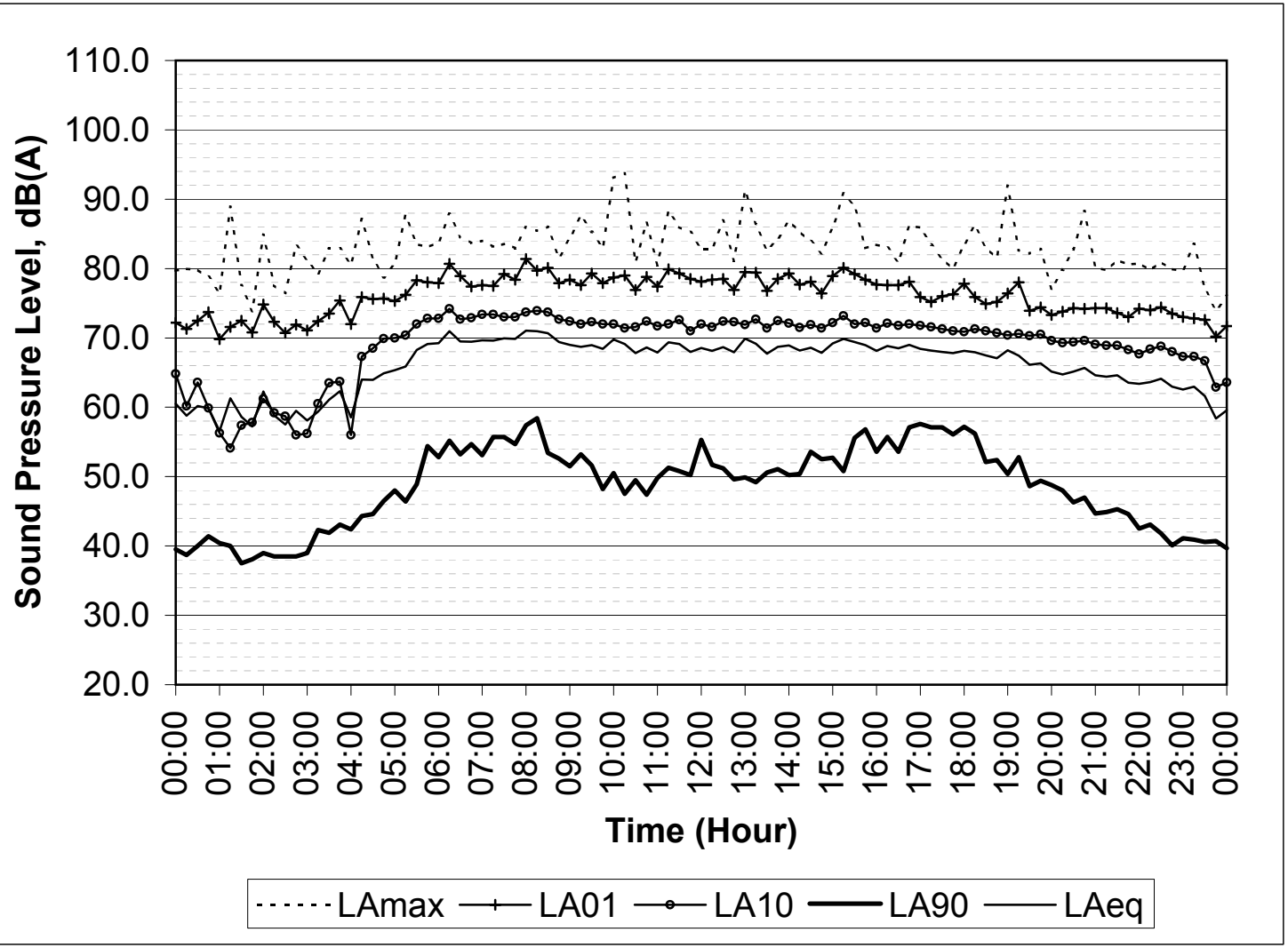
Project Title Proposed Residential Development
101 Nuwarra Road, Moorebank

Measurement Date Thursday, 14 April 2016

Notes

1. Tabulated L_{Aeq} are logarithically averaged
2. Tabulated L_{A01} and L_{A10} are arithmetically averaged
3. Tabulated L_{A90} are the lowest 10-percentile levels

Time	Average Noise Level			
	L_{Aeq}	L_{A01}	L_{A10}	L_{A90}
00:00-01:00	59.1	71.8	60.0	39.1
01:00-02:00	60.3	72.4	57.6	37.7
02:00-03:00	58.5	71.5	57.5	38.5
03:00-04:00	60.6	73.3	60.9	42.0
04:00-05:00	64.6	75.6	68.9	44.4
05:00-06:00	68.3	77.6	72.0	47.2
06:00-07:00	69.9	78.7	73.3	53.1
07:00-08:00	70.1	79.1	73.3	55.0
08:00-09:00	70.1	79.0	73.2	51.8
09:00-10:00	69.0	78.4	72.1	48.9
10:00-11:00	68.4	78.0	71.8	47.4
11:00-12:00	68.8	79.0	71.9	50.4
12:00-13:00	68.7	78.3	72.1	49.7
13:00-14:00	68.7	78.5	72.2	49.5
14:00-15:00	68.5	77.8	71.8	51.0
15:00-16:00	69.1	78.9	72.2	51.6
16:00-17:00	68.7	77.3	71.9	54.2
17:00-18:00	68.0	76.3	71.2	56.4
18:00-19:00	67.7	75.6	70.9	50.9
19:00-20:00	66.3	74.9	70.3	48.7
20:00-21:00	65.1	74.2	69.4	45.2
21:00-22:00	64.0	73.8	68.5	43.1
22:00-23:00	63.4	73.7	68.1	40.4
23:00-24:00	61.0	71.8	65.1	40.0
Day	69.0	78.2	72.2	49.5
Evening	66.3	74.8	69.9	44.8
Night	64.4	74.3	65.0	39.2
LAeq,15hr		68.4		
LAeq,9hr		64.4		
LAeq,24hr		67.5		



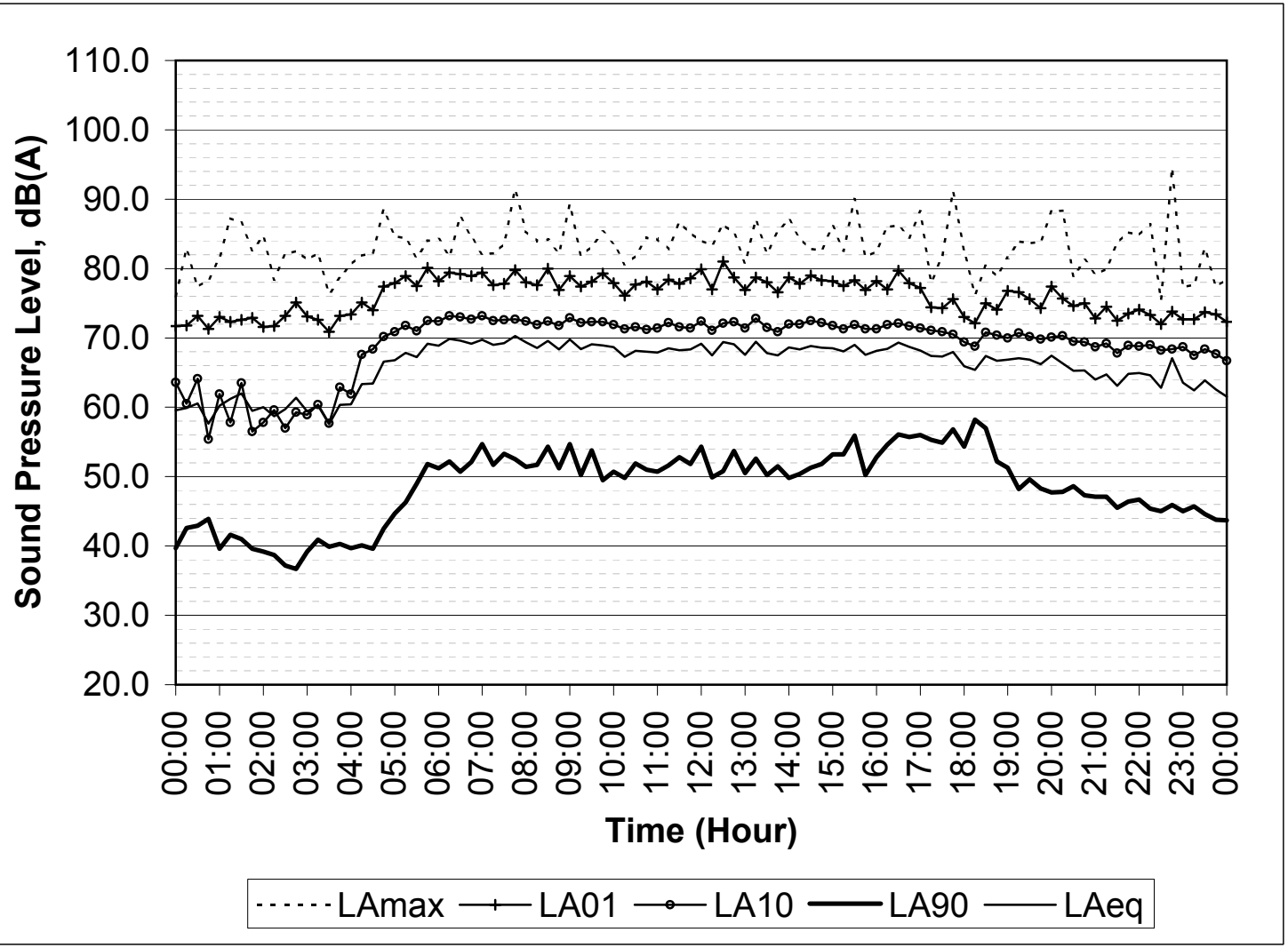
Measurement Location Location 1
Road Traffic Noise Measurement

Project Title Proposed Residential Development
101 Nuwarra Road, Moorebank

Measurement Date Friday, 15 April 2016

Notes
1. Tabulated L_{Aeq} are logarithically averaged
2. Tabulated L_{A01} and L_{A10} are arithmetically averaged
3. Tabulated L_{A90} are the lowest 10-percentile levels

Time	Average Noise Level			
	L_{Aeq}	L_{A01}	L_{A10}	L_{A90}
00:00-01:00	59.7	72.3	60.5	40.5
01:00-02:00	60.8	72.4	58.9	39.3
02:00-03:00	59.9	73.3	58.7	36.9
03:00-04:00	59.8	72.5	60.7	39.8
04:00-05:00	65.3	76.1	69.3	39.8
05:00-06:00	68.3	78.7	71.9	47.1
06:00-07:00	69.6	79.2	73.0	51.1
07:00-08:00	69.5	78.3	72.6	51.5
08:00-09:00	69.1	78.4	72.3	51.4
09:00-10:00	68.8	78.2	72.2	49.7
10:00-11:00	67.8	77.2	71.4	50.1
11:00-12:00	68.6	78.7	71.9	51.7
12:00-13:00	68.5	78.4	71.7	50.1
13:00-14:00	68.4	78.0	71.8	49.9
14:00-15:00	68.6	78.3	72.1	50.7
15:00-16:00	68.2	77.7	71.5	51.0
16:00-17:00	68.7	78.0	71.8	54.9
17:00-18:00	67.2	74.3	70.5	54.5
18:00-19:00	66.7	74.5	70.0	51.6
19:00-20:00	66.9	76.0	70.2	47.9
20:00-21:00	65.3	74.5	69.5	47.2
21:00-22:00	64.5	73.7	68.7	45.8
22:00-23:00	64.8	73.0	68.6	45.0
23:00-24:00	62.7	73.0	67.6	43.7
Day	68.6	77.9	71.9	50.2
Evening	66.0	74.6	69.6	46.8
Night	62.4	72.9	65.0	39.6
LAeq,15hr	68.0			
LAeq,9hr	62.4			
LAeq,24hr	67.2			



