

RAVENS COURT PARK

FORMER ROYAL MASONIC HOSPITAL



LOGIKA GROUP

NOISE IMPACT ASSESSMENT

13691A-20-R01-02-F November 2023



Ravenscourt Park Hospital

Noise Impact Assessment

TT Group

31 October 2023

Document Control

Client: TT Group

Principal Contact: Nick Greenwood

Project Number: 13691A-20

Prepared By: Sam Toone (Consultant)

Document No. 13691A-20-R01-02-F

Date: 31 October 2023

Reviewed by: Will Martin (Technical Director)

Logika Group is a trading name of Air Quality Consultants Limited (Companies House Registration No: 02814570), Noise Consultants Limited (Companies House Registration No: 10853764) and Logika Consultants Limited (Companies House Registration No: 12381912).

This document has been prepared based on the information provided by the client. Air Quality Consultants Ltd, Noise Consultants Ltd or Logika Consultants Ltd do not accept liability for any changes that may be required due to omissions in this information. Unless otherwise agreed, this document and all other Intellectual Property Rights remain the property of Air Quality Consultants Ltd, Noise Consultants Ltd and/or Logika Consultants Ltd. When issued in electronic format, Air Quality Consultants Ltd, Noise Consultants Ltd or Logika Consultants Ltd do not accept any responsibility for any unauthorised changes made by others.

Air Quality Consultants Ltd operates a formal Quality Management System, which is certified to ISO 9001:2015, and a formal Environmental Management System, certified to ISO 14001:2015.

When printed by any of the three companies, this report will be on Evolve Office, 100% Recycled paper.



Registered Office: 23 Coldharbour Road, Bristol BS6 7JT Tel: 0117 974 1086
24 Greville Street, Farringdon, London, EC1N 8SS Tel: 020 3873 4780
Patten House, Moulders Lane, Warrington, WA1 2BA Tel: 01925 937 195

Contents

- 1 Introduction5**
 - 1.2 Local Authority Guidance 7
 - 1.2.1 Hammersmith and Fulham’s (Local Plan & Planning Guidance Supplementary Planning Document) 2018 7
- 2 Assessment Approach8**
 - 2.1 Baseline Noise Survey..... 8
 - 2.2 Local Conditions 9
 - 2.3 Assessment Criteria 10
 - 2.4 ProPG Stage 1: Site Suitability Assessment 10
 - 2.4.2 Selection of LOAEL and SOAEL 10
 - 2.4.3 Site Suitability Noise Exposure Thresholds 11
 - 2.5 ProPG Stage 2: Full Assessment 12
 - 2.5.2 Internal Noise 12
 - 2.5.3 External Noise Amenity 12
 - 2.6 Derivation Internal Noise Levels from External Sources 13
- 3 Noise Survey14**
 - 3.1 Noise Monitoring Equipment 14
 - 3.2 Noise Survey Results..... 15
 - 3.2.1 Survey Observations 15
 - 3.2.2 Measured Baseline Noise Levels 15
- 4 ProPG Stage 1 Initial Site Noise Risk Assessment.....18**
 - 4.2 Site Suitability Assessment..... 18
- 5 Acoustic Design Statement (ADS)20**
 - 5.2 Internal Noise Levels: Acoustics and Ventilation 20
 - 5.2.1 Windows Closed 20
 - 5.2.2 Purge Ventilation – Windows Open 20
 - 5.3 External Amenity Noise Levels 20

5.4 MUGA Assessment	21
5.5 Apartments.....	21
5.6 Amenity Areas	22
5.7 Summary.....	23
5.8 Environmental Sound Criteria	23
6 Conclusion	26
7 Glossary.....	27
8 Appendices	28

Tables and Figures

Table 1.1: Target Internal Noise Levels.....	7
Table 1.2: Noise Levels in External Amenity Spaces.....	7
Table 2.1: Summary of Survey Locations.....	9
Table 2.2: Site Risk Noise Exposure Thresholds.....	11
Table 2.3: Target Internal Noise Levels.....	12
Table 3.1: Noise Survey Equipment	14
Table 3.2: Summary of Measured Levels – Unattended Locations	15
Table 3.3: Summary of Measured Levels - Attended Locations	17
Table 4.1: ProPG Initial Site Noise Risk Assessment – Predicted Noise Levels.....	19
Table 5.1: Predicted External Noise Levels in Amenity Areas	20
Table 5.2: Indicative Environmental Sound Criteria for Proposed Building Services	24
Table A.1.1.1: LOAELs and SOAELs for Road and Railway Infrastructure Projects.....	30
Table A.1.2.1: Planning Practice Guidance – Noise Exposure Hierarchy.....	32
Table A.2.1.1: ProPG – Stage 1 Initial Site Risk Assessment	36

Table A.2.1.2: ProPG Stage 2 – Summary of Four Key Elements.....37

Table A.2.2.1: Indoor Ambient Noise Levels for Residential Dwellings.....39

Table A.2.3.1: Source Specific Recommendations on Noise Exposures40

1 Introduction

- 1.1.1.1 This report describes the potential impact of noise upon the proposed residential development (the 'proposed development') at Ravenscourt Park Hospital, London (the 'site'). The assessment has been carried out by Noise Consultants Ltd on behalf of TT Group (the client).
- 1.1.1.2 It is proposed to submit a planning application to London Borough of Hammersmith and Fulham (LBHF). The development comprises "Part demolition, part extension and alteration of the existing buildings and structures, change of use of the existing buildings and the erection of a new building including provision of a basement, to provide residential units (Use Class C3) and associated ancillary communal floorspace, a Care Home (Use Class C2) and flexible non-residential floorspace (Classes E, F1 and F2), together with associated roof top installations and structures, private and communal amenity space, landscaping, access, refuse storage, parking and associated works."
- 1.1.1.3 The assessment of the suitability of the site for noise-sensitive development has considered local ambient noise sources, including road traffic noise from the local road network, rail noise from the elevated District and Piccadilly London Underground services, and noise from the nearby multi-use games area (MUGA), and Ravenscourt Park.
- 1.1.1.4 **Figure 1.1** and **Figure 1.2** presents the existing and proposed site location, respectively. The MUGA bounds the site to the north, beyond which lies existing residential development and Goldhawk Road (A402). To the east is Ravenscourt Park (Road) which is not a through road. Beyond the road is Ravenscourt Park public green space. To the south is Ravenscourt Gardens, which is a through road between Goldhawk Road and Ravenscourt Park. Further south is the District and Piccadilly London Underground line which are elevated. To the west is Chiswick Nursing Centre and Ravenscourt Square which has restricted access. Further west is Goldhawk Road (A402).

Figure 1.1: Site Location Plan Existing

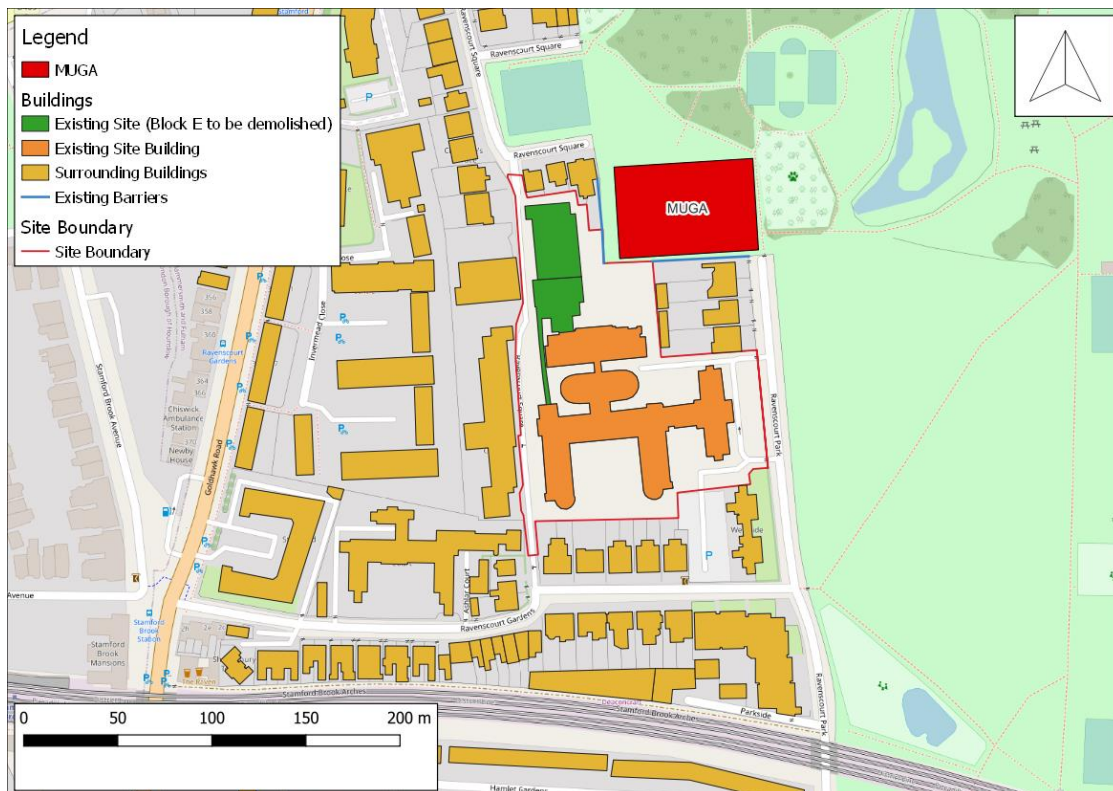
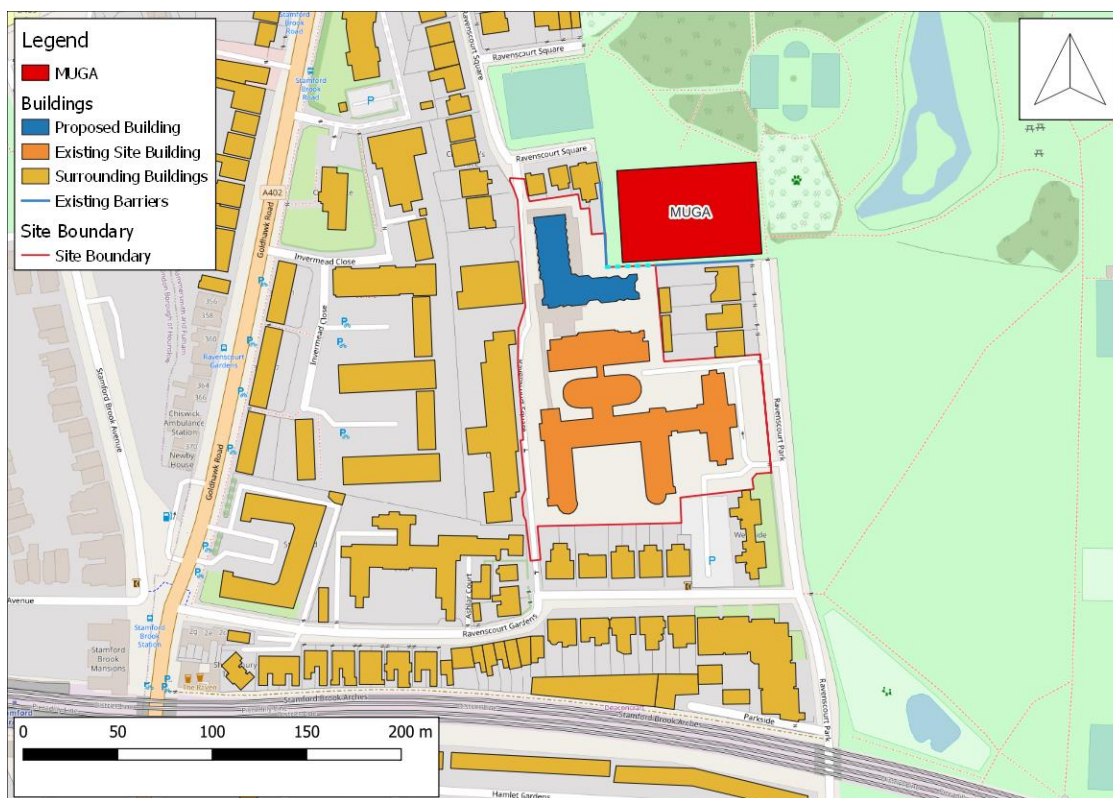


