Project

Clitheroe Road, Whalley
Planning noise assessment

Prepared for

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By

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Revision History

Version	Date	Comments
A	15 April 2019	First issue
B	16 April 2019	Retail option 13 included
C	1 May2019	Retail Options 9, 10 & 11 omitted
D	22 March 2021	Removed statement about barriers.
E	29 April 2021	Updated to include recommendations for a noise barrier to reduce noise levels in external amenity areas of the care home.
F	7 May 2021	Updated to include specific proposals for barrier

Summary

SRL Technical Services Limited has been commissioned by Maple Grove Developments Ltd to do a noise assessment to support a planning application for new mixed used development at Clitheroe Road, Whalley. The development will include 48 bungalows, a 2-storey care home and a small number of commercial units.

The main source of noise affecting the proposed development is road traffic from Clitheroe Road to the west of the site, and the A59 to the south of the site.

We have measured noise levels at several locations during the day and night to establish the baseline noise levels affecting the site. The results of the noise survey have been used to generate a 3D computer model of the site to determine the required sound insulation performance of the façades of the development in order to meet internal ambient noise guidance given in *ProPG: Planning & Noise Guidance*. Typical suitable glazing configurations are also given.

Provided that the facades are designed to achieve the requirements set out in Section 4.1 of this report, it is expected that the internal noise levels set in the *ProPG: Planning & Noise Guidance* can be achieved.

Reasonable noise levels can be achieved in external amenity areas. A noise barrier is required to mitigate noise from the A59 within the care home's external amenity areas.

If building services plant is designed to achieve the noise levels set out in Section 4.3 it is expected that there will be a low risk of adverse comment.

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1.0 Introduction

The application site is located in Whalley, Lancashire on a plot of land to the north of the A59, and to the east of Clitheroe Road. The extent of the site is shown in Figure 1. The proposed scheme will include 48 residential bungalows, a two-storey care home and several commercial units.

Figure 1 Proposed layout in relation to the site location (courtesy of Google Earth Pro)

The site shares its boundary with agricultural land. There are existing residential dwellings at the north-west and south-west corners of the site.

The noise climate at the site is dominated by road traffic from Clitheroe Road and the A59.

2.0 Noise Criteria

2.1 Internal noise levels

I have based this assessment of the residential units and the care home on the guidance set out in Professional Practice Guidance: Planning & Noise for New Residential Developments (ProPG) published in July 2017. Guidance is provided on a recommended internal noise levels for different building uses. This is not an official government code of practice, nor do they replace or provide an authoritative interpretation of the law or government policy, but they do help to draw together existing policies, such as the National Planning Policy Framework (NPPF) and provides additional guidance which helps fill in some current gaps.

This document has been jointly created by three bodies: The Institute of Acoustics, the Association of Noise Consultants, and the Chartered Institute of Environmental Health. The key message is the drive to adopt "Good Acoustic Design" for every new housing scheme to protect people from the harmful effects of noise.

ProPG aims to establish a framework for assessing proposed developments by looking at the potential 'risks' from noise affecting the site and by establishing suitable noise criteria. The fundamental approach is to do an initial noise risk assessment of the site; unless the risk is deemed to be negligible, a full noise assessment is expected. This involves establishing suitable noise criteria and developing a Good Acoustic Design to achieve them, wherever possible. In the case of this site, the noise levels experienced from the nearby noise sources indicate that an assessment of the noise affecting the development is advisable.

ProPG refers to BS 8233:2014 *Guidance on Sound Insulation and Noise Reduction for Buildings* (BS8233) for suitable guidance on indoor ambient noise levels. BS8233 also sets noise levels for the other building types at the site. I have summarised these guidelines in Table 1.

Table 1 Guideline indoor noise levels for dwellings from BS8233

Location	Indoor ambient noise levels
Living room (Residential & Care Home)	Daytime (07:00-23:00) $L_{Aeq,16h}$ 35 dB
Bedroom (Residential & Care Home)	Daytime (07:00-23:00) $L_{Aeq,16h}$ 35 dB Night (23:00-07:00) $L_{Aeq,8h}$ 30 dB
P. F. S.	$L_{Aeq,T}$ 50-55 dB
Drive-thru restaurant	$L_{Aeq,T}$ 40-55 dB
Employment units	$L_{Aeq,T}$ 35-45 dB

2.2 External noise levels

For outdoor areas, such as a gardens and courtyards, ProPG refers to BS 8233:2014 which gives the following guidance:

> *"It is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$ with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments.".*

2.3 Plant noise

BS 4142:2014 *Methods for rating and assessing industrial and commercial sound* (BS4142) gives guidance on setting appropriate noise limits for new items of plant.

