

2-4 High Street Uxbridge

Environmental Noise Survey and Plant Noise Assessment Report

28788/PNA1 Rev1

8 November 2021

For:
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Document Control

Rev	Date	Comment	Prepared by	Authorised by
1	08/11/2021	Section 10.2 added with details regarding nearest noise sensitive windows.		
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0	12/05/2021	First issue.	Gareth Evans Senior Associate BSc(Hons) MIOA	Gareth Evans Senior Associate BSc(Hons) MIOA



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1.0 Introduction

It is proposed to install new building services plant at 2-4 High Street, Uxbridge.

Hann Tucker Associates have therefore been commissioned to undertake an Environmental Noise Survey to establish the prevailing background noise climate around the site. The results of the survey will be used to undertake an atmospheric plant noise assessment to the nearest noise sensitive receptors.

2.0 Objectives

To inspect the site to familiarise ourselves with its layout and surroundings in order to identify suitable accessible locations for environmental noise measurements.

To establish by means of an unmanned 24 hour survey the existing L_{Amax} , L_{Aeq} and L_{A90} environmental road, rail and air traffic noise levels at up to 2no. secure and accessible on-site positions, using fully computerised noise monitoring equipment.

To assess the noise emissions from the proposed plant, based upon data with which we are provided, and comment upon the acceptability.

To advise on noise control measures if required with reference to the requirements of the Local Authority.

3.0 Site Description

3.1 Location

The site is located at 2-4 High Street Uxbridge. The location is shown in the Location Map below.



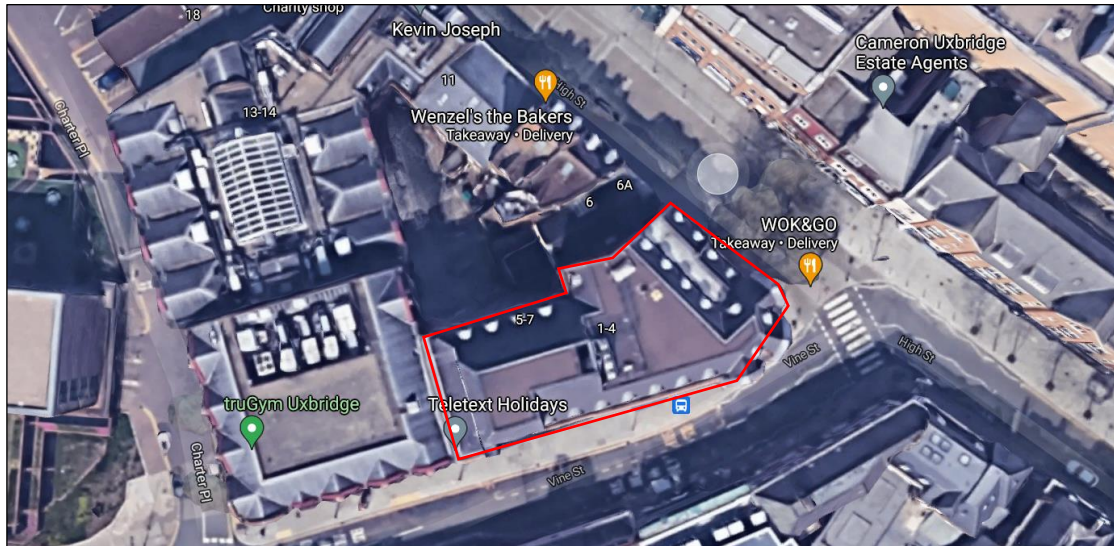
Location Map (Map data © Google 2021)

The site falls within the jurisdiction of the London Borough of Hillingdon.

3.2 Description

The site is positioned on the corner of Vine Street and the High Street within Uxbridge town centre. The building currently comprises of an A2 ground floor banking unit, accessed off the junction of the High Street and Vine Street. While the upper four floors are B1 offices, accessed off Vine Street. Recently, the Royal Bank of Scotland, who have the lease for the ground and first floor, vacated the building.

