181-183 York Way & 282a Camden Road London

Environmental Noise Survey and Noise Impact Assessment Report

24734/NIA1

29 September 2017

For:
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Hann Tucker Associates

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Contents

Attachments

1.0 Introduction

Redevelopment is proposed at 181-183 York Way & 282a Camden Road including the addition of a new rear extension and new roof extension to provide additional residential flats.

Whilst the upper floors of the building are already residential in nature, since it is located close to a main road (Camden Road), Camden London Borough Council have requested that a noise impact assessment is undertaken. Hann Tucker Associates have therefore been commissioned to undertake an environmental noise survey and noise impact assessment in order to assess the suitability of the proposed extensions for residential use.

This report presents the methodology and findings of our noise survey and assessment in the context of national planning policies and the policy of the Local Authority.

2.0 Objectives

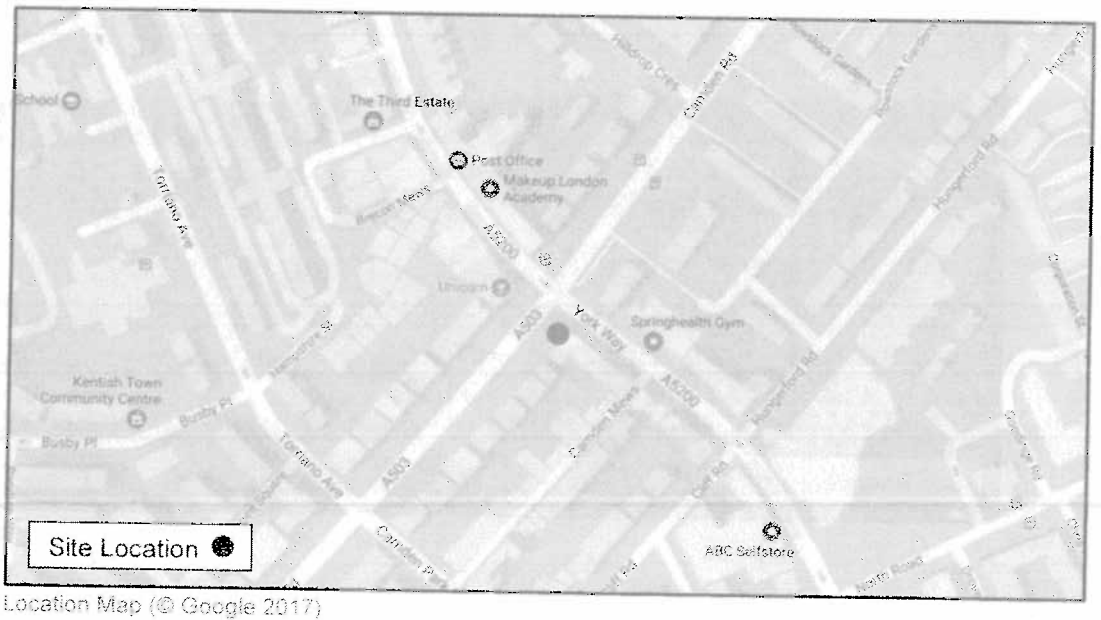
To undertake an environmental noise survey to establish the existing L_{Amax}, L_{Aeq} and L_{A90} environmental road, rail and air traffic noise levels at selected positions.

To undertake a noise assessment, based on the results of the survey, to assess the suitability of the site for residential use with reference to national and local planning policies.

3.0 Site Description

3.1 Location

The site is located on the corner of Camden Road and York Way in Camden. The location is shown in the Location Map below.



Location Map (© Google 2017)

The site falls within the jurisdiction of Camden London Borough Council.

3.2 Description

The site is a ground plus 2No. storey building with a basement comprising commercial use on the ground floor and basement, and residential flats on the first and second floor. It is the end of a terrace of buildings of the same height and use type on York Way. York way lies to the north-east, with Camden road to the north-west. There are detached residential properties of similar height directly to the south-west on Camden Road.

The dominant noise sources at this location were noted to be road traffic from Camden Road and York way. However as noted above there are a large number of existing residential properties in the area all experiencing very similar levels of road traffic noise.

The site is shown in the Site Plan below.

Site Plan (© 2017 Google)

4.0 Acoustic Terminology

For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.

5.0 Methodology

The survey was undertaken by Luke Rendell BA(Hons) MIOA.

5.1 Procedure

Fully manned environmental noise monitoring was undertaken from approximately 12:00 hours on 25th September 2017 to approximately 12:00 hours on 26th September 2017.

During the survey period the wind conditions were calm and the sky was generally patchy cloud. We understand there was no rain during the survey and that road surfaces were dry throughout the survey period.

Measurements were taken of the A-weighted (dBA) L_{90}, L_{eq} and L_{max} sound pressure levels over periods of not less than 15 minutes in each hour. Atypical noises were excluded as far as reasonably possible. The noise levels measured are therefore assumed to be representative of the noise climate during the hour in which the measurements were taken.

In addition, at each unmanned position typical L_{90}, L_{eq} and L_{max} octave band spectra (from 63Hz to 8kHz) were taken for both a daytime and a night time period in order to gain a more detailed description of the prevailing noise climate.

5.2 Measurement Positions

The noise level measurements were undertaken at 4No. positions around the development site. The measurement positions are described in the table below.