Figure 1.2: Site Location Plan Proposed



- 1.1.1.5 This report has been prepared taking into account all relevant local and national policy, guidance and regulations, as fully detailed in **Appendix A1** and **Appendix A2**.

1.2 Local Authority Guidance

1.2.1 Hammersmith and Fulham's (Local Plan & Planning Guidance Supplementary Planning Document) 2018

- 1.2.1.1 LBHF sets out requirements regarding noise in its Local Plan under Policy CC11: *Noise* and is detailed in full in **Appendix A1**, which is in line with national noise policy.

Internal Noise Levels

- 1.2.1.2 **Table 1.1** sets out the target internal noise levels for habitable rooms as identified in LBHF's Planning Guidance Supplementary.

Table 1.1: Target Internal Noise Levels

Room Type	Period	Noise Level $L_{Aeq,T}$ (dB)
Bedrooms	Daytime 0700 hrs to 2300 hrs	30
	Night-time 2300 hrs to 0700 hrs	35
Living Rooms	Daytime 0700 hrs to 2300 hrs	35
Dining Rooms	Daytime 0700 hrs to 2300 hrs	40

- 1.2.1.3 **Table 1.2** sets out the observed effect levels for external amenity spaces as identified in the Planning Guidance Supplementary.

Table 1.2: Noise Levels in External Amenity Spaces

External Amenity Type	Noise Level $L_{Aeq,T}$ (dB)
Gardens and other external amenity areas (balconies etc)	50 dB (an upper limit of 55 dB $L_{Aeq,T}$ may be acceptable in noisier environments).

2 Assessment Approach

2.1 Baseline Noise Survey

2.1.1.1 To quantify current levels of ambient noise on the site, a noise survey comprising of both attended and unattended measurements was conducted between Thursday 26th January and Monday 31st January 2023. The survey was designed to capture baseline noise levels at each façade during the daytime (07:00 – 23:00hrs) and night-time (23:00 – 07:00hrs) periods.

2.1.1.2 **Figure 2.1** presents the noise survey locations, which are described in **Table 2.1** below. The long-term (LT) and short-term (ST) measurements were all taken under free-field conditions. Monitoring was supplemented by subjective observations of the noise climate at each monitoring location during the survey.

Figure 2.1: Noise Monitoring Locations

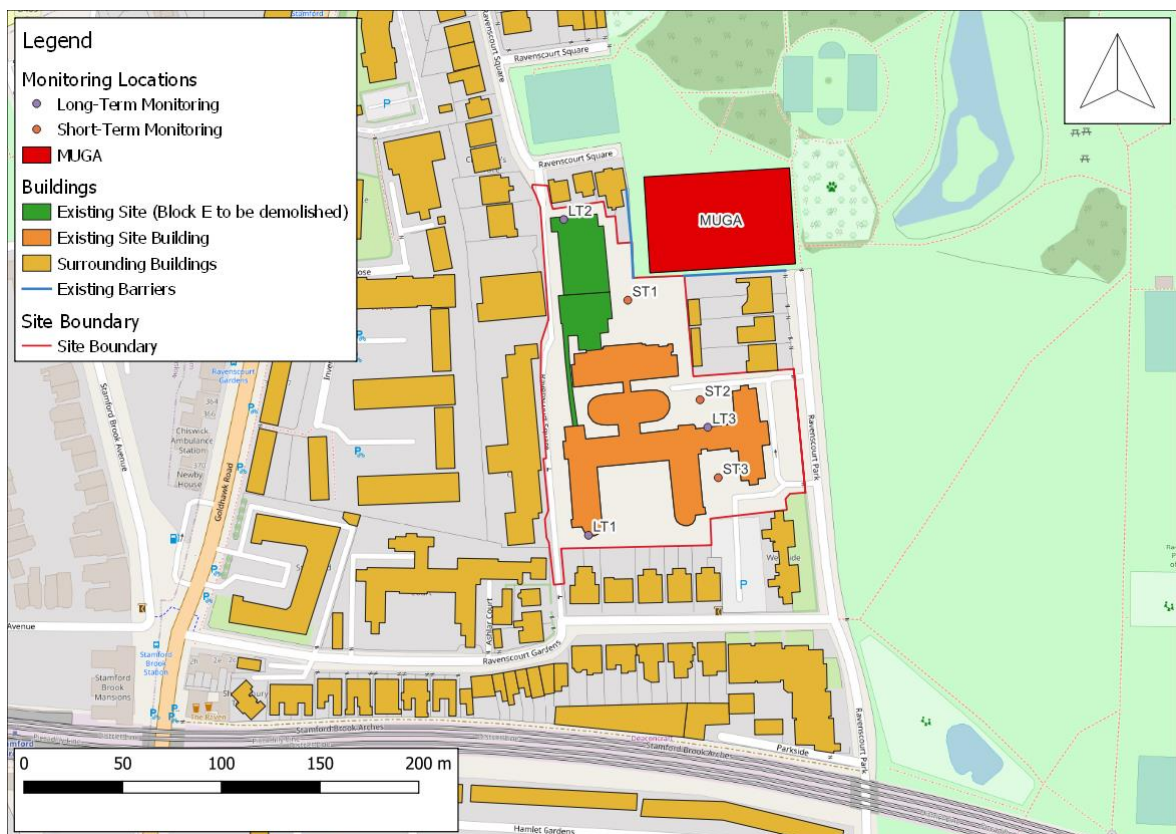


Table 2.1: Summary of Survey Locations

Location	Description
LT1	Unattended, free-field measurement at second floor balcony level at approximately 100 m to the elevated rail line at a height of 1.4 m above floor level.
LT2	Unattended, free-field measurement at first floor roof level at approximately 45 m to the boundary of the MUGA at a height of 1.2 m above floor level.
LT3	Unattended, free-field measurement at fourth floor roof level at approximately 60 m to the boundary of Ravenscourt Park at a height of 1.4 m above floor level.
ST1	Attended, free-field measurement at ground floor level at approximately 12m to the boundary of the MUGA at a height of 1.4 m above ground level.
ST2	Attended, free-field measurement at ground floor level at approximately 25m to the nearest noise sensitive receptor on Ravenscourt Park Road at a height of 1.4 m above ground level.
ST3	Attended, free-field measurement at ground floor level at approximately 35 m to the nearest noise sensitive receptor at a height of 1.4 m above ground level.
LT1	Unattended, free-field measurement at second floor balcony level at approximately 100 m to the elevated rail line at a height of 1.4 m above floor level.

2.1.1.3 The calibration level of the sound level meters (SLMs) was checked before and after each measurement with no significant drift in calibration recorded. Windshields were fitted to the microphones to minimise the effects of any wind-induced sound.

2.1.1.4 All measurements were conducted, where possible, in accordance with BS 7445-1:2003 '*Description and measurement of environmental noise. Guide to quantities and procedures*' (BS 7445, 2003).

2.2 Local Conditions

2.2.1.1 The weather conditions between 26th and 31st January 2023 were generally dry with few spells of rain and varying levels of cloud coverage. Wind speeds were generally below 5 m/s, however, some gusts on between 1400 hrs and 1930 hrs on Thursday 26th September may have exceeded 5 m/s. The prevailing wind direction was from the northwest. The average temperature was 7°C during the daytime and 4°C during the night-time.

2.2.1.2 Heathrow Airport was on easterly operations on the 26 and 27th January reverting to westerly operations during the early hours of 28th January. Road surfaces were generally dry with excluded periods during rainfall.

2.2.1.3 There was no known roadworks or major construction in the area, minor DIY works have been identified at LT2, and surrounding on-site works at LT1 for short periods.

2.3 Assessment Criteria

2.3.1.1 The assessment criteria set out in the following sections have been selected in accordance with the National legislation, policies, and guidance and by reference to the appropriate British and International standards outlined in Appendix A1 and Appendix A2. Specific consideration has been given to:

- Planning Practice Guidance for Noise (PPG-Noise, 2019)
- Professional Practice Guidance: Planning & Noise – ‘New Residential Development’ (ProPG, 2017)
- BS 8233:2014 ‘Guidance on Sound Insulation and Noise Reduction for Buildings’ (BS 8233,2014)
- World Health Organization (WHO) ‘Environmental Noise Guidelines for the European Region’ (WHO, 2018)

2.4 ProPG Stage 1: Site Suitability Assessment

2.4.1.1 The ProPG site noise risk classification presented in **Table A.2.1.1** of **Appendix A2** is a sliding scale that does not define precise noise exposure limits to site risk classification. For the purposes of this report, the noise thresholds that have been adopted to classify site risk are defined in **Table 2.2**, and are set for the daytime and night-time periods.

2.4.2 Selection of LOAEL and SOAEL

2.4.2.1 For the purposes of undertaking an initial site noise risk assessment in accordance with ProPG Stage 1, noise levels representing the ‘Lowest Observed Adverse Effect Level’ (LOAEL) and ‘Significant Observed Adverse Effect Level’ (SOAEL) have been selected based on recent precedents as described in **Appendix A1**.

2.4.2.2 The selected LOAELs align with the onset of adverse effects as outlined in **Table A.2.1.1**. The LOAEL is the level above which adverse effects on health and quality of life can be detected. Therefore, where noise exposure is below the LOAEL during both the daytime and the night-time periods, the noise risk is considered to be negligible.