BS4142 defines the noise source assessed as the 'specific' noise the methodology is to compare new source to the existing noise climate.

When comparing the specific noise against the existing background levels BS4142 highlights that certain acoustic features (tonality, impulsivity, intermittency etc.) can increase any significance of impact and that penalties should be applied to the specific noise level, in accordance with the guidelines in BS4142, to determine the Rating Level of the noise source.

Comparison of the Rating Level to background noise level indicates the significance of the new noise source at the receptor under assessment. If the Rating Level is higher than the background noise level, then there may be an impact.

- A difference of around +10dB or more likely to be an indication of a significant adverse impact.
- A difference of around +5dB is likely to be an indication of an adverse impact.
- The lower the rating level is relative to the measured background noise level, the less likely it is that the specific sound source will have an adverse impact. Where the rating level does not exceed the background noise level, this is an indication of the specific sound source having a low impact.

BS4142 states that:

> *"Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night."*

3.0 Noise Survey

SRL has measured noise at the proposed site to determine the existing environmental noise affecting the proposed development.

The noise measurement positions are shown in Figure 2. Full survey details are given in Appendix A and the measured levels are given in Appendix B. Two unattended noise loggers were installed at the site to measure the noise environment at the site over several days, marked by the letters A and B. The logging measurements were supplemented with short-term attended measurements around the site, marked by the numbers 1-8.

Figure 2 Noise Measurement Positions

Measurements at all locations were dominated by road traffic noise from Clitheroe Road and A59. There was also occasional noise from buses and pedestrians passing, although this was infrequent and non the dominant noise source.

The average noise levels during the day and night time periods are summarised in Table 2.

Table 2 Summary of noise measurements

Measurement position	Daytime (07:00-23:00) $L_{Aeq,16h}$ dB	Night (23:00-07:00) $L_{Aeq,8h}$ dB
A	60	54
1	53	46
2	53	47
3	44	40
B	66	61
4	60	56
5	64	59
6	64	59
7	74	68
8	64	58

4.0 Assessment

4.1 Façade Assessment

Based on the results of the noise survey and the criteria set out above, a 3D computer model of the site has been created using CadnaA to determine the required sound insulation performance of the façades of the buildings to meet the criteria. An image of the 3D computer model is shown in Figure 3.

Figure 3 Screenshot of CadnaA model of site

I have assumed that the building fabric will be a brick/block construction. This will provide a high sound insulation performance. Therefore, the glazing and ventilators will be the weakest elements of the façade acoustically.

Note that the glazing should be specified based on the $R_w + C_{tr}$ values, rather than the glazing configuration. These are given as an example. The sound reduction performance of the glazing must be achieved by both the frame and the glass when combined and tested in a laboratory as a single unit.

No information is available about the internal room layouts in the residential units, and so a worst-case assessment has been carried out by assuming a bedroom at each window. We have assumed a room volume of approximately 51m^3 with a glazed area of 3.6m^2.

I have assumed there is one trickle vent per window in the residential units and the care home. I have assumed the hotel units will be mechanically ventilated with no trickle vents in the windows.

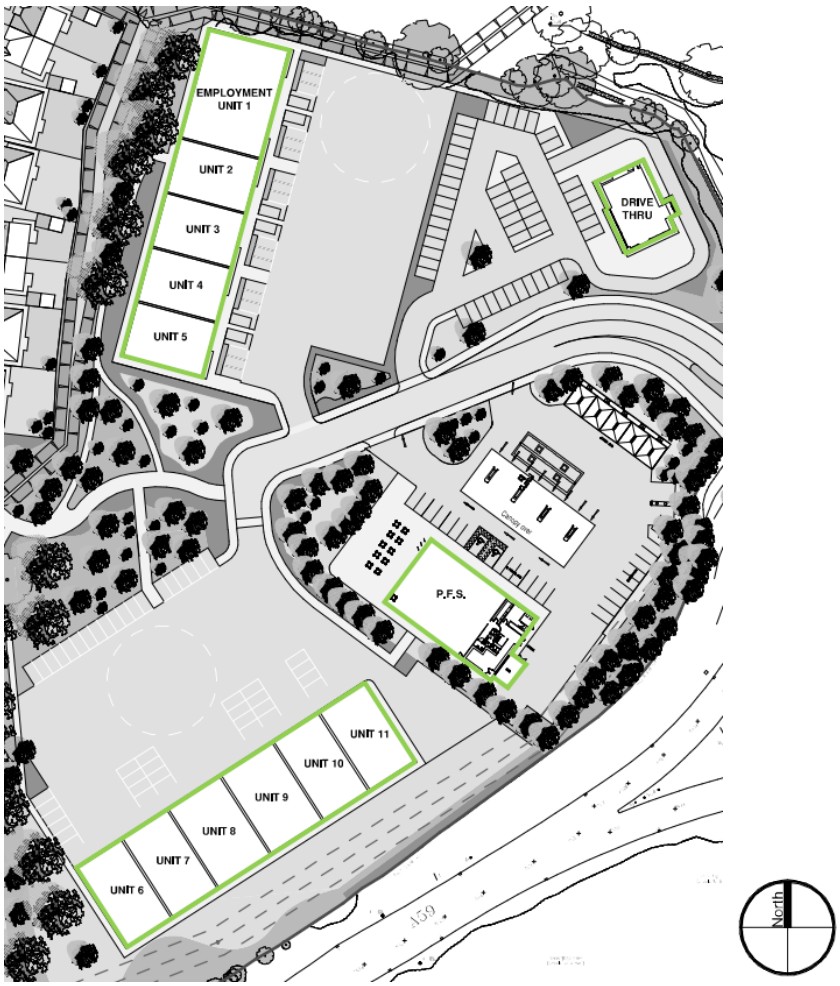
The façade references refer to Figure 4 and Figure 5.