Position No	Description
1	The sound level meter was located on a first floor balcony towards the south corner of the site. The microphone was attached to a pole and positioned at 1m from the building façade, overlooking the proposed location of the rear extension. This position was selected to be representative of noise levels incident on the road facing façade of the proposed rear extension.
2	The sound level meter was located on a second floor balcony towards the south corner of the site. The microphone was attached to a pole and positioned at 1m from the recessed balcony façade, overlooking the gardens to the south-east. This position was selected to be representative of noise levels incident on the rear windows of the proposed rear extension (which will be screened from Camden Road by the extension itself). However this position receives less screening than the proposed windows.
2m	The sound level meter was handheld and located at roof level overlooking the rear gardens of the properties on York Way and was selected to be a comparative measurement with Position 2, since this position receives screening more comparable to that experienced by the proposed rear windows of the rear extension (although there was nowhere to securely attach an unmanned sound level meter at this position).
3	The sound level meter was located at roof level, and the microphone was attached to a pole and mounted to existing fixings associated with the TV aerial. The microphone was located at 1m from the building façade overlooking the crossroads between Camden Road and York Way. This position was selected to represent the worst case noise levels incident on the upper floors of the building for use in assessing noise incident on the proposed roof extension.

The measurements positions are shown on the plan below.

Plan Showing Unmanned Measurement Positions (© Google 2017)

5.3 Instrumentation

The instrumentation used during the manned survey is presented in the table below:

Description	Manufacturer	Type	Serial Number	Calibration
Position 1 Type 1 ½" Condenser Microphone	PCB	377B02	122885	Calibration on 16/05/2017
Position 1 Type 1 Preamp	Larson Davis	PRM902	3692	Calibration on 16/05/2017
Position 1 Type 1 Data Logging Sound Level Meter	Larson Davis	824	3444	Calibration on 16/05/2017
Position 2 Type 1 Data Logging Sound Level Meter	Larson Davis	824	3803	Calibration on 08/12/2016
Position 2 Type 1 Preamp	Larson Davis	PRM902	4214	Calibration on 08/12/2016
Position 2 Type 1 ½" Condenser Microphone	Bruel & Kjaer	4189	2470596	Calibration on 08/12/2016
Position 2m Type 1 Data Logging Sound Level Meter	Bruel & Kjaer	2250	3007292	Calibration on 20/03/2017
Position 2m Type 1 ½" Condenser Microphone	Bruel & Kjaer	4189	3004879	Calibration on 20/03/2017
Position 2m Type 1 Preamp	Bruel & Kjaer	ZC0032	23396	Calibration on 20/03/2017
Position 3 Type 1 ½" Condenser Microphone	Bruel & Kjaer	4189	2470594	Calibration on 25/07/2017
Position 3 Type 1 Preamp	Larson Davis	PRM902	3936	Calibration on 25/07/2017
Position 3 Type 1 Data Logging Sound Level Meter	Larson Davis	824	3157	Calibration on 25/07/2017
Type 1 Calibrator	Bruel & Kjaer	4231	2610161	Calibration on 09/05/2017

Each sound level meter fitted with a microphone windshield.

Each sound level meter, with extension cable fitted where appropriate, was calibrated prior to and on completion of the survey. No significant changes were found to have occurred (no more than 0.1 dB).

6.0 Results

The results have been plotted on Time History Graphs 24734/TH1 to 24734/TH3 enclosed presenting the 15 minute A-weighted (dBA) L_{90}, L_{eq} and L_{max} levels at positions 1, 2, and 3 throughout the duration of the survey.

Measured daytime (07:00-19:00 hours), evening (19:00-23:00) and night-time (23:00-07:00 hours) $L_{Aeq,T}$ noise levels at each position are presented in the table below:

Measured $L_{Aeq,T}$ Noise Levels (dBA re 2.0 x 10^{-5} Pa)			
Position	Daytime (07:00 to 19:00)	Evening (19:00 to 23:00)	Night-time (23:00 to 07:00)
1	68	66	66
2	66	64	64
3	73	72	71

6.1 Correction to Measured Noise Levels

In order to use the above noise data to assess the proposed scheme it may be necessary to apply corrections to the data in order to reflect the proposed geometry.

Position 1 was approximately 7m further from Camden road than the closest windows of the proposed rear extension. Our calculations indicate that a correction of +2dB should be applied due to reduction in distance loss.

The rear bedroom windows of the proposed extension will be completely screened from Camden road by the extension itself. On site it was not possible to find a secure accessible location which was completely representative of this; whilst the microphone at Position 2 was very close to the proposed south-east facing windows and received some screening from the existing building, there was still line of sight between the measurement position and a small portion of Camden road. Therefore noise levels experienced by the proposed windows will be lower than those measured. In addition to this unmanned measurement position, a comparative manned measurement was therefore undertaken at Position 2m (which was completely screened from Camden Road) between approximately 11:45-12:00 hours. The difference between the L_{Aeq} noise levels measured concurrently at both positions was 5dB (63dBA at Position 2 and 58dBA at Position 2m). Therefore a correction factor of -5dB has been applied to the measured data at Position 2.

