

Thursday 22 October 2015

Hoxten Park Pty Ltd
PO Box 37
EDENSOR PARK NSW 2176

Our Reference 140512-02-01L-DD
Rev01

For the attention of Mr Khosrow Chohaili

**Noise Assessment – Development Application Phase
Proposed Residential Development
46-50 Hoxton Park Road, Liverpool**

1.0 INTRODUCTION

Acoustic Consulting Engineers Pty Ltd was engaged by Hoxten Park Pty Ltd to prepare a noise assessment for the proposed residential development at 46-50 Hoxton Park Road, Liverpool.

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 46-50 Hoxton Park Road, Liverpool and currently consists of two (2) residential dwellings.

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

- car-parks on Basement Level;
- residential units on Ground Level and communal open space at the rear of the site; and
- residential units on Level 1 to Level 4

The proposed development site is exposed to road traffic noise from Hoxton Park Road to the north. Properties to the south of Hoxton Park Road and surrounding the proposed development site are residential developments.

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 proposed residential development from Hoxton Park Road to the north;
- 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 for the residential units.

4.0 NOISE MEASUREMENT

Acoustic Consulting Engineers Pty Ltd undertook the noise assessment (*Report No. 140512-01L-DD Rev01* dated 31 July 2014) for the adjoining residential development on the eastern side at 42-44 Hoxton Park Road, Liverpool.

Noise measurements were conducted in July 2014 as part of the noise assessment for the development at 42-44 Hoxton Park Road, Liverpool.

As the proposed development at 46-50 Hoxton Park Road, Liverpool is in a similar location and at similar offset from Hoxton Park Road, the measurements conducted for the development 42-44 Hoxton Park Road, Liverpool may be used for the present assessment.

Tables 1 and 2 presents the measured road traffic, L_{Aeq} ambient and L_{A90} background noise levels, reproduced from *Report No. 140512-01L-DD Rev01*.

The measured day/evening/night L_{Aeq} and L_{A90} represent the ambient background noise levels at nearby residences to the proposed development. The measured daytime ($L_{Aeq,15hr}$) and night-time ($L_{Aeq,9hr}$) noise levels represent road traffic noise exposed to the proposed development.

Table 1 **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
Tuesday 22 July 2014		45.2	38.3		51.7	49.4
Wednesday 23 July 2014	45.2	44.0	41.1	56.4	51.5	50.7
Thursday 24 July 2014	46.8	45.3	39.6	56.4	52.0	50.0
Friday 25 July 2014	50.1	43.1	36.6	57.2	51.3	47.5
Saturday 26 July 2014	46.8	46.6	39.8	56.9	52.3	49.8
Sunday 27 July 2014	45.8	44.5	39.2	56.5	50.9	51.7
Monday 28 July 2014	47.2	44.4	38.0	56.9	51.8	49.1
Rating L_{A90} Background Level	47	45	39	N/A		
Logarithmic Average	N/A			57	52	50

Table 2 **Measured Façade $L_{Aeq,15hr}$ and $L_{Aeq,9hr}$ Noise Levels Exposed to the Development Site, dB(A)**

Date	Measured Road Traffic Noise Level, dB(A)	
	$L_{Aeq,15hr}$ ¹ (Daytime)	$L_{Aeq,9hr}$ ² (Night-time)
Tuesday 22 July 2014		63.2
Wednesday 23 July 2014	66.9	63.3
Thursday 24 July 2014	66.5	63.0
Friday 25 July 2014	67.1	61.8
Saturday 26 July 2014	66.7	63.9
Sunday 27 July 2014	64.7	62.5
Monday 28 July 2014	66.6	62.3
Logarithmic Average	67	63

5.0 NOISE ASSESSMENT OBJECTIVES

5.1 Environmental Noise

Environmental noise from the proposed residential development would be due to mechanical plant such car-park supply and exhaust fans and air-conditioning equipment.

The Environment Protection Authority (EPA) Industrial Noise Policy (INP) recommends guidelines for the assessment of mechanical plant noise from developments in terms of controlling the levels of intrusive noise and maintaining the acoustic amenity for the particular areas.

To control intrusive noise at nearby residences, the EPA:INP recommends that the $L_{Aeq,15min}$ noise level from mechanical plant should not exceed the rating background L_{A90} noise level by more than 5dB(A) at the nearest residential receivers.

For acoustic amenity in an urban residential area, the EPA:INP recommends acceptable L_{Aeq} noise levels from industrial sources of 60/50/45dB(A) during day/evening/night respectively.

Table 3 presents a summary of the recommended L_{Aeq} noise levels from mechanical plant associated with the proposed residential development, established from the measured background noise levels presented in Table 1 and the EPA:INP guidelines.

The project specific noise assessment objectives are the lower of the intrusive and amenity noise assessment objectives. That is, noise from the development will comply with both the intrusive and amenity assessment objectives, provided that the project specific assessment objectives are achieved.

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

Time of Day	Recommended L_{Aeq} Noise Level		
	Intrusiveness	Amenity	Project Specific
Day ¹	52	60	52
Evening ²	50	50	50
Night ³	44	45	45

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 Level

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 a summary of the recommended indoor design noise objectives for the proposed residential 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

Environmental noise from mechanical plant associated with the proposed residential development would mainly be due to car-park supply and exhaust fans and air-conditioning equipment (if provided).

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, siting and incorporation of engineering control measures such as acoustic attenuators, acoustically lined ductwork and purpose-built plant rooms, noise from mechanical plant would be controlled to within the environmental noise assessment objectives presented in *Table 3*.

6.2 External Road Traffic Noise Intrusion

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

- 28dB for sleeping areas (night-time) and 27dB for other habitable areas (daytime) on the northern building façade;
- 25dB for sleeping areas (night-time) and 24dB for other habitable areas (daytime) on the eastern and western building façades; and
- 20dB for sleeping areas (night-time) and other habitable areas (daytime) on the southern building façade.

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 residences); and
- locating noisy plant and equipment within purpose-built plant room(s).

7.2 External Noise Intrusion

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

To reduce the indoor road and rail traffic noise levels to within the recommended assessment objective of 35dB(A) $L_{Aeq,9hr}$ for sleeping areas and 40dB(A) $L_{Aeq,15hr}$ for habitable areas (other than garage, kitchen, bathroom and hallway), the following control measures are recommended:

- sleeping and other habitable areas with external glazed windows/doors along the northern building façade shall achieve a weighted sound reduction index of not less than R_w34 . This can be achieved with appropriately upgraded glazing and acoustic detailing;
- sleeping and other habitable areas with external glazed windows/doors along the eastern and western building façades shall achieve a weighted sound reduction index of not less than R_w31 . This can be achieved with appropriately upgraded glazing and acoustic detailing; and
- sleeping and other habitable areas with external glazed windows/doors along southern building façade shall achieve a weighted sound reduction index of not less than R_w27 . This can be achieved with appropriately standard glazing and acoustic detailing.

Typically, glazing configurations to achieve the above recommended weighted sound reduction indices could consist of:

- **R_w34** 10.38mm or 6.5mm VLam Hush laminated glass (acoustic construction);
- **R_w31** 6.38mm laminated glass (acoustic construction); and
- **R_w27** standard float glass (acoustic construction)

It is noted that the required acoustic performances are for the entire window/door systems and not just the glass. The manufacturers/suppliers/installers shall be consulted for a specific design solution to satisfy the R_w rating for the window/door systems recommended above.

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/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.
- 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 noise intrusion into the proposed residential development at 46-50 Hoxton Park Road, Liverpool 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.

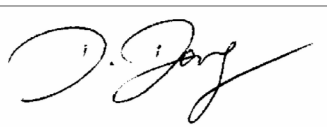
The BCA acoustic privacy requirements between spaces can be controlled by incorporating appropriate construction materials/systems to control air-borne noise and floor covering and/or isolation of plasterboard ceiling and ceiling cavity insulation to control floor impact sound. Noise from waste services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

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,



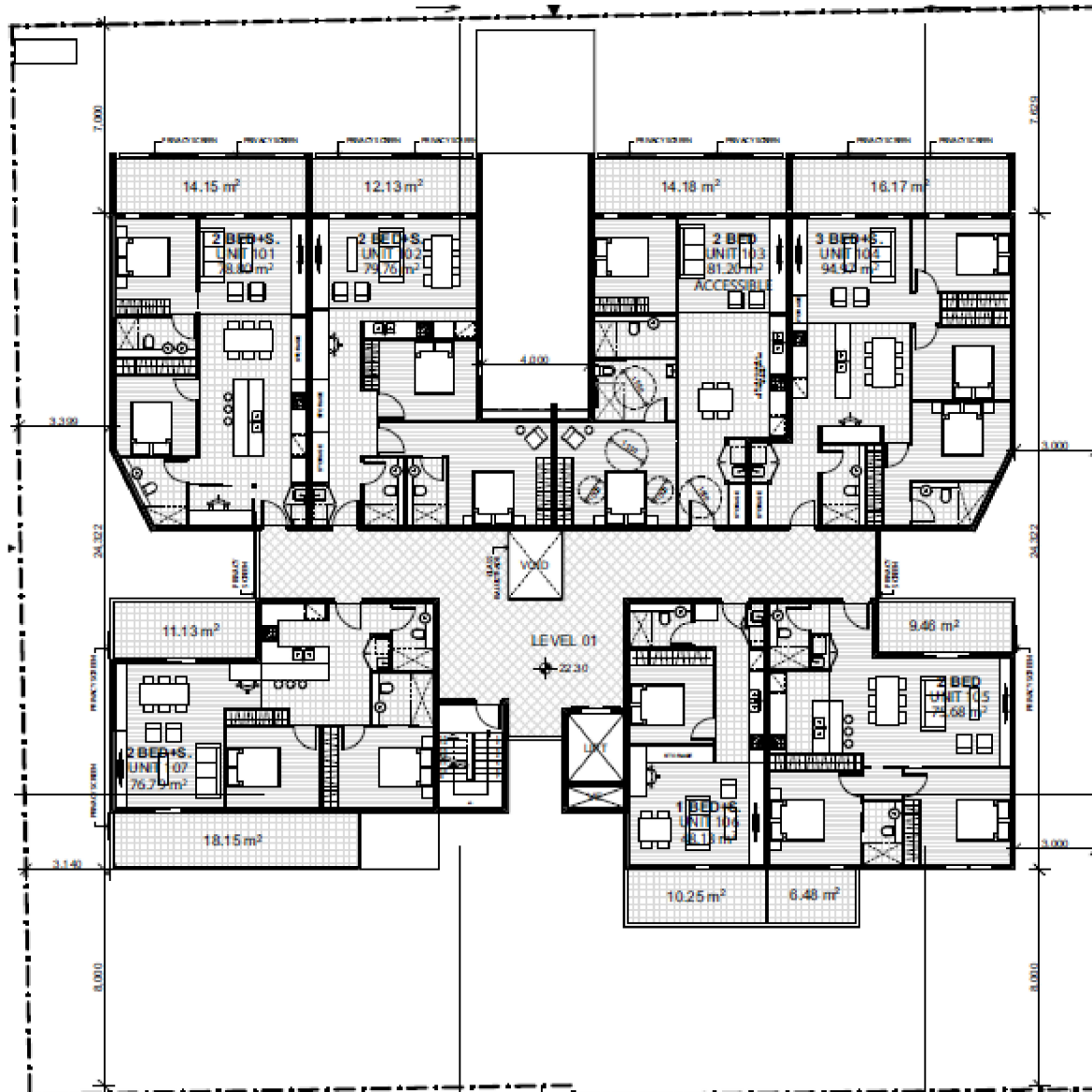
Dan Dang
Principal Acoustic Engineer
Acoustic Consulting Engineers Pty Ltd