Table 3 Required glazing sound insulation performance

Façade colour	Minimum sound insulation required		Example glazing configuration
	Glazing ($R_w + C_{tr}$)	Trickle vent ($D_{ne,w} + C_{tr}$)	
YELLOW	27 dB	40 dB (in the open position)	4/12/4
GREEN	27 dB	Non-acoustic	4/12/4

Figure 4 Façade reference mark up

Figure 5 Façade reference mark-up



The internal noise levels in Table 1 will be met with the above provision when windows are closed. When windows are opened for purge, ventilation internal noise levels will be higher.

These specifications assume one ventilator per sensitive room in the residential units and the care home. I have assumed the hotel will be mechanically ventilated and therefore have no vents. I have assumed there will be no vents in the other commercial units. If the number of vents proposed is different from this then their specifications will need to be reviewed.

4.2 External amenity areas

CadnaA has also been used to predict noise levels in external amenity areas (gardens). The predicted noise levels across the site are shown in Figure 6.

Figure 6 Daytime noise levels across proposed site (1.5m above the ground) - dB $L_{Aeq,16h}$

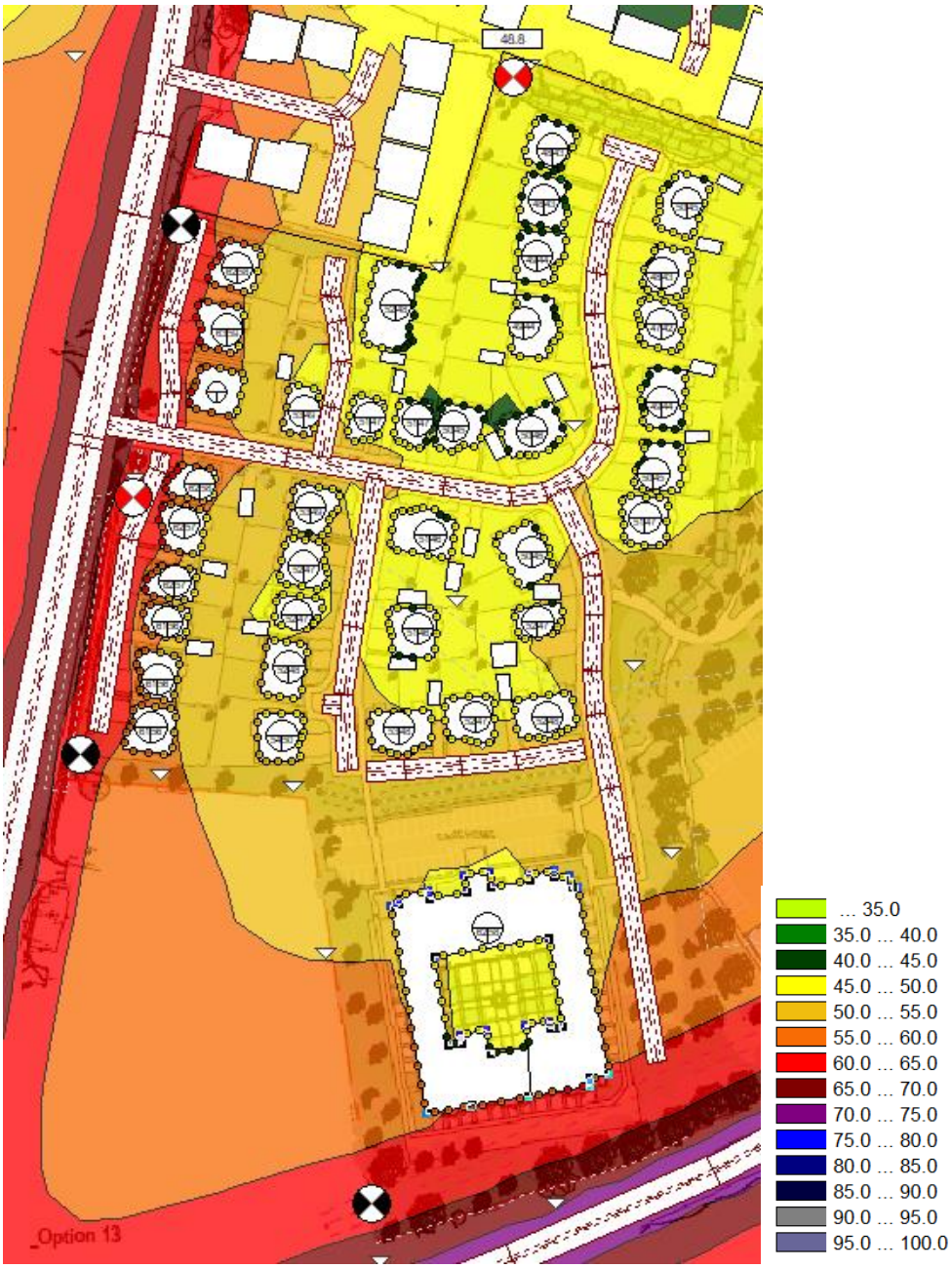
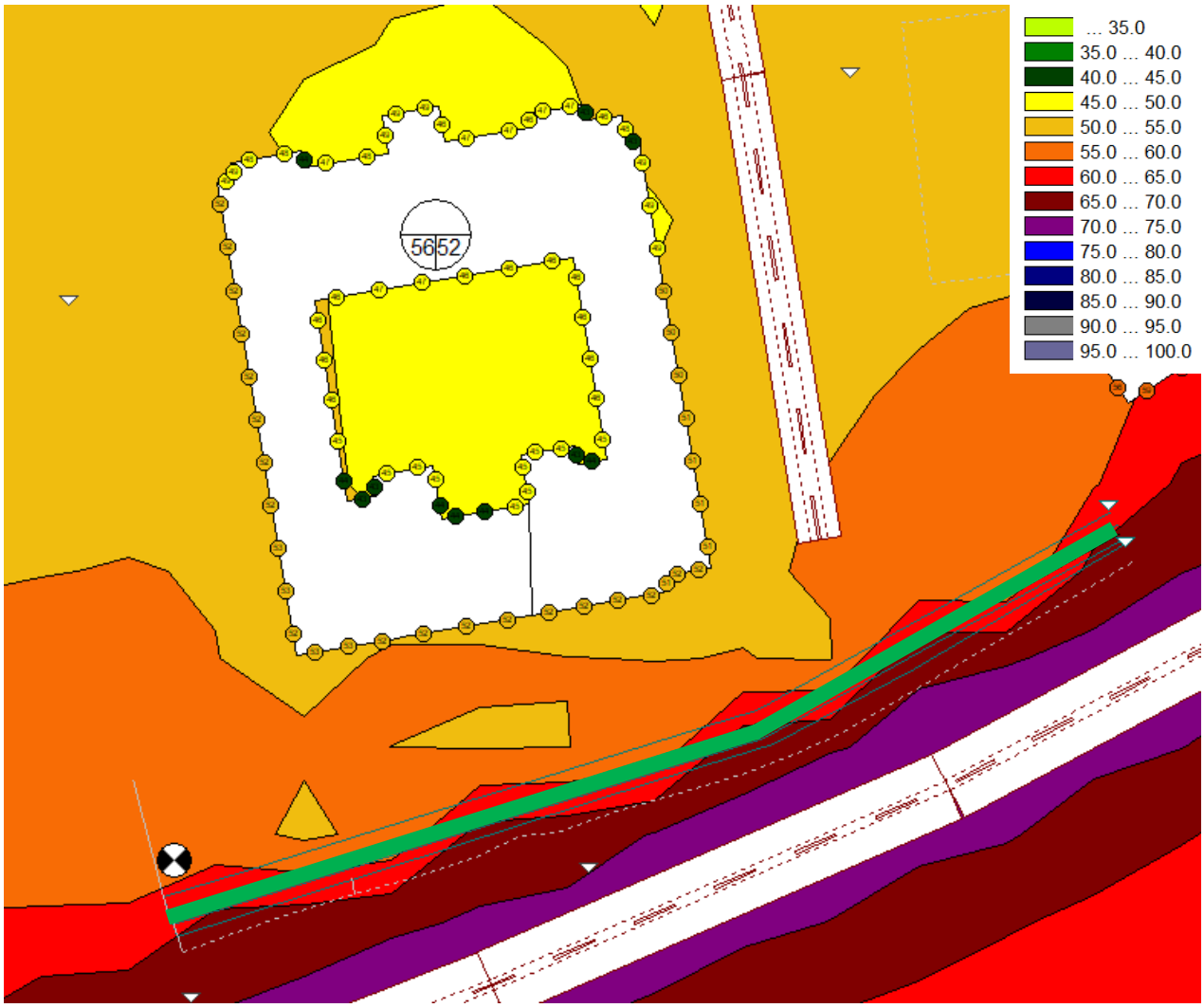