We understand the façade of the proposed roof extension is to be set back from the façade of the rest of the building. Our calculations indicate that the parapet just meets the line of sight between the centre of the proposed roof extension windows and the road centre, corresponding to 5dB screening loss. In addition to this we predict a reduction of 1dB due to distance loss, making the appropriate correction -6dB.

The table below presents the noise data with the above corrections applied:

Corrected $L_{Aeq,T}$ Noise Levels (dBA re 2.0 x 10^{-5} Pa)			
Position	Daytime (07:00 to 19:00)	Evening (19:00 to 23:00)	Night-time (23:00 to 07:00)
1	70	68	68
2	61	59	59
3	67	66	65

6.2 Discussion Of Noise Climate

During the periods we were on site the dominant noise sources were noted to be road traffic noise from Camden Road and York Way.

7.0 Relevant Planning Policies and Guidance

7.1 Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) was published in March 2010. The NPSE is the overarching statement of noise policy for England and applies to all forms of noise other than occupational noise, setting out the long term vision of Government noise policy which is 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."

That vision is supported by the following aims which are reflected in three of the four aims for planning policies and decisions in paragraph 123 of the NPPF (see paragraph 8.2 (b) below):

"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."*

The Explanatory Note to the NPSE has three concepts for the assessment of noise in this country:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise.

LOAEL – Lowest Observable Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

None of these three levels are defined numerically and for the SOAEL the NPSE makes it clear that the noise level is likely to vary depending upon the noise source, the receptor and the time of day/day of the week, etc. The need for more research to investigate what may represent an SOAEL for noise is acknowledge in the NPSE and the NPSE asserts that not stating specific SOAEL levels provides policy flexibility in the period until there is further evidence and guidance.

The NPSE concludes by explaining in a little more detail how the LOAEL and SOAEL relate to the three aims listed in paragraph (b) above. It starts with the aim of avoiding significant adverse effects on health and quality of life, then addresses the situation where the noise impact falls between the LOAEL and the SOAEL when *"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."* The final aim envisages pro-active management of noise to improve health and quality of life, again taking into account the guiding principles of sustainable development which include the need to minimise travel distance between housing and employment uses in an area.

7.2 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) was published in March 2012 and replaced the previous national planning guidance document Planning Policy Guidance 24: *Planning and Noise* (PPG24).

The main reference to noise within the NPPF is at paragraph 123, reproduced below:

> *"123. Planning policies and decisions should aim to:*
>
> - *Avoid noise from giving rise to significant adverse impacts[27] on health and quality of life as a result of new development;*
> - *Mitigate and reduce to a minimum other adverse impacts[27] 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;*[28] *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 reference numbers 27 and 28 point respectively to the Explanatory Note to the NPSE and the provisions of the Environmental Protection Act 1990 *"and other relevant law".*

The spirit of the Localism Act and the NPPF would suggest that of the guidelines cited, it is guidelines adopted as policy by the Local Planning Authority (if such exist) that should prevail, at least until the Government publishes relevant technical guidance under the NPPF.

7.3 Planning Practice Guidance on Noise

Planning Practice Guidance (PPG) under the NPPF has been published by the Government as a web based resource at http://planningguidance.planningportal.gov.uk/blog/guidance/. This includes specific guidance on Noise although, like the NPPF and NPSE the PPG does not provide any quantitative advice. It seeks to illustrate a range of effect levels in terms of examples of outcomes as set out in the following table:

Perception	Examples of Outcomes	Increasing effect level	Action
Not noticeable	No effect	No Observed Effect	No specific measures required
Noticeable 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 Effect	No specific measures required
		Lowest Observed Adverse Effect Level	
Noticeable 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.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	
Noticeable 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	Significant Observed	Avoid

	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.	Adverse Effect	
Noticeable 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 hard, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

7.4 The London Plan

The London Plan, published in 2011 with minor revisions in 2013, 2015 and 2016, provides an overall strategic plan for London, and it sets out a fully integrated economic, environmental, transport and social framework for the development of the capital to 2031. The Plan brings together the Mayor's strategies, including policy on a range of environmental issues, such as climate change, air quality, noise and waste. London boroughs' local plans need to be in general conformity with the London Plan, and its policies guide decisions on planning applications by councils and the Mayor.

Policy 7.15 specifically relates to noise and states:

"Development proposals should seek to reduce noise by:

a) *Minimising the existing and potential; ad verse impacts of noise on, from, within, or in the vicinity of, development proposals;*
b) *Separating new noise sensitive development from major noise sources wherever practicable through the use of distance, screening, or internal layout in preference to sole reliance on sound insulation;*
c) *Promoting new technologies and improving practices to reduce noise at source."*

London Plan – Housing Supplementary Planning Guidance

The Housing SPG 2016 highlights the elements of the London Plan that are relevant to housing development, and where applicable, provides more detail. The SPG states:

"Noise – Baseline

Standard 5.3.1 (and Policy 7.15) – The layout of adjacent dwellings and the location of lifts and circulation spaces should seek to limit the transmission of noise to sound sensitive rooms within dwellings.

Policy 7.15 Reducing Noise and Enhancing Soundscapes requires development proposal to seek to reduce noise and manage the effects of noise. It is another important aspect of retreat and privacy in a dwelling. Noise from the street and adjoining properties can cause stress, sleep disturbance and friction between neighbours as recognised in the NPPF154.