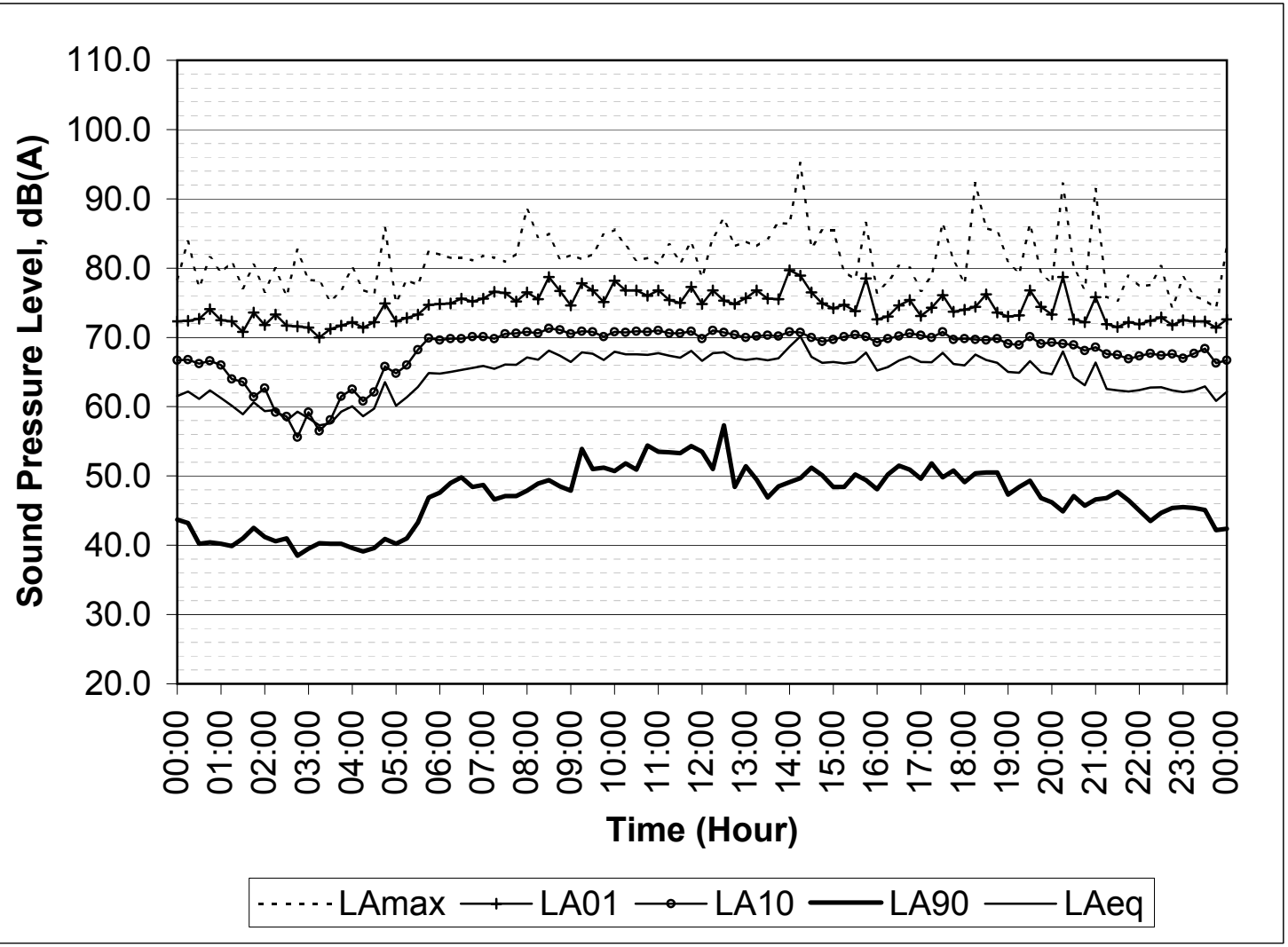
Measurement Location Location 1
Road Traffic Noise Measurement

Project Title Proposed Residential Development
101 Nuwarra Road, Moorebank

Measurement Date Saturday, 16 April 2016

Notes
1. Tabulated L_{Aeq} are logarithically averaged
2. Tabulated L_{A01} and L_{A10} are arithmetically averaged
3. Tabulated L_{A90} are the lowest 10-percentile levels

Time	Average Noise Level			
	L_{Aeq}	L_{A01}	L_{A10}	L_{A90}
00:00-01:00	61.8	72.9	66.4	40.2
01:00-02:00	59.8	72.1	62.9	40.2
02:00-03:00	58.8	72.0	58.2	38.8
03:00-04:00	58.7	71.3	59.7	39.8
04:00-05:00	60.9	72.7	63.4	39.3
05:00-06:00	63.7	73.9	68.4	41.7
06:00-07:00	65.5	75.3	70.0	48.5
07:00-08:00	66.2	76.2	70.4	46.8
08:00-09:00	67.2	76.4	70.9	48.1
09:00-10:00	67.6	77.0	70.7	50.8
10:00-11:00	67.6	76.6	70.9	51.2
11:00-12:00	67.3	75.6	70.5	53.3
12:00-13:00	67.3	75.7	70.5	49.2
13:00-14:00	67.4	76.9	70.4	47.4
14:00-15:00	67.8	76.1	70.0	48.8
15:00-16:00	66.5	74.9	70.0	48.2
16:00-17:00	66.5	74.0	70.2	49.8
17:00-18:00	66.6	74.5	70.1	49.3
18:00-19:00	66.5	74.3	69.6	48.2
19:00-20:00	65.4	74.4	69.4	46.4
20:00-21:00	65.8	74.8	68.7	45.1
21:00-22:00	62.4	71.9	67.3	45.5
22:00-23:00	62.5	72.4	67.4	43.9
23:00-24:00	62.1	72.2	67.3	42.3
Day	67.1	75.8	70.4	47.9
Evening	65.4	74.0	68.9	46.0
Night	60.4	71.4	62.7	35.3
LAeq,15hr	66.7			
LAeq,9hr	60.4			
LAeq,24hr	65.6			



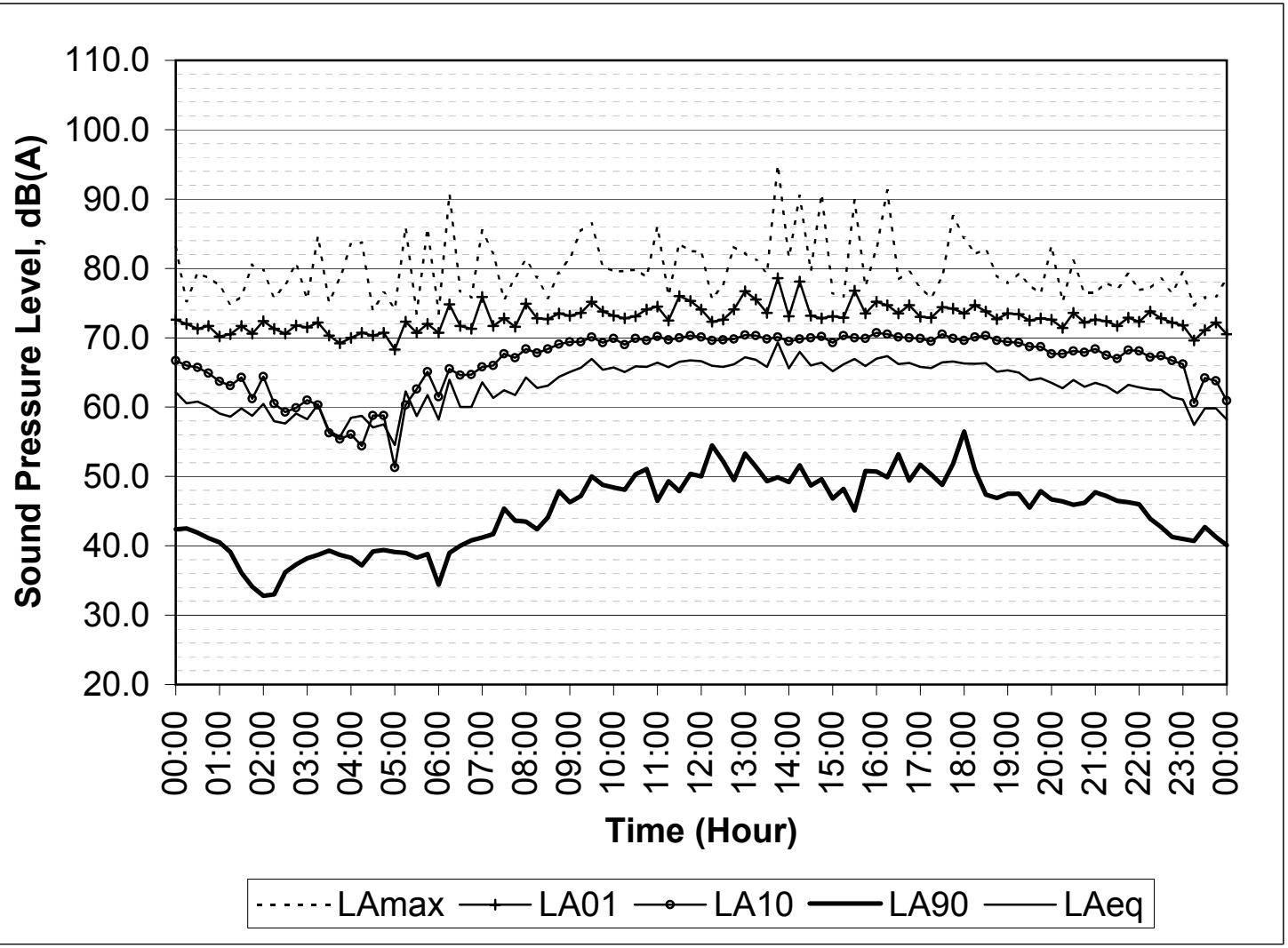
Measurement Location Location 1
Road Traffic Noise Measurement

Project Title Proposed Residential Development
101 Nuwarra Road, Moorebank

Measurement Date Sunday, 17 April 2016

Notes
1. Tabulated L_{Aeq} are logarithically averaged
2. Tabulated L_{A01} and L_{A10} are arithmetically averaged
3. Tabulated L_{A90} are the lowest 10-percentile levels

