329-331 Kentish Town Road London

Environmental Noise & Vibration Survey and Assessment Report

27152/NVR1

8 September 2020

For:
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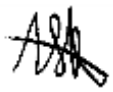
Document Control

Rev	Date	Comment	Prepared by	Authorised by
0	08/09/2020	-		
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1.0 Introduction

The building at 329-331 Kentish Town Road which extends from basement up to a 3rd floor is currently classed as retail space. A change of use is proposed on floors 1 to 3 from retail use to residential use. A small extension to the building is also proposed to the rear of the site.

Hann Tucker Associates have therefore been commissioned to undertake an environmental noise and survey and impact assessment in order to assess the suitability of the site 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 accessible positions.

Based on the results of the survey, to undertake a noise assessment to assess the suitability of the site for residential use in accordance with the Noise Policy Statement for England (NPSE), National Planning Policy Framework (NPPF), Planning Practice Guidance (ProPG), British Standard BS8233:2014 and Local Authority requirements.

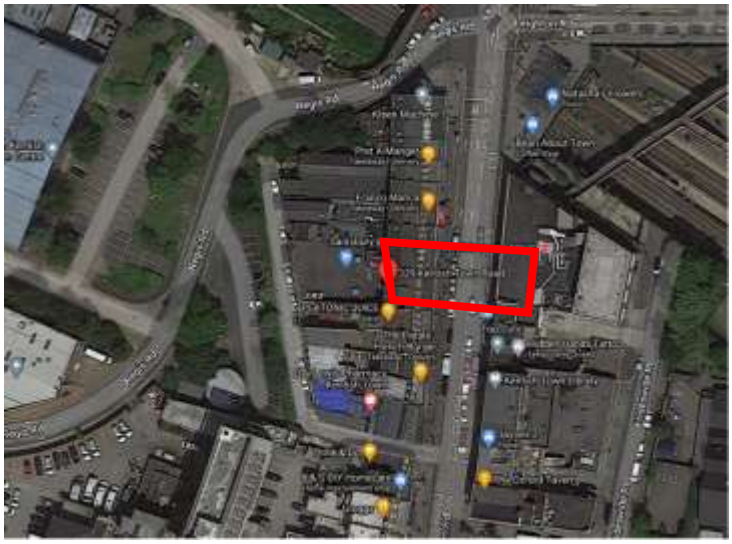
A study will be undertaken of likely typical noise levels in the area, to compensate for the potentially artificially low noise levels currently caused by the coronavirus pandemic. This will include review of the measured levels from our survey, and a review of previous surveys in the vicinity. This would be in accordance with current ANC (Association of Noise Consultants) advice relating to surveys during the COVID-19 societal restrictions.

To undertake a vibration level survey to establish potential groundborne vibration levels due to nearby train lines, and provide an assessment in the context of relevant guidance and policies.

3.0 Site Description

3.1 Location

The site is located in the London Borough of Camden, on the west side of Kentish Town Road. The location is shown in the following Location Map.



Location Map (Imagery 2020 Bluesky, Getmapping PLC)

3.2 Description

The building extends across the whole site at ground level with an additional 3 storeys on the eastern end of the site, set back from Kentish Town Road.

The site is bounded to the east by Kentish Town Road, to the west by York Mews and the north and south by adjoining mixed use buildings. The site is shown in the Site Plan below.

Site Plan (Imagery 2020 Bluesky, Getmapping PLC)

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 John Ridpath BSc (Hons), MIOA and Adam Kershaw BSc(Hons), MIOA.

5.1 Noise Survey

Fully automated environmental noise monitoring was undertaken from approximately 11:00 hours on Thursday 3rd September 2020 to 11:00 hours on Monday 7th September 2020.

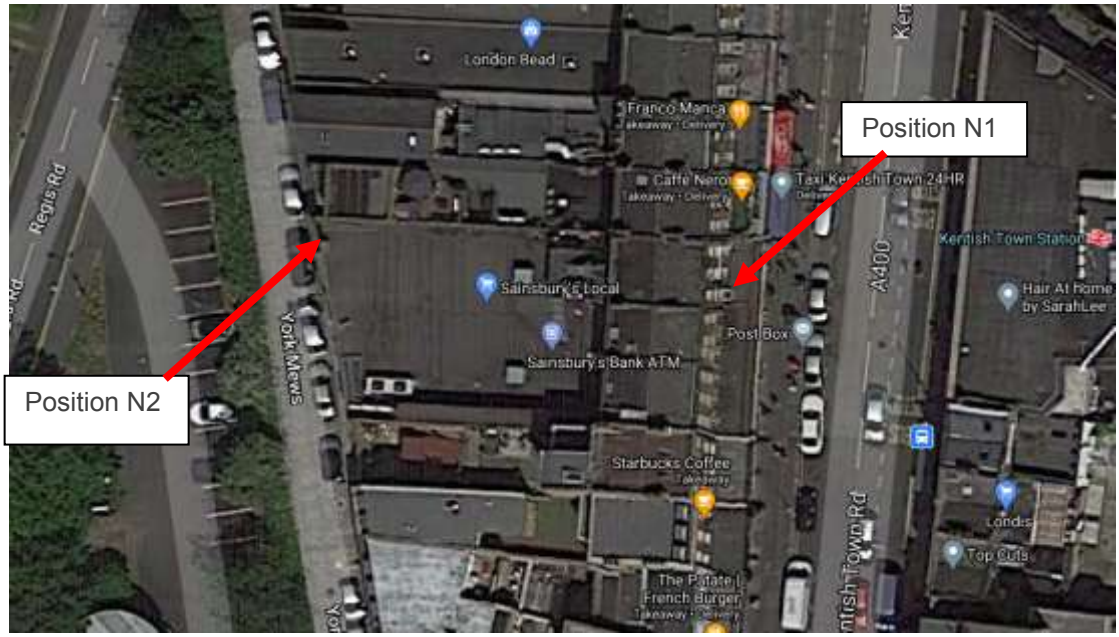
During the periods we were on site the wind conditions were calm and the sky was generally patchy cloud. We understand that generally throughout the survey period the weather conditions were similar to those observes whilst we were on site. These conditions are considered suitable for obtaining representative measurement results.