2.3.35 All dwellings should be built with acoustic insulation and tested to current Building Regulations standards 155. However, acoustic insulation should not be relied upon as the only means of limiting noise and the layout and placement of rooms within the building should be considered at an early stage in the design process to limit the impact of external noise on bedrooms and living rooms. The impact of noise should also be considered in the placement of private external spaces."

7.5 Local Planning Policy

The site falls under the jurisdiction of Camden London Borough Council.

Section 3 of their document 'Camden Development Policies 2010-2025' provides the following tables detailing noise levels at which planning permission will not be granted (Table A) and at and above which attenuation measures will be required (Table B).

Table A: Noise levels on residential sites adjoining railways and roads at which planning permission will not be granted

Noise description and location of measurement	Period	Time	Sites adjoining railways	Sites adjoining roads
Noise at 1 metre external to a sensitive façade	Day	0700-1900	74 dB L_{Aeq},12h	72 dB L_{Aeq},12h
Noise at 1 metre external to a sensitive façade	Evening	1900-2300	74 dB L_{Aeq},4h	72 dB L_{Aeq},4h
Noise at 1 metre external to a sensitive façade	Night	2300-0700	66 dB L_{Aeq},8h	66 dB L_{Aeq},8h

With reference to the noise levels presented in Section 6.1, whilst corrected night-time noise levels at Position 1 exceed Table A by 2dB, this position is only intended to be used to assess internal noise levels within the road facing Living Room/Kitchens of the proposed rear extension which have daytime use only; the bedrooms are to be located on the quieter façade as is best acoustic practise.

Table B: Noise levels on residential streets adjoining railways and roads at and above which attenuation measures will be required

Noise description and location of measurement	Period	Time	Sites adjoining railways	Sites adjoining roads
Noise at 1 metre external to a sensitive façade	Day	0700-1900	65 dB L_{Aeq},12h	62 dB L_{Aeq},12h
Noise at 1 metre external to a sensitive façade	Evening	1900-2300	60 dB L_{Aeq},4h	57 dB L_{Aeq},4h
Noise at 1 metre external to a sensitive façade	Night	2300-0700	55 dB L_{Aeq},1h	52 dB L_{Aeq},1h
Individual noise events several times an hour	Night	2300-0700	>82 dB L_{Amax} (S time weighting)	>82 dB L_{AMAX} (S time weighting)

With reference to the noise levels presented in Section 6.1, attenuation measures will be required on this scheme, as detailed in sections 9.0 and 10.0

7.6 World Health Organisation Guidelines on Community Noise

BS8233:2014 is based upon the current World Health Organisation (WHO) guidance "*Guidelines on Community Noise*". A summary of the noise guidelines relevant to the proposed development is presented in the table below.

Residential Environment	Critical Health Effect(s)	L_{Aeq}	L_{AFmax}	Time Base
Outdoor living area	Serious annoyance, daytime and evening	55	-	07:00-23:00
	Moderate annoyance, daytime and evening	50	-	07:00-23:00
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	-	07:00-23:00
Inside bedrooms	Sleep disturbance, night-time	30	45	23:00-07:00
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	60	23:00-07:00

These WHO guidelines are based, in almost all cases, on the lower threshold below which the occurrence rates of any particular effect can be assumed to be negligible.

The internal and external noise level criteria presented in BS8233:2014 for residential dwelling are generally consistent with the WHO guidelines, although some differences are apparent. For

instance the WHO guidelines refer to research that suggests *"For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{AFmax} more than 10-15 times per night."* (Vallet & Vernet, 1991). The current version of BS8233 does not identify a specific L_{AFmax} level although it suggests that a guideline value may be set using that parameter depending on the character and number of individual noise events per night.

7.7 British Standard BS8233: 2014

British Standard 8233: 2014 "Guidance on sound insulation and noise reduction for buildings" provides guidance for the control of noise in and around buildings.

7.7.1 Internal Areas

BS8233:2014 Section 7.7.2 titled "Internal ambient noise levels for dwellings" states:

"In general for steady external noise sources, it is desirable that internal ambient noise levels do not exceed the following guideline values:

Activity	Location	Desirable Internal Ambient Criteria	
		07:00 – 23:00	23:00 to 07:00
Resting	Living Rooms	35 dB $L_{Aeq,16hour}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq,16hour}$	-
Sleeping (Daytime Resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

Note 1 The above table provides recommended levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Groundborne noise is assessed separately and is not included as part of these targets, as human response to groundborne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

Note 2 The levels shown in the above table are based on the existing guidelines issued by the WHO and assume normal diumal fluctuations in external noise. In cases where local conditions do not follow a typical diumal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the levels recommended in the above table.

Note 3 These levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks nigh or News Year's Eve.

Note 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values.

Note 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.

If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment.

Note 6 Attention is drawn to the Building Regulations.

Note 7 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."

7.8 ProPG : Planning & Noise : 2017

7.8.1 The primary goal of the ProPG is to assist the delivery of sustainable development by promoting good health and well-being through the effective management of noise. It seeks to do that through encouraging a good acoustic design process in and around proposed new residential development having regard to national policy on planning and noise. It is applicable to noise from existing transport sources (noting that good professional practice should have regard to any reasonably foreseeable changes in existing and/or new sources of noise). The recommended approach is also considered suitable where some industrial or commercial noise contributes to the acoustic environment provided that is "not dominant".