Time	Average Noise Level			
	L_{Aeq}	L_{A01}	L_{A10}	L_{A90}
00:00-01:00	60.2	71.3	65.1	40.7
01:00-02:00	59.5	71.3	63.3	33.2
02:00-03:00	58.3	71.3	60.2	34.0
03:00-04:00	58.2	70.4	57.0	38.4
04:00-05:00	57.2	70.0	55.8	37.8
05:00-06:00	60.6	71.4	62.4	35.6
06:00-07:00	62.3	73.4	65.2	39.3
07:00-08:00	62.6	72.8	67.3	42.2
08:00-09:00	63.9	73.1	68.7	42.9
09:00-10:00	66.0	74.0	69.7	47.6
10:00-11:00	65.8	73.6	69.7	47.0
11:00-12:00	66.4	74.5	70.0	48.3
12:00-13:00	66.3	73.9	69.9	50.3
13:00-14:00	67.2	75.2	69.9	49.2
14:00-15:00	66.5	74.3	69.8	47.4
15:00-16:00	66.5	74.6	70.2	46.0
16:00-17:00	66.5	74.0	70.1	49.6
17:00-18:00	66.3	73.8	69.9	49.3
18:00-19:00	65.8	73.7	69.9	47.1
19:00-20:00	64.2	72.8	68.6	45.9
20:00-21:00	63.3	72.5	68.0	46.0
21:00-22:00	62.8	72.3	67.7	46.1
22:00-23:00	61.9	72.7	66.9	41.1
23:00-24:00	58.9	70.9	62.4	40.3
Day	66.2	74.1	69.8	46.2
Evening	64.4	72.9	68.6	46.1
Night	65.4	74.7	64.0	37.9
LAeq,15hr	65.6			
LAeq,9hr	64.5			
LAeq,24hr	64.3			



Measurement Location Location 1
Road Traffic Noise Measurement

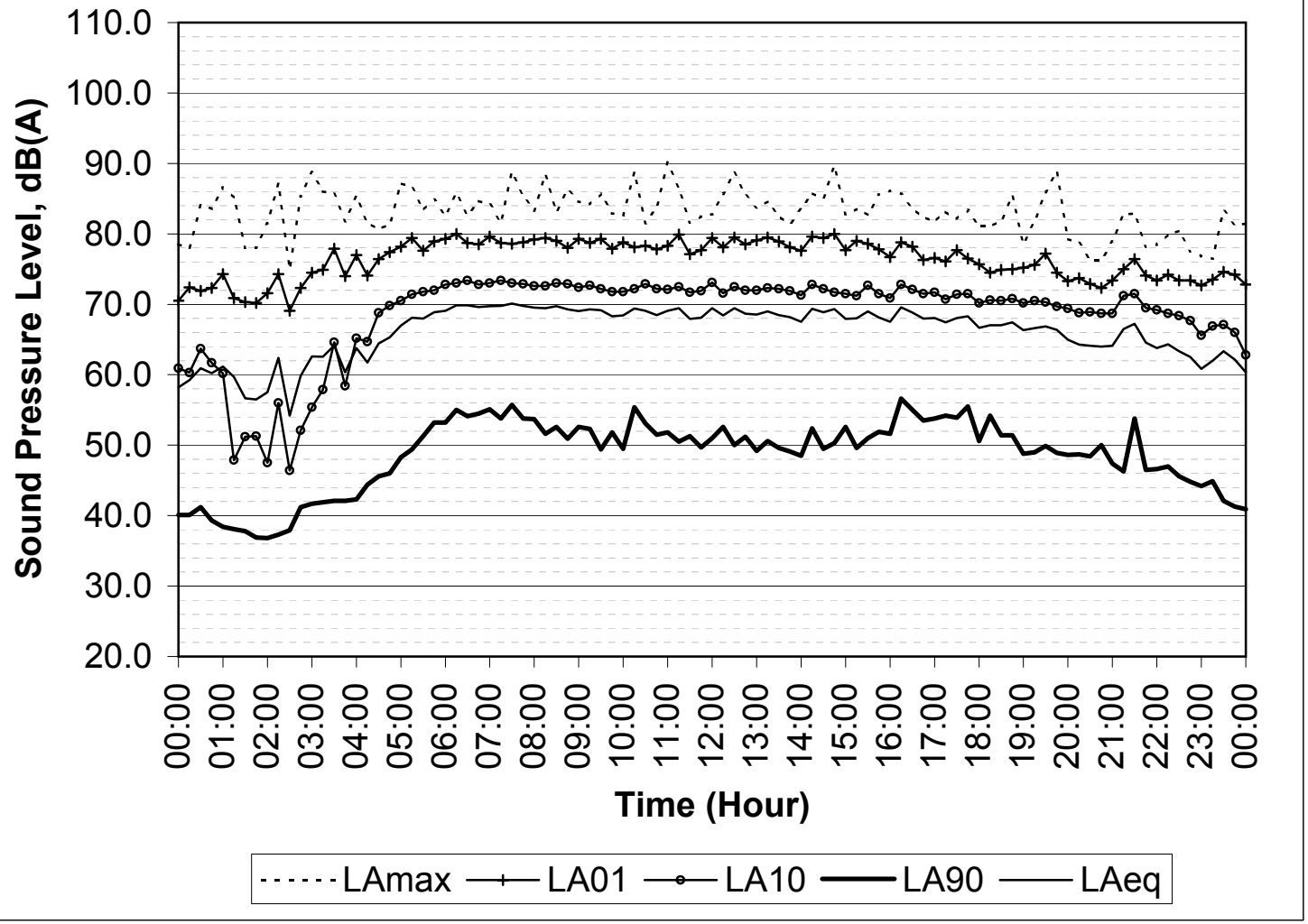
Project Title Proposed Residential Development
101 Nuwarra Road, Moorebank

Measurement Date Monday, 18 April 2016

Notes

1. Tabulated L_{Aeq} are logarithically averaged
2. Tabulated L_{A01} and L_{A10} are arithmetically averaged
3. Tabulated L_{A90} are the lowest 10-percentile levels

Time	Average Noise Level			
	L_{Aeq}	L_{A01}	L_{A10}	L_{A90}
00:00-01:00	60.4	72.7	61.5	38.7
01:00-02:00	57.8	70.8	49.5	36.8
02:00-03:00	60.8	72.6	52.5	37.5
03:00-04:00	62.9	76.0	61.5	42.0
04:00-05:00	65.0	76.5	68.5	44.8
05:00-06:00	68.5	78.8	72.0	50.0
06:00-07:00	69.8	79.2	73.1	54.2
07:00-08:00	69.8	78.8	73.0	53.7
08:00-09:00	69.4	78.9	72.7	51.1
09:00-10:00	68.8	78.7	72.1	49.4
10:00-11:00	69.0	78.1	72.4	51.6
11:00-12:00	68.8	78.5	72.3	49.9
12:00-13:00	68.8	78.8	72.0	49.4
13:00-14:00	68.3	78.5	71.9	48.7
14:00-15:00	68.9	79.2	72.1	49.7
15:00-16:00	68.2	78.0	71.6	50.0
16:00-17:00	68.7	77.5	72.0	53.6
17:00-18:00	67.7	76.5	71.0	51.6
18:00-19:00	67.0	74.9	70.5	49.6
19:00-20:00	66.3	75.2	70.0	48.7
20:00-21:00	64.1	73.1	68.8	47.7
21:00-22:00	65.7	74.7	70.4	46.4
22:00-23:00	62.9	73.4	67.6	44.4
23:00-24:00	62.1	73.8	65.7	41.0
Day	68.9	78.4	72.2	49.5
Evening	66.1	74.6	70.0	47.0
Night	65.1	74.9	64.6	39.5
LAeq,15hr	68.3			
LAeq,9hr	65.1			
LAeq,24hr	67.4			



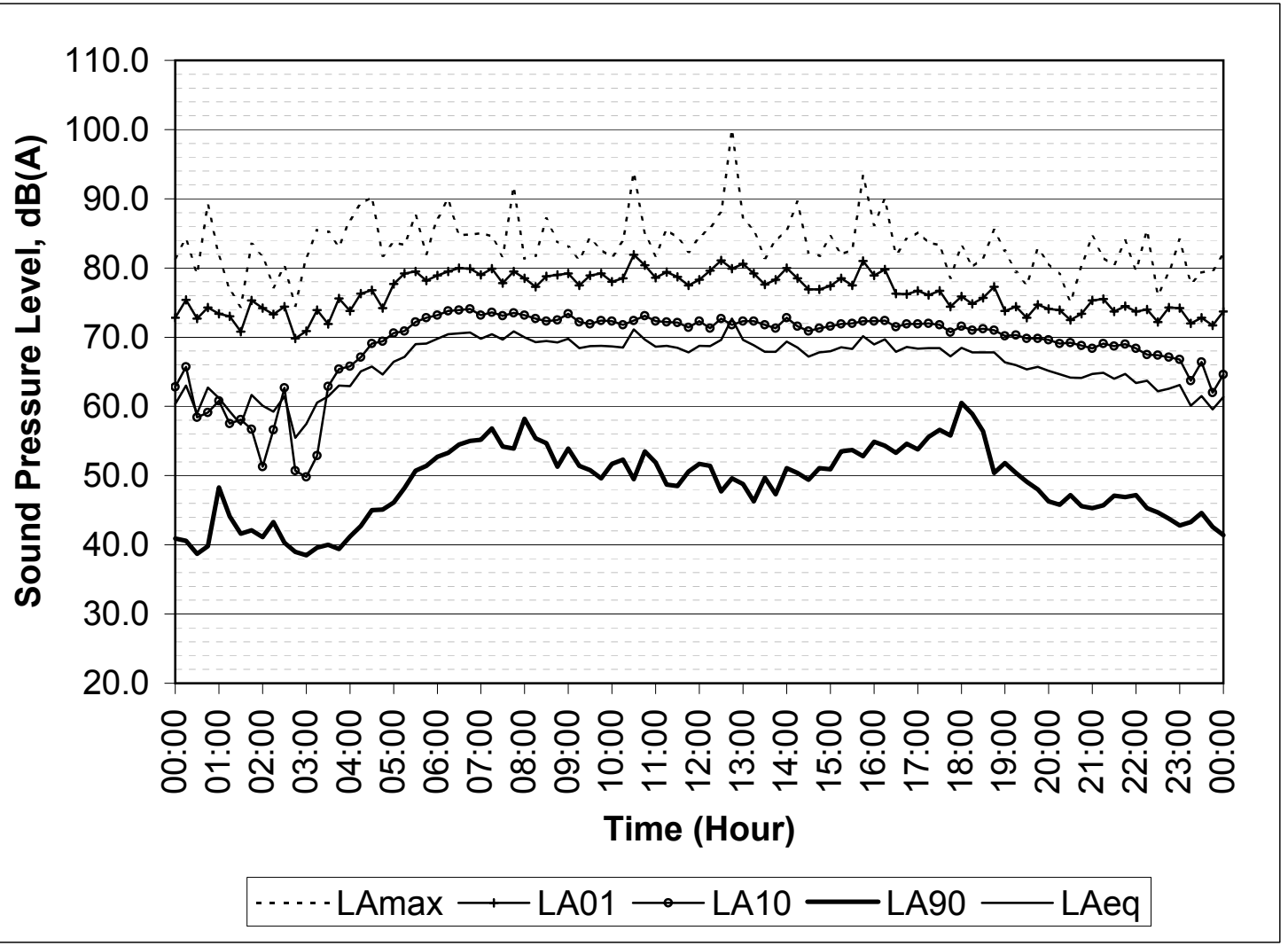
Measurement Location Location 1
Road Traffic Noise Measurement