2.4.2.3 The SOAEL is the level above which significant adverse effects on health and quality of life occur. Where one or more of the daytime or night-time noise levels exceeds the SOAEL, the noise risk is considered to be high. In respect of the night-time period the SOAEL value has been selected to align with the noise constraints for bedrooms stipulated in Building Regulations Approved Document O – Overheating, based on an opening window providing 13dBA of attenuation from outside to inside.

2.4.3 Site Suitability Noise Exposure Thresholds

Table 2.2: Site Risk Noise Exposure Thresholds

ProPG Site Risk Category	Noise Exposure Threshold dB $L_{Aeq,16hr}$	Noise Exposure Threshold dB $L_{Aeq,8hr}$	ProPG Based Pre-Planning Application Advice
Negligible (Below LOAEL)	<50	<40	Indicates development site is likely to be acceptable from a noise perspective
Low (LOAEL- SOAEL)	50 – 63	40 – 53	Indicates development site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and demonstrated
Medium (Above SOAEL)	63 – 70	53 – 66	Indicated site is less suitable from a noise perspective. A subsequent application may be refused unless a good acoustic design process is followed and demonstrated
High (UAEL)	>70	>66	Indicates an increased risk that the development would be refused on noise grounds.

2.4.3.1 With respect to the L_{Amax} (night), ProPG states that *“the initial site noise risk assessment should include the consideration of the individual noise events when the external $L_{Amax,F}$ exceeds 60 dB. A site should not be regarded as negligible risk if the $L_{Amax,F}$ exceeds, or is likely to exceed 60 dB more than 10 times a night. A site should be regarded as high risk if the $L_{Amax,F}$ exceeds, or is likely to exceed 80 dB more than 20 times a night.”*

2.4.3.2 Therefore, taking this into account and with reference to the LOAEL and SOAEL thresholds for the L_{Amax} presented in **Table 2.2**, for the purposes of this assessment:

- a ‘negligible’ risk is deemed to occur where the 10th highest measured L_{Amax} (night) is less than 60 dB;
- a ‘high’ risk is deemed to occur where the 20th highest measured L_{Amax} (night) is greater than 80 dB.

2.4.3.3 Based on the above a ‘low’ risk is deemed to occur where the 10th highest measured L_{Amax} (night) is less than 68 dB.

2.5 ProPG Stage 2: Full Assessment

2.5.1.1 Where the ProPG Stage 1 assessment indicates that the site is at low, medium or high risk of adverse noise effects, a ProPG Stage 2 assessment should be carried out. The following subsections outline the relevant internal and external noise guidelines considered in the assessment.

2.5.2 Internal Noise

2.5.2.1 For the purpose of considering internal noise levels, the assessment will be undertaken with reference to the internal noise guidelines set out in LBHF guidance and BS 8233:2014 as advocated by ProPG. These target internal noise levels are presented in **Table 2.3**.

Table 2.3: Target Internal Noise Levels

Location	Activity	Daytime Noise Level (0700-2300hrs)	Night-time Noise Level (2300-0700hrs)
Living Room	Resting	35 dB $L_{Aeq,16hr}$	-
Dining Room	Dining	40 dB $L_{Aeq,16hr}$	-
Bedroom	Sleeping (daytime resting)	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,16hr}$ 45 dB L_{AFmax} (normally less than 10 times a night)

2.5.2.2 As outlined in LBHF – Planning Guidance, these target internal noise levels should be achieved with open windows where possible, however this is not always practicable. The above levels should readily be achieved with closed windows and an appropriate means of ventilation in accordance with the requirements of Building Regulations Approved Document F (ADF). Adherence to these guidelines will be considered in the design of the building envelope.

2.5.3 External Noise Amenity

2.5.3.1 External noise amenity will be considered with reference to the guidance provided within BS 8233:2014. As the proposed development is likely to include ‘traditional external areas’ such as gardens and patios, as well as balconies, the assessment will consider adherence with external noise levels below 55 dB $L_{Aeq, 16hr}$ as an upper guideline value, and 50 dB $L_{Aeq, 16hr}$ as a design target.

2.6 Derivation Internal Noise Levels from External Sources

2.6.1.1 In order to consider internal noise levels, the assessment has followed guidance provided within the *Acoustics Ventilation and Overheating: Residential Design Guide*¹ (AVO Guide, 2020) which describes a method of calculating internal noise levels based on external free-field levels. For a partially open window, Appendix B of the AVO Guide states that the noise insulation can be assumed to be approximately 13 dB and applied to an external free-field level. It is also noted that the value of 13 dB is not appropriate for all situations, however it does enable a ProPG Stage 2 assessment to be undertaken.

¹ Association of Noise Consultants (ANC), and Institute of Acoustics (IoA), *Acoustics Ventilation and Overheating: Residential Design Guide*, January 2020.

3 Noise Survey

3.1 Noise Monitoring Equipment

- 3.1.1.1 Noise monitoring was undertaken using fully calibrated Class 1 sound level meters as defined in BS EN 61672-1:2013², calibrated to traceable standards within 2 years of the survey. Prior to and following noise measurements acoustic field-calibration of the sound level meters and microphones used in the survey was performed using an acoustic calibrator that itself had been calibrated within the preceding 12 months. No significant drift (i.e., >0.1 dB) in the field-calibrated noise level was observed. Measurement microphones were fitted with suitable windshields for the duration of the noise monitoring and were time synchronised.
- 3.1.1.2 All instrumentation was configured to report the environmental parameters L_{Aeq} , L_{A90} , and L_{Amax} in 1/3 octave bands. All measurements were conducted, where possible, in accordance with BS 7445-1:2003 '*Description and measurement of environmental noise. Guide to quantities and procedures*' (BS 7445, 2003).

Table 3.1: Noise Survey Equipment

Equipment	Manufacturer	Type	Serial number	Locations
Class 1 Sound Level Meter	RION	NL-52	01009667	LT1
Class 1 Sound Level Meter	RION	NL-52	01276546	LT2
Class 1 Sound Level Meter	RION	NL-52	00687044	LT3
Class 1 Sound Level Meter	RION	NL-52	00909494	ST1, ST2 & ST3
Class 1 sound pressure level calibrator	RION	NC-75	35281145	-

² BS EN 61672-1:2013 Electroacoustics. Sound Level Meters Specifications (2013)

3.2 Noise Survey Results

3.2.1 Survey Observations

3.2.1.1 The acoustic environment within the site was observed to be dominated by distant road traffic noise. At the south facing boundary intermittent noise from elevated rail consisting of District and Piccadilly London Underground services dominated. Suspected noise from the MUGA has been identified on 27th January between 12:50 and 14:50.

3.2.2 Measured Baseline Noise Levels

3.2.2.1 Results of the noise survey at each of the monitoring locations are summarised in **Table 3.2** and **Table 3.3**, excluding the periods where rainfall occurs. The time history graphs of the measurement period for LT1, LT2 and LT3 are presented in **Appendix A3**, and also show periods of rainfall.

Table 3.2: Summary of Measured Levels – Unattended Locations

Location	Period of Representation	$L_{Aeq,T}$ (dB)	10 th highest $L_{AFmax, 5min}$	$L_{A90,T}$ Mean (dB)	$L_{A90,T}$ Mode (dB)
LT1	Thursday Daytime (11:00 – 23:00)	53	69	47	48
	Thursday Night-time (23:00 – 07:00)	50	65	42	39
	Friday Daytime (07:00 – 23:00)	54	67	48	49
	Friday Night-time (23:00 – 07:00)	51	72	48	48
	Saturday Daytime (07:00 – 23:00)	55	58	41	40
	Saturday Night-time (23:00 – 07:00)	52	72	47	46
	Sunday Daytime (07:00 – 23:00)	56	60	41	42
	Sunday Night-time (23:00 – 07:00)	52	71	43	44
	Monday Daytime (07:00 – 11:00)	56	60	39	38
	LT2	Thursday Daytime (15:05 – 23:00)	51	72	47
Thursday Night-time (23:00 – 07:00)		44	63	42	41
Friday Daytime (07:00 – 23:00)		53	68	48	48
Friday Night-time (23:00 – 07:00)		45	69	47	48

Location	Period of Representation	$L_{Aeq,T}$ (dB)	10 th highest $L_{AFmax, 5min}$	$L_{A90,T}$ Mean (dB)	$L_{A90,T}$ Mode (dB)
	Saturday Daytime (07:00 – 23:00)	51	65	42	39
	Saturday Night-time (23:00 – 07:00)	44	67	48	49
	Sunday Daytime (07:00 – 23:00)	51	72	48	48
	Sunday Night-time (23:00 – 07:00)	47	58	41	40
	Monday Daytime (07:00 – 23:00)	53	72	47	46
	Thursday Daytime (15:05 – 23:00)	52	60	41	42
	Thursday Night-time (23:00 – 07:00)	45	71	43	44
	Friday Daytime (07:00 – 23:00)	52	60	39	38
	Friday Night-time (23:00 – 07:00)	46	72	47	46
LT3	Saturday Daytime (07:00 – 23:00)	51	63	42	41
	Saturday Night-time (23:00 – 07:00)	46	68	48	48
	Sunday Daytime (07:00 – 23:00)	52	69	47	48
	Sunday Night-time (23:00 – 07:00)	47	65	42	39
	Monday Daytime (07:00 – 23:00)	53	67	48	49

3.2.2.2 The ambient noise levels ($L_{Aeq,T}$) over the selected measurement period (Friday daytime and Friday night-time) are summarised below:

- LT1 (daytime) – 54dB $L_{Aeq,16h}$
- LT2 (daytime) – 53dB $L_{Aeq,16h}$
- LT3 (daytime) – 52dB $L_{Aeq,16h}$
- LT1 (night-time) – 51dB $L_{Aeq,8h}$
- LT2 (night-time) – 45dB $L_{Aeq,8h}$
- LT3 (night-time) – 46dB $L_{Aeq,8h}$

Table 3.3: Summary of Measured Levels - Attended Locations

Location	Period of Representation	$L_{Aeq,T}$ (dB)	$L_{AFmax,5min}$ (dB)	$L_{A90,T}$ Mean (dB)
ST1	Thursday Daytime (10:56 – 11:37)	48	60	46
ST2	Thursday Daytime (11:03 – 11:43)	50	75	47
ST3	Thursday Daytime (10:12 – 11:49)	46	61	41

4 ProPG Stage 1 Initial Site Noise Risk Assessment

4.1.1.1 An initial site noise risk assessment has been undertaken to provide an indication of the likely risk of adverse effects and the suitability of the site for residential development, excluding any subsequent mitigation measures which may be included as part of the development proposals.

4.2 Site Suitability Assessment

4.2.1.1 The external noise levels measured on Friday daytime and Friday night-time have been used for this assessment to represent typical, weekday daytime and night-time noise levels considering activity from the MUGA during Friday afternoon at LT2, and the Night-tube occurring on Fridays and Saturdays at LT1.