7.8.2 This ProPG advocates a systematic, proportionate, risk based, 2-stage, approach. The approach encourages early consideration of noise issues, facilitates straightforward accelerated decision making for lower risk sites, and assists proper consideration of noise issues where the acoustic environment is challenging.

7.8.3 **The two sequential stages of the overall approach are:**

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

7.8.4 **The four key elements to be undertaken in parallel during Stage 2 of the recommended approach 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 – consideration of "Other Relevant Issues".

7.8.5 The ProPG considers suitable guidance on internal noise levels found in "BS8233:2014: Guidance on sound insulation and noise reduction for buildings". Table 4 in Section 7.7.2 of the standard suggests that "in general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values". The standard states (Section 7.7.1) that "occupants are usually more tolerant of noise without a specific character" and only noise without such character is considered in Table 4 of the standard.

Activity	Location	07:00 – 23:00 Hours	23:00 – 07:00 Hours
Resting	Living Room	35dB $L_{Aeq,16hr}$	-
Dining	Dining Room / Area	40dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq,16hr}$	30dB $L_{Aeq,16hr}$ 45dB $L_{Amax,F}$

NOTE 1 the Table provides recommended internal L_{Aeq} target levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Ground-borne noise is assessed separately and is not included as part of these targets, as human response to ground-borne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

NOTE 2 The internal L_{Aeq} target levels shown in the Table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the L_{Aeq} target levels recommended in the Table.

NOTE 3 These internal L_{Aeq} target levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.

NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. 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 45dB $L_{Amax,F}$ 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 the source, number, distribution, predictability and regularity of noise events (see Appendix A).

NOTE 5 Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7.

NOTE 6 Attention is drawn to the requirements of the Building Regulations.

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5dB and reasonable internal conditions still achieved. The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5dB, the more that most people are likely to regard them as "unreasonable". Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10dB, they are likely to be regarded as "unacceptable" by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing "unacceptable" noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form (See Section 3.D).

Figure 2. ProPG Internal Noise Level Guidelines (additions to BS8233:2014 shown in blue).

8.0 Proposed Design Target Internal Noise Levels

On the basis of BS8233:2014 we propose the following internal noise levels be adopted as design targets in the proposed habitable rooms:

Activity	Location	Desirable Internal Ambient Criteria	
		07:00 – 23:00	23:00 to 07:00
Resting	Living Rooms	35 dB $L_{Aeq,16hour}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq,16hour}$	-
Sleeping (Daytime Resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

Note: For this site the $L_{Aeq,T}$ noise parameter alone is considered to be sufficient (with reference to Note 4 of Section 7.7.2 of BS8233:2014) given the character of the noise climate we have measured.

Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target noise levels may be relaxed (subject to the requirements of any planning conditions) by up to 5 dB and reasonable internal conditions still achieved.

9.0 Achievable Internal Noise Levels

We have predicted the noise levels that would be achievable in the worst-case habitable rooms of both the proposed rear extension and roof extension at 181-183 York Way & 282a Camden Road, as detailed in the table below.

Our assessment, using the procedures of BS8233, is based upon the corrected noise levels presented in Section 6.1, the windows and ventilators detailed in the table below, and upon the cladding system (excluding the glazing) achieving a performance of at least R_w 45dB, which for example could be achieved with a single layer of plastered brick.

Worst Case Room	Indicative Minimum Sound Reduction Specification		Example Configuration (For Guidance Only)	Criterion	Calculated Worst Case Internal Noise Level
	Window R_w	Ventilator $D_{n,e,w}$			
Rear Extension Living Room	31	43	10/16/6 Double Glazing with Acoustic Air Brick / Attenuated In Wall Vent	35dB $L_{Aeq,16hr}$	35dB $L_{Aeq,16hr}$
Rear Extension Bedroom	30	32	4/16/4 Double Glazing with Hit and Miss Trickle Ventilator	30dB $L_{Aeq,8hr}$	27 dB $L_{Aeq,8hr}$
Roof Extension Living Room	30	32	4/16/4 Double Glazing with Hit and Miss Trickle Ventilator	35dB $L_{Aeq,16hr}$	34 dB $L_{Aeq,16hr}$
Roof Extension Bedroom	30	36	4/16/4 Double Glazing with Acoustic Trickle Ventilator	30dB $L_{Aeq,8hr}$	29 dB $L_{Aeq,8hr}$

10.0 Mitigation Measures

The predicted worst case internal noise levels with windows closed meet the proposed criteria. It is thus demonstrated that acceptable internal noise levels are achievable with double glazing and ventilators complying with the above indicative minimum sound reduction specification.

Predicted worst case internal noise levels with windows partially opened exceed the proposed target levels (as is often the case). The minimum mitigation available to future occupants would

be to close their window. Ventilation (incorporating suitable acoustic attenuation) will be provided to comply with the requirements of the Building Regulations Approved Document F whole dwelling ventilation. The occupants will thus have the option of keeping windows closed for most of the time and opening windows for purge ventilation.