We understand the nearest noise sensitive residential building is located to the north of the site at 7A High Street, Uxbridge with facades to the rear of the site.



Site Plan (Map Data © Google 2021, Imagery © 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 Acoustic Standards and Guidelines

5.1 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.”

“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.

5.2 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 impacts 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.”

5.3 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 Adverse 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 ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
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

5.4 Local Authority Requirements

The site lies within the jurisdiction of the London Borough of Hillingdon. We understand their past advice regarding atmospheric plant noise is as follows:-

“British Standard 4142:1997 gives advice on measuring and assessing the noise from machinery or plant, and is relevant if surrounding residential areas might be affected. Developments with a BS4142 assessment of marginal significance or above would not ordinarily be permitted. Consequently, the development should be controlled such that the rating level of the noise from the proposed development determined according to BS4142 is at least 5 dB below the background noise level LA90,T. Ideally, the assessment of noise should give a positive indication that complaints are unlikely. We have requested their advice concerning their requirements for setting atmospheric noise emission criteria for building



service plant, but have not received a reply at the time of writing.

5.5 BS 4142:2014

When setting plant noise emission criteria reference is commonly made to BS 4142: 2014 *"Methods for rating and assessing industrial and commercial sound"*.

The procedure contained in BS 4142:2014 provides an assessment of the likely effects of sound on people when comparing the specific noise levels from the source with representative background noise levels. Where the noise contains "a tone, impulse or other characteristic" then various corrections can be added to the specific (source) noise level to obtain the "rating level".

BS 4142 states that: *"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs". An estimation of the impact of the specific noise can be obtained by the difference of the rating noise level and the background noise level and considering the following:*

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

The determination of the "rating level" and the "background level" are both open to interpretation, depending on the context.

In summary it is not possible to set plant noise emission criteria purely on the basis of BS 4142:2014. It is reasonable to infer from the above, however, that a difference of around -5dB corresponds to "No Observed Effect Level" as defined in the Noise Policy Statement for England. It is also reasonable to infer from the above that if the plant noise rating level does not



exceed the existing background noise level outside any noise sensitive residential window then the plant noise is of “low impact”.

5.6 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 scheme 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.

6.0 Survey Methodology

The survey was undertaken by Daniel Stuart BSc(Hons) AMIOA.

6.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 12:30 hours on 16 April 2021 to 08:00 hours on 19 April 2021,

During the periods we were on site the wind conditions were calm. The sky was generally clear. We understand that generally throughout the survey period the weather conditions were similar. These conditions are considered suitable for obtaining representative measurement results.

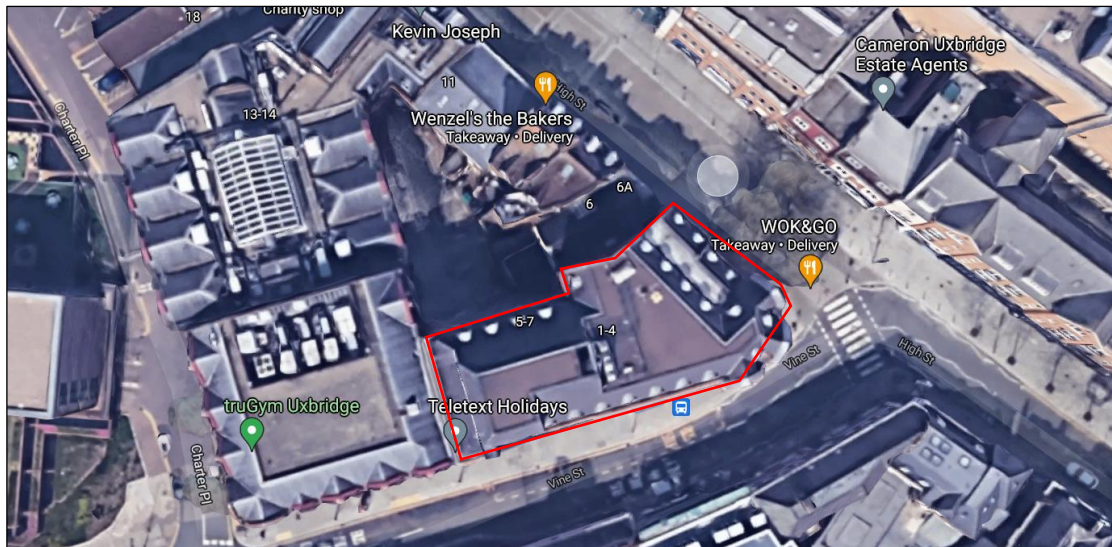
Measurements were taken continuously of the A-weighted (dBA) L₉₀, L_{eq} and L_{max} sound pressure levels over 15 minute periods.