Figure 6 shows that all bungalow gardens comply with the guideline noise level of ≤ 55 dB $L_{Aeq,16h}$. The care home's external amenity areas closest to the A59 are predicted to have noise levels up to 62 dB $L_{Aeq,16h}$.

Noise from the A59 can be mitigated to reasonable levels with a noise barrier installed in the location indicated in Figure 7. The barrier starts in the south west corner of the proposed site and extends for 115m along the southern boundary.

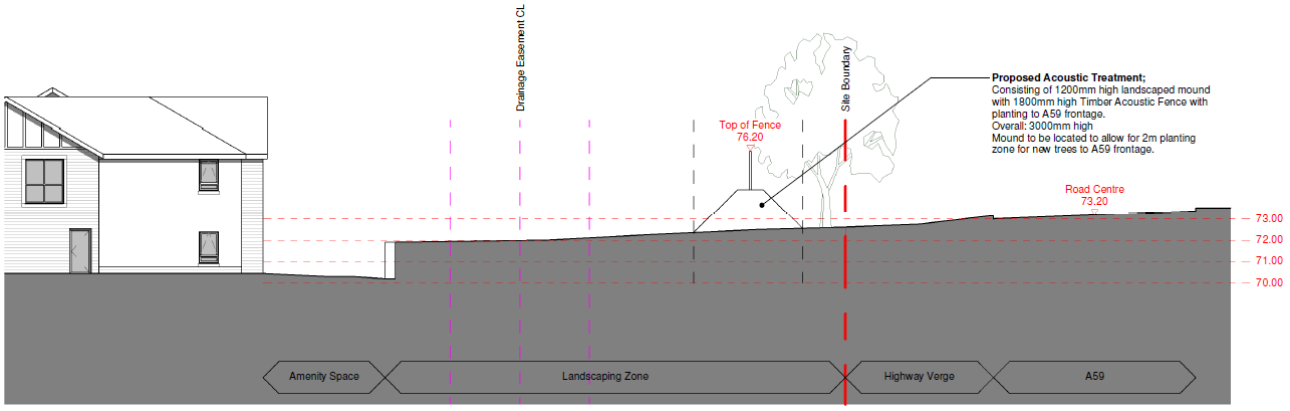
The noise barrier must have a minimum height of 3m, must be solid (no gaps) and have a minimum mass of 10 kg/m² (e.g. a close boarded timber fence).

Figure 7 Noise barrier location shown in green (noise levels at 1.5m height)



The proposed barrier will consist of a 1.2m high landscaped mound / bunding with a 1.8m high solid acoustic fence (min. 10 kg/m^2) to the top as shown in Figure 8.

Figure 8 – Proposed noise barrier



This form of noise mitigation is predicted to reduce noise levels to ≤ 55 dB $L_{Aeq,16h}$ within the majority of the care home's external amenity spaces. The noise levels in the some of the external amenity areas closest to the A59 are predicted to be 56 dB $L_{Aeq,16h}$ with the noise barrier, however it is unlikely that a difference of 1 dB would be noticeable in practice. Furthermore, BS 8233:2014 states the following in relation to its suggested design criteria for external noise: *"However it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable"*.

I therefore consider that a noise barrier which reduces noise levels within the care home's external areas from 62 dB $L_{Aeq,16h}$ to ≤56 dB $L_{Aeq,16h}$ in the areas closest to the A59 (and to ≤55 dB $L_{Aeq,16h}$ in all other areas) will be sufficient to provide an appropriate level of amenity for the care home's residents, staff and visitors.

4.3 Plant noise

Based on the results of the survey, the cumulative noise level resulting from the operation of all new plant at 1m from the worst affected windows of the nearest noise sensitive receivers have been set.

