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Consultants in Acoustics, Noise & Vibration

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HPH 3 Hyde Park Hayes

Acoustic report for proposed change of use from office (B1) to residential (C3)

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Version	Date	Comments	Author	Reviewer
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Summary

Sandy Brown has been appointed to provide acoustic consultancy services in relation to the change of use of HPH 3, Hyde Park Hayes, Millington Road, Hayes, from an office to residential use.

The application is submitted pursuant to Class O of the Town and Country Planning (General Permitted Development) (Amendment) (England) Order 2016 (GPDO 2016), for the conversion of the existing building from office (Use Class B1) to residential (Use Class C3). As per the legislation outlined under Class O, there is a requirement to assess the impacts of noise from commercial premises and transport sources on the intended occupiers of the development – this report provides such an assessment.

A previous planning application has been made. The scheme has been revised based on the comments received although there were no issues raised on acoustics.

An environmental noise survey has been carried out, the purpose of which was to establish the existing ambient and background sound levels in the vicinity of the site and nearby noise sensitive premises. The minimum measured background sound levels were $L_{A90,5min}$ 44 dB in the day (07:00-23:00) and $L_{A90,5min}$ 39 dB at night (23:00-07:00)

Plant noise limits have been set for future development. Allowing for a facade correction, the operation of all new plant at 1m from the nearest facade should not exceed L_{Aeq} 37 dB in the daytime and L_{Aeq} 32 dB at night.These limits are cumulative, and apply with all plant operating under normal conditions. If plant items contain tonal or attention catching features, the limits may be more stringent than those set out above.

An indicative facade sound insulation assessment has been carried out on the worst affected facade of the building. To meet the requirements set out in BS 8233:1999, a glazing performance of R_w+C_{tr} 35 dB is required. This acoustic performance is achievable with double glazing. If enhancements to the existing glazing are required, this could be done by installation of secondary glazing.

The acoustic requirements for the glazing will be less on the facades facing away from the road and railway.

Ventilation by way of high performance acoustically attenuated passive ventilators, or mechanical means, is required to achieve the internal noise criteria

Overall, there will be negligible impact of noise from commercial/transport sources on the intended occupiers of the development.

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1 Introduction

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The application is submitted pursuant to Class O of the Town and Country Planning (General Permitted Development) (Amendment) (England) Order 2016 (GPDO 2016), for the conversion of the existing building from office (Use Class B1) to residential (Use Class C3). As per the legislation outlined under Class O, there is a requirement to assess the impacts of noise from commercial premises and transport sources on the intended occupiers of the development – this report provides such an assessment.

A previous planning application has been made. The scheme has been revised based on the comments received although there were no issues raised on acoustics.

An environmental noise survey has been carried out, the purpose of which was to establish the existing ambient and background sound levels in the vicinity of the site and nearby noise sensitive premises.

The ambient sound levels measured during the survey are used to determine the facade sound insulation requirements.

The background sound levels measured during the survey are used as the basis for setting limits for noise emission from proposed building services plant. These limits are set in accordance with the requirements of the London Borough of Hillingdon.

This report presents the noise survey methods, the results of the survey, a discussion of acceptable limits for noise emission from building services plant and minimum sound insulation requirements for the building envelope.

2 Site description

2.1 The site and its surroundings

The site location in relation to its surroundings is shown in Figure 1. Hyde Park Hayes, Building 3 (HPH 3) is highlighted in red. HPH 3 sits in the Hyde Park Hayes Business Park with four other office buildings. Dawley Road is located to the west side of the site. North Hyde Road (the A437) and the nearby railway link to Harlington and Hayes station is positioned to the north of the site.

Figure 1 Site map (courtesy of Google Earth Pro)

2.2 Adjacent premises

The buildings in the immediate vicinity of the site are predominantly commercial as part of Hyde Park Hayes Business Park. The nearest residential properties to the site are approximately 90 m away on Waltham Avenue and have been indicated in blue in Figure 1.

3 Method

Details of the equipment used, the noise indices, and the weather conditions during the survey are provided in Appendix A. Further information on the specific survey method is provided in this section.

3.1 Unattended measurements

Unattended noise monitoring was undertaken at the site over 7 days to determine the existing background sound levels in the vicinity of nearby noise sensitive premises.