Measurements were taken continuously of the A-weighted (dBA) L_{90}, L_{eq} and L_{max} sound pressure levels over 15-minute periods.

The noise level measurements were undertaken at 2 positions as described in the table below.

Position No	Description
N1	The sound level meter was located on the 1st floor at the eastern end of the building overlooking Kentish Town Road. The microphone was positioned approximately 1m outside of the window.
N2	The sound level meter was located on the 1st floor roof at the western end of the building overlooking York Mews. The microphone was positioned approximately 1m above roof level in free-field conditions.

The measurement positions are shown on the plan below.



Plan Showing Unmanned Measurement Positions (Imagery 2020 Bluesky, Getmapping PLC)

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

Description	Manufacturer	Type	Serial Number	Calibration
Position 1 - Type 1 Data Logging Sound Level Meter	Larson Davis	824	3701	Calibration on 29/06/2020
Type 1 ½" Condenser Microphone	PCB	377A02	101926	Calibration on 29/06/2020
Position 2 - Type 1 Data Logging Sound Level Meter	Larson Davis	824	3803	Calibration on 11/07/2019
Type 1 ½" Condenser Microphone	Bruel & Kjaer	4189	2470596	Calibration on 11/07/2019
Type 1 Calibrator	Larson Davis	CAL200	3082	Calibration on 08/08/2018

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

Each sound level meter was located in an environmental case with the microphone connected to the sound level meter via an extension cable. Each microphone was fitted with a windshield.

5.2 Vibration Survey

The following instrumentation was used for the survey and subsequent analysis:

- 2No. Dytran Accelerometers
- 01dB –dB4 Hardware Interface
- 01dB – dBTrig Vibration Acquisition Software
- 01dB – dBTrait Vibration Analysis Software
- Microsoft Windows Based Laptop Computer

The 01dB hardware connects two accelerometers via a multi-channel USB interface to the laptop computer. The system can record real-time vibration data to a laptop computer allowing simultaneous analysis in both the time and frequency domains. The analysis chain was calibrated prior to the measurements to enable subsequent analysis.

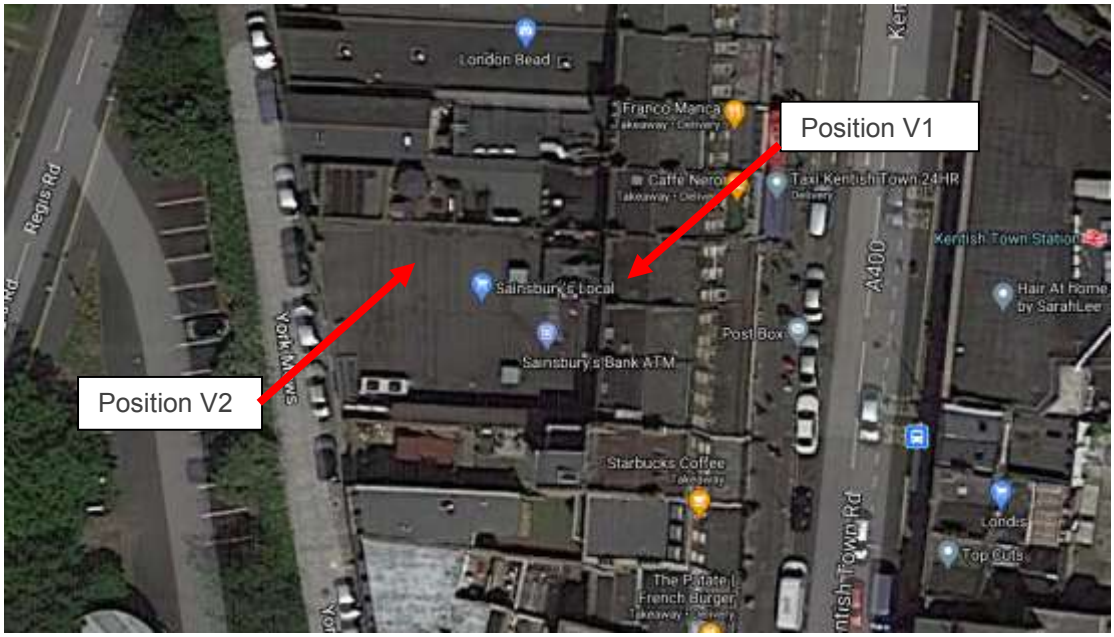
The vibration measurements were undertaken with the accelerometers rigidly attached to the ground slab at basement level using steel washers, magnets and epoxy resin glue.