4.2.1.2 With reference to the assessment criteria, the advice provided in ProPG Stage 1, and the site risk noise exposure thresholds set out in **Table 2.2**, **Table 4.1** presents the initial site noise risk assessment for the site.

Table 4.1: ProPG Initial Site Noise Risk Assessment – Predicted Noise Levels

Location	Daytime L _{Aeq,16hr} (dB)	Night-time L _{Aeq,8hr} (dB)	Night-time L _{Amax 10th Highest} (dB)	ProPG Outcome
LT1	54	51	68	Indication of Low Risk
LT2	53	45	64	Indication of Low Risk
LT3	52	46	60	Indication of Low Risk

- 4.2.1.3 It is considered that the site presents a ‘Low’ risk of adverse noise effect, without additional mitigation measures in place. As a result, specific noise mitigation measures will be required to reduce and minimise noise effects. Therefore, a Stage 2 full assessment is required incorporating an Acoustic Design Statement (ADS) to demonstrate a good acoustic design process.
- 4.2.1.4 Due to the development of new residential properties in proximity to the MUGA a detailed assessment has been considered as part of the Stage 2 assessment.
- 4.2.1.5 Importantly the noise levels observed at night are within the noise constraints for bedrooms stipulated in Building Regulations Approved Document O – Overheating, based on an opening window providing 13dBA of attenuation from outside to inside.

5 Acoustic Design Statement (ADS)

5.1.1.1 All recommendations in this ADS are given for acoustic reasons only and should be reviewed by the design team to ensure co-ordination with other disciplines.

5.2 Internal Noise Levels: Acoustics and Ventilation

5.2.1 Windows Closed

5.2.1.1 The following assessments of noise levels within habitable rooms aims to demonstrate that the target internal noise levels set out in **Table 2.3** are achievable.

5.2.1.2 The sound insulation performance afforded by the building envelope on a ‘closed window’ basis is informed by the combination of the building envelope construction as well as acoustic conditions in the receiving room.

5.2.1.3 The measured external noise levels are relatively low and the minimum required outside to inside sound level reduction required to achieve the noise levels set out in **Table 2.3** is only 21 dB(A). This is readily achievable with a standard double-glazed window system (i.e. 6mm/16mm/6mm which typically provides approximately 25 dB(A) sound reduction) and a ventilation system which complies with the Building Regulations Approved Document F (ADF).

5.2.2 Purge Ventilation – Windows Open

5.2.2.1 With regards to openable windows, it should be noted that Building Regulations Approved Document F – Ventilation (ADF) advises that “*purge ventilation*” is required “*for rapidly diluting indoor air pollutants and extracting water vapour where necessary*”. Therefore “*purge ventilation*” is intermittent i.e., required only when such occasional activities occur, and openable windows are suitable for this purpose.

5.3 External Amenity Noise Levels

5.3.1.1 **Table 5.1** provides a summary of the predicted daytime external noise levels for the external amenity areas within the proposed development.

Table 5.1: Predicted External Noise Levels in Amenity Areas

Location	Daytime L _{Aeq,16hr} (dB)	Night-time L _{Aeq,8hr} (dB)
LT1	54	Measured noise levels are below the upper limit for external noise levels set out in Table 1.2.
LT2	53	
LT3	52	

- 5.3.1.2 The measured external noise levels are below the upper guideline value, and within the LBHF design target noise level of 55 dB $L_{Aeq,16hr}$. Therefore, no specific acoustic mitigation measures are proposed.

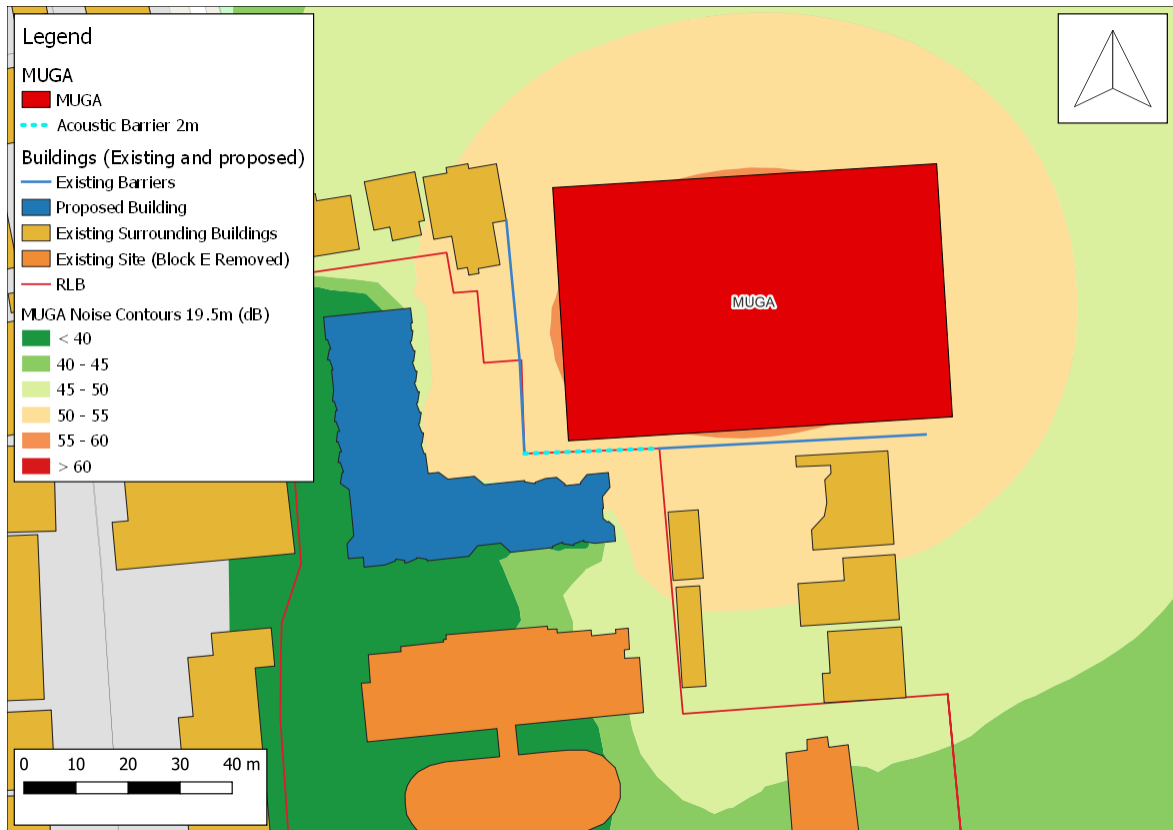
5.4 MUGA Assessment

- 5.4.1.1 Noise emissions from the Ravenscourt Park MUGA have been calculated, based on the 'typical' noise emission level of 58dB $L_{Aeq,1hr}$ at 10 metres from the halfway line, as advocated in Sport England's AGP Guidance. Modelling has been conducted using the Predictor-Lima computational sound modelling software configured to calculate sound levels in accordance with ISO 9613 2:1996 'Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation'.
- 5.4.1.2 The noise spectra were based upon measurements at LT2 which included a brief period of MUGA activity. In terms of absolute level, the measured data was considered atypical because the MUGA activity appeared to be a school sports event or similar with significant amounts of crowd activity. Therefore, the levels in the AGP guidance were adopted instead. The noise emissions from the MUGA were calculated for the surrounding area including the massing introduced by the proposed new residential building.
- 5.4.1.3 Due to the absence of an effective perimeter fence a new / replacement 2 metre acoustic barrier has been incorporated within the design and is to be of a minimum surface mass of 10 kg/m² with no gaps or holes. This is shown in **Figure 5.1** and **Figure 5.2**. The barrier effect provided by the fence has been accounted for in the modelling. Notably this has significant benefits for ground floor outdoor amenity spaces but less so for upper levels of apartments, having direct line of sight.

5.5 Apartments

- 5.5.1.1 The predicted sports pitch noise levels are shown in **Figure 5.1**. The contours are shown at height of 19.5m, which represents a worst case in terms of noise exposure.

Figure 5.1: MUGA Noise Contours with a 2m Barrier (at 19.5m elevation)



5.5.1.2 The results show noise levels at the facades of the proposed new building to be in the region of 50 - 55 dB $L_{Aeq,1hr}$ free-field. At the nearest existing receptors³ noise levels are also in the region of 50 – 55 dB $L_{Aeq,1hr}$ ⁴ free-field. This indicates a ‘low risk’ in terms of site suitability by reference to **Table 2.2**.

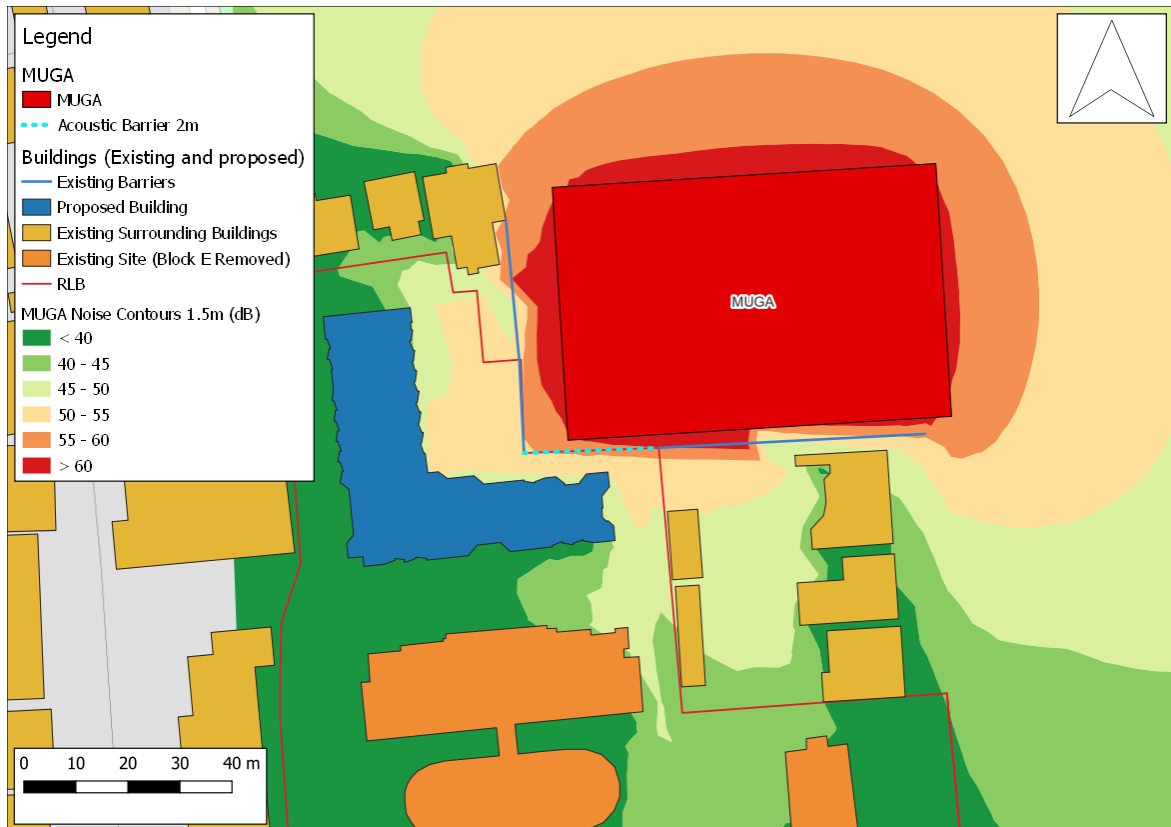
5.6 Amenity Areas

5.6.1.1 The predicted sports pitch noise levels are shown in **Figure 5.1**. The contours are shown at height of 1.5m, which represents a suitable height in terms of external amenity space.