The unattended measurements were performed over 5-minute periods between 14:00 on 15 September 2016 and 15:00 on 21 September 2016. The equipment was installed and collected by Zac Fox.

The measurement positions used during the survey are indicated in Figure 1, denoted by the letter 'L' (Position A and Position B). Photographs showing the measurement location are provided in Figure 2 and Figure 3. These locations were chosen to be reasonably representative of the noise levels experienced by the nearest noise sensitive premises and the general ambient noise levels in the area.

Figure 2 Logging position A

Figure 3 Logging position B

3.2 Attended measurements

Attended sample measurements were performed by Zac Fox at 3 locations around the building. These are indicated in Figure 1 as positions 1 to 3. The attended measurements were carried out on 15 September 2016, over 5-minute periods, with the purpose of determining the existing noise levels from road traffic, pedestrians and other significant noise sources in the area.

The locations of the measurements are indicated in Figure 1. In each case the microphone was held approximately 1.5 m above the ground level and at approximately 1 m from the building, these are considered facade measurements and therefore 3 dB higher than measured in the free field.

3.3 Validation survey

The noise survey described herein was conducted in 2016. While it is not expected the normal noise climate has changed significantly since then (barring possible variations in noise climate due to Covid-19), a new survey is to be conducted to validate the results of the 2016 survey and the findings of this report.

4 Measurement Results

4.1 Observations

The dominant sources observed at the site during the survey consisted of road traffic and rail noise.

Less significant sources included noise generated by commercial plant from neighbouring properties.

4.2 Unattended measurement results

4.2.1 Results from position A

The results of the unattended noise measurements at position A are summarised in Table 1 and Table 2. A graph showing the results of the unattended measurements is provided in Appendix B.

The day and night-time ambient noise levels measured during the unattended survey are presented in Table 1.

Table 1 Ambient noise levels measured during the survey, position A

Date	Daytime (07:00 – 23:00) $L_{Aeq,16h}$ (dB)	Night (23:00 – 07:00) $L_{Aeq,8h}$ (dB)
Thursday 15 September 2016	-	61
Friday 16 September 2016	66*	58
Saturday 17 September 2016	63	56
Sunday 18 September 2016	61	59
Monday 19 September 2016	66*	60
Tuesday 20 September 2016	67*	61
Average	62	59

* Measurement affected by plant noise near measurement location and not included in the average

The minimum background sound levels measured during the unattended survey are given in Table 2.

Table 2 Minimum background sound levels measured during the survey, position A

Date	Daytime (07:00 – 23:00) $L_{A90,5min}$ (dB)	Night (23:00 – 07:00) $L_{A90,5min}$ (dB)
Thursday 15 September 2016	53[1]	47
Friday 16 September 2016	52	45
Saturday 17 September 2016	50	46
Sunday 18 September 2016	48	43
Monday 19 September 2016	50	45
Tuesday 20 September 2016	51	46

[1] Measurement not made over full period due to monitoring start and end time

The lowest background sound levels measured during the survey were $L_{A90,5min}$ 48 dB during the daytime and $L_{A90,5min}$ 43 dB at night.

4.2.2 Results from position B

The results of the unattended noise measurements at position B are summarised in Table 3 and Table 4. A graph showing the results of the unattended measurements is provided in Appendix B.

The day and night-time ambient noise levels measured during the unattended survey are presented in Table 3. These are considered free field measurements.

Table 3 Ambient noise levels measured during the survey, position B

Date	Daytime (07:00 – 23:00)	Night (23:00 – 07:00)
	$L_{Aeq,16h}$ (dB)	$L_{Aeq,8h}$ (dB)
Thursday 15 September 2016	-	57
Friday 16 September 2016	62*	52
Saturday 17 September 2016	57	51
Sunday 18 September 2016	55	53
Monday 19 September 2016	61*	54
Tuesday 20 September 2016	61*	54
Average	56	54

* Measurement affected by plant noise near measurement location and not included in the average

The minimum background sound levels measured during the unattended survey are given in Table 4.