Appendix 1
CONCEPT FLOOR PLANS

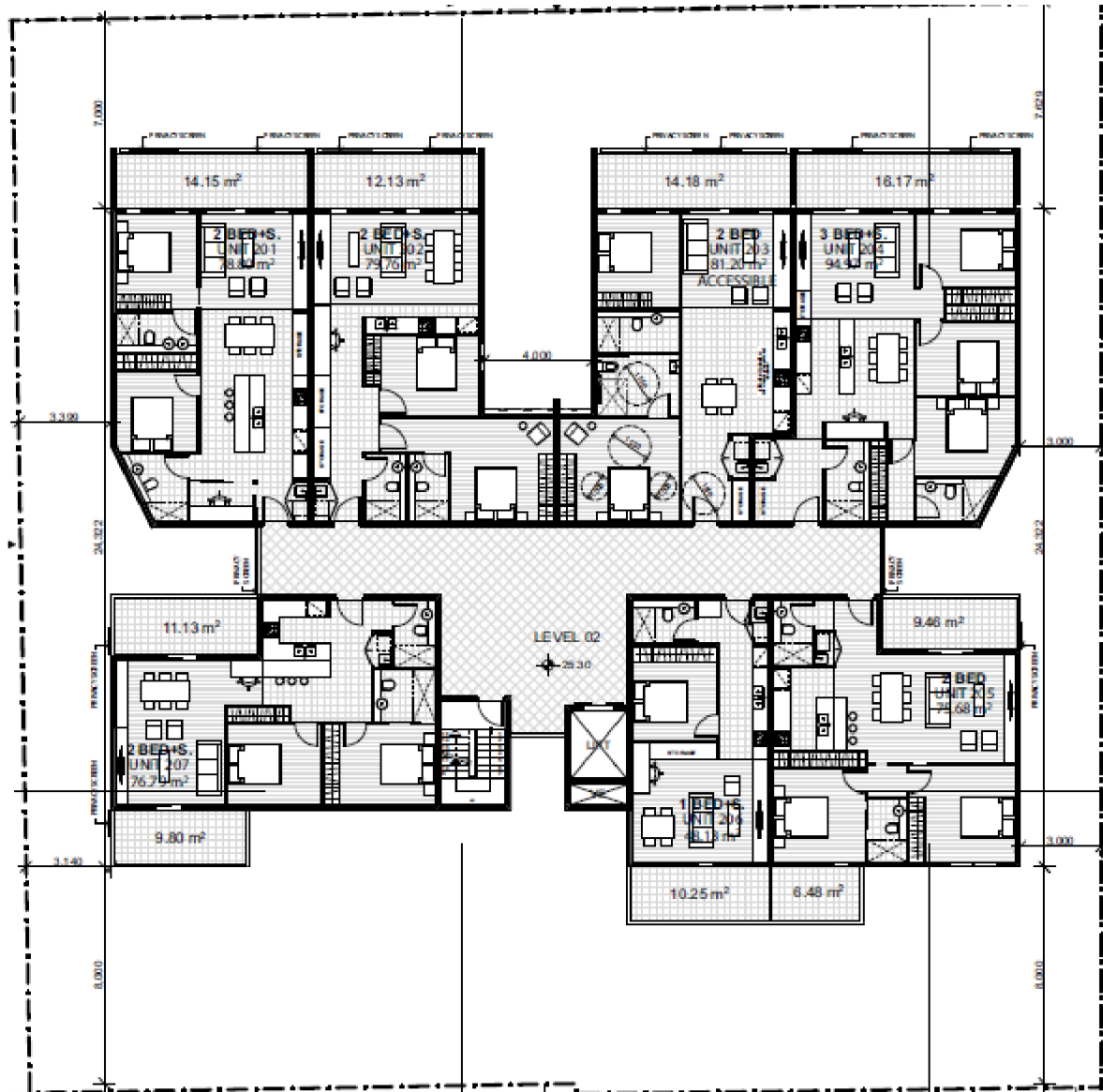
Ground Level



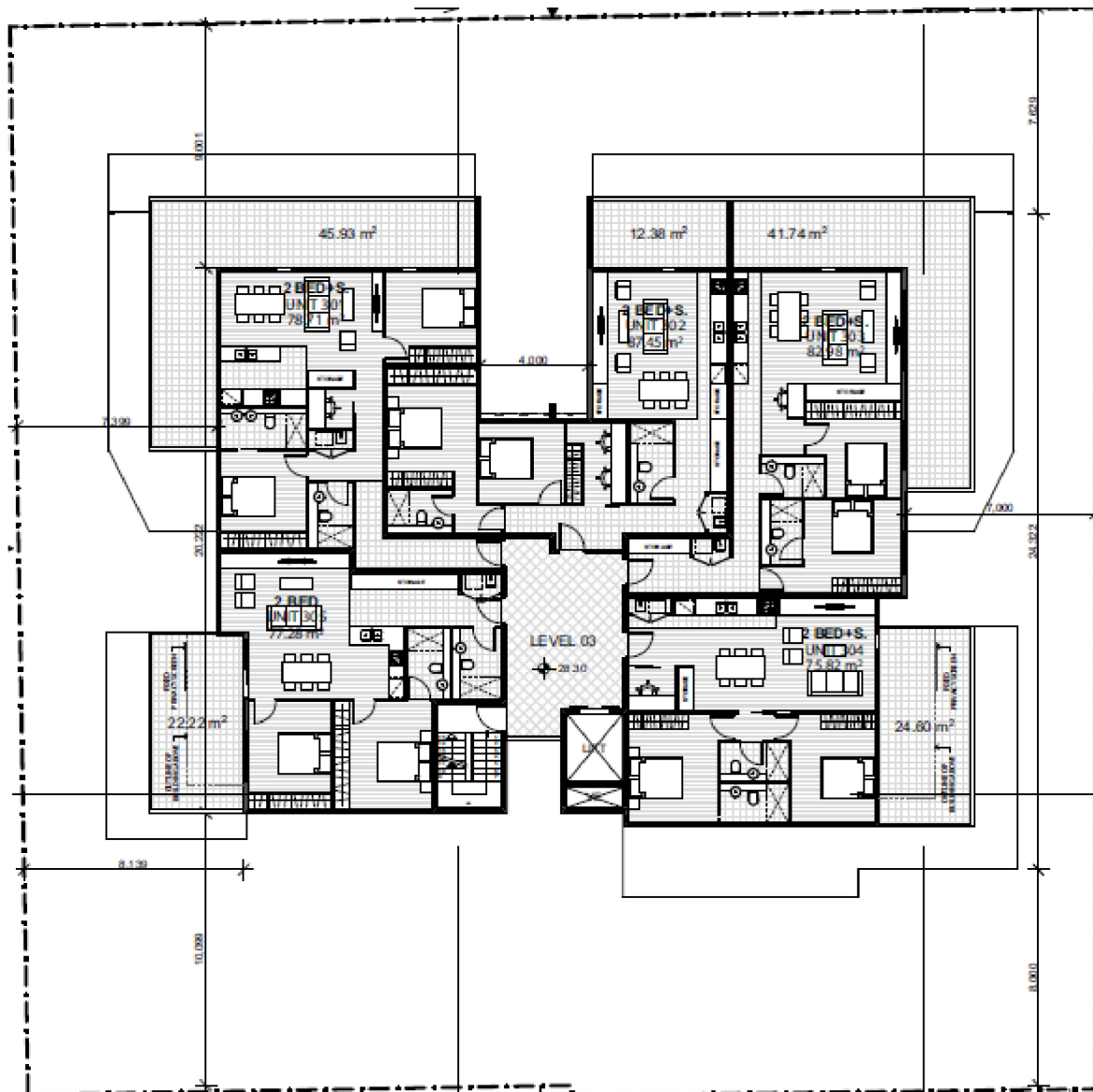
Level 1



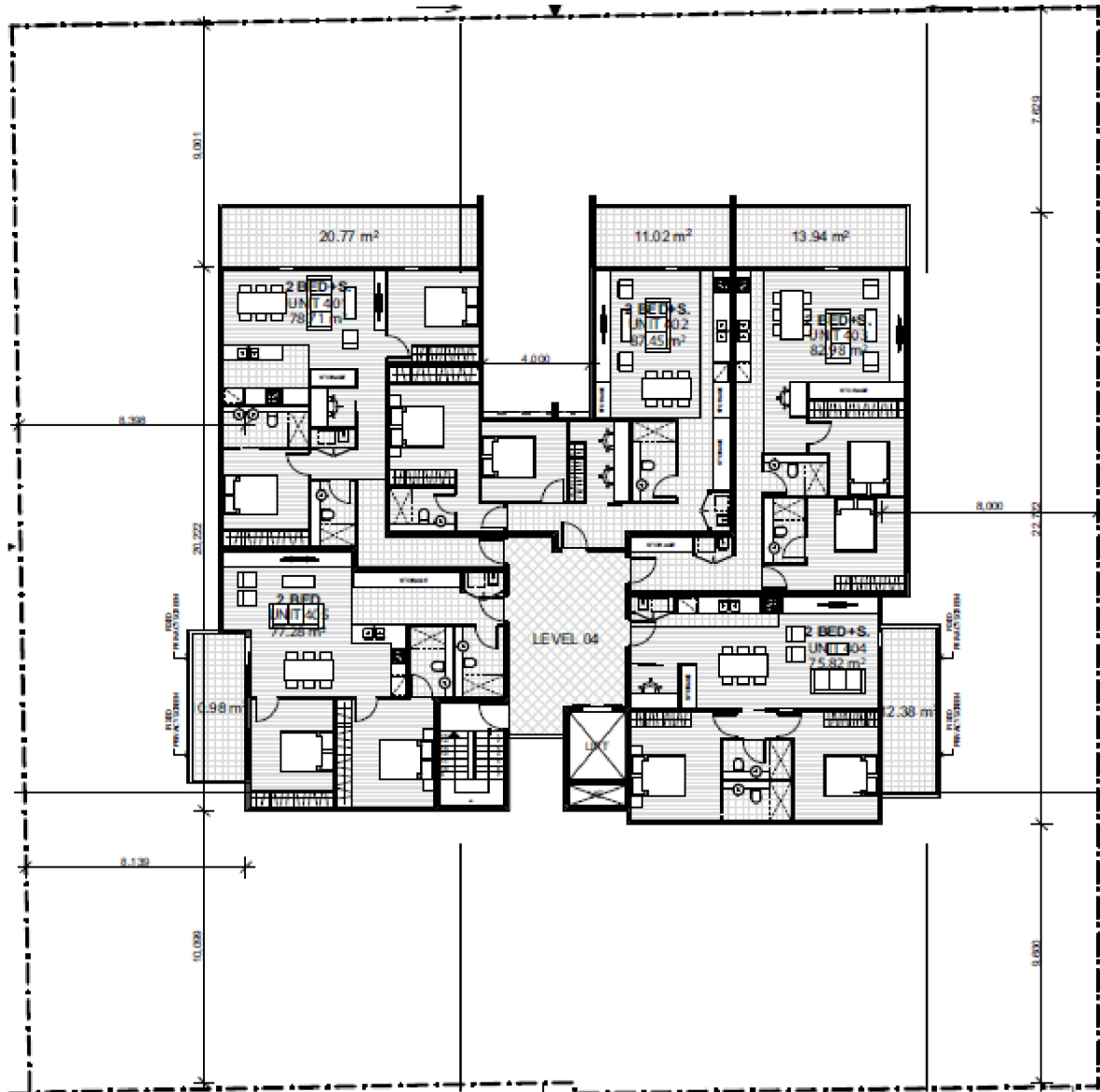
Level 2



Level 3



Level 4



Appendix 2

PREVIOUS BACKGROUND AND AMBIENT NOISE ENVIRONMENT

Measurement Location at Rear of 42 Hoxton Park Road

Measurement Location 42 Hoxton Park Road, Liverpool
Rear Yard

Project Title

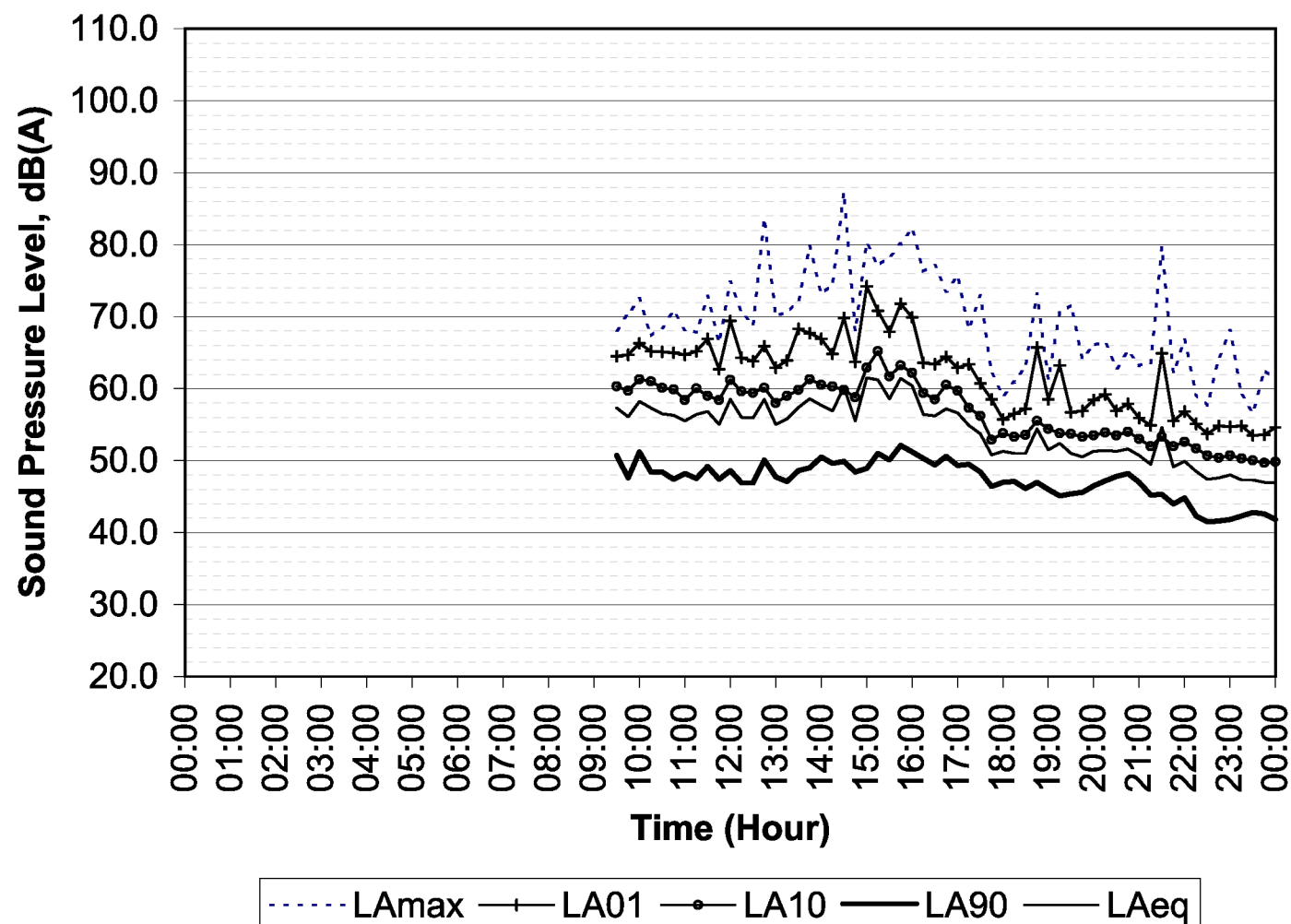
Proposed Residential Development
42-44 Hoxton Park Road, Liverpool