³ 23 Ravenscourt Park and 9 Ravenscourt Square

⁴ Predicted at height of 8m

Figure 5.2: MUGA Noise Contours with a 2m Barrier (at 1.5m elevation)



5.6.1.2 The results show noise levels in ground floor outdoor amenity spaces close to the proposed new residential building to be less than 55 dB $L_{Aeq,1hr}$. At the nearest existing receptors noise levels are in the region of 50 – 55 dB $L_{Aeq,1hr}$ free-field. The noise exposure for ground floor outdoor amenity spaces of the proposed new residential building is observed to be within noise limit guidelines as outlined in **paragraph 2.5.3**.

5.7 Summary

5.7.1.1 The results show that typical MUGA noise levels at the facades and ground floor amenity areas are expected be below 55 dB $L_{Aeq,1hr}$ free-field. This is considered ‘low risk’ in terms of site suitability and are within external amenity noise limit guidelines.

5.8 Environmental Sound Criteria

5.8.1.1 The precise details of any building services plant required as part of the development are currently unknown.

5.8.1.2 Indicative Environmental Sound Criteria (ESC) have been set for the proposed building services plant based on the methodology in BS 4142:2014+A1:2019. The criteria are based on the combined sound rating level ($L_{Ar,Tr}$) from all relevant sources of noise not exceeding the existing background sound level by 10dB during the daytime and night-time. According

to BS 4142, “where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context”.

- 5.8.1.3 Following a review of the measured background sound levels throughout the entire measurement period at the unattended noise monitoring locations, **Table 5.2** sets out the recommended ESC for existing and proposed residential receptors. These are required to be at least 10 dBA lower than the typically lowest representative background noise level L_{A90} as outlined in LBHF Planning Guidance – Supplementary Planning Document.
- 5.8.1.4 It is noted that the measured night-time background sound levels are very low, therefore, consideration of absolute noise levels has been given in determining a practicable night-time ESC.

Table 5.2: Indicative Environmental Sound Criteria for Proposed Building Services

Location	Noise Sensitive Receptors	ESC $L_{Ar,Tr}$ (dB)	
		Daytime	Night-time
LT1	Receptor group A	35 ⁵	35 ⁶
LT2	Receptor group B	36	35 ⁷
LT3	Receptor group C	36	35 ⁸

- 5.8.1.5 The ESC can be secured by way of a suitable planning condition, which if aligned with the limits advised above would have negligible impact on neighbouring properties.

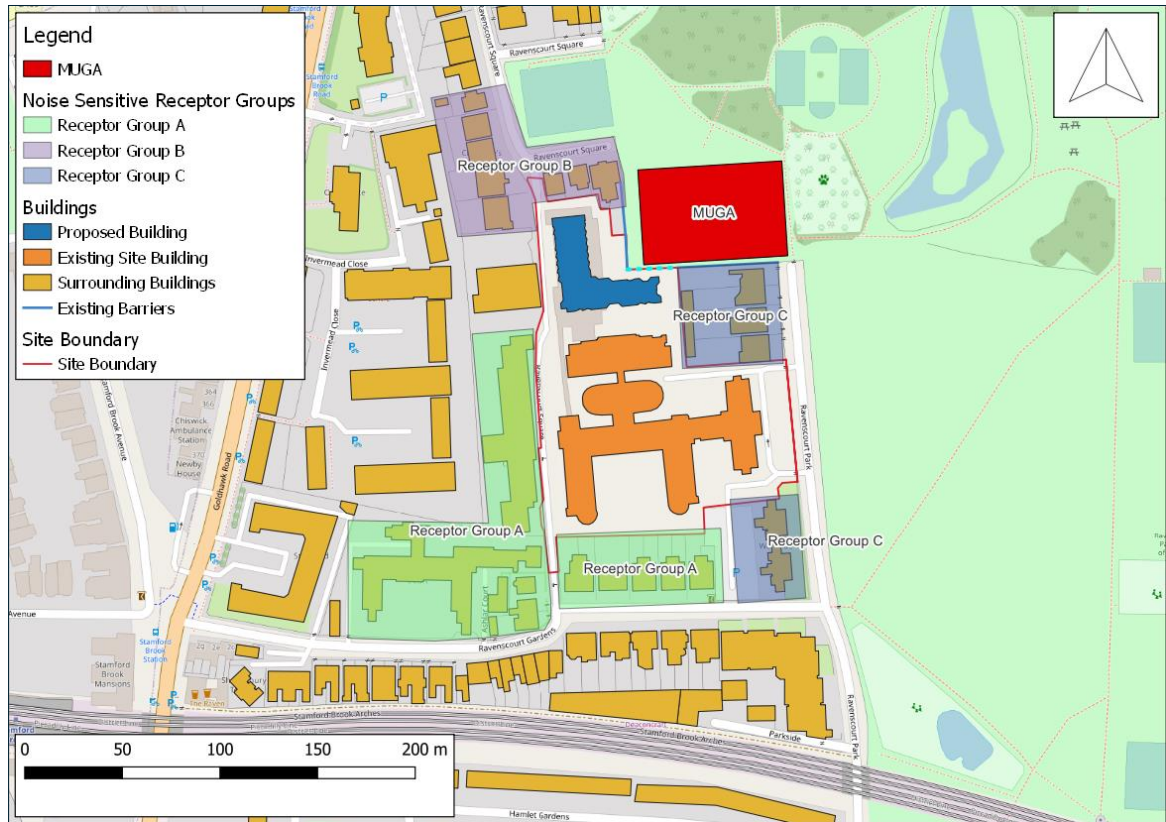
⁵ 1dB above the adopted background sound level but the proposed ESC is considered acceptable in absolute terms

⁶ 6dB above the adopted background sound level but the proposed ESC is considered acceptable in absolute terms

⁷ 5dB above the adopted background sound level but the proposed ESC is considered acceptable in absolute terms

⁸ 4dB above the adopted background sound level but the proposed ESC is considered acceptable in absolute terms

Figure 5.3: Noise Sensitive Receptors Groups



6 Conclusion

- 6.1.1.1 NCL have undertaken a noise impact assessment for the proposed residential development (the 'proposed development') at Ravenscourt Park Hospital, London (the 'site').
- 6.1.1.2 This noise impact assessment assesses the proposed development site in terms of suitability for residential use based on baseline noise monitoring. The report evaluates the potential impacts upon the proposed development and considers design measures, including the building envelope performance required to achieve suitable noise levels within habitable rooms and outdoor amenity space.
- 6.1.1.3 An initial site noise risk assessment was undertaken in accordance with ProPG. The risk assessment demonstrated that there is a likely 'low' risk of adverse effects from noise without the implementation of noise mitigation. For habitable rooms in the proposed development, it has been demonstrated that the target internal noise levels can be achieved with windows closed using a standard double-glazed window system and ventilation system which complies with the Building Regulations Approved Document F-Ventilation. Additionally, the noise levels observed at night are consistent within the noise constraints for bedrooms stipulated in Building Regulations Approved Document O – Overheating, meaning that thermal modelling can assume that windows are partially open.
- 6.1.1.4 During activities at the nearby MUGA, façade noise levels are shown to approach $55\text{dB}_{\text{LAeq},1\text{hr}}$. This noise exposure is considered to occur infrequently, for relatively short periods and during the daytime only. Noise levels in private external amenity areas are predicted to be below the target level of $55\text{ dB } L_{\text{Aeq},16\text{hr}}$ in all areas. During activities at the nearby MUGA, with the provision of a 2m acoustic barrier external noise levels are similarly shown to be below $55\text{dB}_{\text{LAeq},1\text{hr}}$. Importantly the noise exposure from the MUGA is considered to occur infrequently and for relatively short periods.
- 6.1.1.5 The precise details of any building services plant required as part of the development are currently unknown. However, the mitigation of these sound sources should be uncontroversial and can, therefore, be secured by a suitably worded planning condition. The requirements of such a planning condition can then be discharged during detailed design of the proposed development. Indicative Environmental Sound Criteria (ESC) have therefore been suggested in **Table 5.2**, which are commensurate with having a negligible impact on neighbouring properties.
- 6.1.1.6 On the basis of this assessment, the development is not considered to give rise to a significant adverse impact on health and quality of life in relation to noise, in accordance with paragraphs 174 and 185 of the NPPF. Furthermore, in relation to paragraph 187 (agent of change), the mitigation measures proposed will ensure that the new development can be integrated effectively with existing businesses and land uses without imposing unreasonable restrictions upon them.

7 Glossary

Symbol	Description
dB	Decibel. The logarithmically scaled measurement unit of sound.
A-weighting	Frequency weighting applied to measured sound in order to account for the relative loudness perceived by the human ear.
L_{Aeq,T}	A-weighted equivalent continuous sound level over a given time period. It is the sound level of a steady sound that has the same energy as a fluctuating sound over the same time period.
L_{A10,T}	The A-weighted sound level exceeded for 10% of the measurement period. It is widely used as a descriptor of road traffic noise.
L_{A90,T}	The A-weighted sound level exceeded for 90% of the measurement period. Often referred to as the background sound level.
L_{Amax}	The A-weighted maximum recorded noise level during a measurement period.
R_w	The weighted Sound Reduction Index which characterises the airborne sound insulation of a building element over a range of frequencies with a single number quantity.
C and C_{tr}	Spectrum adaption terms that use a standard reference curves to determine the weighted value of airborne sound insulation. C and C _{tr} take into account different source spectra, where C considers the A-weighted pink noise spectrum and C _{tr} considers the A-weighted urban traffic noise spectrum.

8 Appendices

A1 National and Local Policy and Guidance

A1.1 National Noise Policy

A1.1.1 Noise Policy Statement for England (NPSE, 2010)

A1.1.1.1 The Noise Policy Statement for England (NPSE, 2010) sets out the Government's Noise Policy Vision to:

"Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development".