Table 4 Minimum background sound levels measured during the survey, position B

Date	Daytime (07:00 – 23:00)	Night (23:00 – 07:00)
	$L_{A90,5min}$ (dB)	$L_{A90,5min}$ (dB)
Thursday 15 September 2016	50[1]	43
Friday 16 September 2016	50	43
Saturday 17 September 2016	46	42
Sunday 18 September 2016	44	39
Monday 19 September 2016	46	41
Tuesday 20 September 2016	47	42
Wednesday 21 September 2016	59[1]	-

[1] Measurement not made over full period due to monitoring start and end time

The lowest background sound levels measured during the survey were $L_{A90,5min}$ 44 dB during the daytime and $L_{A90,5min}$ 39 dB at night.

4.3 Attended measurement results

The sound pressure levels recorded during the attended measurements are summarised in Table 5. The dominant noise sources noted during the measurements are also described. All the attended measurements were performed over 5-minute periods. These are facade measurements which would be 3 dB higher than measured in the free field.

Table 5 Sound pressure levels from attended measurements

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,5min}$	$L_{AFmax,5min}$	$L_{A90,5min}$	
1	15:10	52	62	45	Road noise and construction
2	15:20	60	75	52	Road noise, construction, aircraft, plant
3	15:30	62	88	58	Road noise, aircraft and rail
1	15:40	55	76	48	Road and construction
2	15:50	61	84	52	Road, plant and rail
3	16:00	60	74	52	Road and construction

5 Assessment criteria

5.1 Town and Country Planning Order (2016)

The "Town and Country Planning (General Permitted Development) (England) (Amendment) Order 2016" allows for the change of commercial buildings (B1) to residential use (C3) as permitted developments. The Order describes this change of use as Class O permitted developments.

The Order states the following with regards to Class O developments:

> *"O.2-(1) Development under Class O is permitted subject to the condition that before beginning development, the developer must apply to the local planning authority for a determination as to whether the prior approval of the authority will be required as to –*
>
> *a) transport and highways impact on the development,*
> *b) contamination risks on the site,*
> *c) flooding risks on the site, and*
> *d) impact of noise from commercial premises on the intended occupiers of the development…*
>
> *O.3 For the purposes of Class O, "commercial premises" means any premises normally used for the purpose of any commercial or industrial undertaking which existed on the date of application under paragraph O.2(1), and includes any premises licensed under the Licensing Act 2003(a) or any other place of public entertainment."*

On the above basis, the change of use from commercial to residential use is permitted if commercial noise and road traffic impacts on the perspective occupiers of the building can be minimised and demonstrated to the Local Authority.

5.2 NPPF and NPSE

The National Planning Policy Framework (NPPF) sets out the government planning requirements and supersedes previous guidance notes such as PPG24. No specific noise criteria are set out in the NPPF, or in the Noise Policy Statement for England (NPSE) to which it refers.

The NPPF states:

'Planning policies and decisions should aim to:

- *Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *Mitigate and reduce to a minimum other adverse impact on health and quality of life arising from noise from new development, including through the use of conditions;*
- *Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.'*

The NPSE states that its aims are as follows:

'Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life; and*
- *Where possible, contribute to the improvement of health and quality of life.'*

As such, although neither of these documents sets out specific acoustic criteria for new residential development, the requirement to control both the effect of existing noise on the new development and the effect of noise from the development on the surroundings needs to be considered.

5.3 Plant noise limits – noise egress

The London Borough of Hillingdon (LBH) outlines its relevant noise criteria in the document *Noise – Supplementary Planning Document* (SPD) April 2006. This document outlines plant noise should be assessed in line with BS 4142:1997 *Method for rating industrial noise affecting mixed residential and industrial areas*. We note that this standard has been superseded by BS 4142:2014 although we have used the BS 4142:1997 version, as stipulated by LBH, for this assessment.

Standard guidance for noise emission from proposed new items of building services plant is given in BS 4142:1997.

BS 4142 provides a method for assessing noise from items such as building services plant against the existing background noise levels at the nearest noise sensitive receptors to assess the risk of complaints occurring.

BS 4142 suggests that if the noise level is 10 dB or more higher than the existing background noise level, complaints are likely. If the level is 5 dB above the existing background noise level, it is considered of marginal significance. If the level is 10 dB or more below the existing background noise level, this is considered a positive indication that complaints are unlikely.

If the noise contains 'attention catching features' such as tones, bangs etc, a penalty is applied which effectively reduces these limits by a further 5 dB.