This form of mitigation is supported within the Pro:PG which advises the following:

2.34 Where the LPA accepts that there is a justification that the internal target noise levels can only be practically achieved with windows closed, which may be the case in urban areas and at sites adjacent to transportation noise sources, special care must be taken to design the accommodation so that it provides good standards of acoustics, ventilation and thermal comfort without unduly compromising other aspects of the living environment. In such circumstances, internal noise levels can be assessed with windows closed but with façade openings used to provide *"whole dwelling ventilation"* in accordance with Building Regulations Approved Document F (e.g. trickle ventilators) in the open position (see Supplementary Document 2). Furthermore, in this scenario the internal L_{Aeq} target noise levels should not generally be exceeded.

2.35 It should also be noted that the internal noise level guidelines are generally not applicable under *"purge ventilation"* conditions as defined by Building Regulations Approved Document F, as this should only occur occasionally (e.g. to remove odour from painting and decorating or from burnt food).

At this stage of the design scheme the precise details of window to be used are not known, nor are the precise details of the ventilation.

The external envelope of the proposed residences will incorporate suitably specified glazing so as to achieve the proposed design target internal noise levels presented above.

Where ventilation is provided through the façade it shall be suitably acoustically attenuated to ensure the achievement of the proposed target internal noise levels is not compromised.

The Local Planning Authority may expect to be provided with details of the sound insulation treatments when available. Therefore in granting consent it would be appropriate for a planning condition to be imposed along the following lines. (based on the example condition 1 drawn from PPG24):

"Construction work shall not begin until a scheme for protecting the proposed [noise-sensitive development] from noise from the …… has been submitted to and approved by the local planning authority; all works which form part of the scheme shall be completed before [any part of] the [noise-sensitive development] is occupied."

11.0 Conclusions

A detailed environmental noise survey has been undertaken in order to establish the currently prevailing environmental noise climate around the site.

The environmental noise impact upon the proposed dwellings has been assessed in the context of national and local planning policies.

Appropriate target internal noise levels have been proposed. These are achievable using conventional mitigation measures in the form of double glazing and ventilators complying with the indicative minimum sound reduction specification given in Section 9.0.

The proposed development is thus considered compliant with the relevant planning policies.

The assessment shows the site is suitable for the proposed development in terms of noise.

Appendix A

The acoustic terms used in this report are defined as follows:

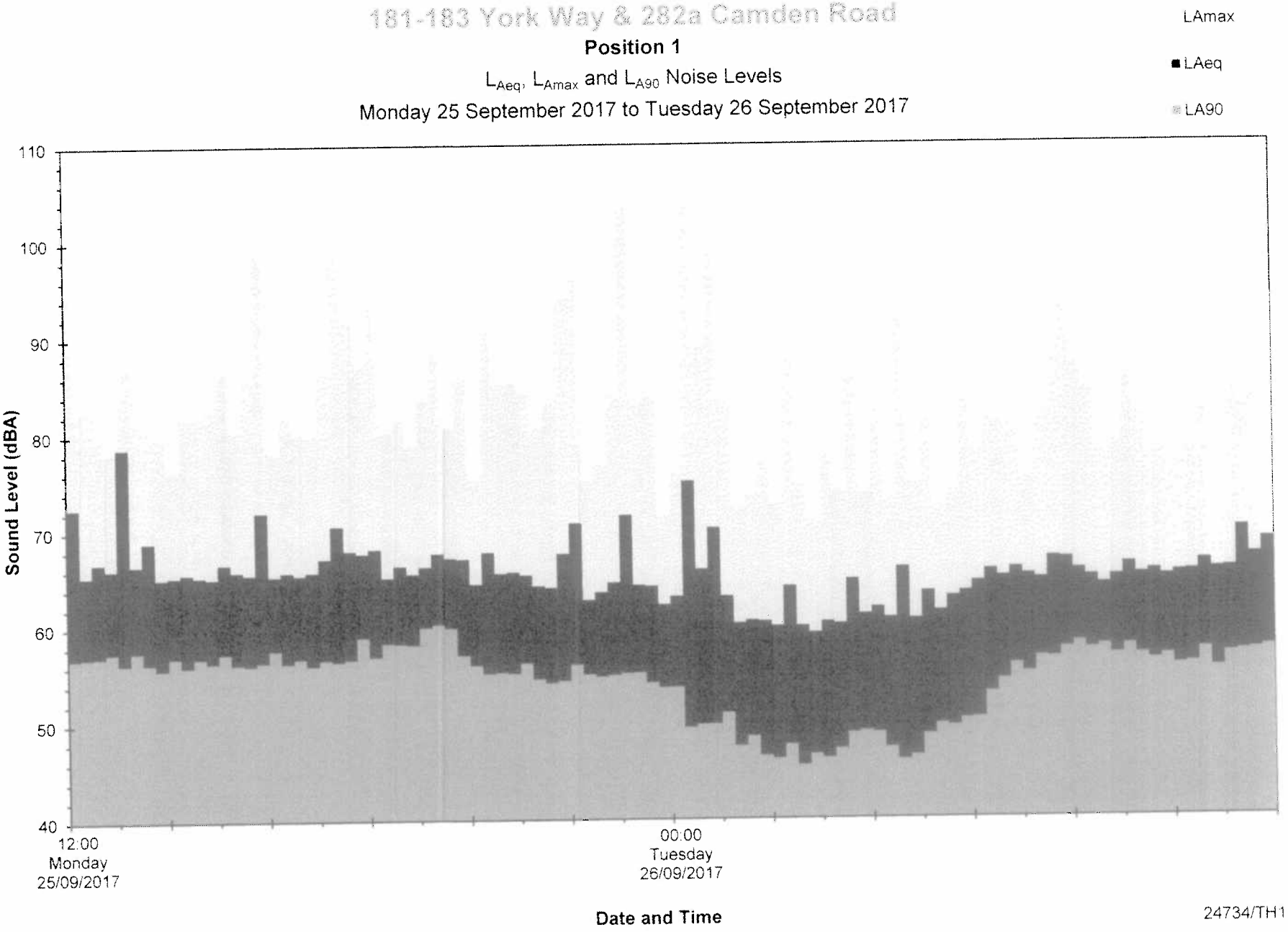
dB	Decibel - Used as a measurement of sound level. Decibels are not an absolute unit of measurement but an expression of ratio between two quantities expressed in logarithmic form. The relationships between Decibel levels do not work in the same way that non-logarithmic (linear) numbers work (e.g. 30dB + 30dB = 33dB, not 60dB).
dBA	The human ear is more susceptible to mid-frequency noise than the high and low frequencies. The 'A'-weighting scale approximates this response and allows sound levels to be expressed as an overall single figure value in dBA. The $_A$ subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted It should be noted that levels in dBA do not have a linear relationship to each other; for similar noises, a change in noise level of 10dBA represents a doubling or halving of subjective loudness. A change of 3dBA is just perceptible.
$L_{90,T}$	L_{90} is the noise level exceeded for 90% of the period *T* (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.
$L_{eq,T}$	$L_{eq,T}$ is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, *T*.
L_{max}	L_{max} is the maximum sound pressure level recorded over the period stated. L_{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{eq} noise level.
L_p	Sound Pressure Level (SPL) is the sound pressure relative to a standard reference pressure of 2×10^{-5} Pa. This level varies for a given source according to a number of factors (including but not limited to: distance from the source; positioning; screening and meteorological effects).
L_w	Sound Power Level (SWL) is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).