The vibration survey was undertaken from approximately 11:00 hours to 12:00 hours on 03/09/2020.

Vibration measurements were undertaken in order to establish the prevailing vibration levels due to nearby train movements.

The measurement positions were undertaken at basement level where the influence of groundborne vibration from nearby trains is usually most noticeable.

The measurements were undertaken at two positions at basement level of the Sainsburys shop. The positions are approximate 50m south of the nearest railway line. The approximate measurement positions are shown on the aerial photo plan below.



6.0 Results

6.1 Noise

The results have been plotted on Time History Graphs 27152/TH1 to 27152/TH2 enclosed presenting the 15-minute A-weighted (dBA) L_{90}, L_{eq} and L_{max} levels at each measurement position throughout the duration of the survey.

The sound level meter located at Position 2 developed a fault whilst on site and stopped measuring just after 11:00 on Friday 4th September 2020.

L_{eq} Noise Levels

In order to compare the results of our survey with the relevant guidelines it is necessary to convert the measured $L_{Aeq(15\ ?minute)}$ noise levels into single figure daytime $L_{Aeq(16\text{-}hour)}$ (07:00-23:00 hours) and night-time $L_{Aeq(8\text{-}hour)}$ (23:00-07:00 hours) levels.

The daytime $L_{Aeq(16\text{-}hour)}$ and night-time $L_{Aeq(8\text{-}hour)}$ noise levels for each position are presented in the table below.

Position	Daytime $L_{Aeq(16\text{-}hour)}$	Night-Time $L_{Aeq(8\text{-}hour)}$
1	69 dB	65 dB
2	58 dB	50 dB

The above levels are as measured at the measurement positions.

Measurement Position 1 results are façade noise levels i.e. 3dB should be subtracted due to the immediacy of the building façade to determine the free-field noise levels. Measurement Position 2 results are free-field noise levels.

Lmax Noise Levels

Position	10th Highest Night-Time L_{Amax}
1	83 dB
2	70 dB

Measurement Position 1 results are façade noise levels i.e. 3dB should be subtracted due to the immediacy of the building façade to determine the free-field noise levels. Measurement Position 2 results are free-field noise levels.

Review of Alternative L_{Aeq} Noise Levels

To compensate for the potentially artificially low levels currently caused by the Government measures in response to the coronavirus pandemic, we have reviewed planning applications at 2 nearby sites which have included detailed environmental noise level measurements.

Application 2019/6433/P (site - 197 Kentish Town Road) noise survey report presents noise level measurements undertaken on 24-25 October 2019 at a site overlooking Kentish Town Road which can be compared to our Position 1 measurements.

The incident (free field) noise levels used in external building fabric calculations (1st Floor)

Daytime ($L_{Aeq\ 16hour}$) - 70dBA
Night time ($L_{Aeq\ 8hour}$) - 66dBA

Application 2019/5037/P (site - 335 Kentish Town Road) plant noise survey report presents noise level measurements undertaken on 4-5 June 2019 at a site overlooking York Mews, which can be compared to our Position 2 measurements.

Free Field Noise Levels

Daytime ($L_{Aeq\ 16hour}$) - 59dBA
Night time ($L_{Aeq\ 8hour}$) - 52dBA

Adjustments to Measured Noise Levels

Position 1 – The measured noise levels appear to be around 4dB lower (after 3dB façade reflection have been deducted from measure noise levels) during the daytime and nighttime than the noise level measurements submitted for Application IP/20/00285/FUL.

To ensure robustness in our calculations we will apply a +3dB correction to our Position 1 noise levels, in an attempt to counter the likely influence of the potentially artificially low levels currently caused by the coronavirus.

Position 2 - The measured noise levels are marginally lower than those measurements submitted for Application IP/18/00194/FUL.

To ensure robustness in our calculations we will apply a +1dB correction to our Position 2 noise levels, in an attempt to counter the likely influence of the potentially artificially low levels currently caused by the coronavirus.

6.2 Vibration

Subjectively our engineers did not perceive any vibration due to train movement. This is backed up by the low levels of vibration measured on site.

The measurement equipment is highly sensitive and the only vibration measured would appear to be due to road traffic and human activity in the Sainsburys shop.

The approximate Vibration Dose Values (VDV) calculated using data from Positions V1 and V2 are detailed in the table below.