Measurement Date Tuesday, 22 July 2014

Notes

1. Tabulated L_{Aeq} are logarithmically 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	56.4	65.0	59.9	47.6
11:00-12:00	56.9	66.1	59.7	47.4
12:00-13:00	56.6	64.2	59.3	46.9
13:00-14:00	57.5	66.7	60.2	47.6
14:00-15:00	59.2	68.1	60.5	48.6
15:00-16:00	60.5	70.1	63.1	50.4
16:00-17:00	56.6	63.6	59.5	49.3
17:00-18:00	53.0	59.6	55.1	46.6
18:00-19:00	52.2	59.5	54.2	46.0
19:00-20:00	51.4	58.8	53.6	45.2
20:00-21:00	51.3	57.5	53.6	47.1
21:00-22:00	51.4	58.0	52.5	44.2
22:00-23:00	47.9	54.6	50.9	41.5
23:00-24:00	47.1	54.1	50.0	42.0
Day				
Evening	51.7	58.4	53.5	45.2
Night	49.4	55.5	50.7	38.3
$L_{Aeq,15hr}$				
$L_{Aeq,9hr}$		49.4		
$L_{Aeq,24hr}$				



Measurement Location 42 Hoxton Park Road, Liverpool
Rear Yard

Project Title

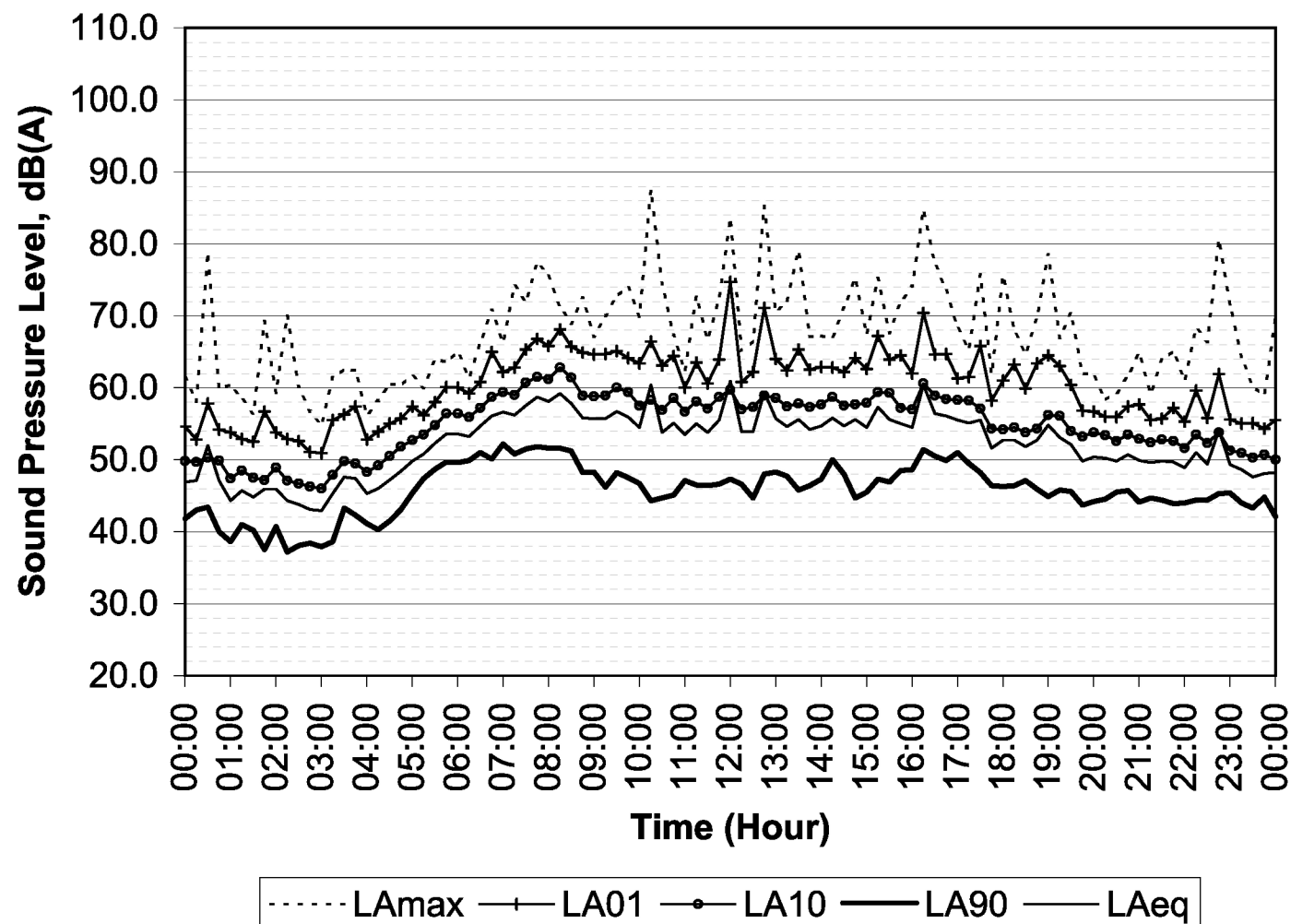
Proposed Residential Development
42-44 Hoxton Park Road, Liverpool

Measurement Date Wednesday, 23 July 2014

Notes

1. Tabulated L_{Aeq} are logarithmically 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	54.7	49.3	39.0
01:00-02:00	45.6	54.0	48.0	38.3
02:00-03:00	43.6	51.9	46.5	37.4
03:00-04:00	46.5	55.5	48.9	39.4
04:00-05:00	48.1	55.5	51.1	40.7
05:00-06:00	52.7	58.6	55.3	47.8
06:00-07:00	55.3	61.8	57.8	50.0
07:00-08:00	57.7	65.2	60.6	51.0
08:00-09:00	57.4	65.8	60.5	48.2
09:00-10:00	55.8	64.3	59.0	46.4
10:00-11:00	56.7	63.5	57.6	44.4
11:00-12:00	57.3	65.7	58.4	46.4
12:00-13:00	56.4	64.5	58.0	45.3
13:00-14:00	54.8	63.3	57.6	46.0
14:00-15:00	55.2	62.9	58.0	44.9
15:00-16:00	55.7	64.4	58.2	47.0
16:00-17:00	57.6	65.3	59.1	50.1
17:00-18:00	54.0	61.6	56.0	46.3
18:00-19:00	53.1	62.8	54.7	45.2
19:00-20:00	51.5	59.2	54.3	43.9
20:00-21:00	50.2	56.8	53.1	44.2
21:00-22:00	49.5	55.9	52.4	43.9
22:00-23:00	51.4	58.2	52.7	44.4
23:00-24:00	48.1	55.0	50.5	42.5
Day	56.4	64.3	58.5	45.2
Evening	51.5	59.0	53.8	44.0
Night	50.7	56.4	51.2	41.1
$L_{Aeq,15hr}$	55.6			
$L_{Aeq,9hr}$	50.7			
$L_{Aeq,24hr}$	54.3			



Measurement Location 42 Hoxton Park Road, Liverpool
Rear Yard

Project Title

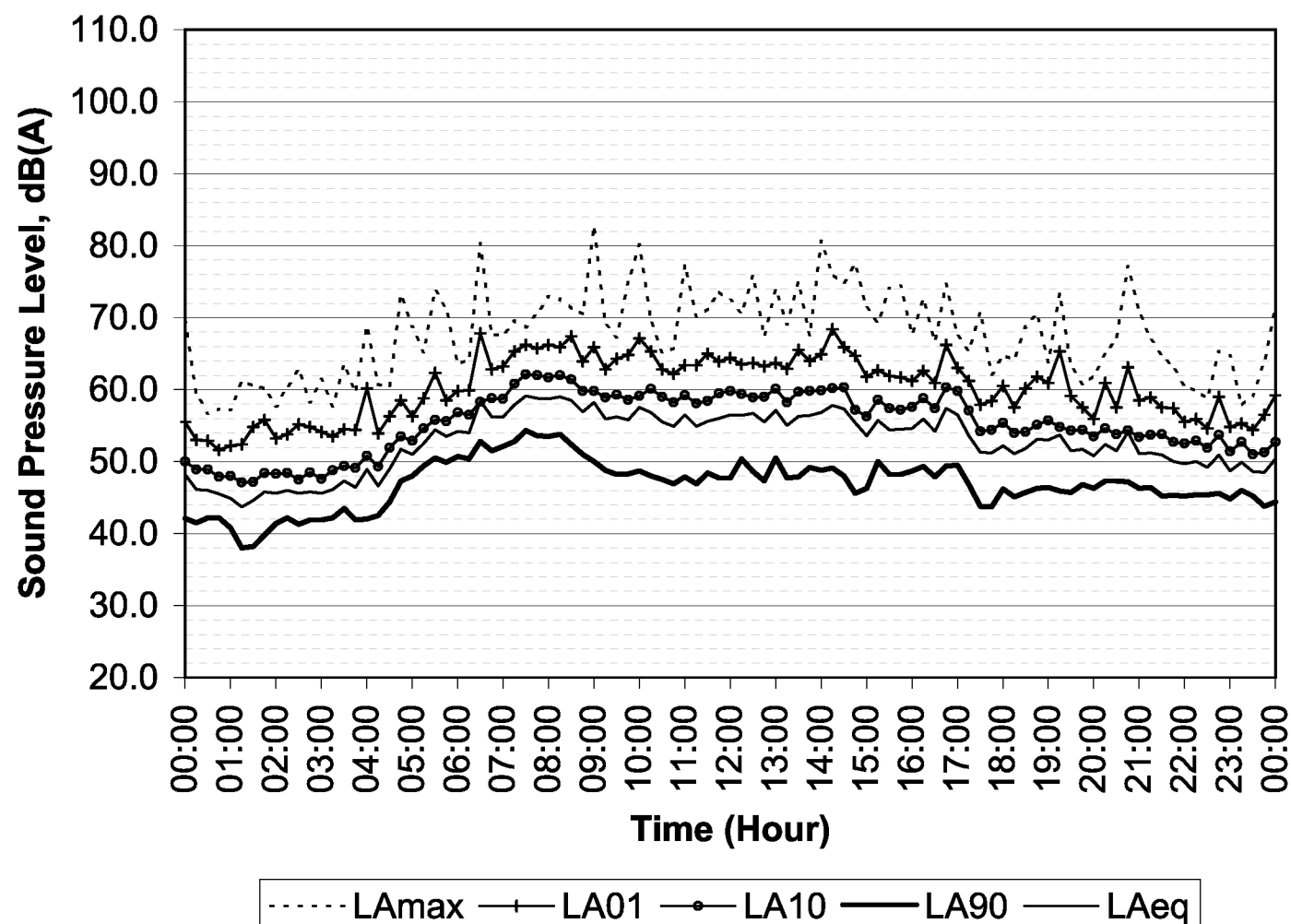
Proposed Residential Development
42-44 Hoxton Park Road, Liverpool

Measurement Date Thursday, 24 July 2014

Notes

1. Tabulated L_{Aeq} are logarithmically 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	45.7	52.4	48.4	41.0
01:00-02:00	45.0	54.1	47.8	38.1
02:00-03:00	45.8	54.5	48.0	41.5
03:00-04:00	47.3	55.7	49.5	41.9
04:00-05:00	50.0	56.3	51.9	43.1
05:00-06:00	53.7	59.9	55.7	49.6
06:00-07:00	56.5	63.4	58.1	50.7
07:00-08:00	58.6	65.9	61.7	53.0
08:00-09:00	58.2	65.8	60.8	50.3
09:00-10:00	56.4	64.8	59.0	48.2
10:00-11:00	56.0	63.4	59.1	47.1
11:00-12:00	55.8	64.2	59.0	47.1
12:00-13:00	56.5	63.5	59.4	47.7
13:00-14:00	56.2	64.3	59.4	47.8
14:00-15:00	56.3	65.2	58.5	45.8
15:00-16:00	54.8	61.9	57.7	48.2
16:00-17:00	56.1	63.2	59.1	48.3
17:00-18:00	52.2	59.5	55.3	43.7
18:00-19:00	52.3	60.1	54.7	45.3
19:00-20:00	52.1	59.5	54.3	45.8
20:00-21:00	52.4	60.0	54.0	46.6
21:00-22:00	50.5	57.3	53.2	45.2
22:00-23:00	49.8	56.1	52.5	45.0
23:00-24:00	49.4	56.4	51.9	44.0
Day	56.4	63.8	59.1	46.8
Evening	52.0	59.5	54.2	45.3
Night	50.0	56.2	51.3	39.6
$L_{Aeq,15hr}$	55.6			
$L_{Aeq,9hr}$	50.0			
$L_{Aeq,24hr}$	54.5			