6.2 Measurement Positions

The noise level measurements were undertaken at 2No. positions as described in the table below.

Position No	Description
1	The sound level meter was placed on the fifth floor roof of the building to the façade facing Vine Street/High Street to the front of the site. The microphone was attached to a pole approximately 1m from the façade.
2	The sound level meter was placed on the fifth floor roof of the building to the façade facing north side of the building towards the rear of the site. The microphone was attached to a pole approximately 1m from the façade.



Plan Showing Measurement Positions (Map Data © Google 2021, Imagery© Bluesky, Getmapping Plc.) Instrumentation

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

Description	Manufacturer	Type	Serial Number	Calibration
Type 1 ½" Condenser Microphone	ACO Pacific	7052E	71786	Calibration on 13/09/2019
Preamp	SvanteK	SV18	75754	Calibration on 13/09/2019
Type 1 Data Logging Sound Level Meter	SvanteK	971	74415	Calibration on 13/09/2019



Description	Manufacturer	Type	Serial Number	Calibration
Type 1 ½" Condenser Microphone	ACO Pacific	7052E	67983	Calibration on 06/02/2019
Preamp	Svantek	SV18	71464	Calibration on 06/02/2019
Type 1 Data Logging Sound Level Meter	Svantek	971	80233	Calibration on 06/02/2019
Type 1 Calibrator	Brüel & Kjær	4231	2610161	Calibration on 21/09/2020

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.

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.

7.0 Results

The results have been plotted on Time History Graphs 28788/TH1 and 28788/TH2 enclosed, presenting the 15 minute A-weighted (dBA) L_{90} and L_{eq} noise levels at each measurement position throughout the duration of the survey.

The lowest L_{A90} (15 min) measurements recorded during the survey are presented in the table below:

Position	Lowest Measured $L_{A90(15min)}$ Background Noise Level (dB re 2×10^{-5} Pa)	
	Daytime (07:00 – 23:00) Hours	Night-Time (23:00 – 07:00) Hours
1	47 dBA	45 dBA
2	47 dBA	46 dBA

8.0 Discussion Of Noise Climate

During the periods we were on site the dominant noise sources were noted to be predominantly from the surrounding road traffic network with some noise from existing roof plant.



9.0 Plant Noise Emission Criteria

Building services plant external noise emission levels will need to comply with local authority requirements and statutory noise nuisance legislation.

On the basis of the above and the results of the environmental noise survey, we propose that the following plant noise emission criteria be achieved at 1 metre from the nearest noise sensitive residential window.

Position	Plant Noise Emissions Criteria at 1m from the nearest residential window	
	Daytime (07:00 – 23:00) Hours	Night-Time (23:00 – 07:00) Hours
1	42 dBA	40 dBA
2	42 dBA	41 dBA

The above criteria are to be achieved with all of the proposed plant operating simultaneously.

If plant contains tonal or impulsive characteristics the external design criteria should be reduced by 5dBA.

It should be noted that the above are subject to the final approval of the Local Authority.