Measurement Date Tuesday, 19 April 2016

Project Title Proposed Residential Development
101 Nuwarra Road, Moorebank

Notes
1. Tabulated L_{Aeq} are logarithically averaged
2. Tabulated L_{A01} and L_{A10} are arithmetically averaged
3. Tabulated L_{A90} are the lowest 10-percentile levels

Time	Average Noise Level			
	L_{Aeq}	L_{A01}	L_{A10}	L_{A90}
00:00-01:00	61.7	74.0	61.0	39.0
01:00-02:00	59.9	73.3	55.9	41.3
02:00-03:00	59.0	72.1	55.0	38.7
03:00-04:00	62.1	73.8	61.8	39.5
04:00-05:00	65.5	76.3	69.1	43.4
05:00-06:00	68.9	79.0	72.3	49.0
06:00-07:00	70.4	79.6	73.8	53.7
07:00-08:00	70.3	78.9	73.4	54.0
08:00-09:00	69.4	78.6	72.7	52.1
09:00-10:00	68.6	78.4	72.2	50.0
10:00-11:00	69.6	79.9	72.4	50.2
11:00-12:00	68.5	78.5	72.0	48.6
12:00-13:00	70.4	80.3	72.0	48.0
13:00-14:00	68.5	78.8	72.1	46.6
14:00-15:00	67.9	77.4	71.4	49.7
15:00-16:00	69.1	79.0	72.1	53.0
16:00-17:00	68.7	77.3	71.9	53.5
17:00-18:00	68.2	75.8	71.5	55.7
18:00-19:00	67.5	75.4	70.9	50.8
19:00-20:00	65.6	74.0	69.9	46.8
20:00-21:00	64.4	73.8	68.9	45.4
21:00-22:00	64.3	74.4	68.8	46.1
22:00-23:00	62.9	73.7	67.2	43.1
23:00-24:00	60.7	72.6	64.2	41.8
Day	69.1	78.5	72.2	48.7
Evening	66.0	74.5	69.8	45.7
Night	64.4	73.9	63.3	37.9
LAeq,15hr	68.5			
LAeq,9hr	64.4			
LAeq,24hr	67.6			



Measurement Location Location 1
Road Traffic Noise Measurement

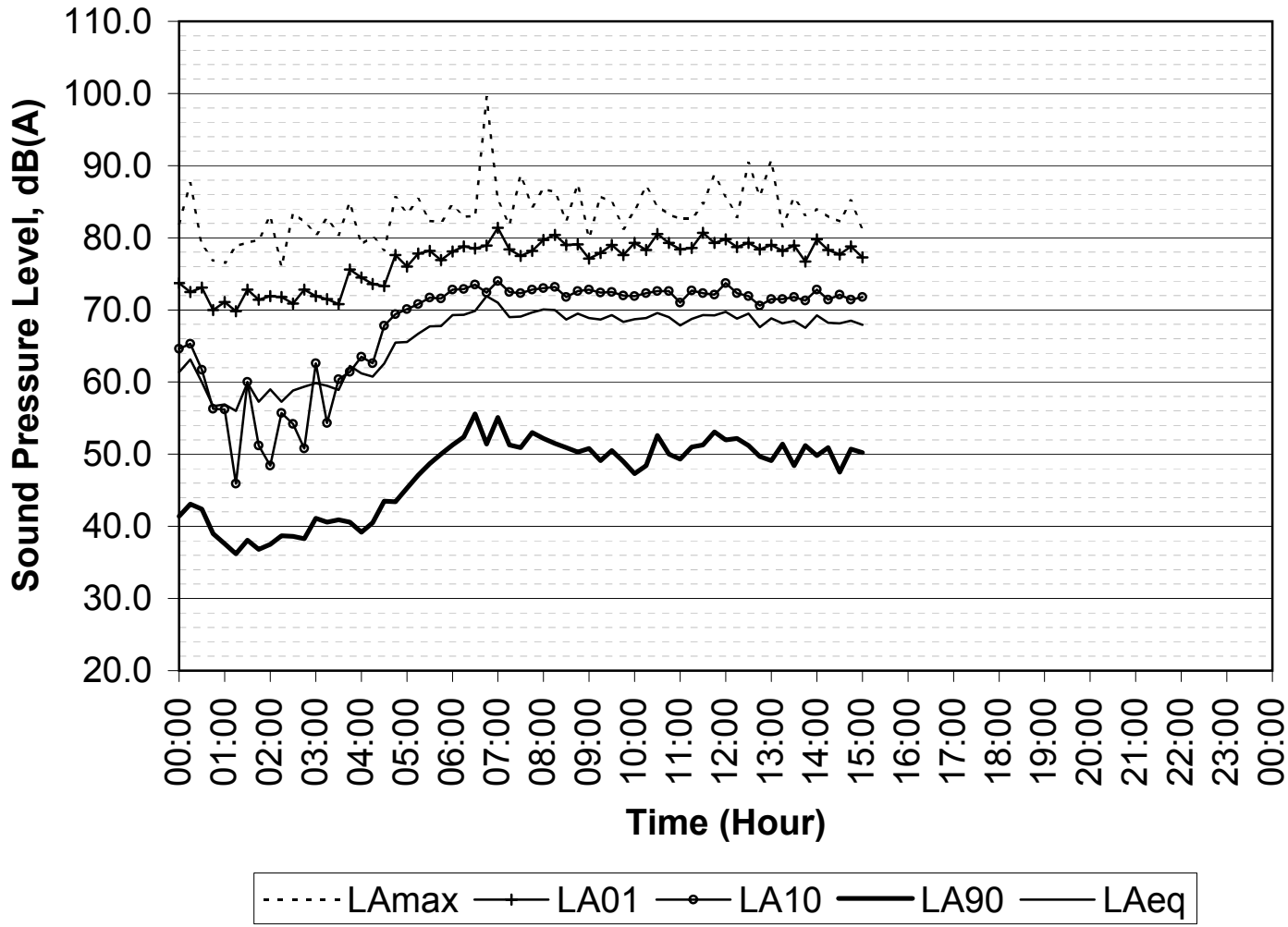
Project Title Proposed Residential Development
101 Nuwarra Road, Moorebank

Measurement Date Wednesday, 20 April 2016

Notes

1. Tabulated L_{Aeq} are logarithically averaged
2. Tabulated L_{A01} and L_{A10} are arithmetically averaged
3. Tabulated L_{A90} are the lowest 10-percentile levels

Time	Average Noise Level			
	L_{Aeq}	L_{A01}	L_{A10}	L_{A90}
00:00-01:00	60.0	71.7	59.9	38.0
01:00-02:00	58.3	71.5	51.4	36.4
02:00-03:00	58.9	71.9	55.8	38.4
03:00-04:00	60.7	73.1	59.9	39.6
04:00-05:00	64.0	75.1	67.5	41.4
05:00-06:00	68.0	77.8	71.7	47.6
06:00-07:00	70.6	79.4	73.2	51.7
07:00-08:00	69.5	78.5	72.7	51.0
08:00-09:00	69.3	78.9	72.6	50.5
09:00-10:00	68.8	78.5	72.2	47.8
10:00-11:00	68.9	79.1	72.1	48.7
11:00-12:00	69.3	79.6	72.7	51.1
12:00-13:00	68.7	78.9	71.6	49.3
13:00-14:00	68.4	78.4	71.9	48.8
14:00-15:00	68.2	78.0	71.7	48.3
15:00-16:00				
16:00-17:00				
17:00-18:00				
18:00-19:00				
19:00-20:00				
20:00-21:00				
21:00-22:00				
22:00-23:00				
23:00-24:00				
Day				
Evening				
Night				
LAeq,15hr				
LAeq,9hr				
LAeq,24hr				



Appendix 3

NOISE MEASUREMENT RESULTS

BACKGROUND NOISE

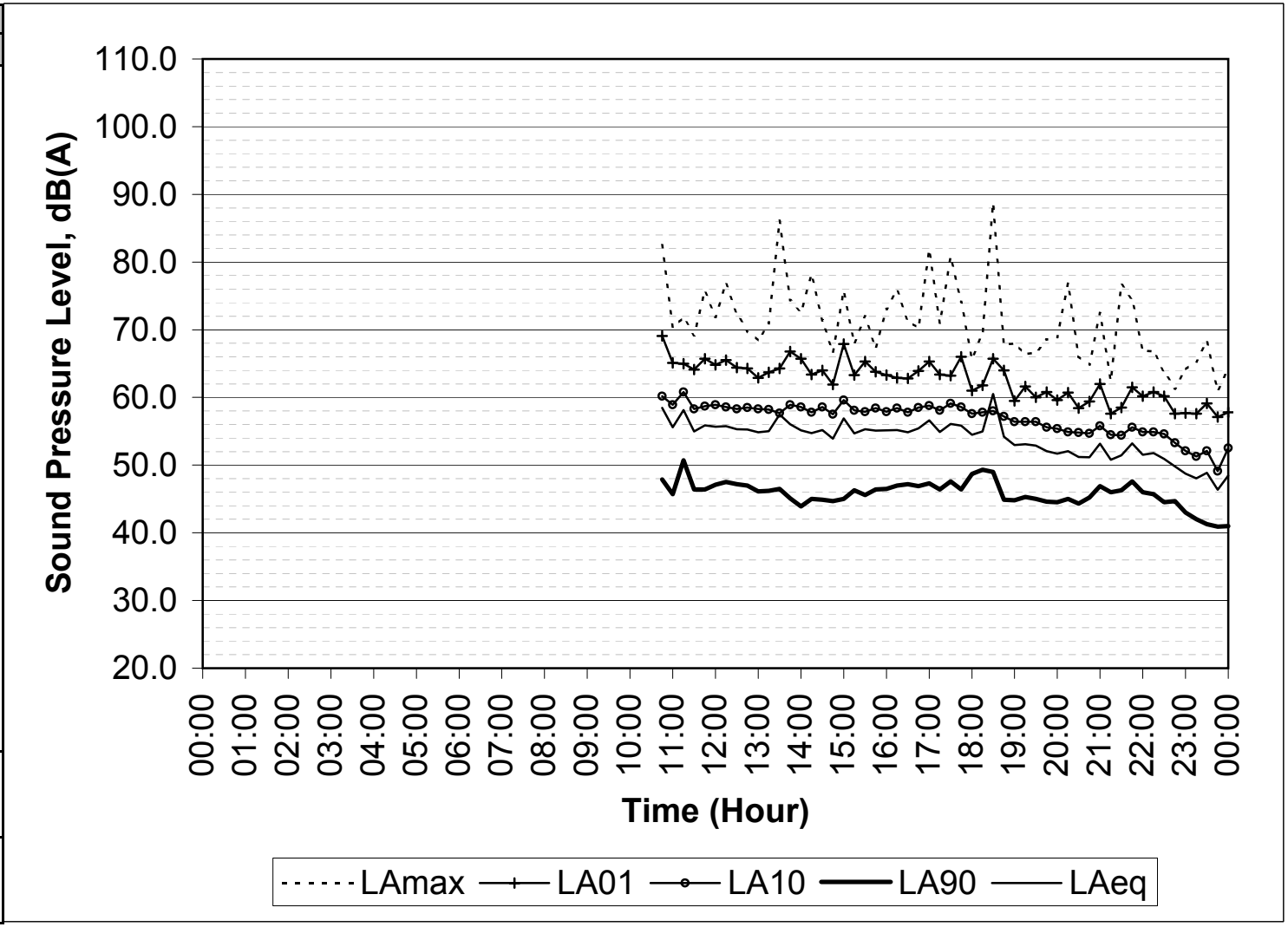
Measurement Location Location 2
Background Noise Measurement