Measurement Location 42 Hoxton Park Road, Liverpool
Rear Yard

Project Title

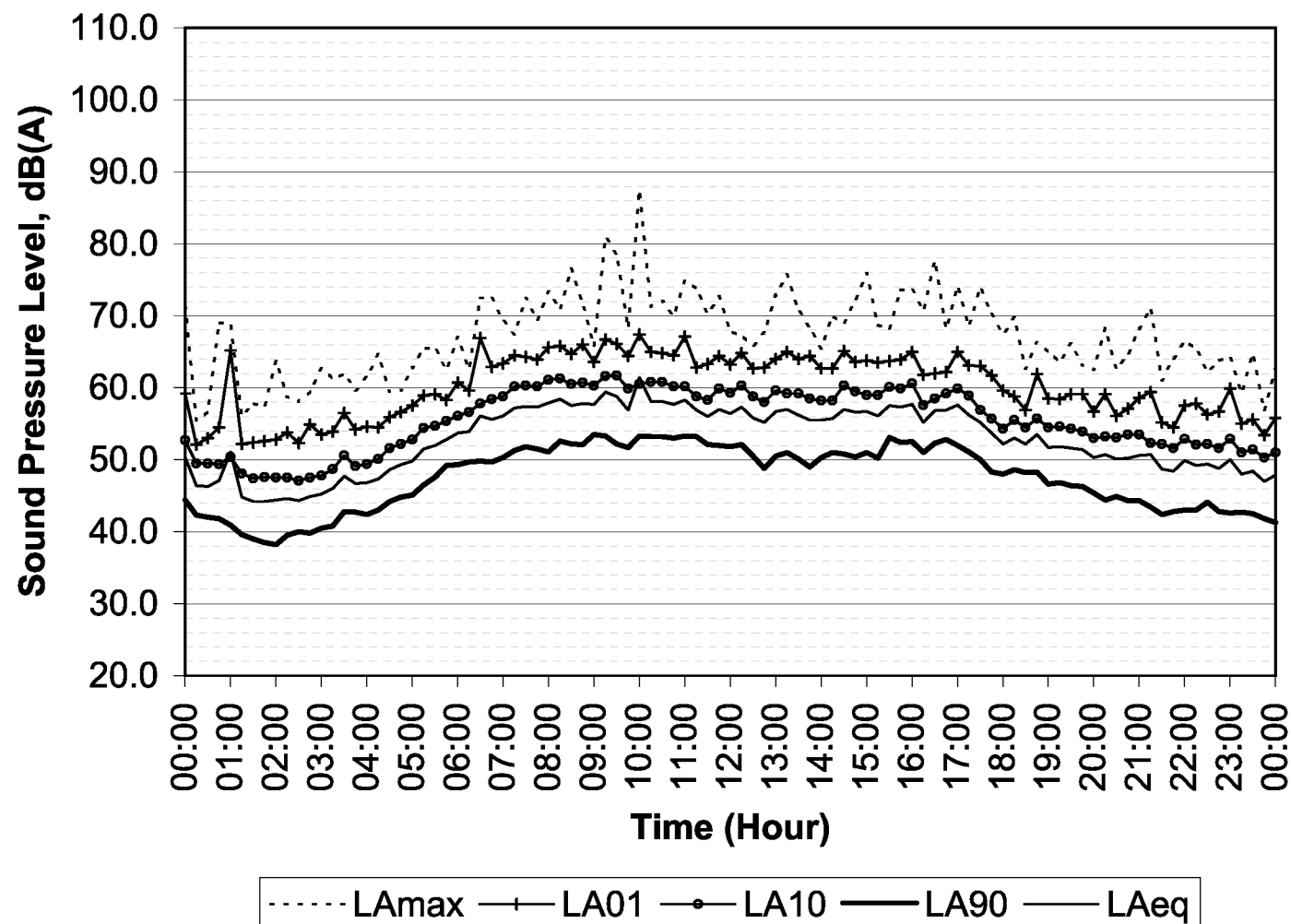
Proposed Residential Development
42-44 Hoxton Park Road, Liverpool

Measurement Date Friday, 25 July 2014

Notes

1. Tabulated L_{Aeq} are logarithmically 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	48.2	56.2	49.7	41.2
01:00-02:00	44.4	52.5	47.7	38.3
02:00-03:00	44.8	53.6	47.5	39.6
03:00-04:00	46.8	54.8	49.5	41.3
04:00-05:00	48.8	56.1	51.7	43.4
05:00-06:00	52.6	59.3	55.2	46.8
06:00-07:00	55.5	63.2	57.9	49.7
07:00-08:00	57.5	64.6	60.5	51.2
08:00-09:00	57.9	65.0	60.7	52.1
09:00-10:00	59.4	66.2	60.9	51.9
10:00-11:00	58.1	65.4	60.5	53.1
11:00-12:00	56.6	63.4	59.1	51.9
12:00-13:00	56.3	63.6	59.2	49.3
13:00-14:00	56.1	64.0	58.8	49.3
14:00-15:00	56.5	63.8	59.3	50.5
15:00-16:00	57.2	64.0	59.9	50.9
16:00-17:00	56.7	62.8	58.8	51.3
17:00-18:00	54.6	61.9	56.5	48.1
18:00-19:00	52.7	59.0	55.1	47.1
19:00-20:00	51.3	58.3	54.0	45.7
20:00-21:00	50.4	57.7	53.3	44.3
21:00-22:00	49.5	56.7	52.3	42.5
22:00-23:00	49.4	57.7	52.2	42.7
23:00-24:00	47.9	55.0	50.9	41.5
Day	57.2	64.1	59.6	50.1
Evening	51.3	58.1	53.7	43.1
Night	47.5	54.7	49.9	36.6
$L_{Aeq,15hr}$	56.2			
$L_{Aeq,9hr}$	47.5			
$L_{Aeq,24hr}$	54.9			



Measurement Location 42 Hoxton Park Road, Liverpool
Rear Yard

Project Title

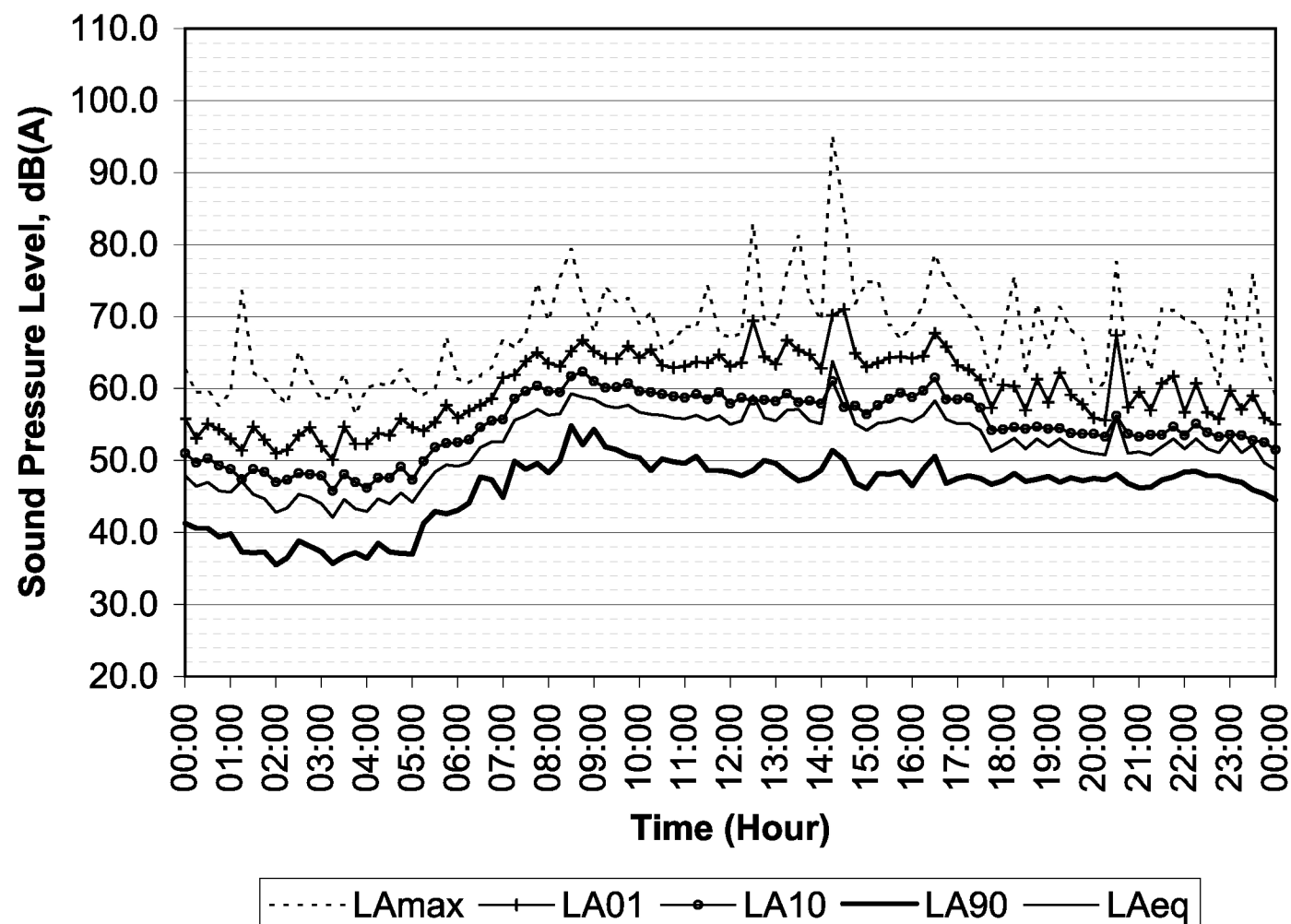
Proposed Residential Development
42-44 Hoxton Park Road, Liverpool

Measurement Date Saturday, 26 July 2014

Notes

1. Tabulated L_{Aeq} are logarithmically 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	46.2	53.9	49.5	39.5
01:00-02:00	45.2	52.5	47.9	36.0
02:00-03:00	44.5	52.9	47.9	36.7
03:00-04:00	43.3	52.4	46.8	35.9
04:00-05:00	44.6	54.4	47.9	37.0
05:00-06:00	48.5	55.8	51.7	41.7
06:00-07:00	51.8	58.7	54.7	44.3
07:00-08:00	56.3	63.6	59.6	48.5
08:00-09:00	58.4	65.1	61.1	50.7
09:00-10:00	57.3	64.6	60.2	50.5
10:00-11:00	56.1	63.7	59.1	48.9
11:00-12:00	55.8	63.8	58.8	48.5
12:00-13:00	56.8	65.2	58.4	48.1
13:00-14:00	56.3	64.9	58.4	47.3
14:00-15:00	59.8	67.3	58.1	46.3
15:00-16:00	55.5	64.1	58.6	47.0
16:00-17:00	56.5	65.3	59.6	47.0
17:00-18:00	53.5	60.4	56.1	46.9
18:00-19:00	52.4	59.2	54.5	47.2
19:00-20:00	51.9	58.8	53.9	47.1
20:00-21:00	52.9	60.0	54.1	46.4
21:00-22:00	51.9	59.0	53.9	46.6
22:00-23:00	52.3	58.2	54.0	47.5
23:00-24:00	50.6	56.8	52.6	44.8
Day	56.9	64.4	58.9	46.8
Evening	52.3	59.5	54.2	46.6
Night	49.8	55.1	50.8	39.8
$L_{Aeq,15hr}$	56.0			
$L_{Aeq,9hr}$	49.8			
$L_{Aeq,24hr}$	54.5			



Measurement Location 42 Hoxton Park Road, Liverpool
Rear Yard

Project Title

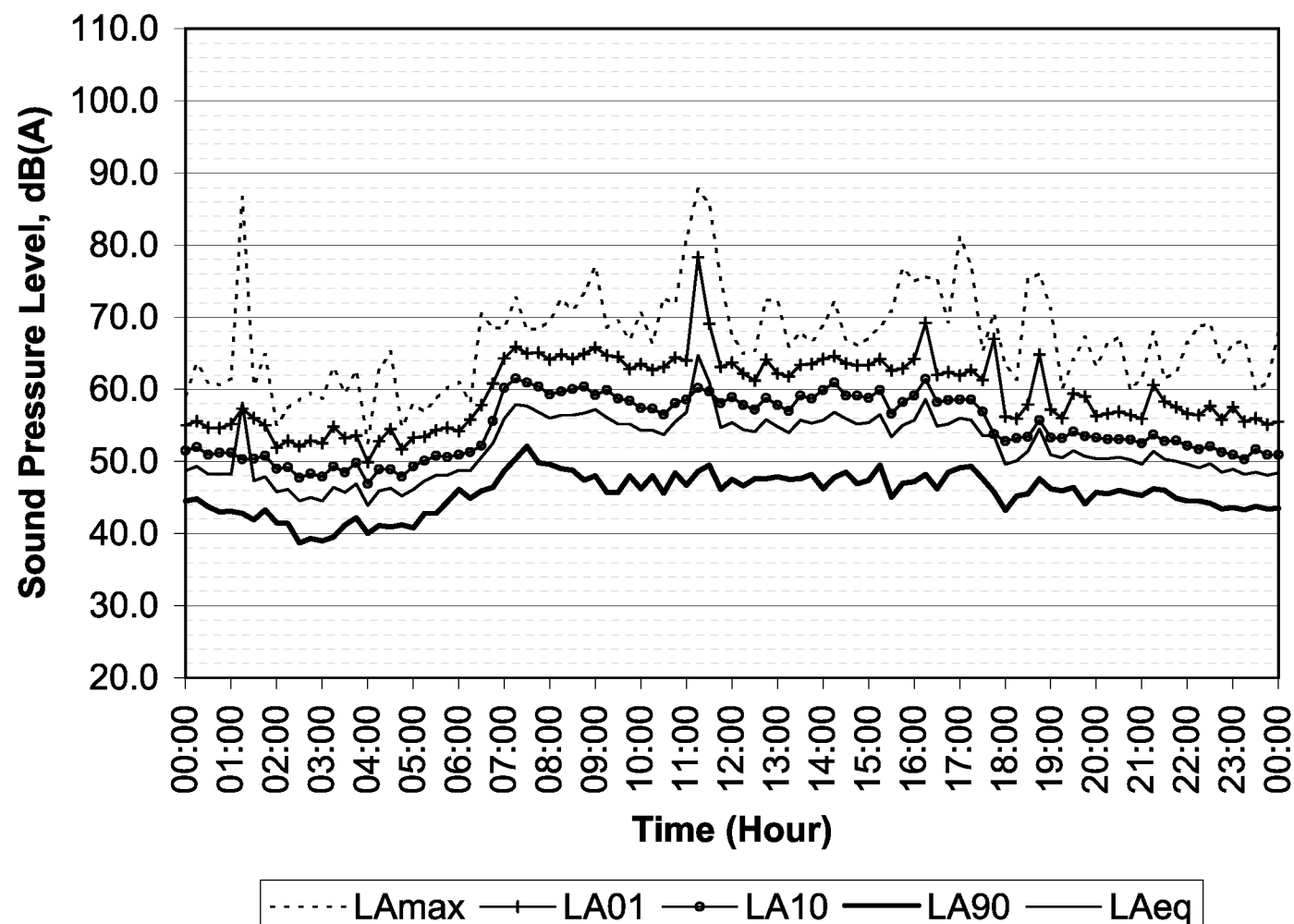
Proposed Residential Development
42-44 Hoxton Park Road, Liverpool