10.0 Plant Noise Impact Assessment

We understand the proposed plant comprises the following:-

Plant Description	Location	Plant Make	Model Number
1no. Condenser Unit	Roof	Mitsubishi	PUHY-M300
1no.Extract Fan	Ground floor and discharging at roof level	Systemair	MUB/T062 630
1no.Supply Fan	Ground floor	Systemair	MUB/T062 560

10.1 Plant Noise Data

We understand the manufacturer's noise data for the equipment to be as follows:

Plant Description	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at 1 metre at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
1no. Condenser Unit	75	69	66	63	58	54	50	47	65

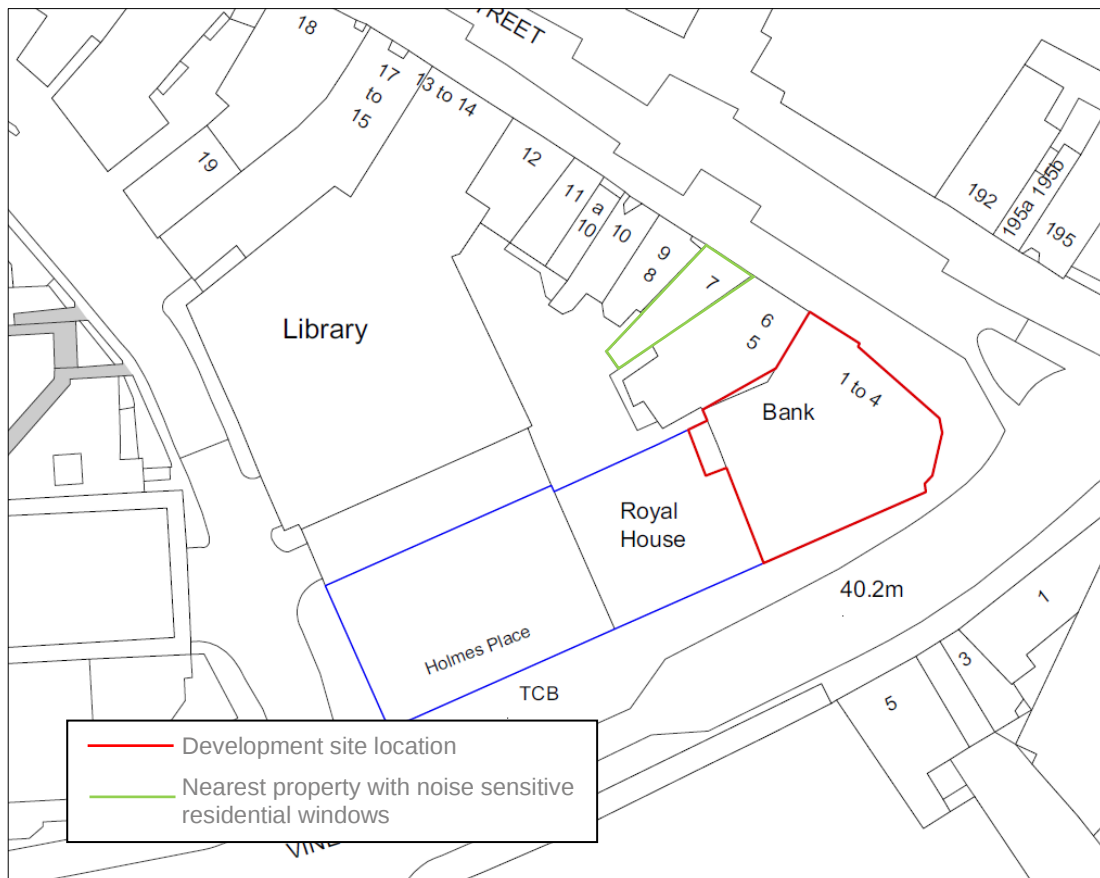


Plant Description	Sound Power Level (dB re 10-12 Watts) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
1no.Extract Fan	64	64	78	80	81	79	75	69	-
1no.Supply Fan	55	68	71	75	75	71	68	63	-

10.2 Nearest Noise Sensitive Windows

From our on-site observations whilst setting up and collecting our noise survey equipment, we believed the nearest noise sensitive residential windows to be located to the north of the site at 7A High Street. There are residential windows to the rear of this property which we believe to be the most noise sensitive given the proposed plant location. A review of the gov.uk Council Tax band checker has not indicated that there are any closer residential windows.