Period	VDV ($m/s^{1.75}$)
Daytime (07:00 – 23:00)	0.012
Night-Time (23:00 – 07:00)	0.005

Note: The Vibration Dose Value parameter is mainly dictated by the magnitude of the individual train passbys and is relatively insensitive to the number of train passby events.

The maximum vertical weighted peak acceleration measured at Positions V1 and V2 in the absence of human activity was $0.0008 m/s^2$.

7.0 Discussion of Noise Climate

Position 1 - During the periods we were on site the dominant noise source was noted to be local road traffic movements and people shopping in Kentish Town Road.

Position 2 - During the periods we were on site the dominant noise source was noted to be distant road traffic movements and some building services noise.

8.0 Relevant Planning Policies and Guidance

8.1 Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) was published in March 2010 (i.e. before the NPPF). 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 NPSE noise policy aims which are reflected in three of the four aims of 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 acknowledged 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 NPSE noise policy aims listed 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.

8.2 National Planning Policy Framework (NPPF)

The following paragraphs are from the NPPF (revised February 2019):

"180. 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:

a) mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

182. 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."

Paragraph 180 also references the Noise Policy Statement for England. This document does not refer to specific noise levels but instead sets out three aims:

"Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development. Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."

8.3 Local Planning Policy

The Camden Local Plan (2017) provides the following guidance:

Appendix 3: Noise thresholds

The significance of noise impact varies dependent on the different noise sources, receptors and times of operation presented for consideration within a planning application. Therefore, Camden's thresholds for noise and vibration evaluate noise impact in terms of various 'effect levels' described in the National Planning Policy Framework and Planning Practice Guidance:

- NOEL – No Observed Effect Level
- LOAEL – Lowest Observed Adverse Effect Level
- SOAEL – Significant Observed Adverse Effect Level

Three basic design criteria have been set for proposed developments, these being aimed at guiding applicants as to the degree of detailed consideration needed to be given to noise in any planning application. The design criteria outlined below are defined in the corresponding noise tables. The values will vary depending on the context, type of noise and sensitivity of the receptor:

- Green – where noise is considered to be at an acceptable level.
- Amber – where noise is observed to have an adverse effect level, but which may be considered acceptable when assessed in the context of other merits of the development.
- Red – where noise is observed to have a significant adverse effect.

Proposed Developments likely to be Sensitive to Noise

Special consideration will need to be given to noise sensitive developments that are proposed in areas which are, or expected to become, subject to levels of noise likely to have an adverse effect. The threshold of acceptability of the noise will primarily depend on two factors: the intended use of the noise sensitive development and the source of the noise experienced, or likely to be experienced.

Table B: Noise levels applicable to noise sensitive residential development proposed in areas of existing noise

Dominant Noise Source	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAEL (Red)
Anonymous noise such as general environmental noise, road traffic and rail traffic ~	Noise at 1 metre from noise sensitive façade/free field	Day	<50dB$L_{Aeq,16hr}$*	50dB to 72dB$L_{Aeq,6hr}$*	>72dB$L_{Aeq,16hr}$*
		Night	<45dB$L_{Aeq,8hr3}$ <40 dB$L_{Aeq,8hr}$**	45dB to 62dB$L_{Aeq,8hr}$* >40dBL_{night}**	>62dB$L_{Aeq,8hrs}$*
	Inside a bedroom	Day	<35dB$L_{Aeq,16hr}$	35dB to 45dB$L_{Aeq,16hr}$	>45dB$L_{Aeq,16hr}$
		Night	<30dB$L_{Aeq,8hr}$ 42dB$L_{Amax,fast}$	30dB to 40dB$L_{Aeq,16hr}$ 40dB to 73dB$L_{Amax,fast}$	>40dB$L_{Aeq,8hr}$ >73dB$L_{Amax,fast}$
	Outdoor living space (free field)	Day	<50dB$L_{Aeq,16hr}$	50dB to 55dB$L_{Aeq,6hr}$	>55dB$L_{Aeq,16hr}$
Non-anonymous noise	See guidance note on non-anonymous noise				

*LAeq, T values specified for outside a bedroom window are façade levels
**Lnight values specified for outside a bedroom window are free field levels

The levels given above are for dwellings, however, levels are use specific and different levels will apply dependent on the use of the premises. The Council will also take into account the likely times of occupation for types of development and will be amended according to the times of operation of the establishment under consideration.

8.4 The London Plan (2016)

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; adverse 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."

8.5 The Draft New London Plan (2019 Draft)

This is a new London Plan (also known as a Replacement Plan). This means it is not an alteration or update to previous London Plans. This new London Plan, once published will be the third London Plan, the previous ones being the 2004 London Plan produced by former Mayor of London Ken Livingstone and the 2011 London Plan produced by former Mayor of

London Boris Johnson. All of the other iterations of the London Plan from 2004-2016 have been alterations. Once published adopted this London Plan will replace all previous versions.