Measurement Date Sunday, 27 July 2014

Notes

1. Tabulated L_{Aeq} are logarithmically 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	48.5	55.0	51.3	43.0
01:00-02:00	53.0	55.1	50.1	41.6
02:00-03:00	45.1	52.6	48.3	38.8
03:00-04:00	45.9	52.9	48.6	39.7
04:00-05:00	45.9	53.1	48.8	40.8
05:00-06:00	48.1	54.2	50.6	42.8
06:00-07:00	52.8	59.7	54.8	45.2
07:00-08:00	57.2	65.0	60.5	49.7
08:00-09:00	56.7	64.9	59.8	47.6
09:00-10:00	55.2	63.9	58.6	45.7
10:00-11:00	55.2	63.6	57.6	45.9
11:00-12:00	60.8	68.6	59.2	46.5
12:00-13:00	54.8	62.4	57.9	46.9
13:00-14:00	55.2	63.2	58.7	46.6
14:00-15:00	55.9	63.7	59.5	47.1
15:00-16:00	55.3	63.5	58.5	45.6
16:00-17:00	56.4	63.9	59.2	46.8
17:00-18:00	53.6	61.8	55.5	44.0
18:00-19:00	52.1	59.0	53.9	45.3
19:00-20:00	50.8	57.7	53.5	44.6
20:00-21:00	50.2	56.5	52.9	45.4
21:00-22:00	50.4	58.3	52.9	44.6
22:00-23:00	49.1	56.9	51.5	43.5
23:00-24:00	48.3	55.5	51.0	43.3
Day	56.5	64.1	58.6	45.8
Evening	50.9	57.8	53.4	44.5
Night	51.7	57.2	51.9	39.2
$L_{Aeq,15hr}$	55.6			
$L_{Aeq,9hr}$	49.3			
$L_{Aeq,24hr}$	54.2			



Measurement Location 42 Hoxton Park Road, Liverpool
Rear Yard

Project Title

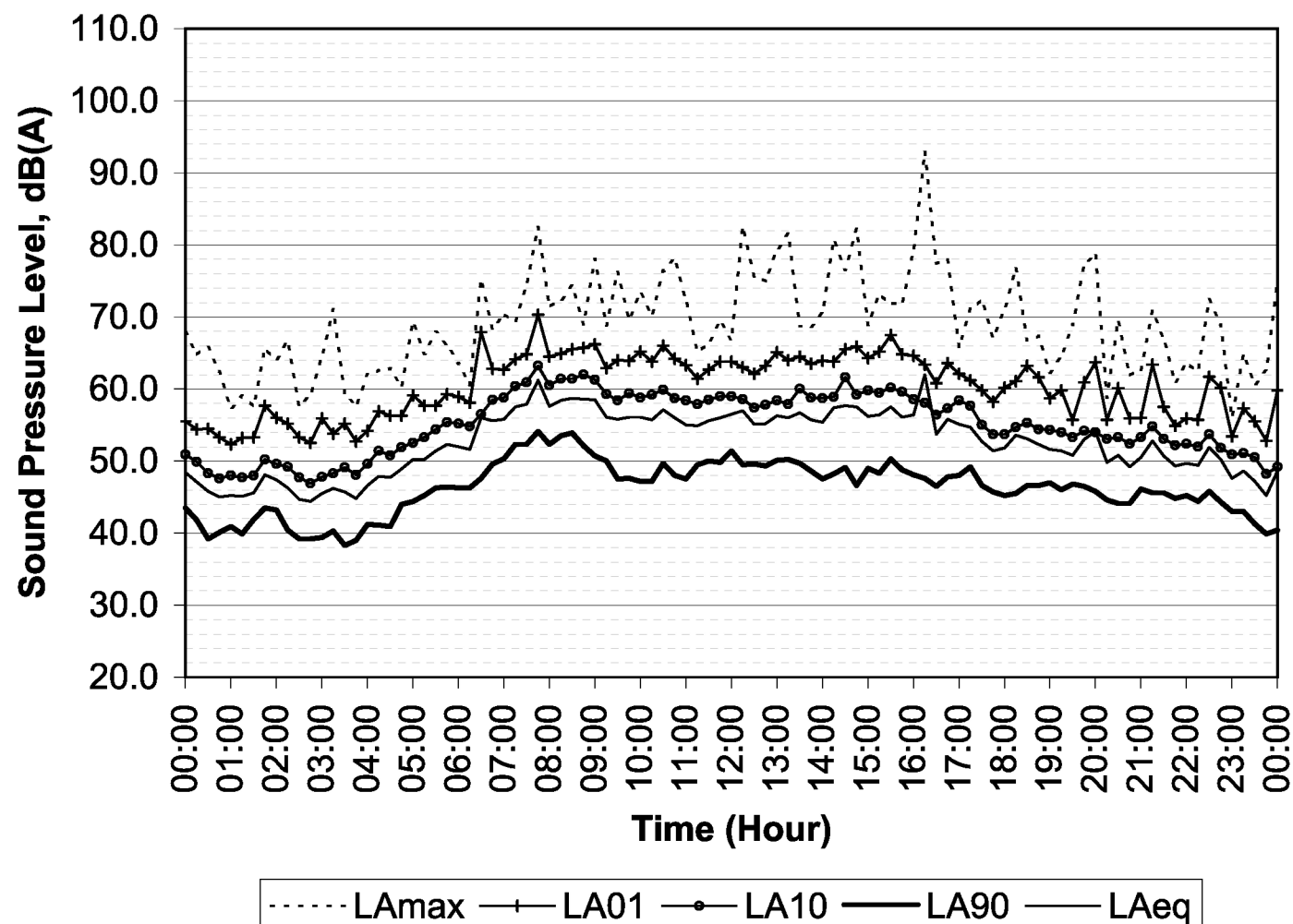
Proposed Residential Development
42-44 Hoxton Park Road, Liverpool

Measurement Date Monday, 28 July 2014

Notes

1. Tabulated L_{Aeq} are logarithmically 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	45.9	53.6	48.5	39.5
01:00-02:00	46.7	55.1	48.9	40.5
02:00-03:00	45.3	54.2	47.9	39.2
03:00-04:00	45.9	54.0	48.8	38.5
04:00-05:00	48.8	57.2	51.7	41.0
05:00-06:00	51.5	58.4	54.6	45.5
06:00-07:00	55.1	62.9	57.2	46.7
07:00-08:00	58.9	65.9	61.3	52.3
08:00-09:00	58.6	65.6	61.5	51.1
09:00-10:00	56.0	64.0	59.0	47.3
10:00-11:00	56.0	64.3	59.1	47.3
11:00-12:00	55.8	62.9	58.6	49.6
12:00-13:00	56.0	63.4	58.1	49.4
13:00-14:00	56.0	64.0	58.9	47.8
14:00-15:00	57.2	64.9	59.9	47.1
15:00-16:00	56.6	65.5	59.5	48.2
16:00-17:00	58.0	62.5	57.6	46.8
17:00-18:00	52.8	59.9	55.0	45.4
18:00-19:00	52.7	61.2	54.7	45.8
19:00-20:00	52.5	60.0	53.9	45.9
20:00-21:00	50.1	56.9	53.0	44.1
21:00-22:00	50.9	57.9	53.1	44.9
22:00-23:00	50.0	57.8	52.1	43.4
23:00-24:00	47.6	56.4	49.8	40.1
Day	56.9	63.9	59.0	47.2
Evening	51.8	59.3	53.8	44.4
Night	49.1	55.9	50.3	38.0
$L_{Aeq,15hr}$	56.0			
$L_{Aeq,9hr}$	49.1			
$L_{Aeq,24hr}$	54.6			



Measurement Location 42 Hoxton Park Road, Liverpool
Rear Yard

Project Title

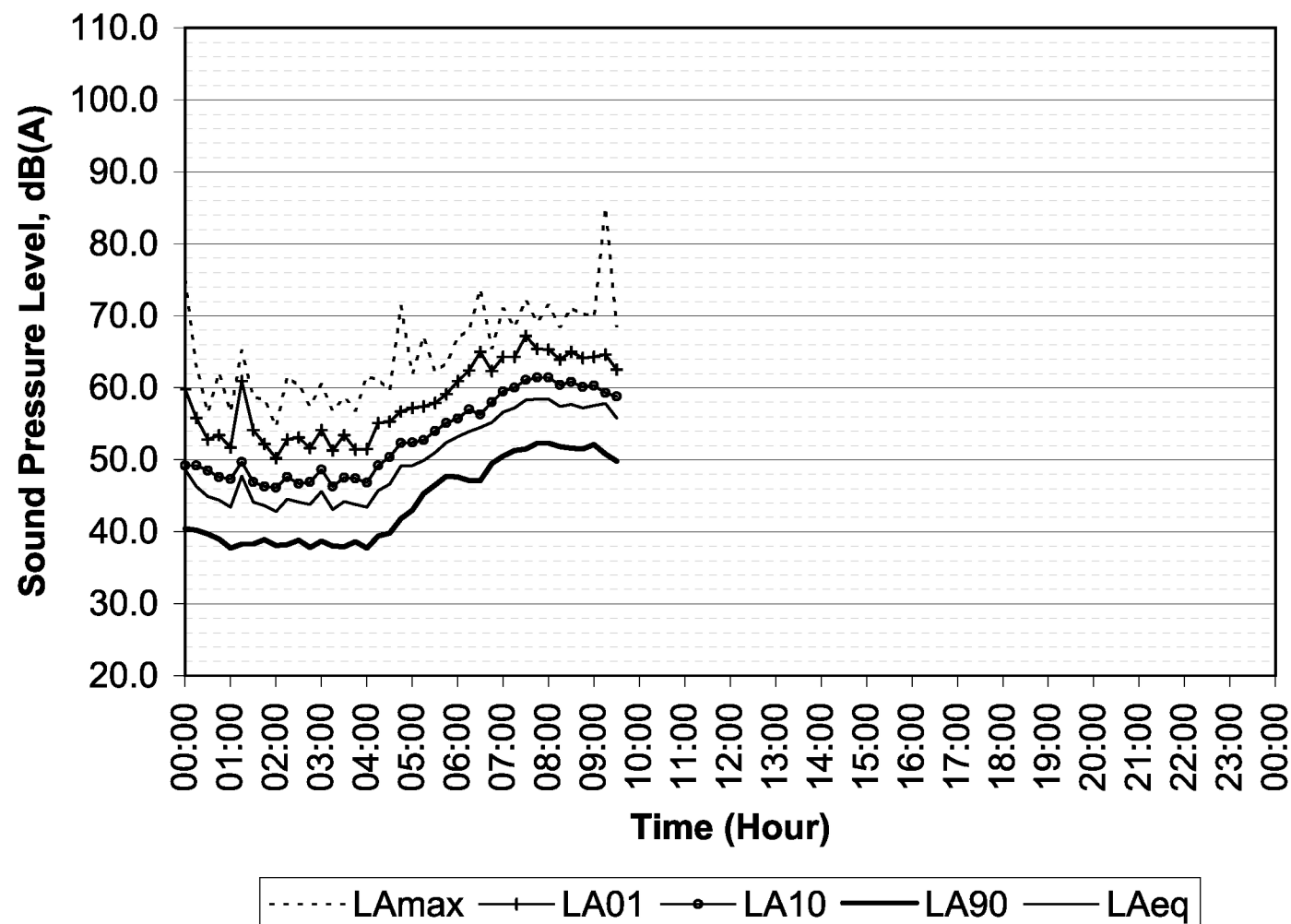
Proposed Residential Development
42-44 Hoxton Park Road, Liverpool

Measurement Date Tuesday, 29 July 2014

Notes

1. Tabulated L_{Aeq} are logarithmically 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	44.9	53.4	48.2	38.1
01:00-02:00	45.0	54.4	47.3	38.2
02:00-03:00	44.6	52.9	47.5	37.9
03:00-04:00	43.6	51.9	47.0	37.8
04:00-05:00	47.9	56.1	51.1	39.5
05:00-06:00	51.8	58.8	54.4	45.7
06:00-07:00	55.2	63.5	57.7	47.1
07:00-08:00	58.1	65.6	61.0	51.4
08:00-09:00	57.5	64.3	60.4	51.5
09:00-10:00				
10:00-11:00				
11:00-12:00				
12:00-13:00				
13:00-14:00				
14:00-15:00				
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				
$L_{Aeq,15hr}$				
$L_{Aeq,9hr}$				
$L_{Aeq,24hr}$				