The day time plant noise limit at both positions has been determined based on rating noise level of 5 dB below the measured background noise level. Details for the plant are not known at this point, however, a +5dB penalty for attention catching features for tonality (+2dB) and intermittency (+3dB) as this is common for most building services plant. Therefore, the specific nose level will be limited to L_{Aeq} 10dB below the background noise level. These penalties will need to be reviewed once the plant selection has been made.

Night time background noise levels at both positions are too low to practically achieve a rating noise level 5 dB below the background noise level. An absolute specific noise level limit equal to the background noise level has been set instead.

The plant noise criterion for the site should not exceed the levels given in Table 4.

Table 4 Maximum allowable plant noise limits

Time of day	Maximum allowable level at 1m from noise sensitive premises (dB)	
	Position 1	Position 2
Daytime (07:00-23:00)	$L_{Ar,T}$ 43	$L_{Ar,T}$ 34
Night (23:00-07:00) Absolute limit	$L_{Aeq,T}$ 28	$L_{Aeq,T}$ 29

Appendix A - Survey Details

A1. Location of Survey

Land Adjacent to Clitheroe Road, Whalley

A2. Date & Time of Survey

Attended measurements – 13:22 – 17:25 on 29 March 2019

Position A – 12:53 on 31 March 2019 until 09:22 2 February 2019

Position B – 14:20 on 29 March 2019 until 09:06 2 February 2019

A3. Personnel Present During Survey

Jago Edwards (SRL)

A4. Weather Conditions during Survey

Dry, sunny. Wind speed <5m/s

A5. Instrumentation

Position A

Description	Location	SRL No.	Make	Model	Serial
Sound Level Meter (AE1, Orange)	Manchester	516	B&K	2250	2506736
All weather kit	Manchester	518	-	B&K	UA 1404
Pre-amp	Manchester	516	B&K	ZC0032	14463
Microphone	Manchester	516	B&K	4189	2643199
Calibrator	Manchester	517	B&K	4231	2528393

Position B

Description	Location	SRL No.	Serial	Make	Model
Sound and Vibration Analyser	Manchester	823	28411	Svantek	958
Pre-amp	Manchester	796	30331	Svantek	SV17
Microphone	Manchester	796	9984	Microtech Gefell	MK250
Calibrator	Manchester	872	43085	Svantek	SV33

Positions 1-8

Description	Location	SRL No.	Serial	Make	Model
Sound Level Meter (AE2, Purple)	Manchester	853	3007896	B&K	2250
Pre-amp	Manchester	853	22195	B&K	ZC0032
Microphone	Manchester	853	2978188	B&K	4189
Calibrator	Manchester	698	2482655	B&K	4231

A6. Calibration Procedure

Before and after the survey the measurement apparatus was check calibrated to an accuracy of ±0.3 dB using the type 4231 Sound Level Calibrator. The Calibrator produces a sound pressure level of 93.8 dB re 2 x 10^{-5} Pa at a frequency of 1 kHz.