The site plan below shows the location of the noise sensitive residential windows we believe to be the nearest to the proposed plant locations.





10.3 Location of Plant

The proposed condenser unit is to be located on the roof of 2-4 High Street, Uxbridge. The nearest noise sensitive windows are located approximately 25m away to the north, to the rear of the upper floors of 7A High Street.

The proposed extract fan is to be located at ground floor and will be ducted to discharge at roof level. The nearest noise sensitive windows to the proposed discharge grille are located approximately 25m away to the north, to the rear of the upper floors of 7A High Street.

The proposed supply fan is to be located at ground floor and will be ducted to an intake louvre at ground floor level within the courtyard to the north of the site. The nearest noise sensitive windows are located approximately 12m away to the north, to the rear of the lower floors of 7A High Street.

10.4 Mitigation Measures

In order to control plant noise emissions in line with the proposed criterion, we recommend that the proposed extract and supply fans are fitted with atmospheric side attenuators.

The following attenuator schedule details atmospheric attenuation requirements:-

Attenuator Ref	Dimensions			Max PD Pa	Minimum Insertion Loss (dB) at Octave Band Centre Frequency (Hz)							
	H	W	L		63	125	250	500	1k	2k	4k	8k
Extract Discharge	To suit airflow and max PD		900	<50	4	7	13	19	23	23	16	13
Supply Intake			900	<50	4	7	13	19	23	23	16	13

10.5 Plant Noise Impact Assessment

We understand that the proposed plant will be operational during daytime and night-time hours.

The following tables summarise our predictions of atmospheric noise emissions from the proposed plant to the nearest noise sensitive residential window.

**Roof Plant**

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
1no. Condenser Unit at Receptor	41	35	31	26	19	13	6	0	28
1no. Extract Fan at Receptor	26	23	31	27	24	22	25	22	31
Combined Plant Noise at Receptor	41	35	34	30	25	23	25	22	33
Façade Reflection	+3	+3	+3	+3	+3	+3	+3	+3	+3
Calculated Noise Level at Receptor	44	38	37	33	28	26	28	25	36

Our calculations indicate that the proposed plant, in conjunction with the propose mitigation measures, should be capable of achieving the requirements of the Local Authority outlined in Section 8.0.

Ground Floor Plant

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
1no. Supply Fan at Receptor	22	32	29	27	23	19	23	21	30
Façade Reflection	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Noise Level at Receptor	25	35	32	30	26	22	26	24	33

Our calculations indicate that the proposed plant, in conjunction with the propose mitigation measures, should be capable of achieving the requirements of the Local Authority outlined in Section 8.0.

11.0 Conclusions

An environmental noise survey has been undertaken in order to establish the currently prevailing noise levels.

Plant noise emission criteria have been recommended based on the results of the noise survey and with reference to the Local Authority's requirements.



An assessment has been carried out to determine the plant noise emissions at the nearest noise sensitive window.

The assessment indicates that the proposed plant, in conjunction with the proposed attenuation, should be capable of achieving the proposed environmental noise criteria at the nearest noise sensitive window.

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} L₉₀ 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.

Sound Pressure Level (L_p) 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).

Sound Power Level (SWL or L_w) 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).