Policy D13 Noise states:

A. *"In order to reduce, manage and mitigate noise to improve health and quality of life, residential and other non-aviation development proposals should manage noise by:*

   1) *avoiding significant adverse noise impacts on health and quality of life*
   2) *reflecting the Agent of Change principle as set out in Policy D12.*
   3) *mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development without placing unreasonable restrictions on existing noise-generating uses.*
   4) *improving and enhancing the acoustic environment and promoting appropriate soundscapes (including Quiet Areas and spaces of relative tranquillity).*
   5) *separating new noise-sensitive development from major noise sources (such as road, rail, air transport and some types of industrial use) through the use of distance, screening, layout, orientation, uses and materials – in preference to sole reliance on sound insulation.*
   6) *where it is not possible to achieve separation of noise-sensitive development and noise sources without undue impact on other sustainable development objectives, then any potential adverse effects should be controlled and mitigated through applying good acoustic design principles.*
   7) *promoting new technologies and improved practices to reduce noise at source, and on the transmission path from source to receiver.*

B. *Boroughs, and others with relevant responsibilities, should identify and nominate new Quiet Areas and protect existing Quiet Areas in line with the procedure in Defra's Noise Action Plan for Agglomerations.*

3.13.1. *The management of noise is about encouraging the right acoustic environment in the right place at the right time. This is important to promote good health and a good quality of life within the wider context of achieving sustainable development. The management of noise should be an integral part of development proposals and considered as early as possible. Managing noise includes improving and enhancing the acoustic environment and promoting appropriate soundscapes. This can mean allowing some places or certain times to become noisier within reason, whilst others become quieter. Consideration of existing noise sensitivity within an area is important to minimise potential conflicts of uses or activities, for example in relation to internationally important nature conservation sites which contain noise-sensitive species. Boroughs,*

developers, businesses and other stakeholders should work collaboratively to identify the existing noise climate and other noise issues to ensure effective management and mitigation measures are achieved in new development proposals.

3.13.2. The Agent of Change Principle places the responsibility for mitigating impacts from existing noise-generating activities or uses on the new development. Through the application of this principle existing land uses should not be unduly impacted affected by the introduction of new noise-sensitive uses. For noise-generating uses regard should be had to not prejudicing their potential for intensification or expansion.

3.13.3. The management of noise also includes promoting good acoustic design of the inside of buildings. Section 5 of BS 8223:2014 provides guidance on how best to achieve this. The Institute of Acoustics has produced advice Pro:PG Planning and Noise (May 2017) that may assist with the implementation of residential developments. BS4214 provides guidance on monitoring noise issues in mixed residential/industrial areas.

3.13.4. Deliberately introducing sounds can help mitigate the adverse impact of existing sources of noise, enhance the enjoyment of the public realm, and help protect the relative tranquillity and quietness of places where such features are valued. For example, playing low-level music outside the entrance to nightclubs has been found to reduce noise from queueing patrons, leading to an overall reduction in noise levels. Water features can be used to reduce the traffic noise, replacing it with the sound of falling water, generally found to be more pleasant by most people.

3.13.5. Heathrow and London City Airport Operators have responsibility for noise action plans for airports. Policy T8 Aviation sets out the Mayor's approach to aviation-related development.

3.13.6. The definition of Tranquil Areas, Quiet Areas and spaces of relative tranquillity are matters for London boroughs. These are likely to reflect the specific context of individual boroughs, such that Quiet Areas in central London boroughs may reasonably be expected not to be as quiet as Quiet Areas in more residential boroughs. Defra has identified parts of Metropolitan Open Land and local green spaces as potential Quiet Areas that boroughs may wish to designate."

8.6 London Plan Sustainable Design and Construction SPG

The London Plan Sustainable Design and Construction SPG provides additional information in the following key areas:

- The sources of noise;
- Ways to mitigate noise emitted by developments;
- Ways to mitigate the impact of noise on developments; and
- Some detailed design considerations.

8.7 World Health Organisation

The current Environmental Noise Guidelines 2018 for the European Region (ENG) supersede the Guidelines for Community Noise from 1999 (CNG). Nevertheless, the ENG recommends that all CNG indoor guideline values and any values not covered by the current guidelines (such as industrial noise and shopping areas) remain valid.

A summary of the guidance from the ENG and CNG is shown in the table below.

Source	CNG guideline indoors all sources	ENG guideline outdoors noise from specific source only
Road traffic noise	35 $L_{Aeq, 16h}$	53 dB L_{den}
	30 $L_{Aeq, 8h}$	45 dB L_{night}
Railway noise	35 $L_{Aeq, 16h}$	54 dB L_{den}
	30 $L_{Aeq, 8h}$	44 dB L_{night}
Aircraft noise	35 $L_{Aeq, 16h}$	45 dB L_{den}
	30 $L_{Aeq, 8h}$	40 dB L_{night}

With regard to single-event noise indicators, Section 2.2.2 of the WHO Environmental Noise Guidelines 2018 state:

"In many situations, average noise levels like the L_{den} or L_{night} indicators may not be the best to explain a particular noise effect. Single-event noise indicators – such as the maximum sound pressure level ($L_{A,max}$) and its frequency distribution – are warranted in specific situations, such as in the context of night-time railway or aircraft noise events that can clearly elicit awakenings and other physiological reactions that are mostly determined by $L_{A,max}$. Nevertheless, the assessment of the relationship between different types of single-event noise indicators and long-term health outcomes at the population level remains tentative. The guidelines therefore make no recommendations for single-event noise indicators."