Project Title Proposed Residential Development
101 Nuwarra Road, Moorebank

Measurement Date Tuesday, 12 April 2016

Notes
1. Tabulated L_{Aeq} are logarithically averaged
2. Tabulated L_{A01} and L_{A10} are arithmetically averaged
3. Tabulated L_{A90} are the lowest 10-percentile levels

Time	Average Noise Level			
	L_{Aeq}	L_{A01}	L_{A10}	L_{A90}
00:00-01:00				
01:00-02:00				
02:00-03:00				
03:00-04:00				
04:00-05:00				
05:00-06:00				
06:00-07:00				
07:00-08:00				
08:00-09:00				
09:00-10:00				
10:00-11:00				
11:00-12:00	56.3	64.9	59.2	46.4
12:00-13:00	55.3	64.3	58.4	46.4
13:00-14:00	56.0	65.1	58.4	44.3
14:00-15:00	55.3	64.3	58.4	44.8
15:00-16:00	55.1	63.9	58.1	45.8
16:00-17:00	55.6	63.7	58.4	46.9
17:00-18:00	55.4	63.4	58.4	46.4
18:00-19:00	56.8	62.8	57.4	44.8
19:00-20:00	52.5	60.5	56.0	44.5
20:00-21:00	52.0	60.1	55.1	44.5
21:00-22:00	51.8	59.5	54.9	46.0
22:00-23:00	50.5	59.1	53.7	43.5
23:00-24:00	48.0	57.9	51.3	40.9
Day				
Evening	54.0	60.8	56.0	44.6
Night	53.2	59.7	52.4	38.7
LAeq,15hr LAeq,9hr LAeq,24hr	53.2			



Measurement Location Location 2
Background Noise Measurement

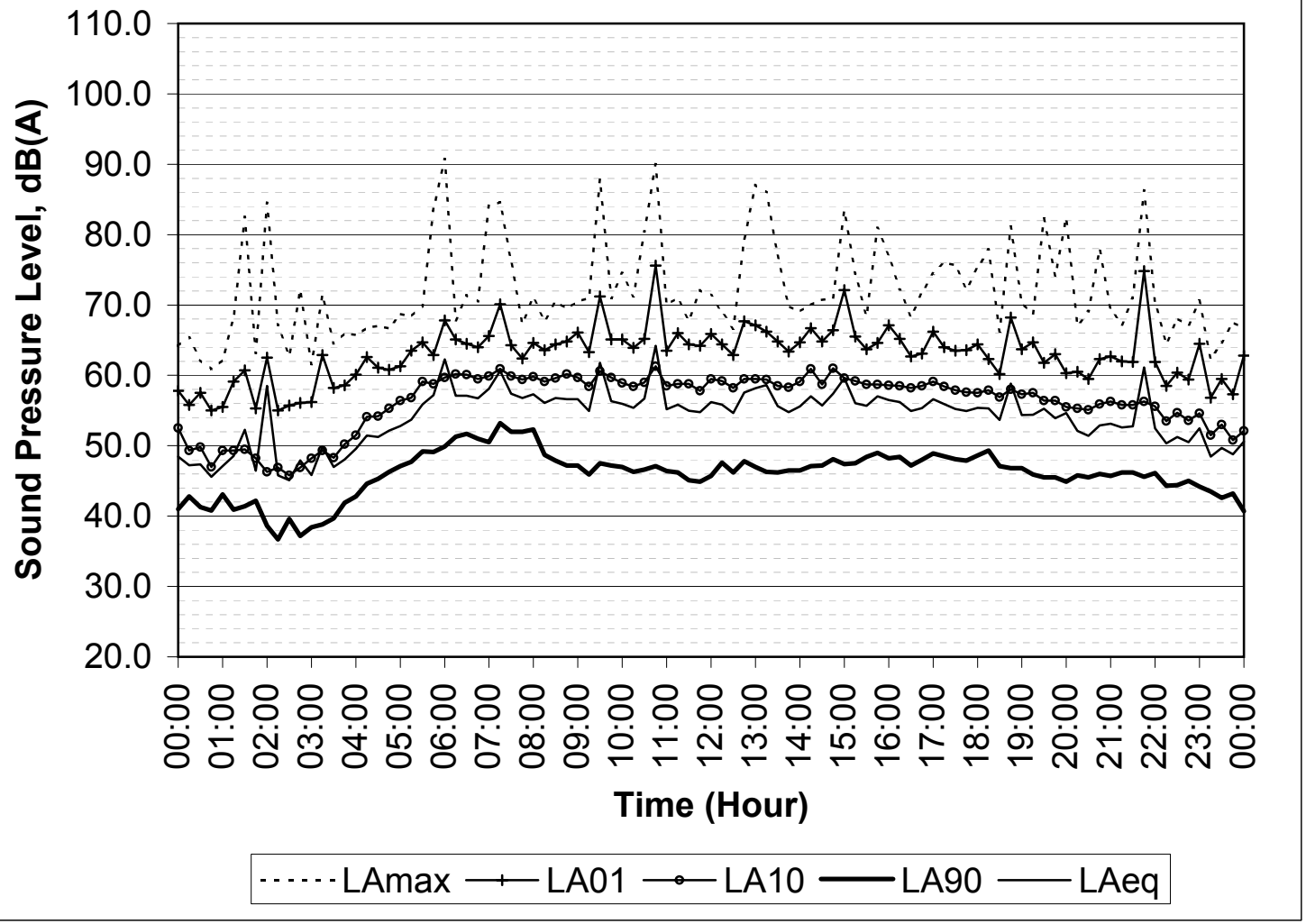
Project Title Proposed Residential Development
101 Nuwarra Road, Moorebank

Measurement Date Wednesday, 13 April 2016

Notes

1. Tabulated L_{Aeq} are logarithically averaged
2. Tabulated L_{A01} and L_{A10} are arithmetically averaged
3. Tabulated L_{A90} are the lowest 10-percentile levels

Time	Average Noise Level			
	L_{Aeq}	L_{A01}	L_{A10}	L_{A90}
00:00-01:00	46.9	56.0	48.9	41.0
01:00-02:00	53.9	59.4	48.3	39.3
02:00-03:00	46.3	55.8	47.0	36.9
03:00-04:00	48.8	60.0	49.8	39.1
04:00-05:00	52.0	61.5	55.0	44.8
05:00-06:00	58.5	64.7	58.6	48.1
06:00-07:00	57.3	64.8	59.9	50.7
07:00-08:00	58.3	65.4	60.0	52.0
08:00-09:00	56.5	64.7	59.7	47.2
09:00-10:00	58.2	66.2	59.4	46.2
10:00-11:00	59.8	67.1	59.3	46.3
11:00-12:00	55.5	65.1	58.7	45.0
12:00-13:00	56.8	65.5	59.1	46.4
13:00-14:00	56.4	64.8	58.8	46.2
14:00-15:00	57.7	67.5	60.1	47.1
15:00-16:00	56.3	65.2	58.8	47.7
16:00-17:00	55.8	64.3	58.6	47.4
17:00-18:00	55.4	63.9	57.9	48.0
18:00-19:00	56.0	63.6	57.5	46.8
19:00-20:00	54.6	62.5	56.5	45.1
20:00-21:00	52.4	61.3	55.7	45.6
21:00-22:00	56.6	65.2	55.9	45.8
22:00-23:00	51.2	60.7	54.1	44.2
23:00-24:00	49.5	59.1	51.9	41.3
Day	57.2	65.4	59.2	46.2
Evening	55.3	63.3	56.5	45.5
Night	52.3	60.2	53.1	40.4
LAeq,15hr	56.8			
LAeq,9hr	52.3			
LAeq,24hr	55.9			



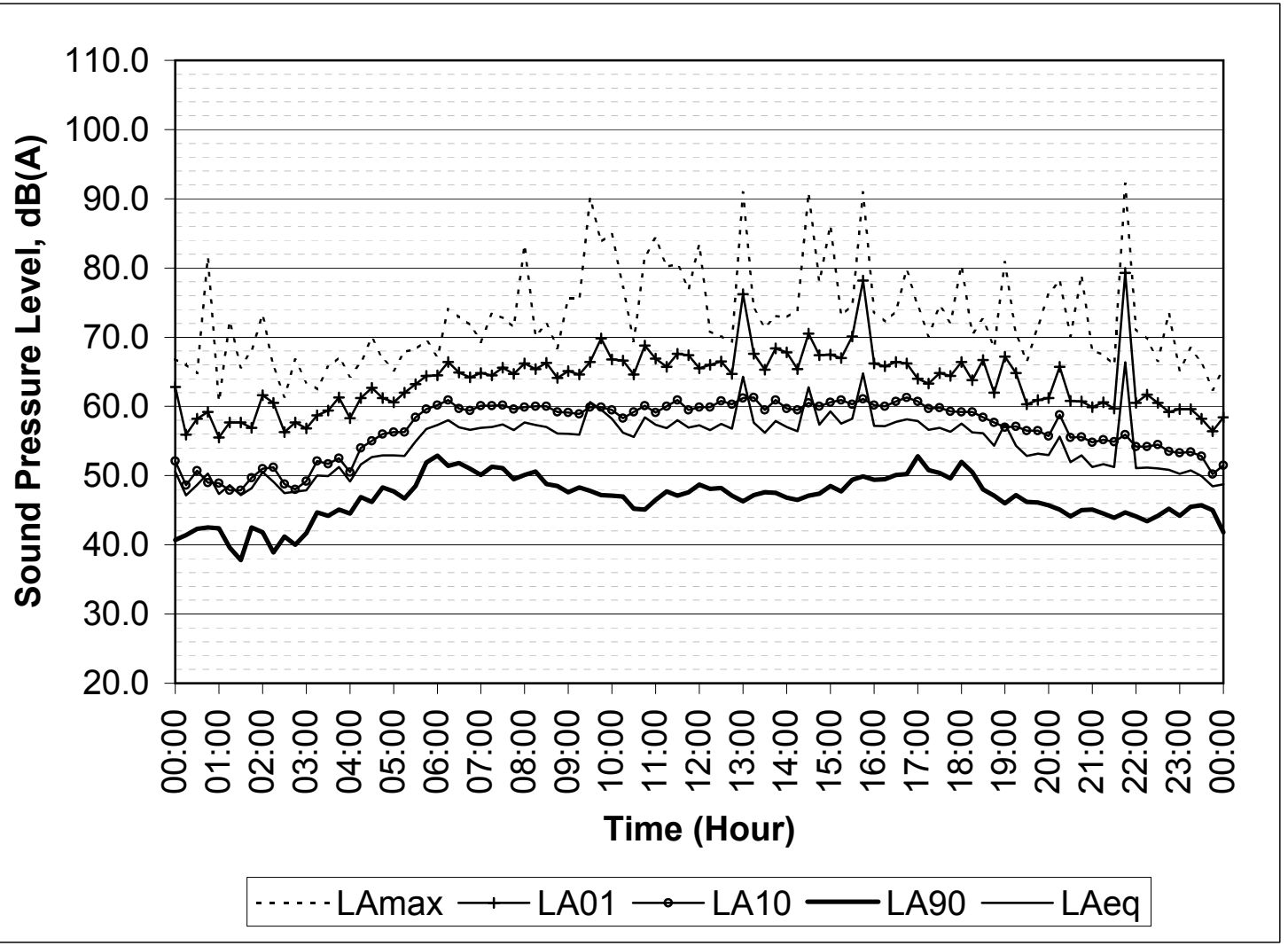
Measurement Location Location 2
Background Noise Measurement