A1.1.1.2 This long-term vision is supported by three Noise Policy Aims that can be delivered through effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development. These aims are to:

- a) *avoid significant adverse impacts on health and quality of life;*
- b) *mitigate and minimise adverse impacts on health and quality of life; and*
- c) *where possible, contribute to the improvement of health and quality of life.*

A1.1.1.3 The explanatory note to the NPSE sets out 'effect levels' which are aligned to the Policy Aims. Drawing upon established concepts from toxicology, the NPSE defines the following noise effect levels:

- NOEL - 'No Observed Effect Level';
- LOAEL - 'Lowest Observed Adverse Effect Level'; and
- SOAEL - 'Significant Observed Adverse Effect Level'.

A1.1.1.4 The explanatory note describes SOAEL as the effect level above which significant adverse effects on health and quality of life occur, aligning this level with the first policy aim.

A1.1.1.5 LOAEL is described as the level at which adverse effects begin and the second aim of the NPSE refers to a situation where the effect lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8 of the NPSE) however this does not mean that such adverse effects cannot occur.

A1.1.1.6 NOEL is described as a level of noise exposure below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life.

A1.1.1.7 The third aim seeks, where possible, to positively improve health and quality of life through the pro-active management of noise while also taking into account the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society.

A1.1.1.8 The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim.

- A1.1.1.9 NPSE states that it is not possible have a single, numerical definition of the SOAEL that is applicable to all sources of noise in all situations, since the SOAEL is likely to be different for different noise sources, for different receptors and at different times.
- A1.1.1.10 The setting of LOAELs and SOAELs for transportation sources has however reached a form of consensus following a number of high-profile infrastructure projects in England, namely HS2 and a series of Highways England road schemes which have been successful through the Government’s Hybrid Bill and Development Consent Order (DCO) consenting processes.
- A1.1.1.11 In these projects, the setting of SOAEL has been aligned to Government policy and legislation in relation to the provision of noise insulation where it has been argued that significant adverse effects can be avoided through these means. **Table A.1.1.1** provides a summary of the LOAEL and SOAEL values applied on these projects.

Table A.1.1.1: LOAELs and SOAELs for Road and Railway Infrastructure Projects

Source/Project	Period	LOAEL	SOAEL
Road Traffic (Highway Agency A14 DCO)	Daytime	50 dB LAeq, 16hr	63 dB LAeq, 16hr
	Night-time	40 dB LAeq, 8hr	55 dB LAeq, 8hr
Rail (HS2)	Daytime	50 dB LAeq, 16hr	63 dB, LAeq 16hr
	Night-time	40 dB LAeq, 8hr	55 dB LAeq, 8hr
		60 dB LAmax	80/85 dB LAmax

A1.2 Planning Policy

A1.2.1 National Planning Policy Framework (NPPF, 2023)

A1.2.1.1 The National Planning Policy Framework (NPPF, 2023) sets out the Government’s planning policies for England and how these should be applied. The NPPF provides a framework within which locally prepared plans for housing and other development can be produced.

A1.2.1.2 In relation to noise, it states:

“174. Planning policies and decisions should contribute to and enhance the natural local environment by: ...

preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and...”

A1.2.1.3 The NPPF includes policy which makes reference to ‘significant adverse impacts on health and quality of life’, as per the NPSE. NPPF policy states:

“185. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- *mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and...*”

A1.2.1.4 NPPF has also recently introduced the agent of change principle as follows:

“187. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.”

A1.2.2 Planning Practice Guidance – Noise (PPG-Noise, 2019)

A1.2.2.1 The Planning Practice Guidance (PPG-Noise, 2019) provides further detail about how the effects of noise can be described in terms of perception and outcomes. It aligns this to increasing effect levels as defined in the NPSE. In addition, the PPG-Noise adds a fourth term and corresponding effect level:

- UAEL – ‘Unacceptable Adverse Effect Level’.

A1.2.2.2 This effect level is higher than the significant adverse effect on health and quality of life (SOAEL) and requires that unacceptable adverse effects are to be prevented. In PPG-Noise, prevention is not in the context of Government policy on sustainable development. **Table A.1.2.1** presents the noise exposure hierarchy described in PPG-Noise.

Table A.1.2.1: Planning Practice Guidance – Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

- A1.2.2.3 This noise exposure hierarchy is based on the principle that once noise or vibration becomes perceptible, the effect on people and other receptors increases as the level increases. PPG-Noise presents example outcomes to help characterise these effects using non-technical language. In general terms, an observed adverse effect is characterised as a perceived change in quality of life for occupants of a building or a perceived change in the acoustic character of an area, whereas a significant observed adverse effect disrupts activities.
- A1.2.2.4 PPG-Noise also provides guidance in terms of what factors may influence whether noise could become a concern, and how adverse effects of noise can be mitigated. Examples of mitigation provided include:
- *“engineering: reducing the noise generated at source and/or containing the noise generated;*
 - *layout: where possible, optimising the distance between the source and noise-sensitive receptors and/or incorporating good design to minimise noise transmission through the use of screening by natural or purpose built barriers, or other buildings;*
 - *using planning conditions/obligations to restrict activities allowed on the site at certain times and/or specifying permissible noise levels differentiating as appropriate between different times of day, such as evenings and late at night, and;*
 - *mitigating the impact on areas likely to be affected by noise including through noise insulation when the impact is on a building”.*
- A1.2.2.5 In the case of residential development, PPG-Noise also states that the impact of noise can be “partially off-set” if occupants have access to:
- *“a relatively quiet façade (containing windows to habitable rooms) as part of their dwelling, and/or;*
 - *a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced with increasing noise exposure and could be such that significant adverse effects occur, and/or;*
 - *a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings, and/or;*
 - *a relatively quiet, protected, external publicly accessible amenity space (e.g. a public park or a local green space designated because of its tranquility) that is nearby (e.g. within 5 minutes walking distance)”.*

A1.3 London Borough of Hammersmith and Fulham

A1.3.1 London Borough of Hammersmith and Fulham - Local Plan (2018)

Policy CC11 - Noise

- A1.3.1.1 “Noise (including vibration) impacts of development will be controlled by implementing the following measures:

- a) *Noise and vibration sensitive development should be located in the most appropriate locations and protected against existing and proposed sources of noise and vibration through careful*

- design, layout and use of materials, and by ensuring adequate insulation of the building envelope and internal walls, floors and ceilings as well as protecting external amenity areas;*
- b) Housing, schools, nurseries, hospitals and other noise-sensitive development will not normally be permitted where the occupants/users would be affected adversely by noise, both internally and externally, from existing or proposed noise generating uses. Exceptions will only be made if it can be demonstrated that adequate mitigation measures will be taken, without compromising the quality of the development; and*
 - c) noise generating development will not be permitted, if it would be liable to materially increase the noise experienced by the occupants/users of existing or proposed noise sensitive uses in the vicinity. Where necessary, applicants will be expected to carry out noise assessments and provide details of the noise levels on the site. Where noise mitigation measures will be required to enable development to take place, an outline application will not normally be acceptable*

Justification

- a) The dominant sources of noise in Hammersmith and Fulham are road and rail traffic, construction (including DIY), noisy neighbours, pubs/clubs and other entertainment venues, pavement cafés/outdoor seating and noisy building services, plant and equipment. Aircraft and helicopter noise is also a concern in parts of the borough.*
- b) Noise and associated vibration can affect and have a direct impact on noise sensitive uses, particularly housing, but also other sensitive uses such as schools and hospitals and impact upon people's health and well being. Some areas of the borough are subject to significant noise disturbance. Existing and potential noise levels will be taken into account when assessing a proposal for residential development. Noise levels both inside the dwelling and in external amenity spaces will be considered. The council will therefore require a careful assessment of likely noise levels before determining planning applications.*
- c) Any proposal (including new development, conversion, extension, change of use) for a noise generating development close to dwellings or other noise sensitive uses will be assessed to determine the impact of the proposed development in relation to these existing uses. In this borough, noise generating activities that cause particular problems tend to be lateclosing entertainment and food and drink establishments. Also an issue is noise disturbance in existing buildings where sound insulation is inadequate. Proposals for conversions and change of use should minimise noise disturbance from adjoining uses by improving sound insulation and the arrangement of rooms, such as stacking/locating rooms of similar uses above/adjacent to each other.*
- d) Issues of noise and nuisance are considered on a site-by-site basis having regard to the proposal, site context and surrounding uses in the context of related policies and guidelines.*

A2 Residential Development Guidance

A2.1 Professional Practice Guidance (ProPG, 2017) on Planning & Noise – ‘New Residential Development’

A2.1.1.1 Professional Practice Guidance: Planning & Noise – ‘New Residential Development’ (ProPG, 2017) is a joint publication by the Chartered Institute of Environmental Health (CIEH), the Association of Noise Consultants (ANC) and the Institute of Acoustics (IoA).

A2.1.1.2 The primary goal of ProPG is “to assist the delivery of sustainable development by promoting good health and wellbeing through the effective management of noise”.

A2.1.1.3 The guidance has been produced to assist practitioners in matters relating to noise and new residential development. It focuses on existing transportation noise sources and has been developed to consider the Government’s overarching noise policy, planning policy and policy guidance. It has also been developed to take into account other authoritative sources of guidance such as British Standard 8233:2014 ‘Guidance on Sound Insulation and Noise Reduction for Buildings’ (BS 8233:2014).

A2.1.1.4 The guidance provides advice for Local Planning Authorities (LPAs) and developers, and practitioners. ProPG aims to:

- *Advocate the full consideration of the acoustic environment from the earliest possible stage of the development control process;*
- *Promote and encourage the process of good acoustic design in and around new residential developments;*
- *Set out the considerations which should be taken into account in deciding planning applications for new noise-sensitive developments;*
- *Promoting the use of appropriate noise exposure standards and policies in assessment; and*
- *Provide assistance in the delivery of sustainable development.*

A2.1.1.5 ProPG advocates a two-stage assessment approach:

- **Stage 1** – an initial noise risk assessment of the proposed development site; and
- **Stage 2** – a systematic assessment considering four key elements.

A2.1.1.6 ProPG is underpinned by the preparation and delivery of an Acoustic Design Statement (ADS).

A2.1.2 Stage 1 – Initial Risk Assessment

A2.1.2.1 Stage 1 of ProPG provides guidance to practitioners as to whether the site poses a risk in terms of noise for any future site occupants. To identify this, ProPG sets out a number of considerations for inclusion within an ‘initial risk assessment’. **Table A.2.1.1** reproduces Figure 1 from ProPG, which describes the initial site risk assessment.