8.8 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.

8.8.1 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 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 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."

8.9 ProPG : Planning & Noise : 2017

8.9.1 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".

8.9.2 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.

8.9.3 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.

8.9.4 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".

8.9.5 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).

8.10 Vibration BS6472

British Standard BS 6472: 2008 "*Guide to Evaluation of Human Exposure to Vibration in Buildings*" advises that intermittent vibration events should not be judged based on perception alone but using the corresponding vibration dose value over a long period.

BS6472:2008 advises that "the VDV defines a relationship that yields a consistent assessment of continuous, intermittent, occasional and impulsive vibration and correlates well with subjective response" and also "the VDV is much more strongly influenced by vibration magnitude than by duration. A doubling of halving of the vibration magnitude is equivalent to an increase or decrease of exposure duration by a factor of sixteen."

The table below details the Vibration Dose Values ($m/s^{1.75}$) above which various degrees of adverse comment may be expected in Residential Buildings.

Time Period	Low probability of adverse comment	Adverse comment possible	Adverse comment probable
Daytime (07:00– 23:00)	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Night-time (23:00–07:00)	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

The perception threshold for continuous whole-body vibration varies widely among individuals. Approximately half a typical population, when standing or seated, can perceive a vertical weighted peak acceleration of 0.015 m/s^2. The weighting used is W_b. A quarter of the population would perceive a vibration of 0.010m/s^2 peak, but the least sensitive quarter would only be able to detect a vibration of 0.020m/s^2 peak or more.

9.0 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 $L_{Aeq,8hour}$

10.0 Achievable Internal Noise Levels

We have predicted the levels that would be achievable in the worst-case dwellings with windows partially opened and also with windows closed.

10.1 Windows Partially Open

It is generally accepted that the typical noise reduction achieved with partially opened windows is around 15dBA (ref. BS 8233:2014 Annex G.1). This value is the difference between dBA levels measured outside and inside typical dwellings, therefore 3dBA should be added to free field noise levels to determine outside levels.

A simple assessment thus indicates the following noise levels may be expected within the proposed worst case habitable rooms with partially opened windows.

Description	Predicted Worst Case Internal Noise Levels with Windows Partially Opened			
	Position 1		Position 2	
	Daytime $L_{Aeq(16\text{-}hour)}$	Night-time $L_{Aeq(8\text{-}hour)}$	Daytime $L_{Aeq(16\text{-}hour)}$	Night-time $L_{Aeq(8\text{-}hour)}$
External free field level	69 dBA	65 dBA	59 dBA	51 dBA
Façade correction	3 dBA	3dBA	3 dBA	3 dBA
Façade noise level	72 dBA	68 dBA	62 dBA	54 dBA
Noise reduction for conventional thermal double glazing	-15dBA	-15dBA	-15dBA	-15dBA
Predicted internal noise levels	57 dBA	53 dBA	47 dBA	39 dBA

10.2 Windows Closed

Provision exists to provide appropriate sound insulation solutions as required including, where necessary, suitably specified glazing and attenuated ventilators. We have carried out preliminary calculations to determine the likely façade sound insulation performance requirements for the worst affected (east – overlooking Kentish Town Road) facade. Our calculation methods follow those outlined in BS 8233:2014. Our calculations are based on the following assumptions:

- Conventional brick/block cavity external wall or equivalent
- 30m^3 approximate room volume
- 1.6m^2 approximate window area
- Typical furnishings including beds, sofas, chairs etc.
- Double glazing comprising 10/16/6.4 or equivalent having an R_w of 40dB
- Ventilator having an Dn,e,w of 42dB

The following table summarises our assessment of achievable noise levels within the proposed worst case habitable rooms with closed windows.

Description	Predicted Worst Case Internal Noise Levels with Windows Closed	
	Daytime LAeq(16-hour)	Night-time LAeq(8-hour)
External free field level	69dBA	65 dBA
Noise reduction for closed windows1	36 dBA	36 dBA
Predicted internal noise levels	33 dBA	29 dBA

1 Calculated in accordance with BS8233:2014 assuming mitigation measures outlined in Section 12.0.

Note: At detailed design stage octave band acoustic specifications will need to be developed, and it will be essential that the prospective glazing/cladding system suppliers can demonstrate compliance with these specifications, rather than simply offering generic glazing configurations as described above.

11.0 External Amenity Area

Noise levels in external amenity areas should ideally not be above the range of 50-55dB LAeq,16hr, as stated in BS8233:2014.

External amenity areas are proposed towards the centre of the site, fully screened from Kentish Town Road and partially screened from York Mews. It would not be unreasonable to assume a the daytime LAeq16hr level used in our calculations for the rear of the site would be attenuated by at least 5dBA due to distance/screening to the proposed amenity areas. This would result in a daytime LAeq16hr level of ~54dB thus comply with the range recommended in BS8233:2014.