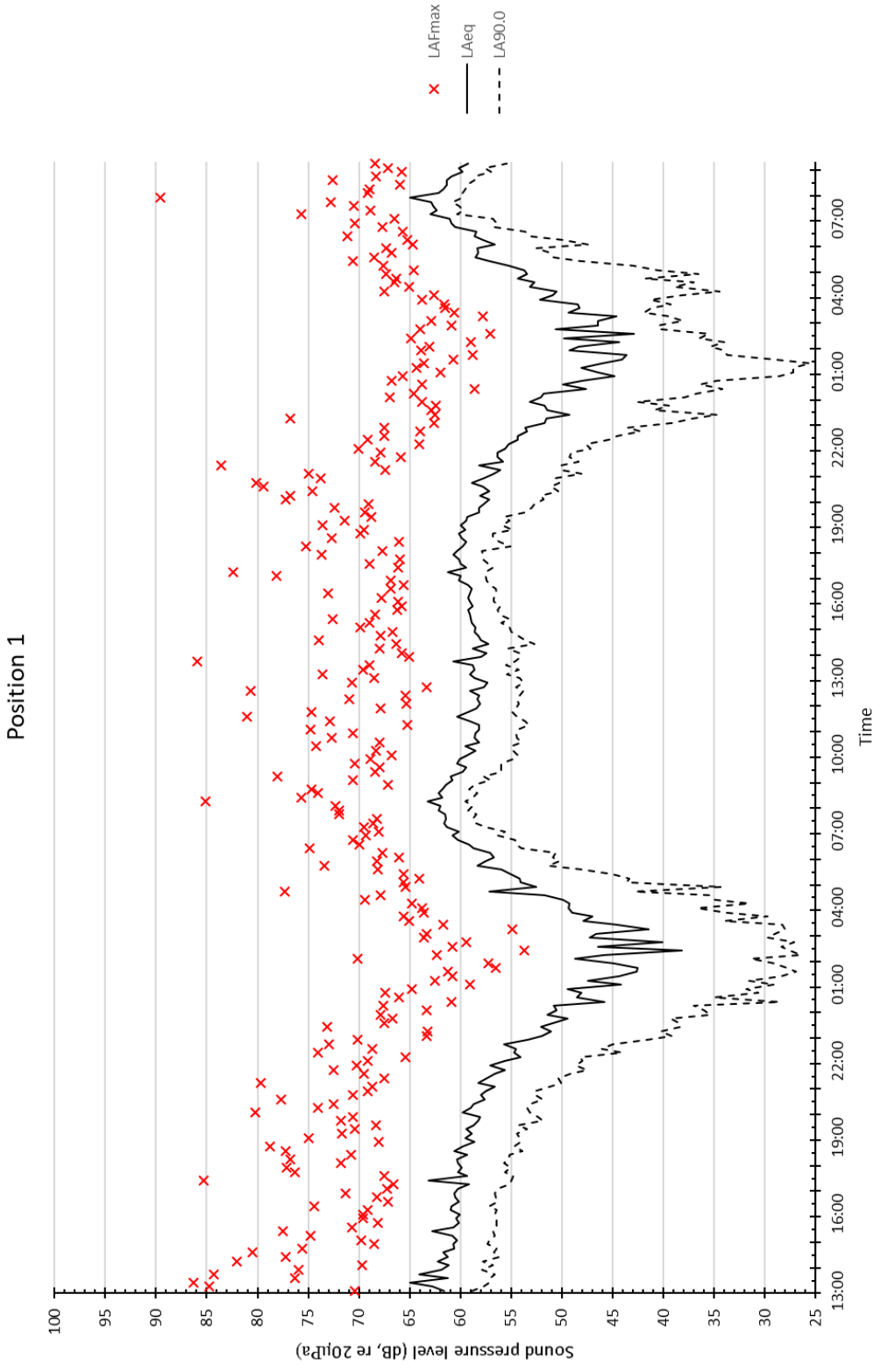
A7. Survey Procedure

Ambient noise levels were monitored at various positions around the site as shown on Figure 1. The measured levels are given in Appendix B, and explanations of the parameters used are listed in Appendix C.

Appendix B - Measured Ambient Noise Levels

L_{eq} Octave Band Levels

Pos	Time	63	125	250	500	1k	2k	4k	dB(A)
1	13:22	64.8	59.6	51.5	42.8	49.2	44.2	32.1	52.3
2	13:40	64.0	56.6	48.4	42.6	47.6	41.6	30.6	50.4
3	14:00	62.5	55.9	46.0	41.9	45.0	39.7	29.5	48.4
4	14:20	66.7	63.9	60.9	61.2	61.6	57.0	48.8	64.9
5	14:30	65.5	59.4	57.2	57.4	61.9	58.2	47.6	64.6
6	14:40	69.8	64.5	58.4	58.9	61.3	55.3	47.3	63.8
7	14:50	72.1	69.2	64.3	66.0	70.3	64.6	55.6	72.5
8	15:00	70.7	63.8	57.3	52.9	57.3	52.6	44.5	60.2
1	15:10	64.7	59.2	50.5	41.7	45.9	41.0	30.4	50.0
2	15:20	62.2	57.6	49.7	41.9	48.0	43.9	33.4	51.2
3	15:30	60.2	54.3	44.4	41.6	46.9	40.2	30.5	49.1
4	15:40	65.5	59.7	57.2	58.4	62.1	58.2	48.8	64.8
5	15:50	68.4	61.5	56.9	58.5	62.9	58.8	48.2	65.4
6	16:00	68.3	65.7	58.7	59.0	63.1	56.6	46.4	65.1
7	16:10	73.4	69.4	64.4	67.0	71.9	66.5	56.8	74.0
8	16:20	70.7	66.2	59.5	55.4	60.0	55.3	46.4	62.8
1	16:30	66.5	61.2	52.0	43.0	49.6	45.6	37.7	53.3
2	16:36	63.1	56.9	47.8	42.2	48.8	43.4	31.8	51.3
3	16:43	63.3	57.5	52.2	45.6	48.7	45.2	37.4	52.6
4	16:51	63.9	58.8	58.5	56.2	60.6	56.5	47.9	63.3
5	17:00	65.0	58.1	55.9	57.4	63.0	59.2	48.5	65.5
6	17:10	68.6	63.5	57.7	58.9	63.6	58.1	47.6	65.7
7	17:20	71.8	70.3	65.9	65.8	71.3	66.3	57.0	73.5