2-4 High Street, Uxbridge

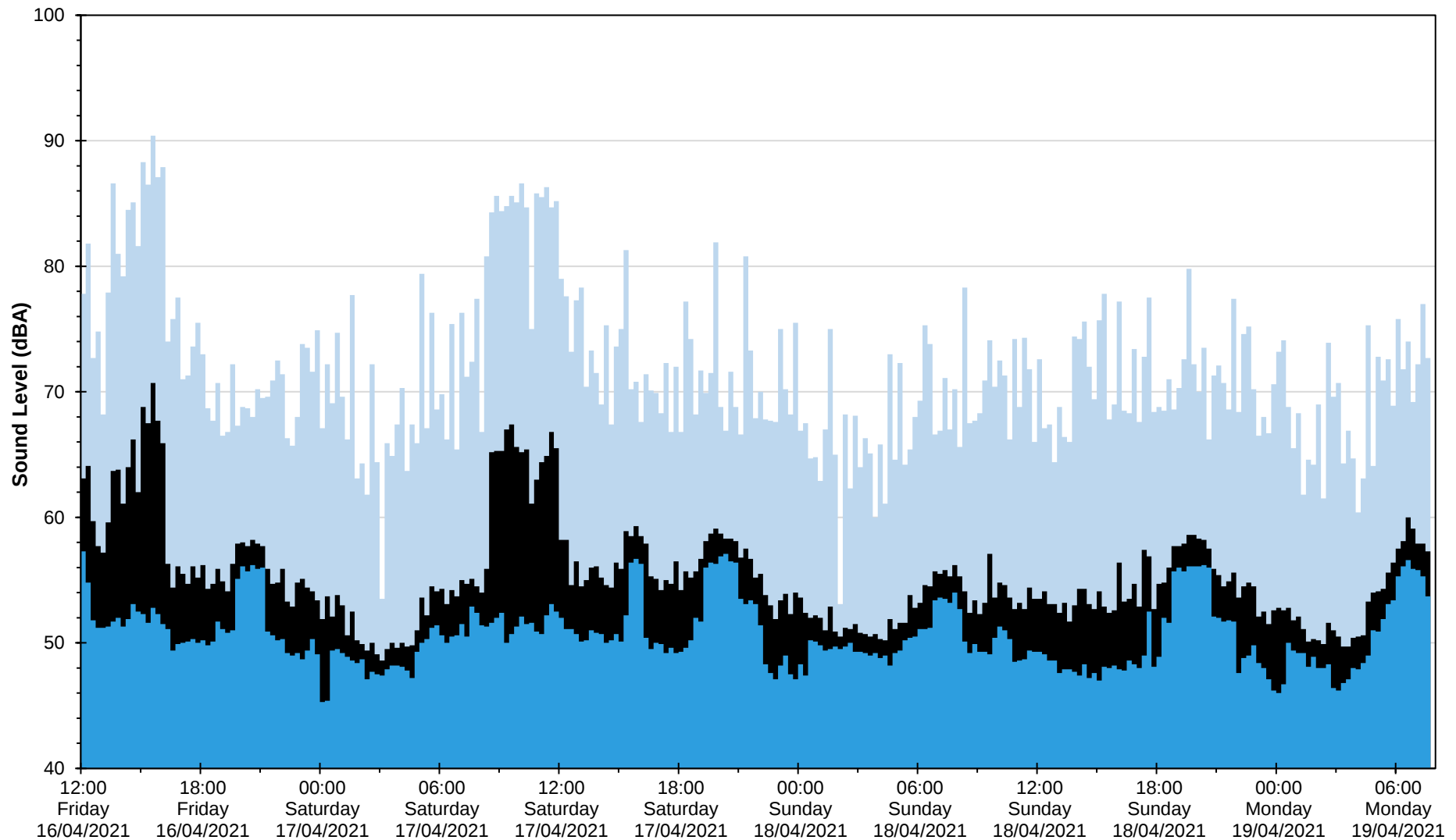
Position 1

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

Friday 16 April 2021 to Monday 19 April 2021

L_{max} L_{eq}

L_{90}



Date and Time

28788/TH1