5.4 Internal noise level – noise ingress

LBH sets out in its SDP that acceptable internal noise levels in residential dwellings, based on BS 8233:1999 *Guidance on sound insulation and noise reduction for building*s. We note that this standard has been superseded by BS 8233:2014 although we have used the BS 8233:1999 version, as stipulated by LBH, for this assessment.

Table 6 Internal residential noise criteria

Internal Space	Indoor ambient noise level	
	(07:00-23:00)	(23:00-07:00)
Indoor living areas	$L_{Aeq,T}$ 35 dB	-
Bedrooms	-	$L_{Aeq,T}$ 30 dB $L_{Amax,fast}$ 45 dB

6 Plant noise limits – noise egress

6.1 Limits

Based on the criteria in Section 5.3 and the measurement results, the cumulative noise level resulting from the operation of all new plant at 1 m from the nearest noise sensitive facade should not exceed:

- L_{Aeq} 37 dB in the daytime and
- L_{Aeq} 32 dB at night.

These values are 10 dB below the lowest background noise and allowing for a 3 dB correction for the influence of a facade.

If the proposed plant noise contains attention catching features (such as tonal elements, whines, whistles, bangs etc), the plant should be designed to achieve a limit 5 dB below those set out above.

6.2 Assessment

At this stage, no information is available in relation to the proposed installation of building services plant, and this will need to be assessed in detail as the design progresses. However, all plant items will be designed to achieve the plant noise limits set out above, including any corrections for attention catching features.

7 Facade sound insulation – noise ingress

This section discusses internal noise level criteria and assesses the required facade sound insulation performance. In principle, the required facade specification depends on two factors: the external noise levels at the site and the internal noise criteria.

The following assessment is based on achieving the internal noise levels recommended in BS 8233, which are set out in Section 5.4.

7.1 Facade sound insulation

To achieve the internal noise criteria given in Section 5.4 for bedrooms and other living areas, the minimum facade sound insulation requirements have been determined, based on the external levels measured during the noise survey.

The minimum sound insulation performances for the glazing of the north facade should be R_w+C_{tr} 35 dB. This acoustic performance is achievable with suitable double glazing. If enhancements to the existing glazing are required, this could be done by installation of secondary glazing.

Ventilation by way of high performance acoustically attenuated passive ventilators, or mechanical means, is required to achieve the internal noise criteria given in Section 5.4.

The acoustic requirements for the glazing will be less on the facades facing away from the road and railway.

7.2 Guidance on ventilation strategy

For information and context, Table 7 sets out some examples of glazing build ups and ventilation strategies required to achieve a range of sound insulation performance requirements.

Table 7 Example glazing configurations and ventilation strategies

Sound insulation R_w+C_{tr} (dB)	Example glazing configuration	Ventilation Strategy
≤10	6 mm/12 mm/6 mm	Open windows
10-15	6 mm/12 mm/6 mm	Limited open area opening windows
15-29	6 mm/12 mm/6 mm	Attenuated passive ventilation (eg, trickle vents)
30-32	6.4 mm/12 mm/6 mm	Attenuated passive ventilation
33-35	6.4 mm/12 mm/10 mm	High performance acoustically attenuated passive ventilation
36-38	12.8 mm/12 mm/10 mm	Mechanical ventilation (eg, whole house ventilation)
39-41	12.8 mm/20 mm/10 mm	Mechanical ventilation (eg, whole house ventilation)
42-44	This represents a very high sound insulation performance. The highest performance typically achievable using double glazing is around R_w+C_{tr} 42 dB (16.8 mm/20 mm/16.8 mm). For higher performances, a substantial facade construction, limited glazing area, and mechanical ventilation is likely to be required.	

The attenuation of sound provided by an open window is typically in the region of 10 to 15 dB when located in a solid facade, depending on the open area. As such, where the required facade sound insulation performance is less than R_w+C_{tr} 10 dB, it is likely that opening windows can be used whilst achieving the necessary internal noise elves.

In areas where the necessary facade sound insulation is between R_w+C_{tr} 10 and 15 dB, partially open windows may be used for ventilation purposes depending on the open area.

The performance require by each element will depend on the construction of solid elements, the glazing specification, the relative areas of solid and glazed elements, and the ventilation strategy (including the acoustic performance of the trickle ventilators and the number of ventilators required to serve individual rooms, if applicable).