Table A.2.1.1: ProPG – Stage 1 Initial Site Risk Assessment

Noise Risk Assessment	Potential Effect Without Noise Mitigation	Pre-Planning Application Advice
-----------------------	---	---------------------------------

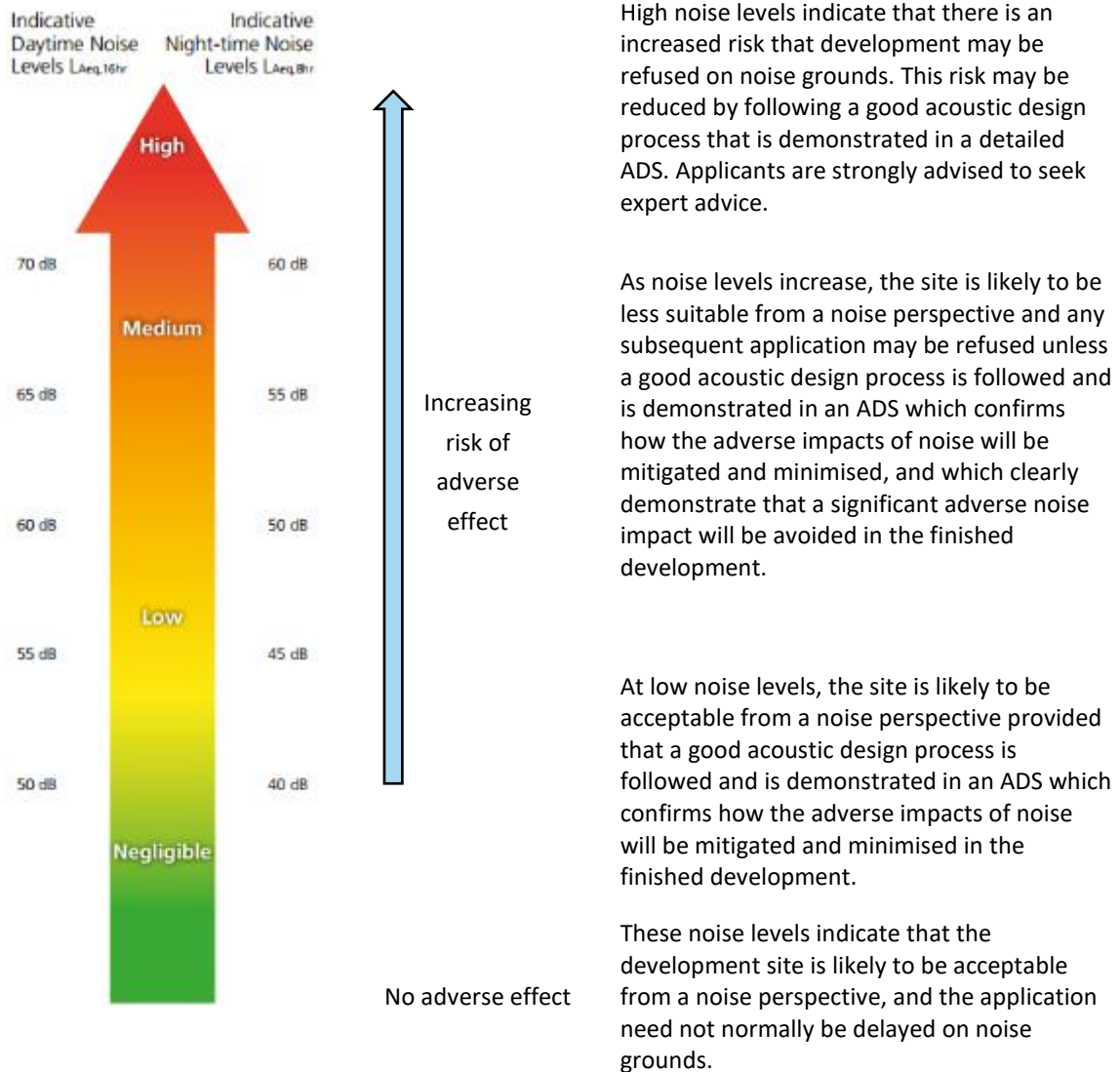


Figure 1 Notes:

- a. Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.
- b. Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is “not dominant”.
- c. $L_{Aeq,16hr}$ is for daytime 07:00 – 23:00, $L_{Aeq,8hr}$ is for night-time 23:00 – 07:00.
- d. An indication that there may be more than 10 noise events at night (23:00 – 07:00) with $L_{Amax,F} > 60$ dB means the site should not be regarded as negligible risk.

A2.1.2.2 ProPG is clear that an Acoustic Design Statement should be included as part of a planning application where the risk is anything above ‘negligible’.

A2.1.3 Stage 2 – Full Assessment

A2.1.3.1 Stage 2 of ProPG describes four elements required for a full assessment. These are:

- **Element 1** – demonstrating a “Good Acoustic Design Process”
- **Element 2** – observing internal “Noise Level Guidelines”
- **Element 3** – undertaking an “External Amenity Area Noise Assessment”; and
- **Element 4** – the consideration of “Other Relevant Issues”.

A2.1.3.2 A summary of the considerations required in each of the four elements is provided in **Table A.2.1.2**.

Table A.2.1.2: ProPG Stage 2 – Summary of Four Key Elements

Element	Potential Effect Without Noise Mitigation
<p>Element 1 Good Acoustic Design Process</p>	<p>Considerations include: Good acoustic design is not just compliance with recommended internal and external noise exposure standards. Good acoustic design should provide an integrated solution whereby the optimum acoustic outcome is achieved, without design compromises that will adversely affect living conditions and the quality of life of the inhabitants or other sustainable design objectives and requirements.</p> <p>Using fixed unopenable glazing for sound insulation purposes is generally unsatisfactory and should be avoided. Any reliance upon building envelope insulation with closed windows should be justified in supporting documents</p> <p>The Planning Application MUST:</p> <ul style="list-style-type: none"> • Check the feasibility of relocating, or reducing noise levels from relevant sources. • Consider options for planning the site or building layout. • Consider the orientation of proposed building(s). • Select construction types and methods for meeting building performance requirements. • Examine the effects of noise control measures on ventilation, fire regulation, health and safety, cost, CDM (construction, design and management) etc. • Assess the viability of alternative solutions. • Assess external amenity area noise.
<p>Element 2 Internal Noise Level Guidelines</p>	<p>Considerations include:</p> <ul style="list-style-type: none"> • Reference to BS 8233:2014 ‘Guidance on Sound Insulation and Noise Reduction for Buildings’ for internal noise level guidelines • Most residents value the ability to open windows at will, for a variety of reasons, and LPAs should therefore normally request that designers principally aim, through the use of good acoustic design, to achieve the internal noise level guidelines in noise-sensitive rooms with windows open. Where internal noise levels are assessed with windows closed the justification for this should be included in the ADS. <p>In the case of sites exposed to industrial and/or commercial noise:</p>

Element	Potential Effect Without Noise Mitigation
<p>Element 3 External Amenity Area Noise Assessment</p>	<ul style="list-style-type: none"> • Where industrial and/or commercial noise is present on the site and is considered to be “dominant” (i.e., where the impact would be rated as adverse or greater (subject to context)) then this is outside the scope of this ProPG and regard should be had to the guidance in BS 4142:2014. • In the special case where industrial and/or commercial noise is present on the site but is “not dominant” (i.e. where the impact would be rated as lower than adverse (subject to context) if a BS 4142:2014 assessment was to be carried out), its contribution may be included in the noise level used to establish the degree of risk in Stage 1 and may also be included in the consideration of Stage 2 Element 2 Internal Noise Level Guidelines (and if included, this should be clearly stated). <p>The assessment must provide and demonstrate:</p> <ul style="list-style-type: none"> • Full details of the external amenity area noise assessment should be included in an Acoustic Design Statement. • The term “assessment” is deliberately used because this element concerns more than just the level of noise outside. • ProPG external amenity area noise assessment reflects and extends the advice contained in BS 8233:2014 and the current Government guidance in PPG-Noise <p>In the case of sites exposed to industrial and/or commercial noise:</p> <ul style="list-style-type: none"> • Where external amenity areas are exposed to “dominant” industrial and/or commercial noise, the impact of the noise should be assessed in accordance with BS 4142:2014 over the time period that the amenity area is likely to be used. • In the special case where industrial and/or commercial noise is present on the site but is “not dominant”, its contribution may be included in the noise level used to establish the degree of risk in Stage 1 and may also be included in the consideration of Stage 2 Element 3 External Amenity Area Noise Assessment (and if included, this should be clearly stated).
<p>Element 4 Assessment of Other Relevant Issues</p>	<p>Consideration should be given to:</p> <ul style="list-style-type: none"> • Compliance with relevant national and local policy: i.e., NPSE, PPG-Noise and The Environmental Noise Regulations. • Magnitude and extent of compliance with ProPG • Likely occupants of the development • Acoustic design vs unintended adverse consequences: Examples include sealed up balconies that result in a lack of connection with the external environment, roadside barriers that remove views or prevent crossing roads, sealed facades that affect personal control over the internal environment etc. Wherever possible, such unintended adverse consequences should be obviated by good acoustic design. • Acoustic design vs wider planning objectives

A2.1.4 Acoustic Design Statement (ADS)

A2.1.4.1 ProPG requires that the Acoustic Design Statement (ADS) provides sufficient evidence that the ProPG Stage 1 and Stage 2 Elements 1 – 4 have been followed. It also advises that the ADS should be proportionate to the scale of the development and the degree of noise risk at the proposed development site. In this context, ProPG states that the level of detail to be provided within the ADS should increase with the increasing level of risk.

A2.1.5 Supporting Decision-Makers

A2.1.5.1 ProPG also provides advice and support to decision-makers when taking into account noise and new residential development. These recommendations are aligned to the outcomes of Stage 1 and Stage 2 of the assessment along with the considerations made within the Acoustic Design Statement. Section 3 of ProPG details the recommendations to decision-makers.

A2.1.6 Sites Exposed to Industrial and/or Commercial Noise

A2.1.6.1 In the case of sites exposed to industrial and/or commercial noise, ProPG states that if the industrial and/or commercial noise is present but not dominant, then its contribution may be included in the noise level used to establish the degree of risk.

A2.1.6.2 If the industrial and/or commercial noise is considered to be dominant, then the risk assessment should not be applied to the industrial or commercial noise and instead the assessment should follow the methodology and guidance provided in British Standard 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' (BS 4142:2014+A1:2019).

A2.1.6.3 ProPG states that "[t]he judgement on whether or not to undertake a BS 4142:2014 assessment to determine dominance should be proportionate to the level of risk. In low risk cases a subjective judgement of dominance, based on audibility, would normally be sufficient."

A2.2 British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'

A2.2.1.1 BS 8233:2014 provides guidance for the control of noise in and around buildings. It is applicable to the design of new buildings, or refurbished buildings undergoing a change of use.

A2.2.1.2 BS 8233:2014 provides noise guidance for buildings of different uses, however in respect to dwellings and habitable residential spaces, Table 4 of BS 8233:2014 provides guideline values that it is desirable not to exceed during daytime and night-time periods. These guideline values are reproduced in **Table A.2.2.1**.