Appendix 3

PREVIOUS ROAD TRAFFIC NOISE EXPOSURE TO SITE

Measurement Location at Front of 42-44 Hoxton Park Road

Measurement Location 42/44 Hoxton Park Road, Liverpool
Front Façade

Project Title

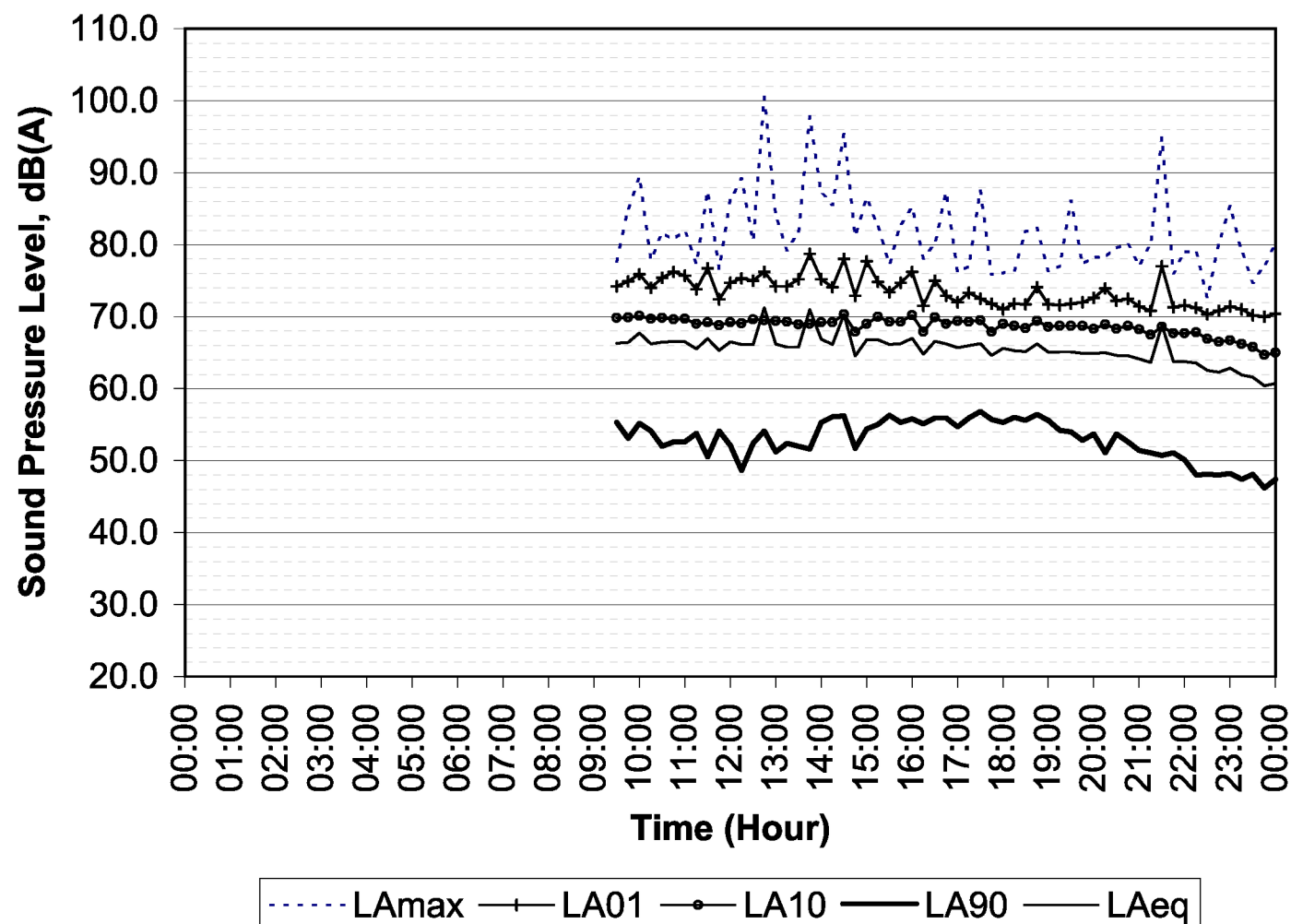
Proposed Residential Development
42-44 Hoxton Park Road, Liverpool

Measurement Date Tuesday, 22 July 2014

Notes

1. Tabulated L_{Aeq} are logarithmically 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	66.4	75.3	69.7	52.2
11:00-12:00	66.1	74.4	69.1	51.0
12:00-13:00	68.0	75.2	69.4	49.4
13:00-14:00	67.9	75.8	69.1	51.7
14:00-15:00	67.5	75.7	69.1	52.5
15:00-16:00	66.5	74.8	69.7	55.1
16:00-17:00	65.9	72.9	69.1	54.8
17:00-18:00	65.7	72.2	68.9	55.4
18:00-19:00	65.4	72.3	68.8	55.6
19:00-20:00	65.0	72.0	68.6	53.1
20:00-21:00	64.6	72.5	68.5	51.2
21:00-22:00	65.7	72.7	67.9	50.3
22:00-23:00	62.8	70.9	67.0	48.0
23:00-24:00	61.2	70.4	65.4	46.6
Day				
Evening	65.3	72.3	68.5	51.1
Night	63.2	71.1	65.5	40.9
$L_{Aeq,15hr}$				
$L_{Aeq,9hr}$		63.2		
$L_{Aeq,24hr}$				



Measurement Location 42/44 Hoxton Park Road, Liverpool
Front Façade

Project Title

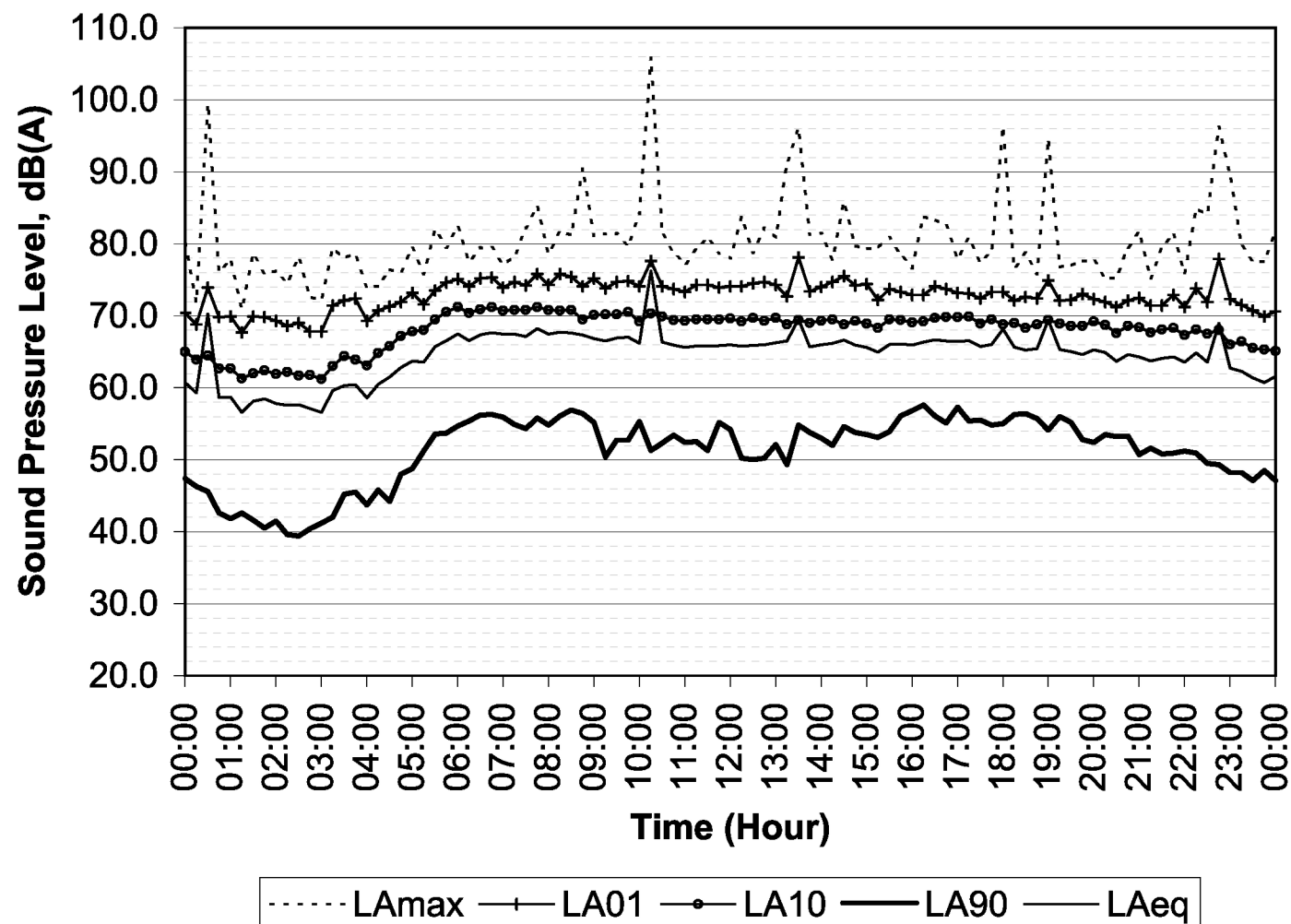
Proposed Residential Development
42-44 Hoxton Park Road, Liverpool

Measurement Date Wednesday, 23 July 2014

Notes

1. Tabulated L_{Aeq} are logarithmically 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	65.1	70.6	63.5	42.0
01:00-02:00	57.8	69.2	61.9	40.8
02:00-03:00	57.2	68.3	61.7	39.5
03:00-04:00	59.8	71.3	63.6	42.5
04:00-05:00	62.3	71.8	66.4	44.7
05:00-06:00	66.0	73.7	69.8	51.9
06:00-07:00	67.3	74.6	70.8	55.6
07:00-08:00	67.6	74.8	70.9	54.5
08:00-09:00	67.4	75.1	70.3	55.5
09:00-10:00	66.7	74.4	70.0	51.1
10:00-11:00	71.3	74.7	69.7	51.6
11:00-12:00	65.8	74.2	69.5	51.7
12:00-13:00	66.0	74.4	69.5	50.1
13:00-14:00	67.2	74.6	69.1	50.4
14:00-15:00	66.1	74.7	69.1	52.5
15:00-16:00	65.8	73.0	69.1	53.3
16:00-17:00	66.5	73.5	69.6	55.4
17:00-18:00	66.7	73.0	69.3	54.9
18:00-19:00	66.8	73.0	68.9	54.6
19:00-20:00	65.1	72.4	68.8	52.5
20:00-21:00	64.4	71.9	68.3	51.5
21:00-22:00	63.9	71.7	67.9	50.8
22:00-23:00	65.8	74.0	67.4	48.5
23:00-24:00	61.5	70.7	65.6	47.1
Day	67.3	74.2	69.7	50.7
Evening	65.5	72.4	68.6	50.9
Night	63.3	71.5	65.6	43.1
$L_{Aeq,15hr}$	66.9			
$L_{Aeq,9hr}$	63.3			
$L_{Aeq,24hr}$	66.0			



Measurement Location 42/44 Hoxton Park Road, Liverpool
Front Façade

Project Title

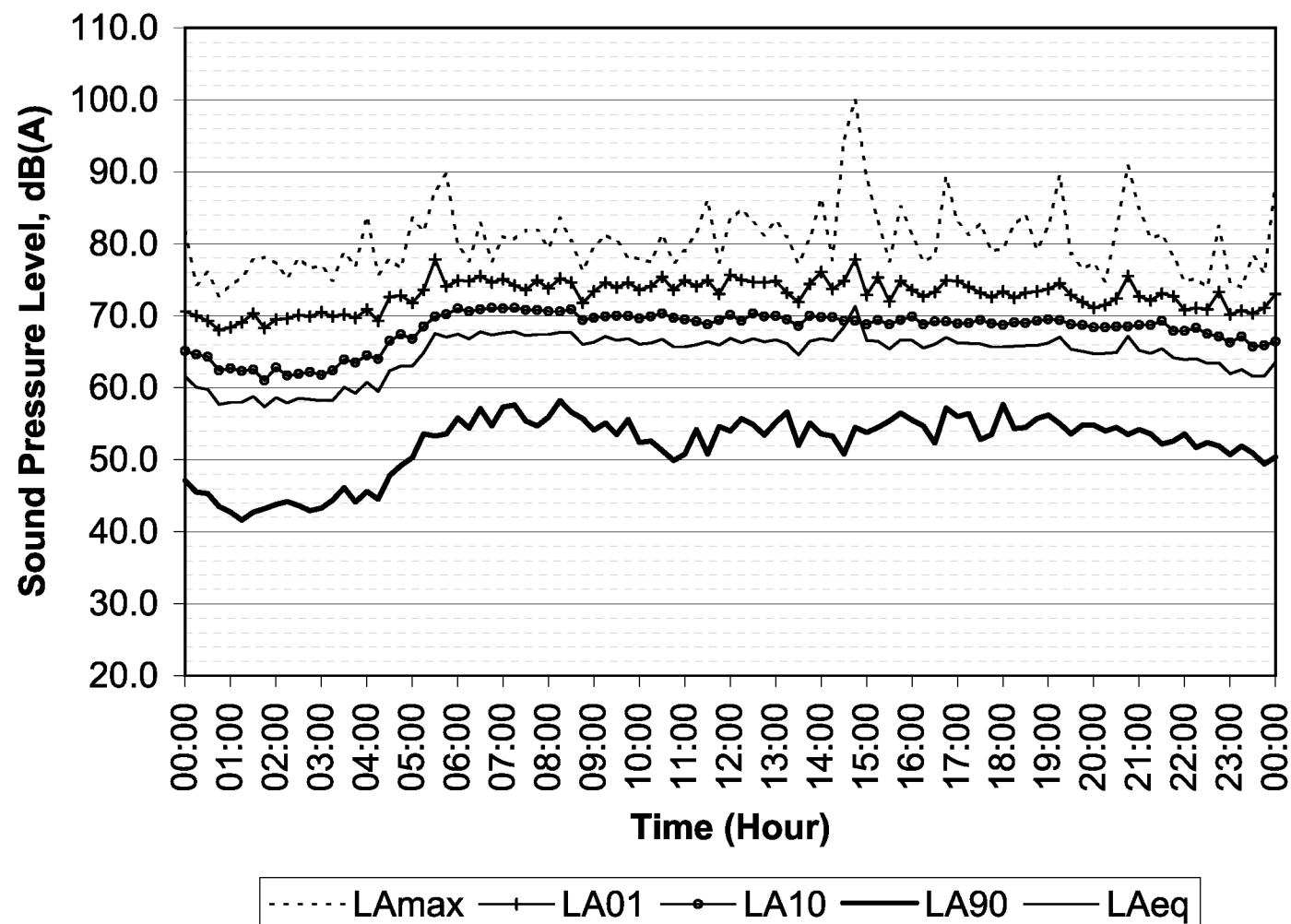
Proposed Residential Development
42-44 Hoxton Park Road, Liverpool