Project Title Proposed Residential Development
101 Nuwarra Road, Moorebank

Measurement Date Thursday, 14 April 2016

Notes
1. Tabulated L_{Aeq} are logarithically averaged
2. Tabulated L_{A01} and L_{A10} are arithmetically averaged
3. Tabulated L_{A90} are the lowest 10-percentile levels

Time	Average Noise Level			
	L_{Aeq}	L_{A01}	L_{A10}	L_{A90}
00:00-01:00	48.6	57.2	49.3	41.7
01:00-02:00	48.8	58.5	49.1	38.3
02:00-03:00	48.1	57.8	49.3	39.2
03:00-04:00	50.1	59.4	51.7	44.3
04:00-05:00	52.6	61.4	55.3	46.4
05:00-06:00	55.8	63.5	58.6	47.2
06:00-07:00	57.2	65.1	60.0	50.4
07:00-08:00	57.2	65.3	60.0	49.7
08:00-09:00	56.7	65.2	59.6	47.9
09:00-10:00	58.9	66.9	59.6	47.1
10:00-11:00	57.0	66.7	59.2	45.1
11:00-12:00	57.3	66.6	60.1	47.3
12:00-13:00	60.2	68.4	60.6	46.5
13:00-14:00	57.2	67.3	60.4	46.9
14:00-15:00	59.7	67.7	60.2	46.7
15:00-16:00	60.8	70.4	60.6	48.2
16:00-17:00	57.7	65.6	60.7	49.7
17:00-18:00	56.9	64.7	59.5	49.8
18:00-19:00	56.2	64.9	58.1	46.3
19:00-20:00	53.4	61.8	56.5	45.8
20:00-21:00	53.3	61.8	56.2	44.4
21:00-22:00	60.7	65.0	55.1	44.0
22:00-23:00	50.8	60.3	53.9	43.6
23:00-24:00	49.6	58.2	52.0	42.8
Day	58.4	66.8	60.0	46.6
Evening	57.3	63.8	56.8	44.3
Night	53.0	61.0	53.1	38.8
LAeq,15hr	58.1			
LAeq,9hr	53.0			
LAeq,24hr	56.8			



Measurement Location Location 2
Background Noise Measurement

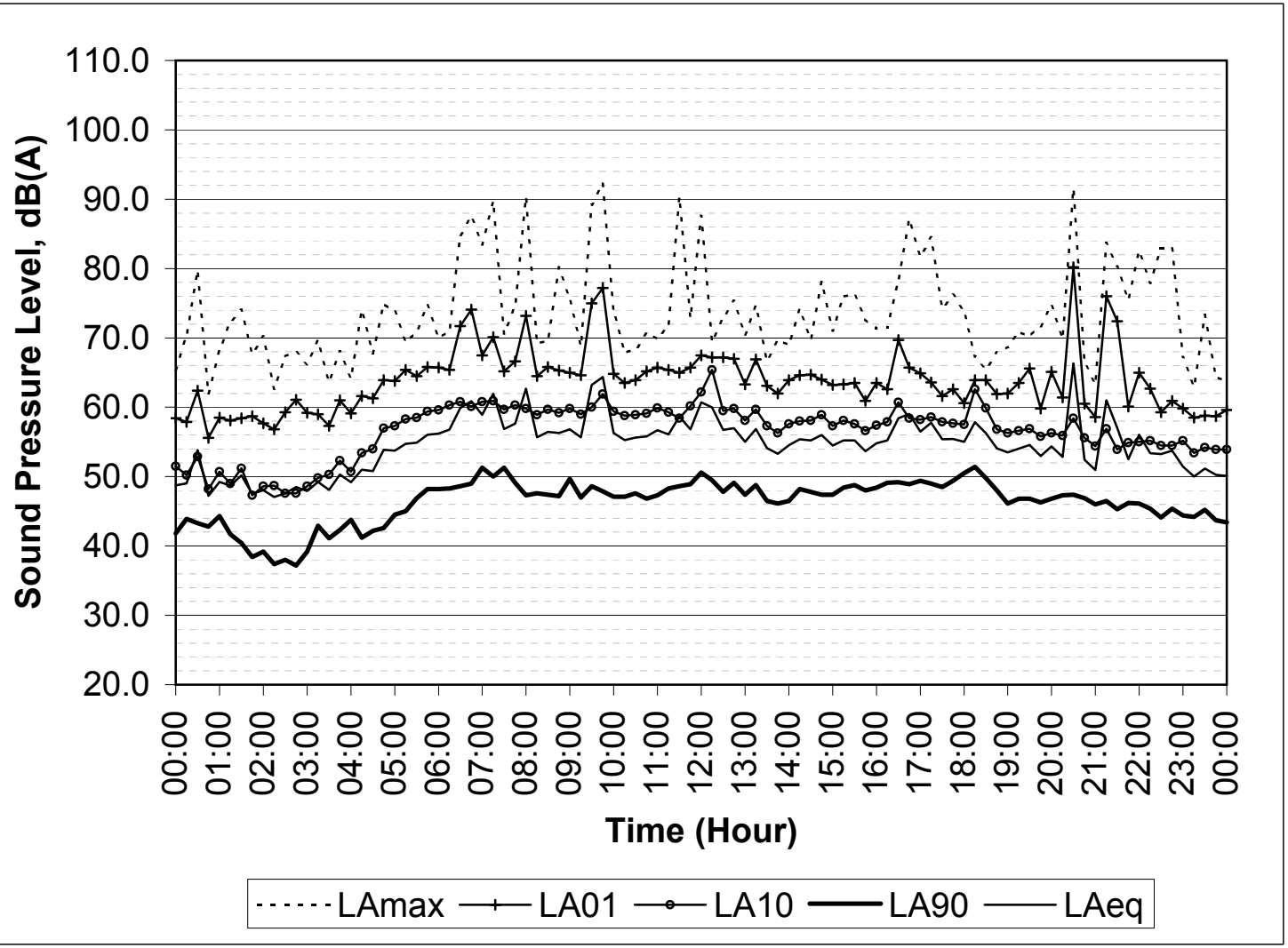
Measurement Date Friday, 15 April 2016

Project Title Proposed Residential Development
101 Nuwarra Road, Moorebank

Notes

1. Tabulated L_{Aeq} are logarithically averaged
2. Tabulated L_{A01} and L_{A10} are arithmetically averaged
3. Tabulated L_{A90} are the lowest 10-percentile levels

Time	Average Noise Level			
	L_{Aeq}	L_{A01}	L_{A10}	L_{A90}
00:00-01:00	50.6	58.6	50.5	43.0
01:00-02:00	48.7	58.2	49.0	38.6
02:00-03:00	47.8	59.1	48.1	37.3
03:00-04:00	49.3	59.1	50.8	41.5
04:00-05:00	52.6	62.7	55.4	41.5
05:00-06:00	55.5	65.4	59.0	45.6
06:00-07:00	59.4	69.7	60.5	48.4
07:00-08:00	60.5	68.8	60.2	47.8
08:00-09:00	56.3	65.2	59.4	47.3
09:00-10:00	61.5	70.4	60.1	47.0
10:00-11:00	55.9	64.6	59.2	46.9
11:00-12:00	58.4	65.9	60.0	48.4
12:00-13:00	57.6	66.2	60.7	47.5
13:00-14:00	54.9	64.0	57.7	46.2
14:00-15:00	55.3	64.1	58.1	47.4
15:00-16:00	54.8	62.8	57.4	48.1
16:00-17:00	57.5	65.7	58.8	49.0
17:00-18:00	56.0	62.1	57.9	48.7
18:00-19:00	55.8	62.9	58.9	46.7
19:00-20:00	54.0	63.5	56.4	46.5
20:00-21:00	60.8	65.2	56.1	46.3
21:00-22:00	57.7	68.4	55.2	45.5
22:00-23:00	53.0	60.7	54.9	44.2
23:00-24:00	50.4	58.9	53.9	43.5
Day	57.8	65.6	59.1	47.0
Evening	57.8	64.7	56.8	46.1
Night	51.4	59.9	52.4	38.2
LAeq,15hr	57.8			
LAeq,9hr	51.4			
LAeq,24hr	56.7			



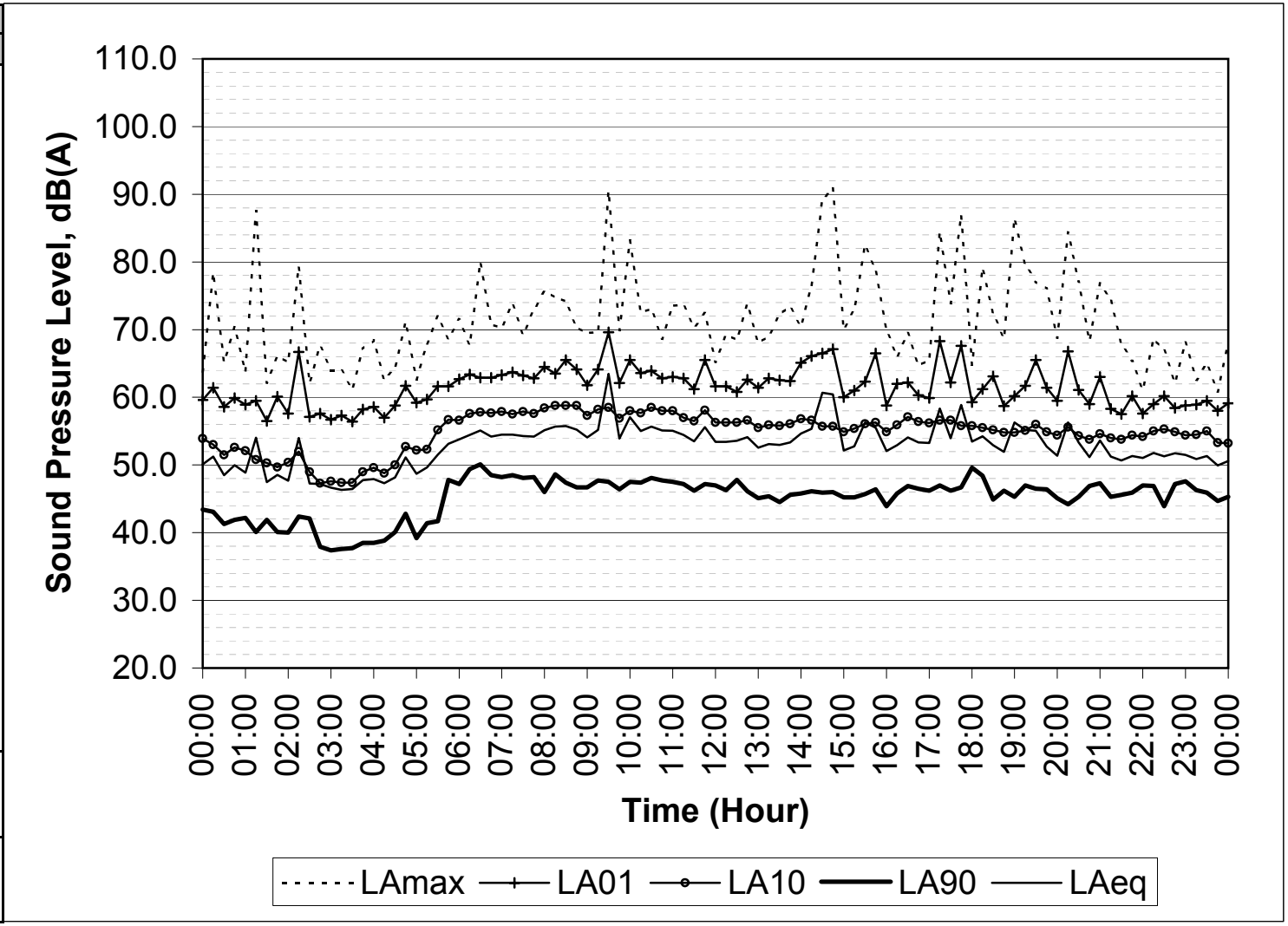
Measurement Location Location 2
Background Noise Measurement