8 Conclusion

Under the Town and Country Planning (General Permitted Development) (Amendment) (England) Order 2016, there is a requirement to consider the impacts of noise from commercial premises on the intended occupiers of the development.

Our survey around the site has indicated that the noise from Dawley road and the train line to the north dominate the soundscape, less so than noise from the surrounding commercial premises.

The minimum measured background sound levels were $L_{A90,5min}$ 44 dB in the day (07:00-23:00) and $L_{A90,5min}$ 39 dB at night (23:00-07:00)

Plant noise limits have been set for future development. Allowing for a facade correction, the operation of all new plant at 1m from the nearest facade should not exceed L_{Aeq} 37 dB in the daytime and L_{Aeq} 32 dB at night.These limits are cumulative, and apply with all plant operating under normal conditions. If plant items contain tonal or attention catching features, the limits may be more stringent than those set out above.

An indicative facade sound insulation assessment has been carried out on the worst affected facade of the building. To meet the requirements set out in BS 8233:1999, a glazing performance of R_w+C_{tr} 35 dB is required. This acoustic performance is achievable with double glazing. If enhancements to the existing glazing performance are required, this could be done by installation of secondary glazing.

The acoustic requirements for the glazing will be less on the facades facing away from the road and railway.

Ventilation by way of high performance acoustically attenuated passive ventilators, or mechanical means, is required to achieve the internal noise criteria.

Overall, there will be negligible impact of noise form commercial/transport sources on the intended occupiers of the development.

Appendix A

Survey details

Equipment

A Rion NL 52 sound level meter was used to undertake the unattended measurements. The attended measurements were carried out using two Rion NL 32 sound level meters. The calibration details for the equipment used during the survey are provided in Table A1.

All equipment used for had a valid calibration certificate at the time of the survey.

Table A1 Equipment calibration data

Equipment description	Type/serial number	Manufacturer	Calibration expiry	Calibration certification number
Sound level meter	NL-52/00242702	Rion	4 Jun 17	1506331
Microphone	UC-59/06185	Rion	4 Jun 17	1506331
Pre-amp	NH-25/32730	Rion	4 Jun 17	1506331
Calibrator	CAL200/4499	Larson Davis	4 Jun 17	1506327
Sound level meter	NL-32/00623769	Rion	05 Oct 17	1510538
Microphone	UC-53A/319244	Rion	05 Oct 17	1510538
Pre-amp	NH-21/36677	Rion	05 Oct 17	1510538
Calibrator	NC-74/34336009	Rion	02 Oct 17	1510531
Sound level meter	NL-32/00623761	Rion	06 Oct 17	1510540
Microphone	UC-53A/319233	Rion	06 Oct 17	1510540
Pre-amp	NH-21/36669	Rion	06 Oct 17	1510540
Calibrator	NC-74/34536129	Rion	02 Oct 17	1510533

Calibration of the sound level meters used for the tests is traceable to national standards. The calibration certificates for the sound level meters used in this survey are available upon request.

The sound level meters and microphones were calibrated at the beginning and end of the measurements using their respective sound level calibrators. No significant deviation in calibration occurred.

Noise indices

The equipment was set to record a continuous series of broadband sound pressure levels. Noise indices recorded included the following:

- $L_{Aeq,T}$ The A-weighted equivalent continuous sound pressure level over a period of time, T.
- $L_{AFmax,T}$ The A-weighted maximum sound pressure level that occurred during a given period with a fast time weighting.
- $L_{A90,T}$ The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background sound level.

The L_{A90} is considered most representative of the background sound level for the purposes of complying with any Hillingdon Council's requirements.

Sound pressure level measurements are normally taken with an A-weighting (denoted by a subscript 'A', eg L_{A90}) to approximate the frequency response of the human ear.