12.0 Camden Local Plan Noise Thresholds

The measured noise levels have been compared to the noise level ranges presented in Section 8.3 (taken from Appendix 3 of the Camden Local Plan 2017) of this report.

Assessment Location	Period	Position 1	Position 2
1m from noise sensitive facade	Day (façade noise level)	72dB $L_{Aeq,16hr}$ = Amber	62dB $L_{Aeq,16hr}$ = Amber
	Night (façade noise level)	68dB $L_{Aeq,8hr}$ = Red	54dB $L_{Aeq,8hr}$ = Amber
Inside Bedroom (based on sections 6.1 & 10.2)	Day	33dB $L_{Aeq,16hr}$ = Green	Green
	Night	29dB $L_{Aeq,8hr}$ = Green 44dB $L_{Amax,f}$ = Amber	Green

Assessment Location	Period	Centre Of Site
Outdoor Living Space	Day	~54dB $L_{Aeq16hr}$ = Amber

13.0 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 suitably selected double glazing.

The 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."*

14.0 Discussion of Vibration

Subjectively our engineers did not perceive any vibration due to train movement. This is backed

up by the low levels of vibration measured on site.

The measurement equipment is highly sensitive and the only vibration measured would appear to be due to road traffic and human activity in the Sainsburys shop.

The calculated VDV levels and measured peak weighted acceleration vibration levels presented in Section 6.2, are significantly lower than the proposed criteria described in Section 8.10.

We would not expect any vibration to be perceivable from train movement in the future residential dwellings.

15.0 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. Mitigation advice, including the use of suitably specified glazing and acoustically attenuated ventilation, have been recommended to reduce to a minimum the adverse impact on health and quality life arising from environmental noise.

We did not measure any significant vibration levels form nearby train lines. As such our vibration assessment indicates that vibration should not be a concern with regards to residential use.

The assessment shows the site, subject to appropriate mitigation measures, is suitable for residential development in terms of noise and vibration.

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).

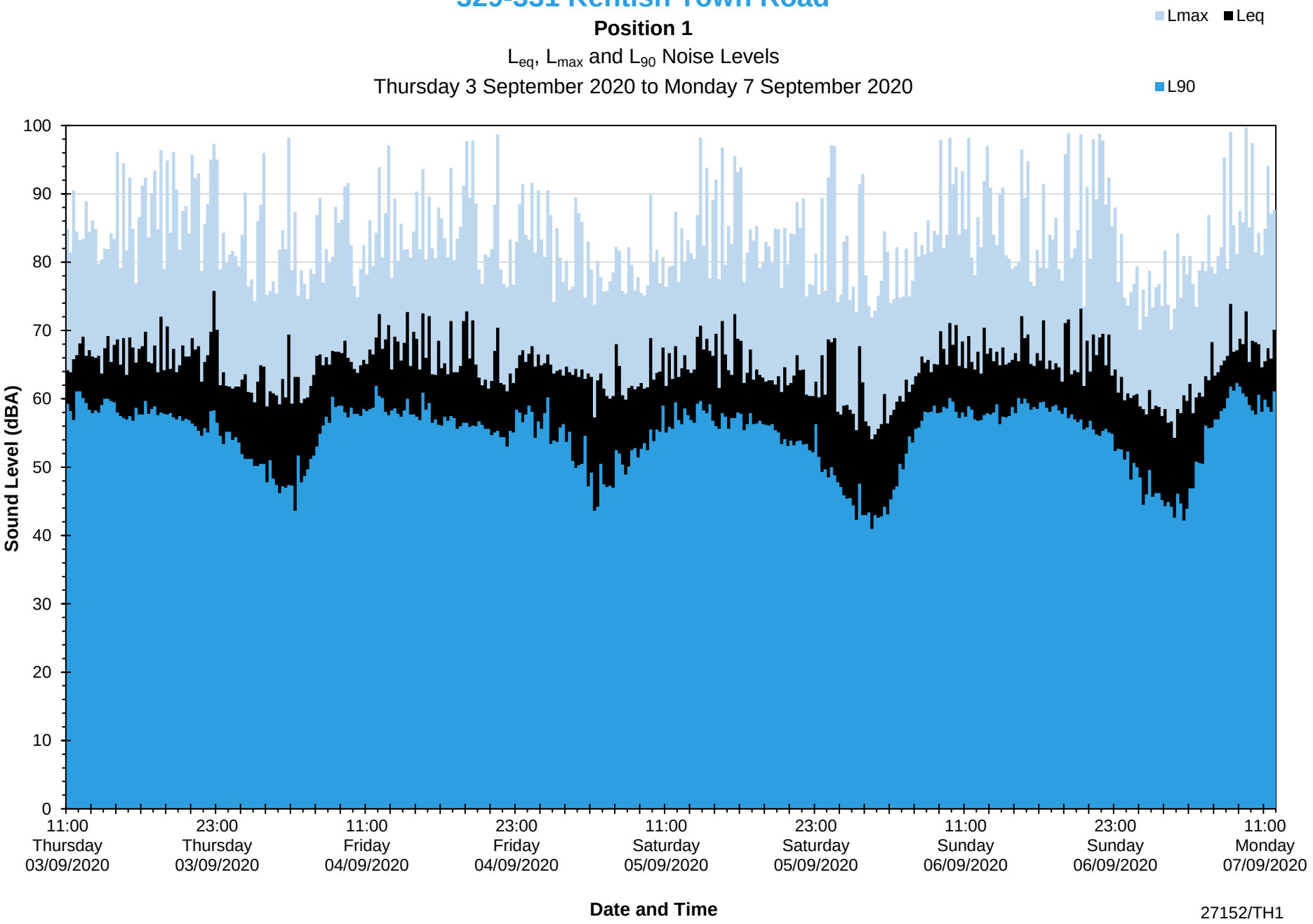
L_w — Sound Power Level (SWL) is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).