Measurement Date Saturday, 16 April 2016

Project Title Proposed Residential Development
101 Nuwarra Road, Moorebank

Notes
1. Tabulated L_{Aeq} are logarithically averaged
2. Tabulated L_{A01} and L_{A10} are arithmetically averaged
3. Tabulated L_{A90} are the lowest 10-percentile levels

Time	Average Noise Level			
	L_{Aeq}	L_{A01}	L_{A10}	L_{A90}
00:00-01:00	49.8	59.7	52.3	41.5
01:00-02:00	50.4	58.4	50.3	40.0
02:00-03:00	50.0	59.5	49.0	37.6
03:00-04:00	47.2	57.6	48.4	37.6
04:00-05:00	49.1	59.2	50.9	38.9
05:00-06:00	52.3	61.4	55.2	41.5
06:00-07:00	54.6	63.1	57.8	48.3
07:00-08:00	54.5	63.6	57.9	46.6
08:00-09:00	55.2	63.7	58.4	46.7
09:00-10:00	59.2	65.3	57.9	46.7
10:00-11:00	55.2	63.3	58.1	47.4
11:00-12:00	54.3	62.8	57.0	46.4
12:00-13:00	53.4	61.6	56.2	45.4
13:00-14:00	53.6	63.2	56.2	44.8
14:00-15:00	58.4	64.9	55.7	45.4
15:00-16:00	54.5	62.2	55.7	44.3
16:00-17:00	53.4	61.1	56.4	45.9
17:00-18:00	56.8	64.4	56.2	46.4
18:00-19:00	54.2	60.8	55.1	45.0
19:00-20:00	53.9	62.0	55.1	45.5
20:00-21:00	54.0	62.5	54.6	44.5
21:00-22:00	51.1	58.4	54.1	45.4
22:00-23:00	51.6	59.1	54.9	44.8
23:00-24:00	50.7	58.9	54.0	44.9
Day	55.8	63.4	56.9	45.3
Evening	53.6	61.0	54.8	45.0
Night	49.0	57.4	50.7	35.7
LAeq,15hr	55.3			
LAeq,9hr	49.0			
LAeq,24hr	54.2			



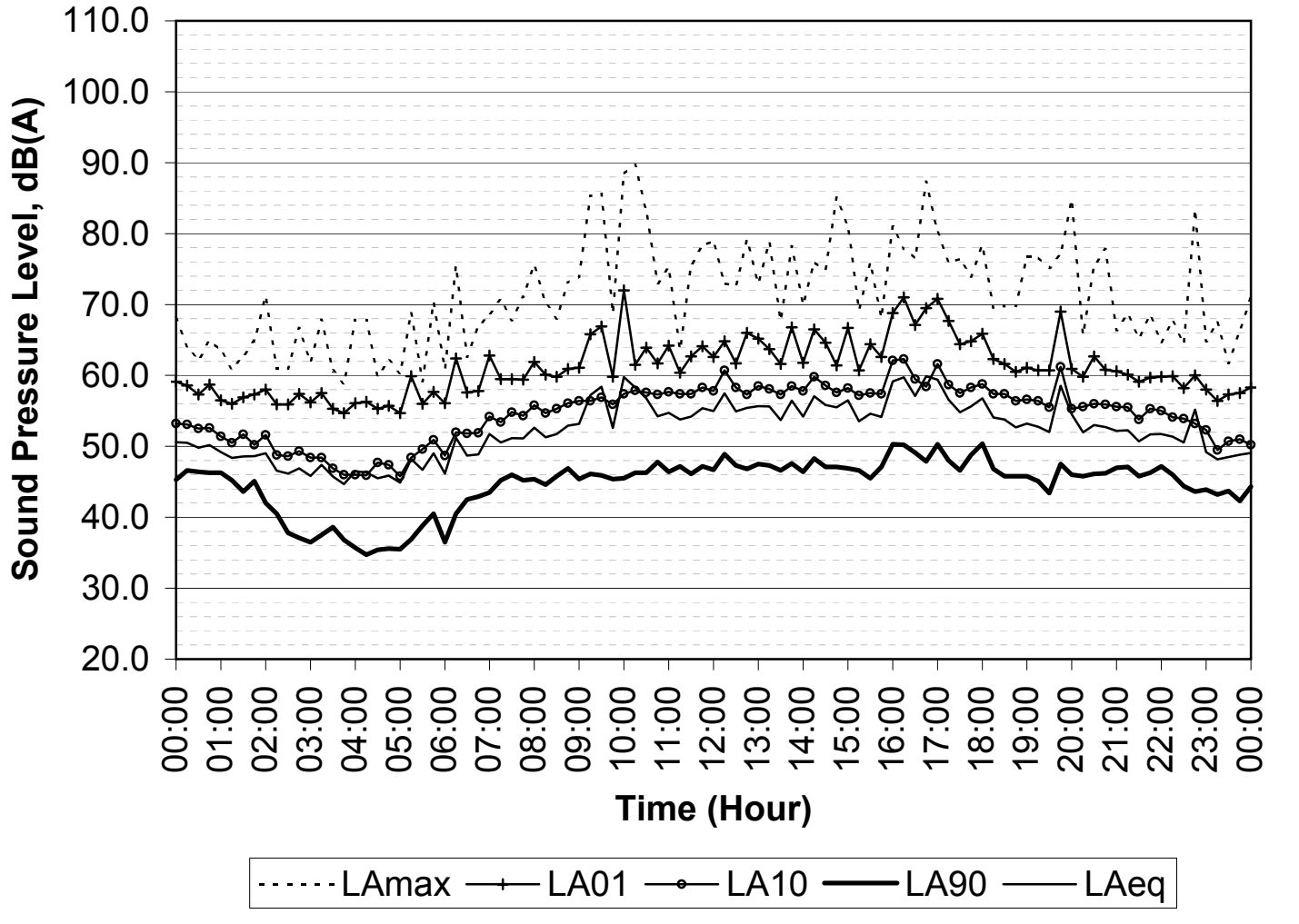
Measurement Location Location 2
Background Noise Measurement

Project Title Proposed Residential Development
101 Nuwarra Road, Moorebank

Measurement Date Sunday, 17 April 2016

Notes
1. Tabulated L_{Aeq} are logarithically averaged
2. Tabulated L_{A01} and L_{A10} are arithmetically averaged
3. Tabulated L_{A90} are the lowest 10-percentile levels

Time	Average Noise Level			
	L_{Aeq}	L_{A01}	L_{A10}	L_{A90}
00:00-01:00	49.9	57.8	52.4	46.3
01:00-02:00	48.6	57.1	51.0	42.5
02:00-03:00	46.4	56.4	48.8	36.7
03:00-04:00	46.2	55.9	46.8	36.0
04:00-05:00	45.7	55.5	46.7	34.9
05:00-06:00	47.7	57.4	49.4	36.6
06:00-07:00	50.3	60.2	52.5	41.1
07:00-08:00	51.4	60.1	54.6	45.2
08:00-09:00	52.3	60.5	55.6	44.8
09:00-10:00	57.7	66.1	56.7	45.4
10:00-11:00	56.3	62.8	57.6	46.3
11:00-12:00	54.6	62.5	57.7	46.3
12:00-13:00	56.0	64.4	58.7	47.0
13:00-14:00	55.1	63.5	57.9	46.5
14:00-15:00	56.3	64.8	58.6	47.0
15:00-16:00	56.0	64.1	58.6	45.8
16:00-17:00	59.2	69.6	60.5	48.3
17:00-18:00	56.0	65.7	58.3	47.0
18:00-19:00	53.5	61.4	57.0	45.8
19:00-20:00	55.3	62.8	57.1	43.9
20:00-21:00	52.5	61.0	55.8	45.9
21:00-22:00	51.6	59.7	54.9	46.0
22:00-23:00	52.2	59.0	53.4	43.7
23:00-24:00	48.7	57.4	50.4	42.6
Day	56.2	64.3	57.9	45.5
Evening	53.8	61.6	56.4	45.5
Night	54.5	61.6	53.7	40.3
LAeq,15hr	55.5			
LAeq,9hr	53.6			
LAeq,24hr	54.1			



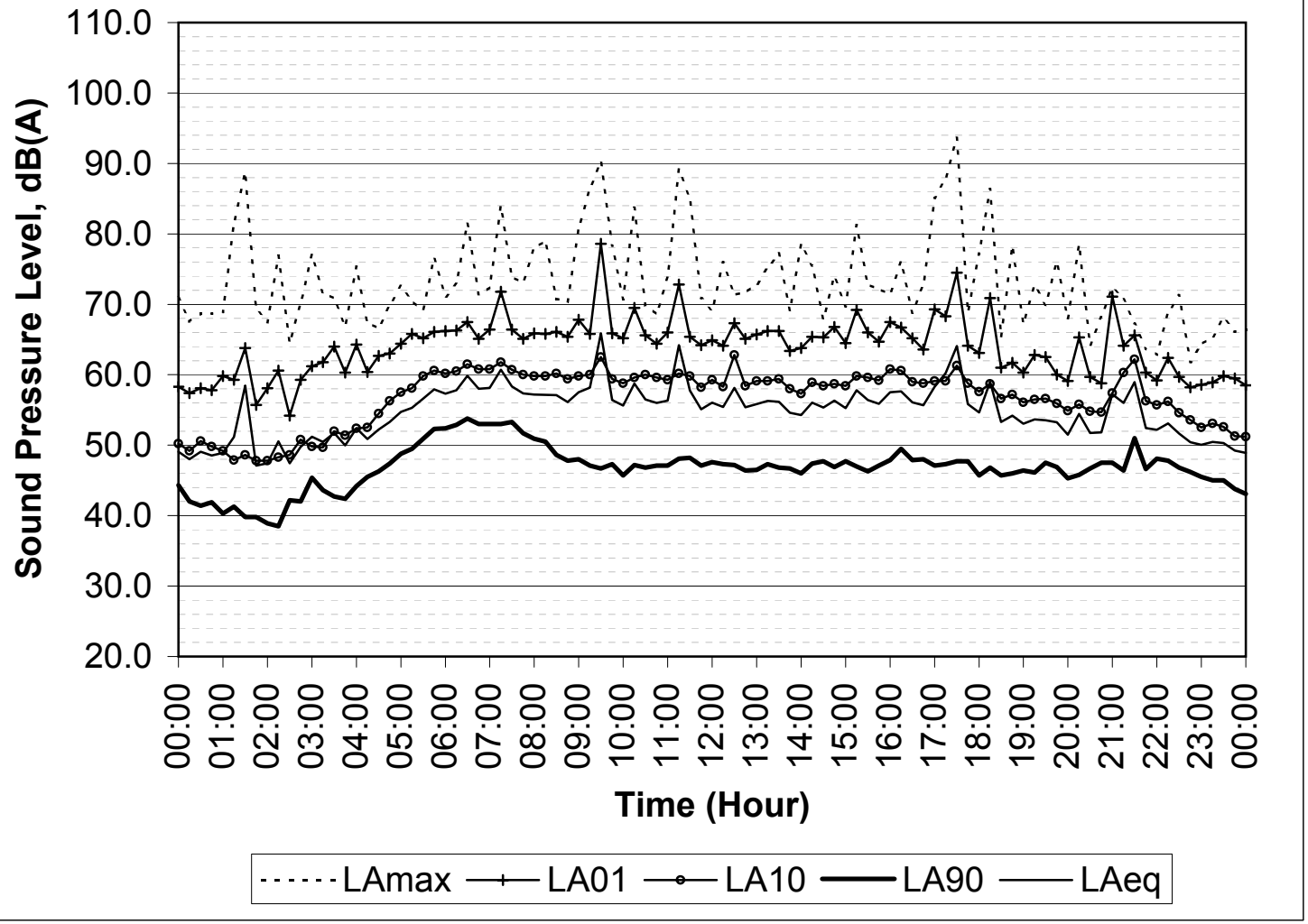
Measurement Location Location 2
Background Noise Measurement