Measurement Date Thursday, 24 July 2014

Notes

1. Tabulated L_{Aeq} are logarithmically 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	59.0	68.9	63.5	42.9
01:00-02:00	58.2	69.3	62.2	41.9
02:00-03:00	58.3	70.0	61.9	43.0
03:00-04:00	59.7	70.2	63.6	44.2
04:00-05:00	62.2	71.6	66.2	45.5
05:00-06:00	66.8	75.1	69.9	53.4
06:00-07:00	67.4	75.0	70.9	54.5
07:00-08:00	67.5	74.1	70.8	54.9
08:00-09:00	67.0	73.8	70.2	54.6
09:00-10:00	66.7	74.2	69.9	52.7
10:00-11:00	66.1	74.5	69.9	50.2
11:00-12:00	66.3	74.4	69.4	51.8
12:00-13:00	66.5	74.8	69.9	53.9
13:00-14:00	66.1	73.9	69.5	52.5
14:00-15:00	68.7	74.8	69.3	51.6
15:00-16:00	66.3	73.9	69.4	54.8
16:00-17:00	66.2	73.9	69.0	53.0
17:00-18:00	65.9	73.3	69.0	53.0
18:00-19:00	65.9	73.2	69.2	54.4
19:00-20:00	65.6	72.6	68.8	54.0
20:00-21:00	65.6	73.0	68.5	53.7
21:00-22:00	64.6	72.2	68.5	52.3
22:00-23:00	63.3	71.4	67.3	51.0
23:00-24:00	62.4	71.3	66.3	49.7
Day	66.8	74.2	69.7	51.5
Evening	65.6	72.9	68.8	53.1
Night	63.0	71.3	65.9	42.5
$L_{Aeq,15hr}$	66.5			
$L_{Aeq,9hr}$	63.0			
$L_{Aeq,24hr}$	65.6			



Measurement Location 42/44 Hoxton Park Road, Liverpool
Front Façade

Project Title

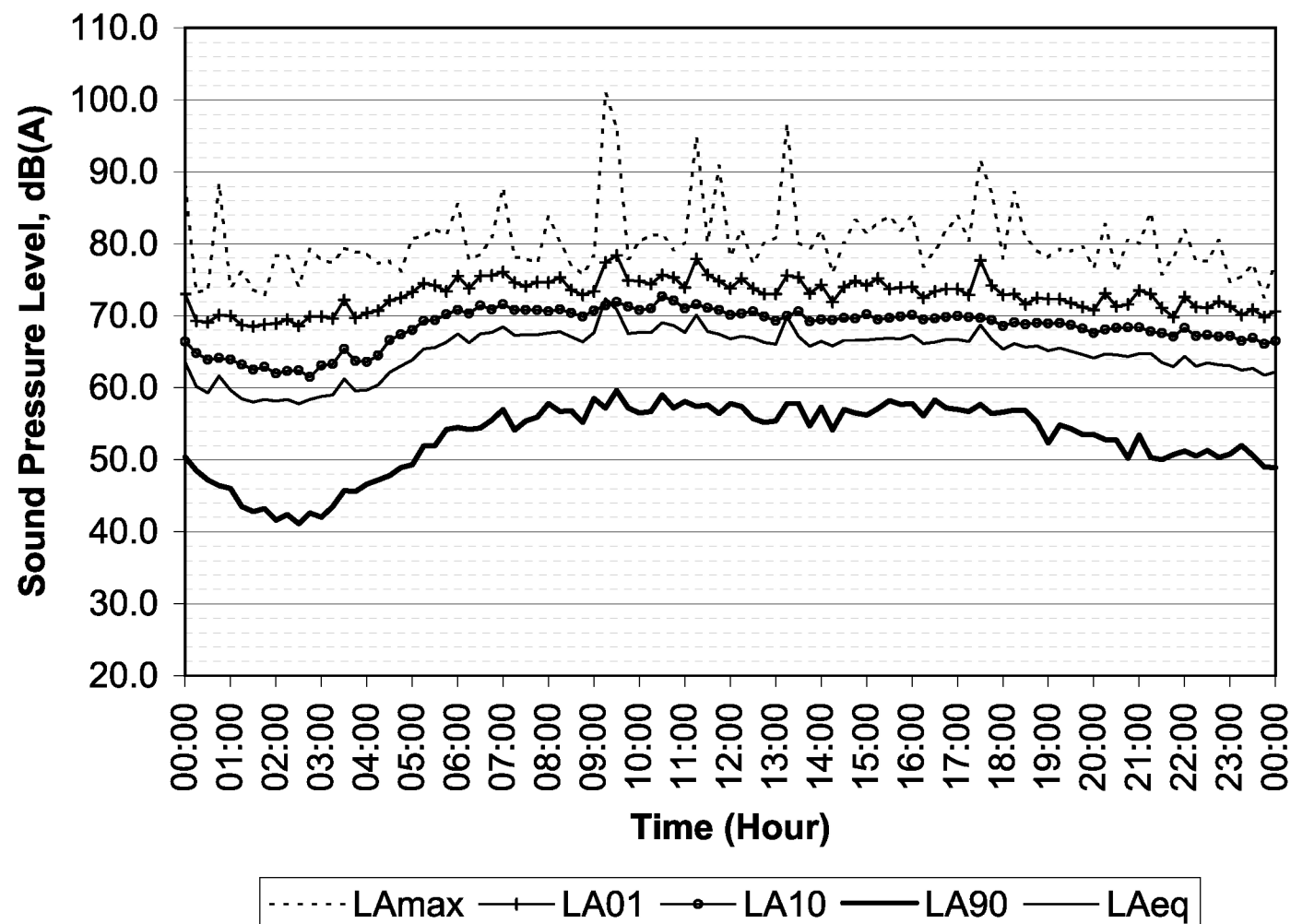
Proposed Residential Development
42-44 Hoxton Park Road, Liverpool

Measurement Date Friday, 25 July 2014

Notes

1. Tabulated L_{Aeq} are logarithmically 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	60.3	69.6	64.2	46.1
01:00-02:00	58.2	68.7	62.7	42.0
02:00-03:00	58.3	69.5	62.3	41.4
03:00-04:00	59.9	70.5	64.0	44.1
04:00-05:00	62.5	72.2	66.6	47.4
05:00-06:00	66.3	74.4	69.9	51.9
06:00-07:00	67.5	75.3	71.1	54.3
07:00-08:00	67.4	74.5	70.8	54.5
08:00-09:00	67.2	73.8	70.5	55.7
09:00-10:00	70.1	76.4	71.4	56.7
10:00-11:00	68.3	74.8	71.7	56.9
11:00-12:00	68.2	75.6	70.9	56.7
12:00-13:00	66.6	73.8	70.0	55.3
13:00-14:00	67.6	74.6	69.8	55.5
14:00-15:00	66.4	73.7	69.7	54.7
15:00-16:00	66.9	74.2	69.8	57.3
16:00-17:00	66.5	73.3	69.7	56.4
17:00-18:00	67.0	74.4	69.4	56.5
18:00-19:00	65.7	72.4	69.0	53.2
19:00-20:00	64.9	71.5	68.4	53.5
20:00-21:00	64.6	72.4	68.3	51.0
21:00-22:00	64.0	71.6	67.7	50.1
22:00-23:00	63.2	71.4	67.2	50.4
23:00-24:00	62.3	70.4	66.5	48.9
Day	67.7	74.5	70.4	55.3
Evening	64.9	72.0	68.4	50.3
Night	61.8	70.5	65.4	40.1
$L_{Aeq,15hr}$	67.1			
$L_{Aeq,9hr}$	61.8			
$L_{Aeq,24hr}$	66.1			



Measurement Location 42/44 Hoxton Park Road, Liverpool
Front Façade

Project Title

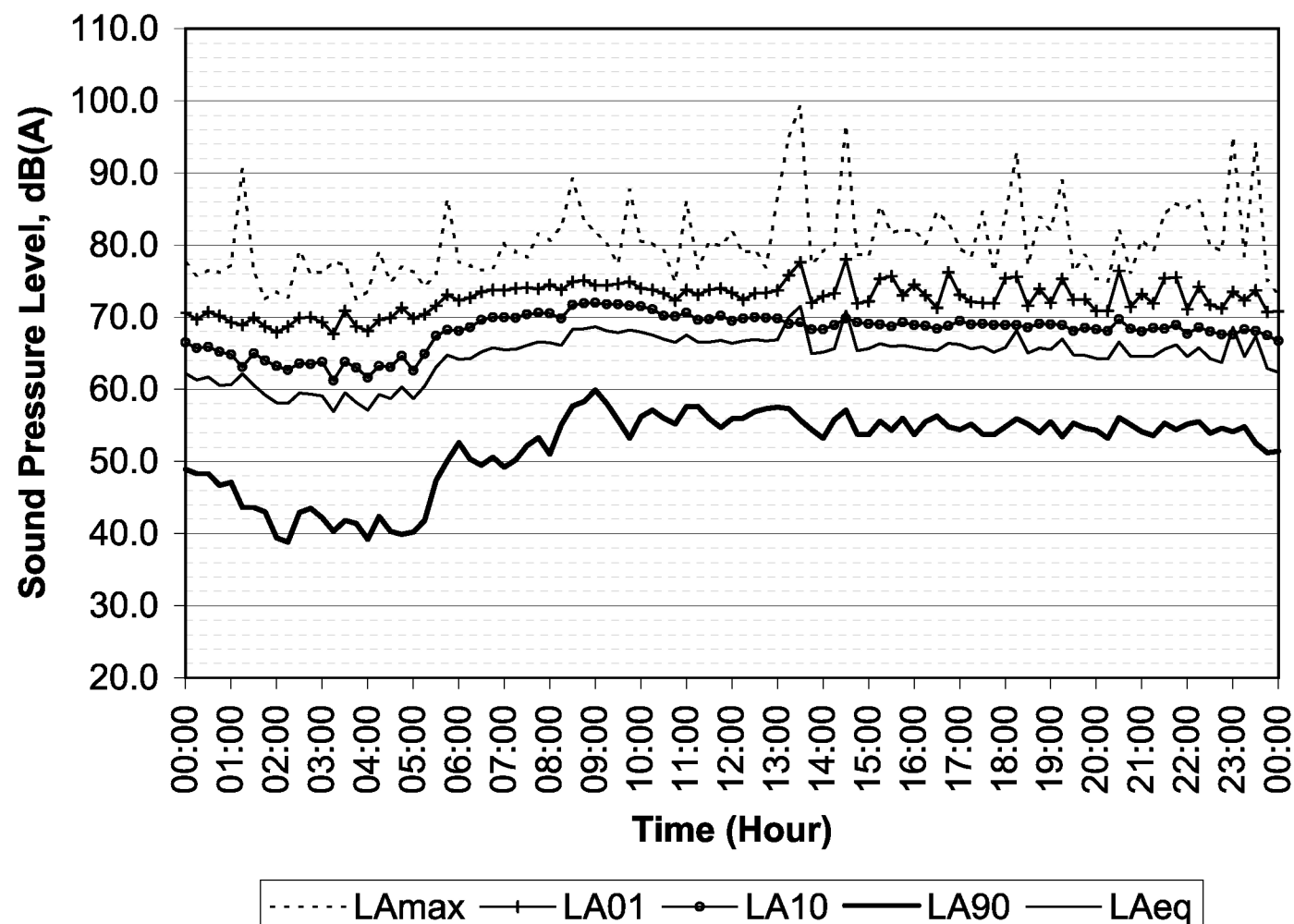
Proposed Residential Development
42-44 Hoxton Park Road, Liverpool