Position 1
LAFmax
LAeq
LA90.0
Sound pressure level (dB, re 20μPa)
Time
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60
55
50
45
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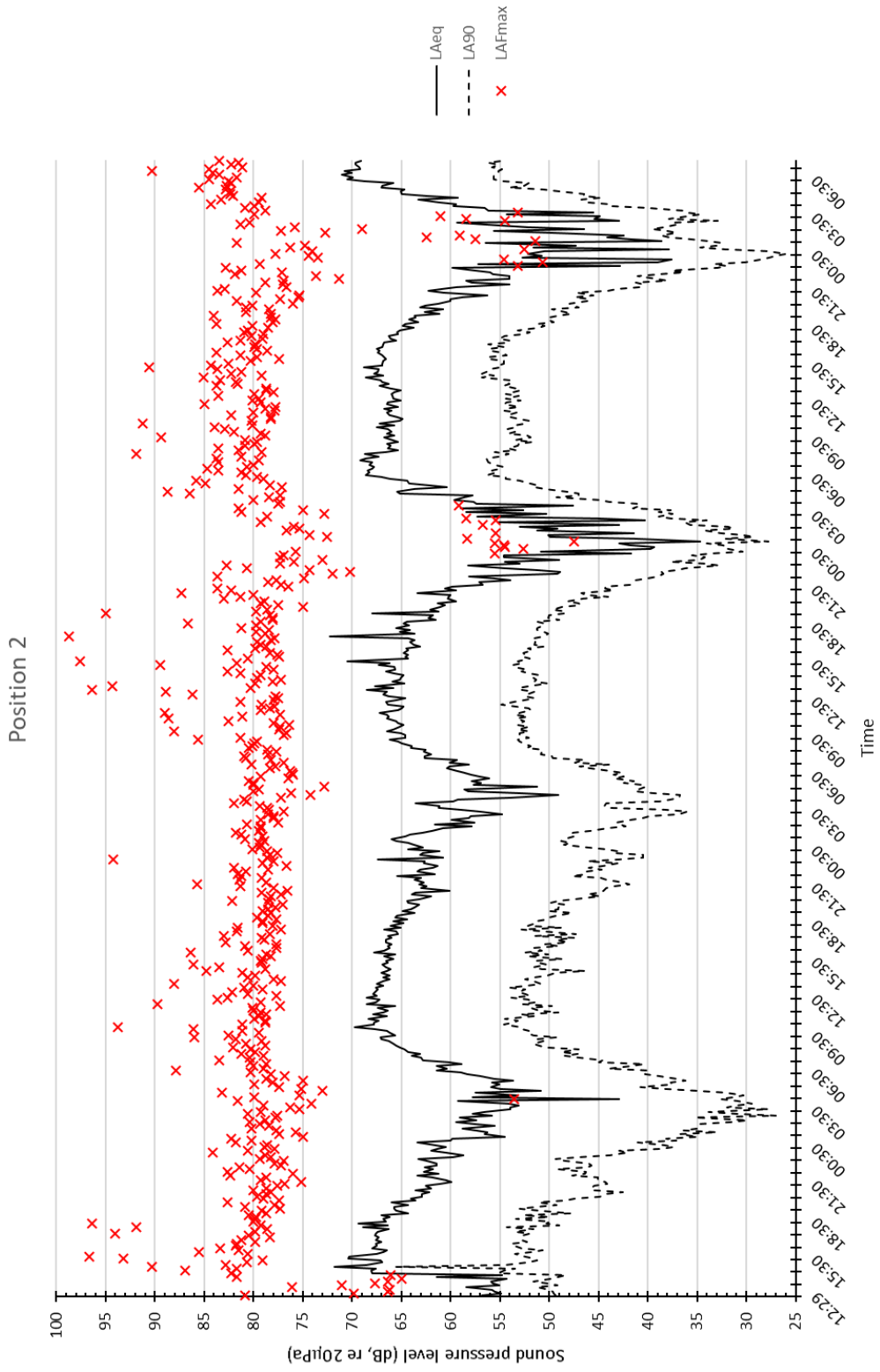
LAeq
LA90
LAFmax
Position 2
Sound pressure level (dB, re 20µPa)
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Appendix C - Noise Measurement Parameter Definitions

L_{A90} - The "A" weighted sound pressure level that is exceeded for 90% of the measurement period. It is commonly used as the "Background Noise Level".

L_{A10} - The "A" weighted sound pressure level that is exceeded for 10% of the measurement period. This is often used for assessing traffic noise.

L_{Aeq} - The "A" weighted equivalent continuous sound pressure level. A representation of a continuous sound level containing the same amount of sound energy as the measured varying noise, over the measurement period. It can be considered as the "average" noise level.

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