Measurement Date Monday, 18 April 2016

Project Title Proposed Residential Development
101 Nuwarra Road, Moorebank

Notes
1. Tabulated L_{Aeq} are logarithically averaged
2. Tabulated L_{A01} and L_{A10} are arithmetically averaged
3. Tabulated L_{A90} are the lowest 10-percentile levels

Time	Average Noise Level			
	L_{Aeq}	L_{A01}	L_{A10}	L_{A90}
00:00-01:00	48.6	58.3	49.7	40.6
01:00-02:00	53.7	59.2	48.0	39.2
02:00-03:00	49.9	58.8	49.4	39.6
03:00-04:00	51.2	62.6	51.4	42.5
04:00-05:00	53.0	62.6	55.2	45.7
05:00-06:00	56.9	65.8	59.7	49.9
06:00-07:00	58.5	66.3	60.9	52.9
07:00-08:00	58.7	67.3	60.6	51.1
08:00-09:00	57.0	66.3	59.8	47.9
09:00-10:00	61.3	68.9	60.2	46.0
10:00-11:00	57.0	66.4	59.6	46.9
11:00-12:00	59.9	66.8	59.4	47.3
12:00-13:00	56.4	65.6	59.7	46.4
13:00-14:00	55.4	64.9	58.5	46.2
14:00-15:00	55.8	65.5	58.6	47.1
15:00-16:00	57.0	66.9	59.9	46.5
16:00-17:00	57.1	66.2	59.4	47.3
17:00-18:00	60.3	67.5	59.2	46.2
18:00-19:00	55.7	63.5	57.2	45.8
19:00-20:00	53.1	61.1	56.0	45.5
20:00-21:00	54.4	63.7	55.7	46.1
21:00-22:00	55.8	62.3	58.6	46.5
22:00-23:00	51.5	59.7	54.2	45.7
23:00-24:00	49.8	59.2	52.1	43.3
Day	58.3	66.6	59.6	46.6
Evening	55.0	62.9	57.0	45.7
Night	55.6	61.3	53.8	42.9
LAeq,15hr	57.6			
LAeq,9hr	55.6			
LAeq,24hr	56.6			



Measurement Location Location 2
Background Noise Measurement

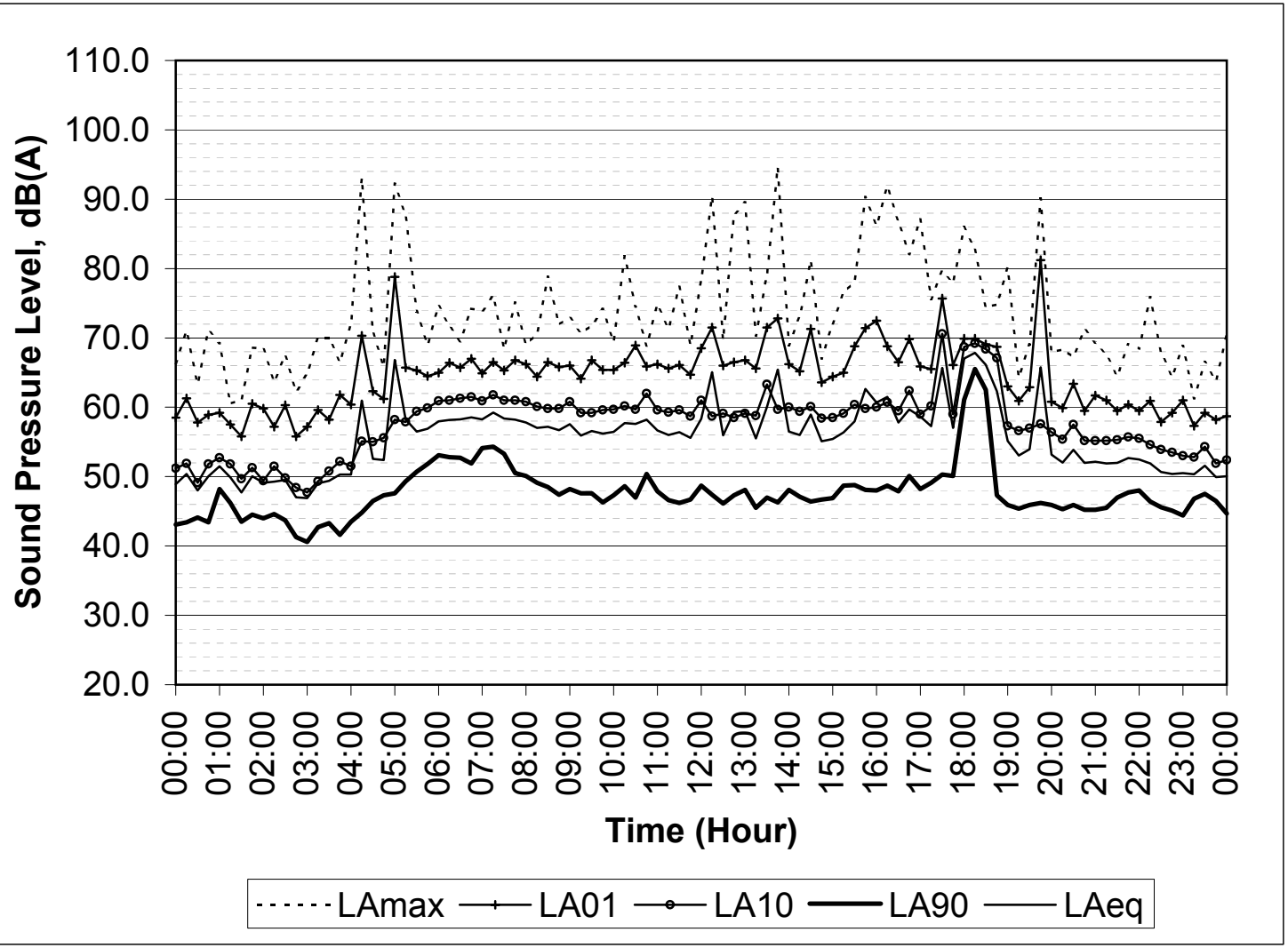
Measurement Date Tuesday, 19 April 2016

Project Title Proposed Residential Development
101 Nuwarra Road, Moorebank

Notes

1. Tabulated L_{Aeq} are logarithically averaged
2. Tabulated L_{A01} and L_{A10} are arithmetically averaged
3. Tabulated L_{A90} are the lowest 10-percentile levels

Time	Average Noise Level			
	L_{Aeq}	L_{A01}	L_{A10}	L_{A90}
00:00-01:00	50.1	59.3	51.4	43.4
01:00-02:00	49.3	58.4	50.6	43.7
02:00-03:00	48.3	57.6	49.4	40.8
03:00-04:00	49.8	60.0	51.0	41.9
04:00-05:00	62.0	68.2	56.0	45.3
05:00-06:00	57.5	65.1	59.5	49.7
06:00-07:00	58.3	66.0	61.2	52.1
07:00-08:00	58.4	66.2	61.2	50.2
08:00-09:00	57.1	65.7	60.1	47.6
09:00-10:00	56.3	65.4	59.4	46.6
10:00-11:00	57.6	66.9	60.4	47.3
11:00-12:00	56.7	66.2	59.7	46.3
12:00-13:00	61.3	67.7	58.9	46.5
13:00-14:00	61.2	69.0	60.5	45.7
14:00-15:00	56.7	66.1	59.1	46.5
15:00-16:00	60.1	69.4	59.8	48.0
16:00-17:00	59.6	67.8	60.4	48.0
17:00-18:00	63.9	69.3	64.6	49.4
18:00-19:00	64.8	67.7	65.5	46.3
19:00-20:00	60.4	66.5	56.9	45.6
20:00-21:00	52.6	61.1	55.8	45.2
21:00-22:00	52.3	60.1	55.4	46.0
22:00-23:00	50.9	59.8	53.8	44.6
23:00-24:00	50.5	58.4	52.9	45.2
Day	59.2	67.1	60.2	46.3
Evening	61.6	64.5	59.2	45.3
Night	52.6	60.1	53.1	40.8
LAeq,15hr	59.9			
LAeq,9hr	52.6			
LAeq,24hr	58.9			



Measurement Location Location 2
Background Noise Measurement

Project Title Proposed Residential Development
101 Nuwarra Road, Moorebank

Measurement Date Wednesday, 20 April 2016

Notes
1. Tabulated L_{Aeq} are logarithically averaged
2. Tabulated L_{A01} and L_{A10} are arithmetically averaged
3. Tabulated L_{A90} are the lowest 10-percentile levels

Time	Average Noise Level			
	L_{Aeq}	L_{A01}	L_{A10}	L_{A90}
00:00-01:00	49.0	57.3	50.1	40.5
01:00-02:00	47.4	57.2	48.2	39.8
02:00-03:00	48.4	58.0	49.8	41.1
03:00-04:00	49.4	59.6	50.4	41.6
04:00-05:00	52.2	61.2	54.6	44.4
05:00-06:00	56.0	64.2	59.0	49.6
06:00-07:00	58.8	67.2	61.2	51.2
07:00-08:00	58.2	66.0	60.3	48.4
08:00-09:00	58.1	66.0	59.7	46.7
09:00-10:00	61.8	69.7	60.0	46.0
10:00-11:00	57.4	66.5	59.6	45.6
11:00-12:00	57.6	67.2	60.4	46.1
12:00-13:00	60.1	67.4	58.9	44.1
13:00-14:00	57.5	67.1	59.7	44.3
14:00-15:00	56.1	65.4	59.7	45.6
15:00-16:00				
16:00-17:00				
17:00-18:00				
18:00-19:00				
19:00-20:00				
20:00-21:00				
21:00-22:00				
22:00-23:00				
23:00-24:00				
Day				
Evening				
Night				
LAeq,15hr				
LAeq,9hr				
LAeq,24hr