2-4 High Street, Uxbridge

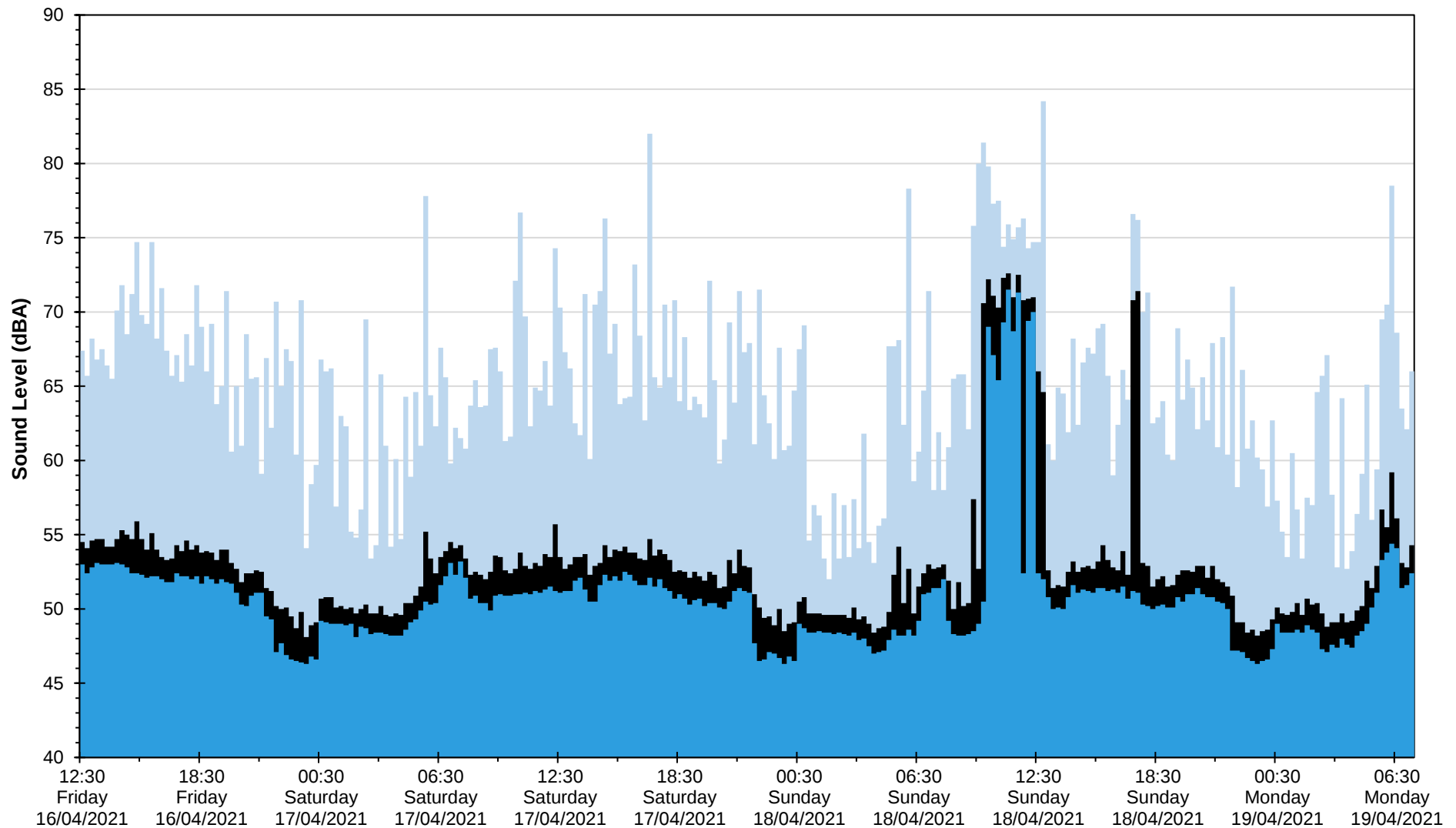
Position 2

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

Friday 16 April 2021 to Monday 19 April 2021

L_{max} L_{eq}

L_{90}



Date and Time

28788/TH2