Measurement Date Saturday, 26 July 2014

Notes

1. Tabulated L_{Aeq} are logarithmically 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	61.1	70.0	65.4	46.8
01:00-02:00	60.3	68.9	63.8	40.5
02:00-03:00	59.0	69.5	63.4	39.8
03:00-04:00	58.1	68.9	62.4	39.5
04:00-05:00	59.3	70.2	63.4	40.0
05:00-06:00	63.4	71.9	67.2	43.5
06:00-07:00	65.2	73.4	69.6	49.3
07:00-08:00	66.2	74.1	70.4	50.4
08:00-09:00	68.0	74.6	71.4	55.9
09:00-10:00	68.0	74.5	71.7	54.0
10:00-11:00	67.1	73.3	70.5	55.4
11:00-12:00	66.6	73.6	69.8	55.1
12:00-13:00	66.8	73.2	69.9	56.3
13:00-14:00	68.8	74.6	68.8	53.6
14:00-15:00	67.6	73.9	69.3	53.7
15:00-16:00	66.0	74.6	69.0	53.9
16:00-17:00	65.9	73.4	68.9	54.5
17:00-18:00	65.6	72.9	69.0	53.7
18:00-19:00	66.3	73.3	68.9	54.4
19:00-20:00	65.3	72.8	68.5	53.7
20:00-21:00	65.1	73.0	68.6	53.5
21:00-22:00	65.3	73.5	68.4	53.8
22:00-23:00	66.0	72.7	68.0	54.0
23:00-24:00	64.7	71.9	67.7	51.3
Day	67.1	73.8	69.9	53.2
Evening	65.6	73.4	68.6	53.5
Night	63.9	70.3	65.1	42.7
$L_{Aeq,15hr}$	66.7			
$L_{Aeq,9hr}$	63.9			
$L_{Aeq,24hr}$	65.6			



Measurement Location 42/44 Hoxton Park Road, Liverpool
Front Façade

Project Title

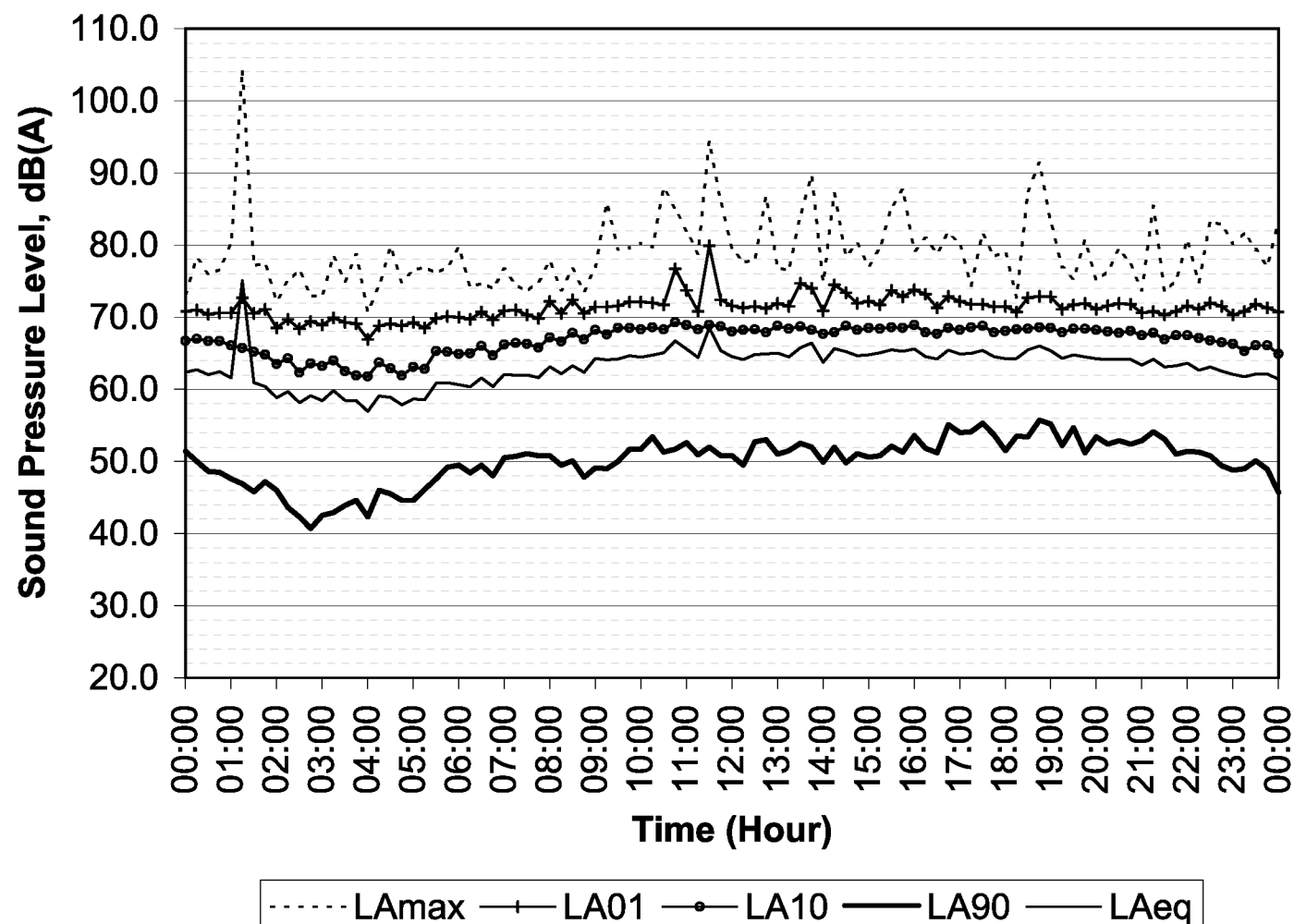
Proposed Residential Development
42-44 Hoxton Park Road, Liverpool

Measurement Date Sunday, 27 July 2014

Notes

1. Tabulated L_{Aeq} are logarithmically 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	62.2	70.7	66.6	47.9
01:00-02:00	69.4	70.7	64.8	45.9
02:00-03:00	58.9	69.1	63.4	41.2
03:00-04:00	58.5	68.8	62.6	42.5
04:00-05:00	58.6	69.0	62.9	44.6
05:00-06:00	60.3	69.6	64.6	46.6
06:00-07:00	61.2	70.2	65.5	48.1
07:00-08:00	62.2	70.8	66.4	50.7
08:00-09:00	63.1	71.2	67.4	48.2
09:00-10:00	64.3	71.8	68.2	49.3
10:00-11:00	65.6	73.5	68.8	51.4
11:00-12:00	66.0	73.7	68.5	50.8
12:00-13:00	64.7	71.5	68.3	50.0
13:00-14:00	65.2	72.8	68.3	50.4
14:00-15:00	65.1	73.0	68.4	50.0
15:00-16:00	65.4	73.0	68.6	51.0
16:00-17:00	64.8	72.4	68.1	51.4
17:00-18:00	64.8	71.6	68.4	52.2
18:00-19:00	65.3	72.3	68.5	53.4
19:00-20:00	64.5	71.5	68.2	51.5
20:00-21:00	64.0	71.5	67.9	52.4
21:00-22:00	63.6	70.9	67.4	51.1
22:00-23:00	62.6	71.2	66.7	49.0
23:00-24:00	61.9	71.2	65.6	46.7
Day	65.0	72.5	68.3	49.5
Evening	64.4	71.5	68.0	51.4
Night	63.3	71.7	65.9	41.7
$L_{Aeq,15hr}$	64.7			
$L_{Aeq,9hr}$	62.5			
$L_{Aeq,24hr}$	64.2			



Measurement Location 42/44 Hoxton Park Road, Liverpool
Front Façade

Project Title

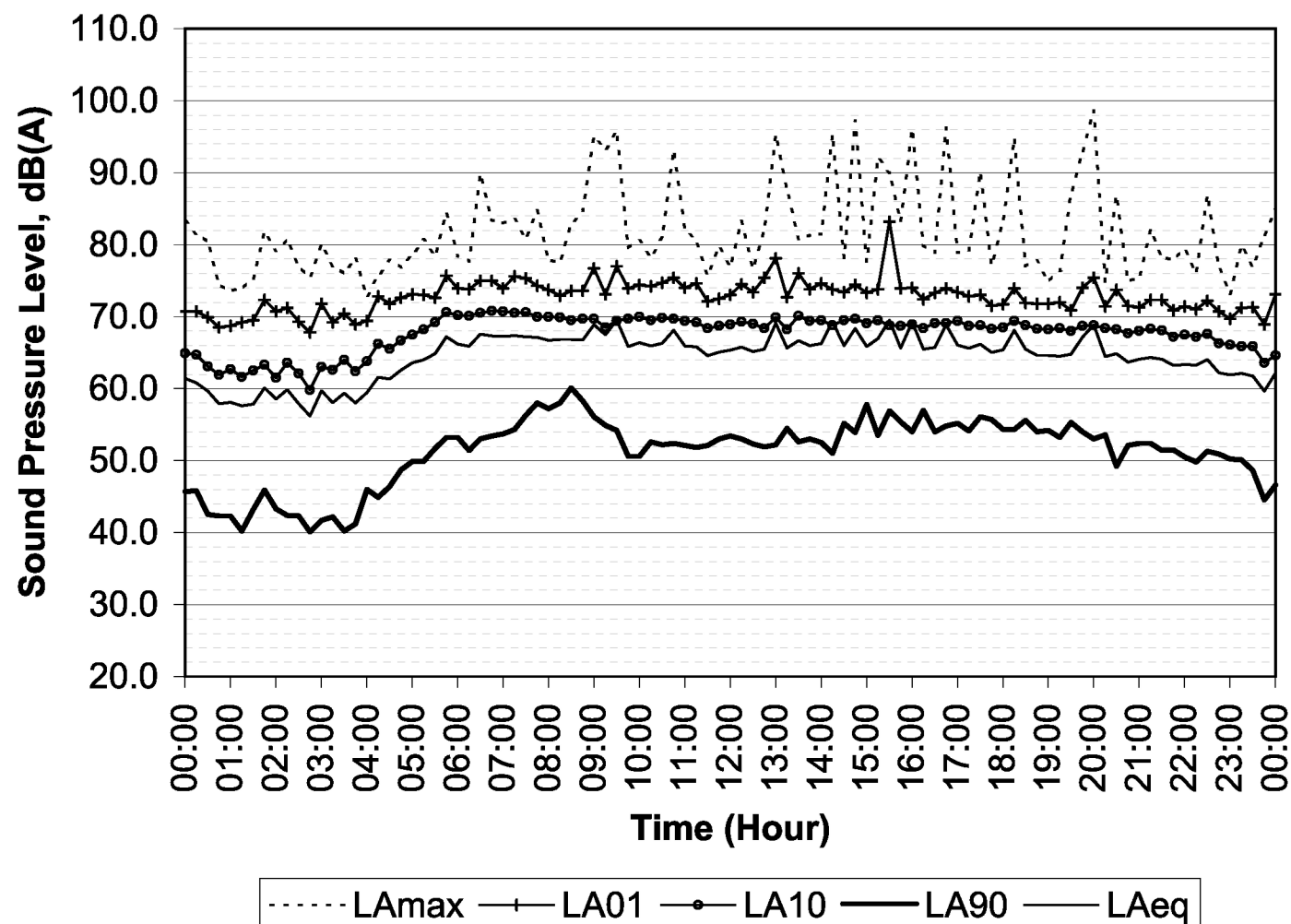
Proposed Residential Development
42-44 Hoxton Park Road, Liverpool

Measurement Date Monday, 28 July 2014

Notes

1. Tabulated L_{Aeq} are logarithmically 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	59.3	69.5	63.1	42.3
01:00-02:00	58.6	70.4	62.2	41.1
02:00-03:00	58.7	70.0	62.1	40.6
03:00-04:00	58.8	69.5	63.2	40.5
04:00-05:00	62.4	72.6	66.5	45.4
05:00-06:00	65.7	73.8	69.6	50.4
06:00-07:00	67.0	74.4	70.5	51.9
07:00-08:00	67.1	74.7	70.3	54.9
08:00-09:00	67.4	74.2	69.7	56.7
09:00-10:00	67.5	74.6	69.4	50.6
10:00-11:00	66.7	74.6	69.6	52.1
11:00-12:00	65.2	73.1	68.8	51.9
12:00-13:00	66.7	75.4	69.2	52.0
13:00-14:00	66.1	74.3	69.3	52.5
14:00-15:00	67.6	73.7	69.3	51.9
15:00-16:00	68.1	76.2	69.0	53.7
16:00-17:00	66.8	73.3	69.0	54.2
17:00-18:00	65.6	72.3	68.6	54.1
18:00-19:00	66.0	72.4	68.7	54.1
19:00-20:00	66.7	73.1	68.5	53.1
20:00-21:00	64.3	72.0	68.1	50.1
21:00-22:00	63.8	71.7	67.8	50.8
22:00-23:00	62.9	70.9	66.8	49.9
23:00-24:00	61.5	71.1	65.0	45.1
Day	66.9	74.3	69.3	52.0
Evening	65.4	72.3	68.3	51.5
Night	62.3	70.6	64.8	40.9
$L_{Aeq,15hr}$	66.6			
$L_{Aeq,9hr}$	62.3			
$L_{Aeq,24hr}$	65.6			



Measurement Location 42/44 Hoxton Park Road, Liverpool
Front Façade

Project Title

Proposed Residential Development
42-44 Hoxton Park Road, Liverpool

Measurement Date Tuesday, 29 July 2014

Notes

1. Tabulated L_{Aeq} are logarithmically 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	58.8	69.3	63.2	41.3
01:00-02:00	57.3	68.5	60.8	41.1
02:00-03:00	56.7	68.3	60.7	40.7
03:00-04:00	57.7	68.4	61.9	40.9
04:00-05:00	62.1	71.7	66.2	43.9
05:00-06:00	65.5	73.4	69.1	51.6
06:00-07:00	67.1	75.0	70.6	53.9
07:00-08:00	67.2	74.2	70.6	54.6
08:00-09:00	66.8	74.1	70.1	54.3
09:00-10:00				
10:00-11:00				
11:00-12:00				
12:00-13:00				
13:00-14:00				
14:00-15:00				
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				
$L_{Aeq,15hr}$				
$L_{Aeq,9hr}$				
$L_{Aeq,24hr}$				