181-183 York Way & 282a Camden Road

Position 1

L_{Aeq}, L_{Amax} and L_{A90} Noise Levels

Monday 25 September 2017 to Tuesday 26 September 2017



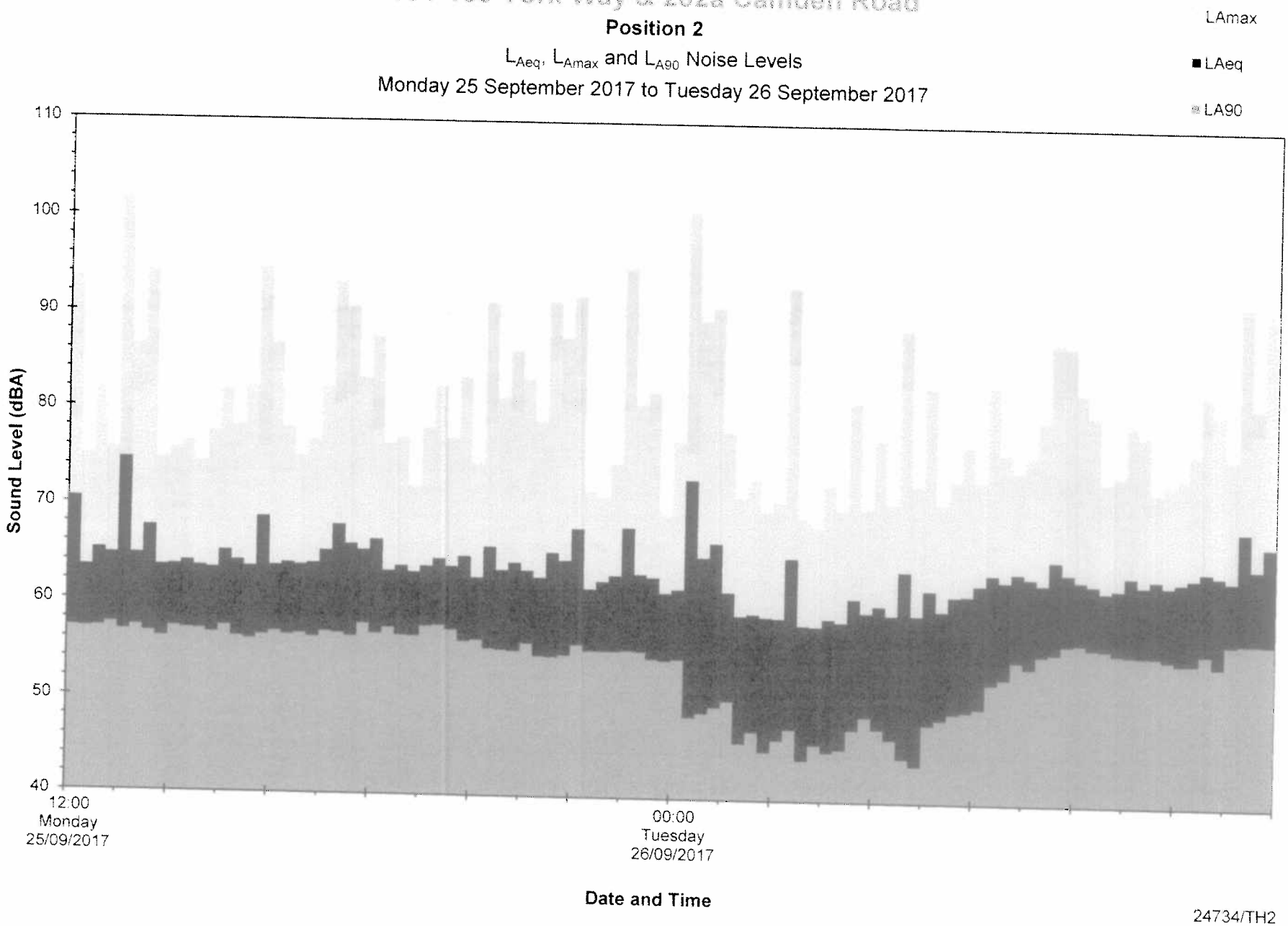
24734/TH1

181-183 York Way & 282a Camden Road

Position 2

L_{Aeq}, L_{Amax} and L_{A90} Noise Levels