A more detailed explanation of these quantities can be found in BS7445: Part 1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures.*

Weather conditions

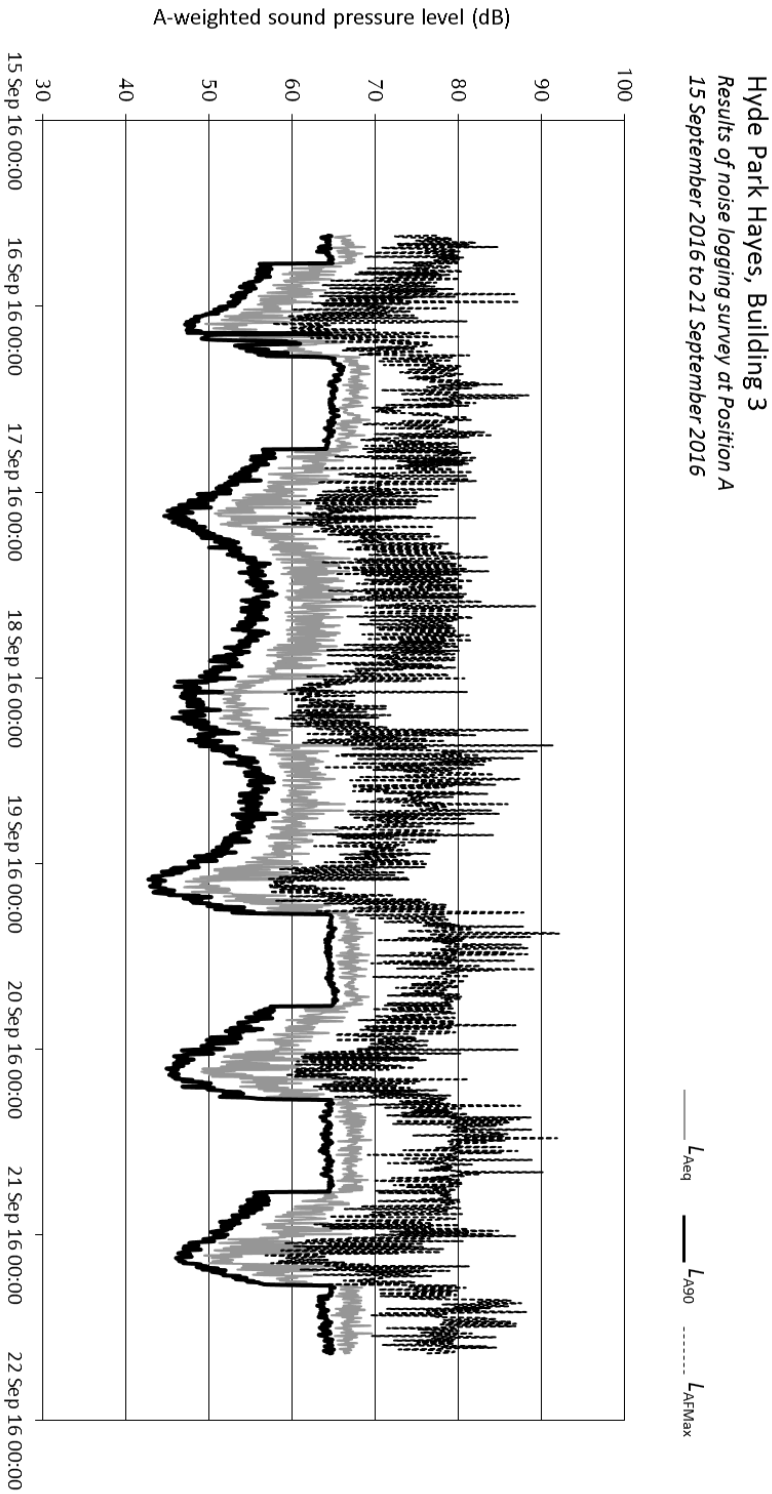
During the attended measurements carried out on 15 September 2016, the weather was generally clear and dry and no rain occurred.