Table A.2.2.1: Indoor Ambient Noise Levels for Residential Dwellings

Activity	Location	Daytime Guideline (07:00-23:00hrs)	Night-time Guideline (23:00-07:00hrs)
Resting	Living Room	35 dB $L_{Aeq, 16hr}$	-
Dining	Dining Room / Area	40 dB $L_{Aeq, 16hr}$	-
Sleeping (Daytime Resting)	Bedroom	35 dB $L_{Aeq, 16hr}$	30 dB $L_{Aeq, 8hr}$

- A2.2.1.3 The internal noise requirements are not intended to be met with open windows, although BS 8223:2014 states that the internal noise levels should take account of the proposed ventilation strategy.
- A2.2.1.4 BS 8233:2014 also notes that: *“Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved”*. This sentence refers to the WHO ‘Guidelines for Community Noise’ (WHO, 1999).
- A2.2.1.5 BS 8233:2014 does not provide specific guidance on noise levels for regular individual noise events, such as passing trains, which can cause sleep disturbance. Guidance on suitable noise levels for individual events is provided in ProPG, which states:
- ‘In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as source, number, distribution, predictability and regularity of noise events’.*
- A2.2.1.6 On this basis, it is considered appropriate to adopt the 10th highest $L_{Amax,F}$ noise event occurring in the night time period for the purposes of the assessment.

A2.3 World Health Organization ‘Environmental Noise Guidelines for the European Region’ (WHO, 2018)

- A2.3.1.1 The guidelines presented within the World Health Organization’s (WHO) ‘Environmental Noise Guidelines for the European Region’ (WHO, 2018) complement the WHO ‘Guidelines for Community Noise’ (WHO, 1999) and the WHO ‘Night Noise Guidelines for Europe’ (WHO NNG, 2009).
- A2.3.1.2 The guidelines recommend noise exposure-response relationships that are mostly related to the noise exposure indicators L_{den} and L_{night} , with the aim of *“protecting human health from exposure to environmental noise originating from various sources: transportation (road traffic, railway, aircraft) noise, wind turbine noise and leisure noise”*.
- A2.3.1.3 The guidelines provide source-specific recommendations on noise exposures. **Table A.2.3.1** presents the recommendations relating to transportation sources from the guidance.

Table A.2.3.1: Source Specific Recommendations on Noise Exposures

Source	Average Noise Exposure	Night Noise Exposure
Road traffic noise	Below 53 dB L_{den} strongly recommended	Below 45 dB L_{night} strongly recommended
Railway noise	Below 54 dB L_{den} strongly recommended	Below 44 dB L_{night} strongly recommended
Aircraft noise	Below 45 dB L_{den} strongly recommended	Below 40 dB L_{night} strongly recommended

A2.3.1.4 Notably, the L_{den} parameter is a compound noise indicator, and is representative of the average sound pressure level over all days, evenings and night in a year, subject to an evening penalty of 5 dB and a night penalty of 10 dB. Whilst the WHO guidelines (2018) adopt the L_{den} as an appropriate indicator for adverse health effects, the $L_{Aeq, T}$ parameter, as advocated in Government policy and legislation is deemed to be the appropriate parameter for the determination of likely adverse impacts on health and quality of life.

A3 Measured Sound Levels

Figure A.3.1: Location LT1 Unattended Measurements – Whole Period

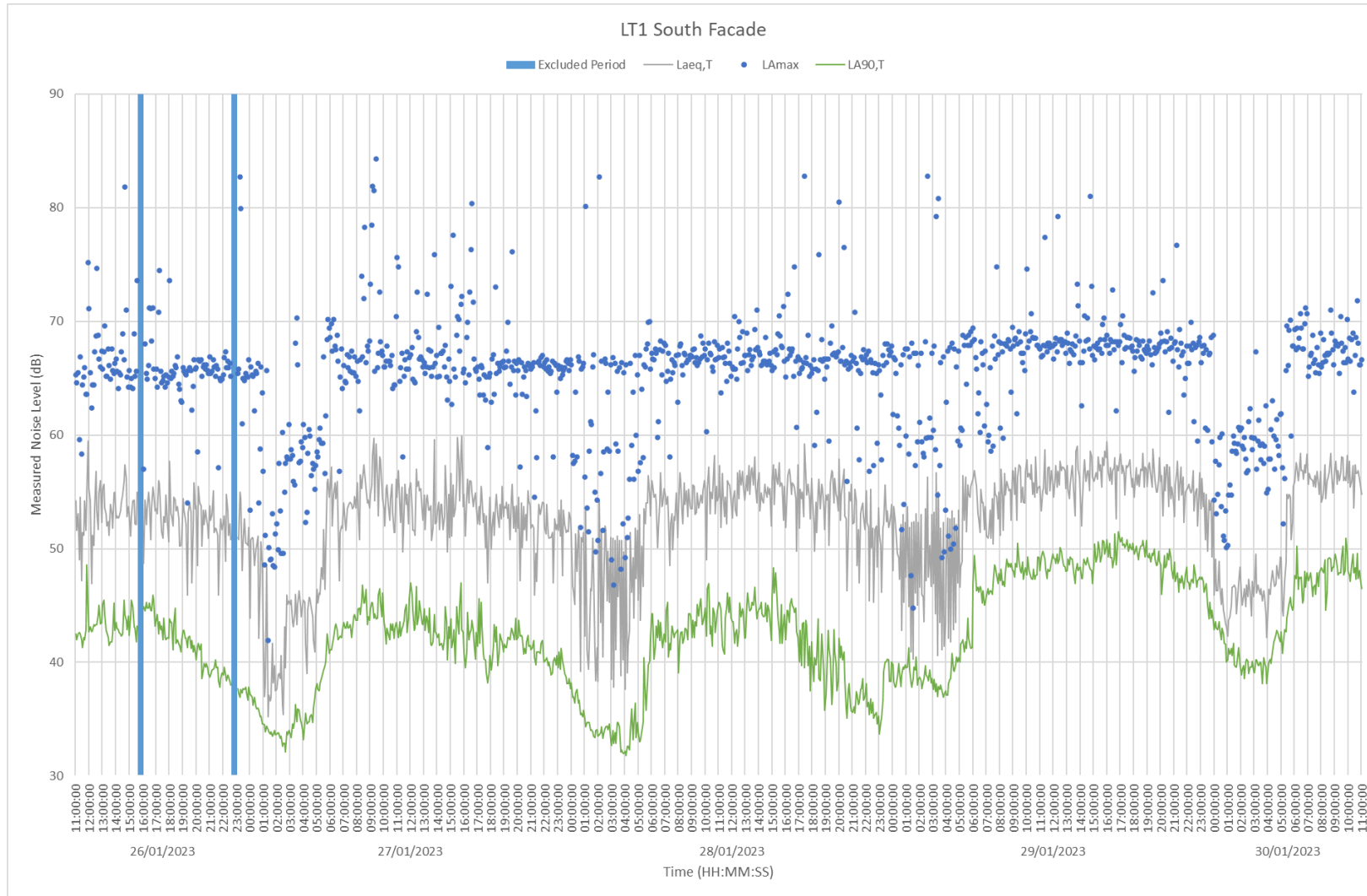


Figure A.3.2: Location LT2 Unattended Measurements – Whole Period

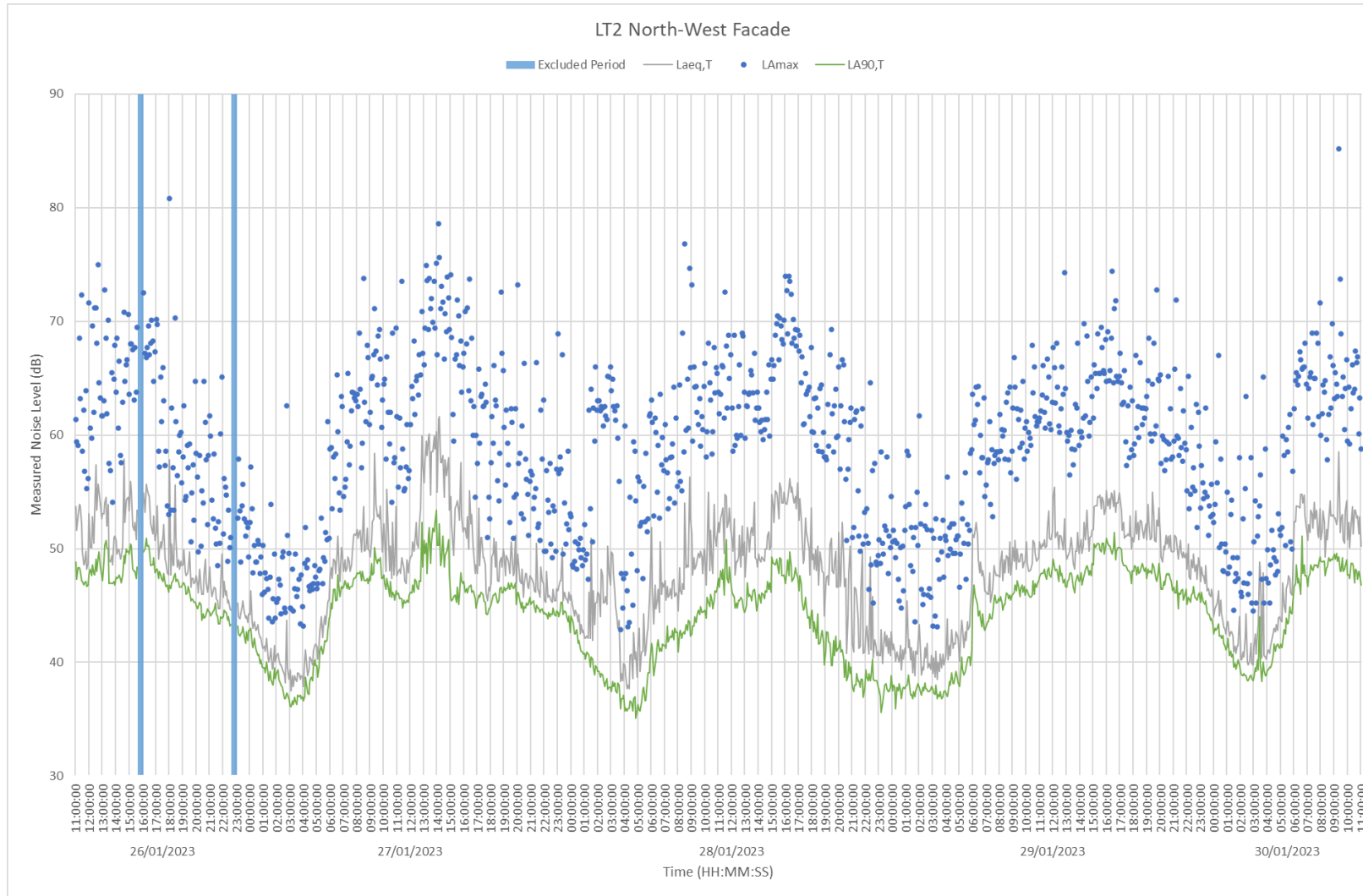


Figure A.3.3: Location LT3 Unattended Measurements – Whole Period