329-331 Kentish Town Road

Position 1

L_{eq}, L_{max} and L_{90} Noise Levels

Thursday 3 September 2020 to Monday 7 September 2020



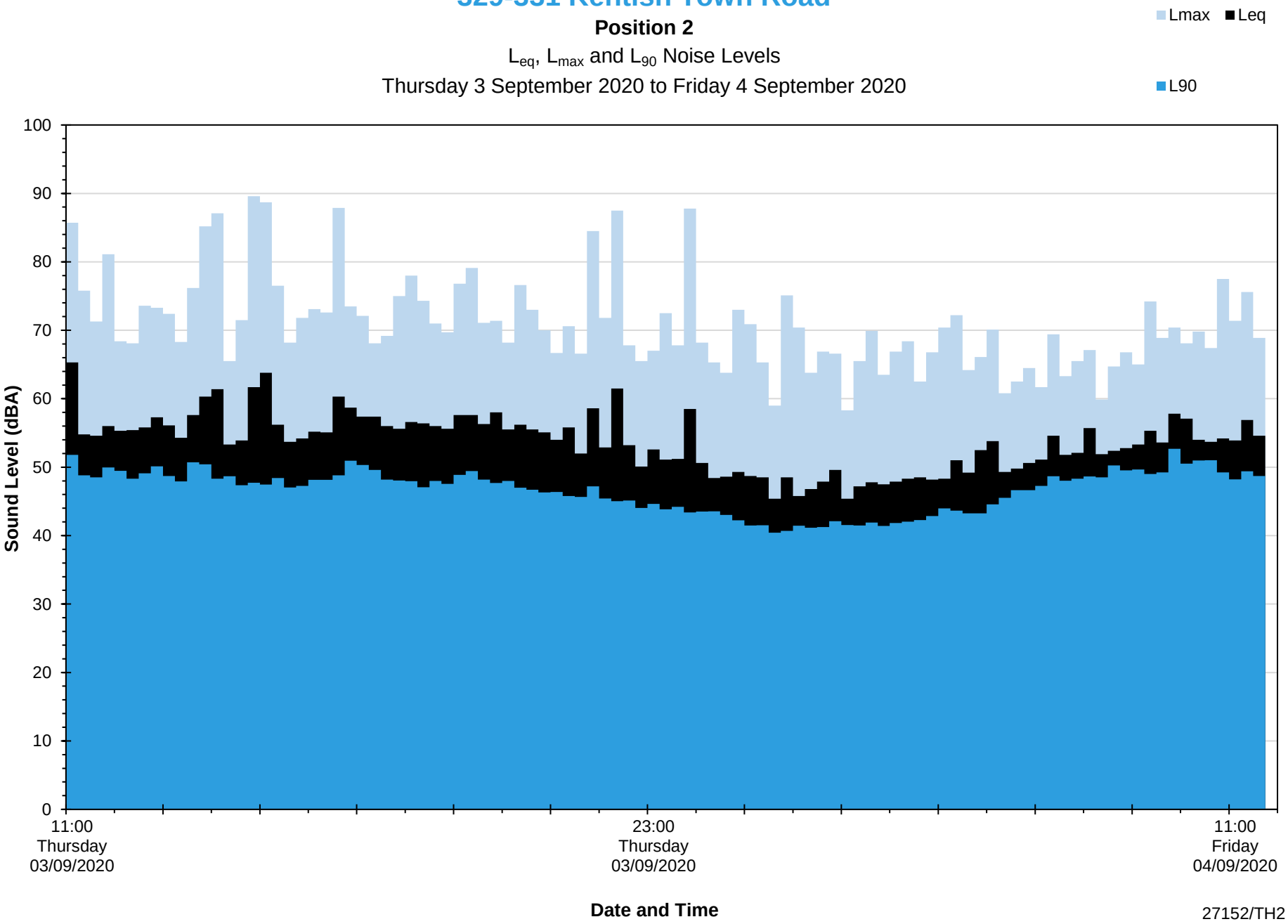
27152/TH1

329-331 Kentish Town Road

Position 2

L_{eq}, L_{max} and L_{90} Noise Levels

Thursday 3 September 2020 to Friday 4 September 2020



27152/TH2