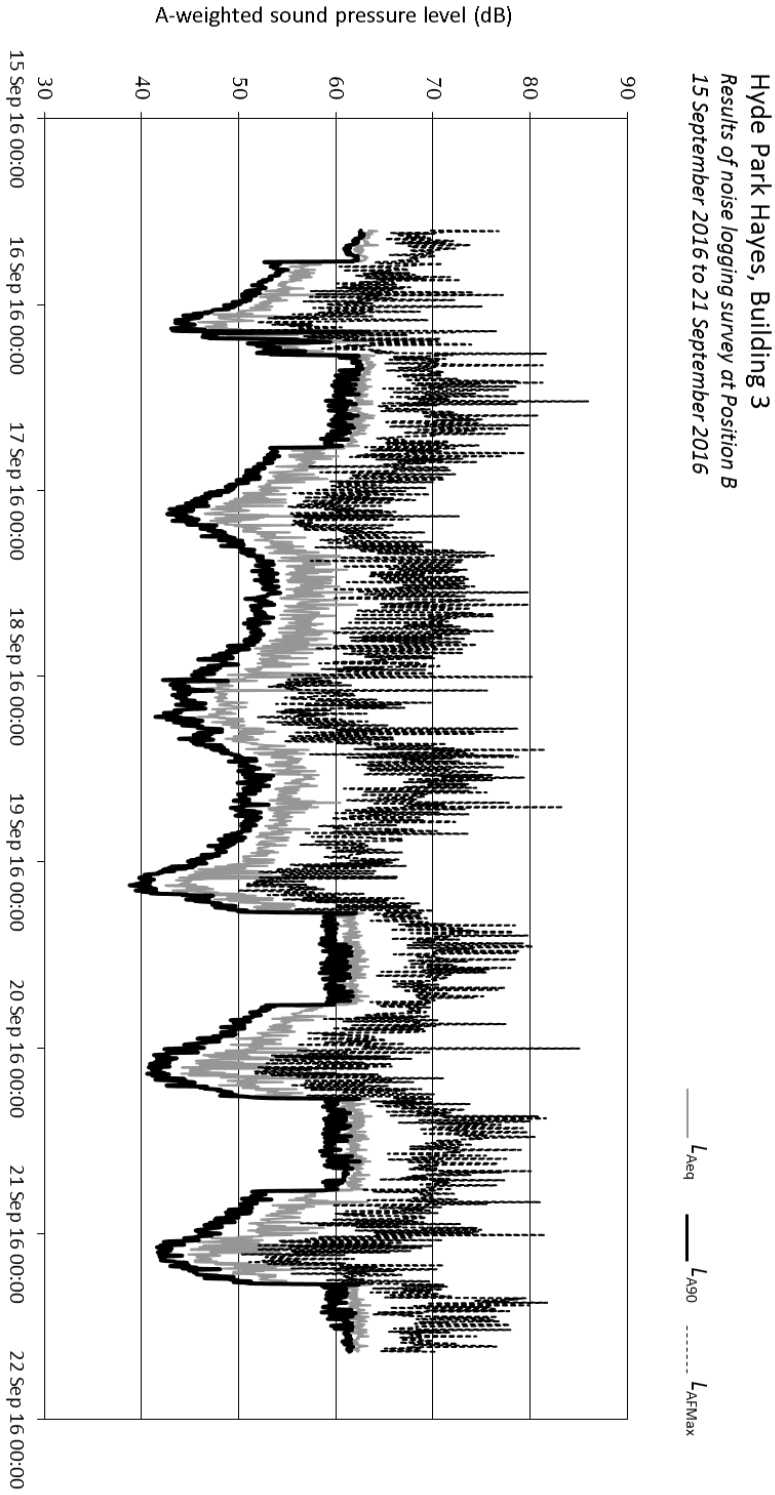
During the unattended noise measurements between 15 September 2016 and 21 September 2016, weather reports for the area indicated that temperatures varied between 13°C at night and 21°C during the day, and the wind speed was less than 7 m/s.

These weather conditions are considered suitable for obtaining representative measurements.

Appendix B

Results of unattended measurements at positions A and B


Hyde Park Hayes, Building 3
Results of noise logging survey at Position A
15 September 2016 to 21 September 2016
L_{Aeq}
L_{A90}
L_{AFMax}
A-weighted sound pressure level (dB)
100
90
80
70
60
50
40
30
15 Sep 16 00:00
16 Sep 16 00:00
17 Sep 16 00:00
18 Sep 16 00:00
19 Sep 16 00:00
20 Sep 16 00:00
21 Sep 16 00:00
22 Sep 16 00:00
Date/Time


Hyde Park Hayes, Building 3
Results of noise logging survey at Position B
15 September 2016 to 21 September 2016
LAeq
LA90
LAFMax
A-weighted sound pressure level (dB)
90
80
70
60
50
40
30
15 Sep 16 00:00
16 Sep 16 00:00
17 Sep 16 00:00
18 Sep 16 00:00
19 Sep 16 00:00
20 Sep 16 00:00
21 Sep 16 00:00
22 Sep 16 00:00
Date/Time