Monday 25 September 2017 to Tuesday 26 September 2017



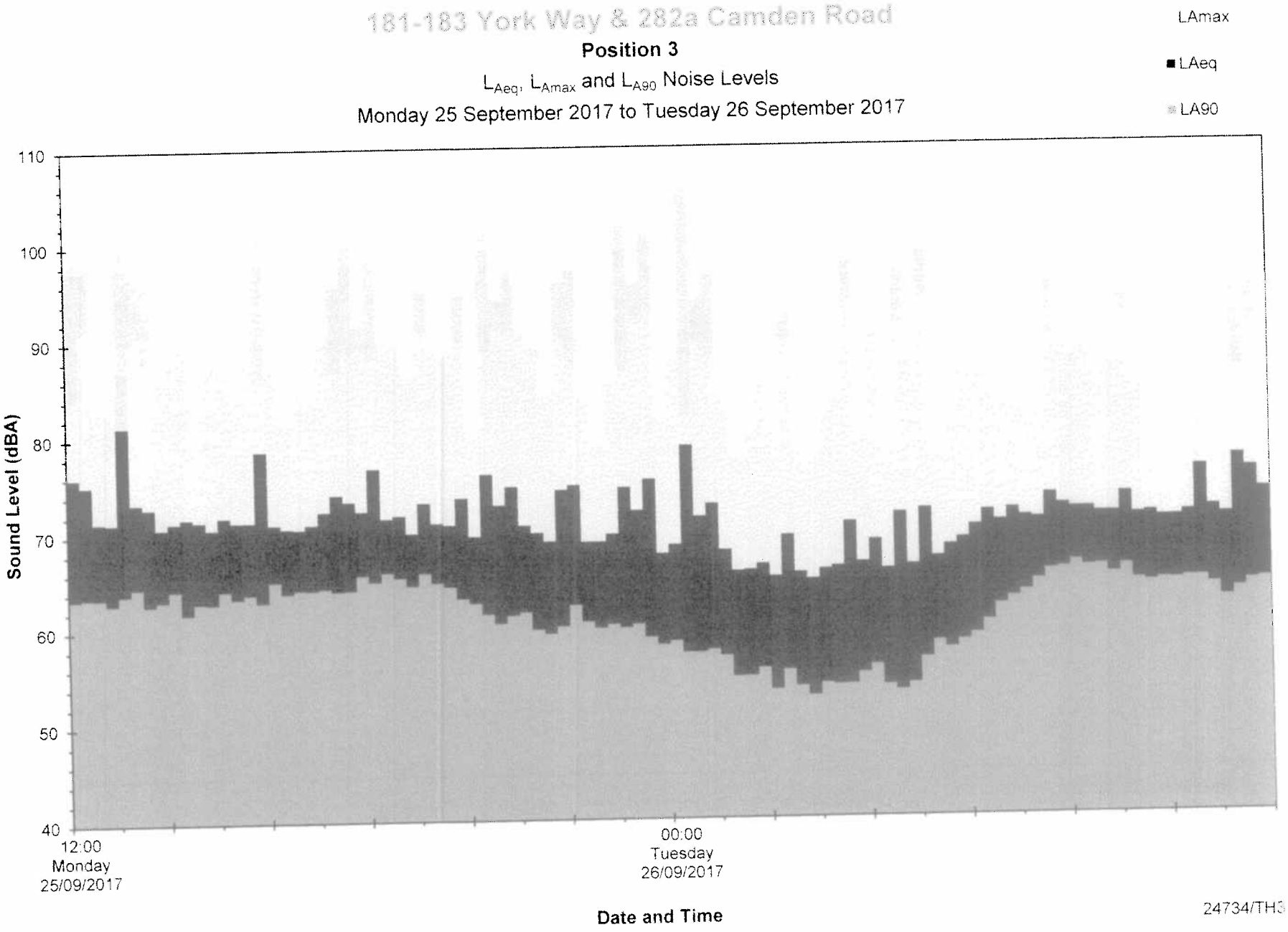
24734/TH2

181-183 York Way & 282a Camden Road

Position 3

L_{Aeq}, L_{Amax} and L_{A90} Noise Levels

Monday 25 September 2017 to Tuesday 26 September 2017



24734/TH3