REPORT TITLE:

195 – 199 Gray's Inn Road - Noise Survey and Assessment Report

CLIENT DETAILS:

European Urban Developments

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1. Executive Summary

The prevalent noise levels at the site on Gray's Inn Road, London were measured over a typical day and night time period to assess the impact of the existing noise sources on the proposed residential development. The potential noise effects of the proposed development on surrounding areas are also considered.

The site is mainly affected by the road traffic noise to the east. It is considered that using guidelines from the World Health Organisation alongside levels provided in BS8233:2014 for noise conditions within dwellings will make sure that 'significant adverse impacts on health and quality of life' are avoided as required by the Noise Policy Statement for England.

Consequently, an adequate level of noise mitigation measures will be required to ensure that future residents of the site are protected from the existing ambient noise.

Mitigation measures are to be included to achieve the specified internal noise levels, so that future residents of the proposed development will be protected from the dominant noise sources. Mitigation measures include the use of appropriate glazing coupled with acoustic trickle ventilation. The ventilation strategy has also been designed so that appropriate internal noise levels can be achieved at all times.

This assessment concludes that there are no reasons relating to noise that should prevent planning permission from being granted.

2. Introduction

Pace Consult was commissioned by European Urban Developments to undertake an assessment of the noise impacts associated with the proposed development on Gray's Inn Road, London.

There is a potential for road traffic noise to have an impact on the proposal. Therefore, the impact of the existing noise levels has been considered in assessing the site's suitability for residential use.

It should be noted that vibration is not assessed in this report as there are no significant sources of vibration in the area. Vibration levels in the proposed development are expected to be well below the relevant standards for residential developments.

The assessment has been undertaken in accordance with national standards and guidelines for residential dwellings.

3. The Site

3.1 Location and Description

The site is bounded to the east by Gray's Inn Road, to the west by terraced residential properties and to the north and south by existing garden space. The nearest noise sensitive receivers are the terraced houses to the west.

Figure 1 shows the location of the site relative to the surrounding area with survey locations indicated, however a site plan is presented below for information purposes.

3.2 Proposed Development

The proposal is to develop the existing single storey retail building into a two storey building containing four residential units.

4. Assessment Methodology

National Planning Policy Framework and the Noise Policy Statement for England

The National Planning Policy Framework (NPPF) sets out the general requirements for gaining planning permission. Comments regarding noise found within the document are as follows. The planning system should prevent 'both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or NOISE pollution' (paragraph 109). It adds to this by saying that 'planning policies and decisions should aim to avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development' (paragraph 123).

The NPPF references the Noise Policy Statement for England (NPSE) which intern references two concepts used by the World Health Organisation (WHO) which can be used to ascertain relevant noise levels for individual sites. The concepts are LOAEL (Lowest Observed Adverse Effect Level) and SOAEL (Significant Observed Adverse Effect Level). The NPPF then gives three aims to adhere to:

Aim 1 – 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.

Aim 2 – Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy of sustainable development.

Aim 3 – 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.

To avoid 'significant adverse impacts on health and quality of life', by creating a situation where the impact of noise lies below the SOAEL we will refer to both BS8233 : 1999 – Sound Insulation and noise Reduction for buildings and the World Health Organisation (WHO) 'Guidelines for Community Noise' which both provide good criteria for internal noise levels for residential buildings.

British Standard BS8233:2014 – Guidance on sound insulation and noise reduction for buildings

The scope of BS8233 is the provision of recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new or refurbished buildings undergoing a change of use rather than to assess the effect of changes in the external noise climate.

BS8233 suggests suitable internal noise levels within different types of buildings, including residential dwellings. It suggests an internal noise level of 35 dB $L_{Aeq,T}$ during day time, and 30 dB $L_{Aeq,T}$ during night time within bedrooms. In the daytime, the standard recommends 35 dB $L_{Aeq,T}$ in living rooms and in 40 dB $L_{Aeq,T}$ dining rooms. Table 4 below is extracted from this document.

Table 4 **Indoor ambient noise levels for dwellings**

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	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 $L_{Aeq,8hour}$

World Health Organisation (WHO) 'Guidelines for Community Noise'

This document states that, in dwellings, the critical effects of noise are on sleep, annoyance and speech interference. According to this document, to protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB L_{Aeq} for a steady, continuous noise. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound pressure level should not exceed 50 dB L_{Aeq}. To avoid any possibility of sleep disturbance, indoor guideline values for bedrooms are 30 dB L_{Aeq} for continuous noise and 45 dB L_{Amax} for single sound events. These indoor noise levels correspond to sound pressure levels at the outside façades of the living spaces of 45 dB L_{Aeq} and 60 dB L_{Amax}. These values have been obtained by assuming that the noise reduction from outside to inside with the window partly open is 15 dB.

BS4142:2014 Method for rating and assessing industrial and commercial sound

BS4142 has recently been revised and the 1997 edition has been replaced. The standard sets out a methodology for the assessment of whether noise from factories, industrial premises or fixed installations and sources of an industrial/commercial nature.

The procedure contained in BS4142 for assessing the likelihood of complaints is to compare the measured or predicted noise level from the source in question, the 'specific noise level', at the assessment position with the correct background noise level for the worst case time of operation.

Where the noise contains a 'distinguishable, discreet, continuous note (whine, hiss, screech, hum etc.) or if there are distinct impulses in the noise (bangs, clicks or clatters), or if the noise is irregular enough to attract attention' then a range of correction factors can be added to the specific noise level as appropriate to obtain the 'rating level'.

As this is a prescriptive report prior to plant installation, overall rating noise levels will be specified for the new installation. Compliance with the rating value will be necessary to provide evidence that significant adverse impact has been avoided as required by the NPSE.

To assess the likelihood of complaints, the measured background noise level is subtracted from the rating noise level. BS4142 states:

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 effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessment and arriving at decisions, therefore, it is essential to place the sound in context.

Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (See Clause 8) from the rating level (see Clause 9) and consider the following.

a) Typically the greater the difference, the greater the magnitude of the impact.

b) A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around 5dB is likely to be an indication of an adverse impact, depending on the context.

d) 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.

Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following.

1) The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.

Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night

Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.

2) *The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.*

3) *The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as;*

   i) Façade sound insulation treatment

   ii) Ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and

   iii) Acoustic screening.

In summary, the BS4142: 2014, 'Methods for rating and assessing industrial and commercial sound' would indicate that compliance with the wider aims of the NPSE is achieved when a rating level does not exceed the background sound level for the given time of operation.

Camden Council DP28 & DP29

Camden Council provide thresholds for both existing external noise levels and proposed plant noise levels; these are as follows:

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

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 $_{LAeq,}$12h	62 dB $_{LAeq,}$12h
Noise at 1 metre external to a sensitive façade	Evening	1900-2300	60 dB $_{LAeq,}$4h	57 dB $_{LAeq,}$4h
Noise at 1 metre external to a sensitive façade	Night	2300-0700	55 dB $_{LAeq,}$1h	52 dB $_{LAeq,}$1h
Individual noise events several times an hour	Night	2300-0700	>82dB L_{Amax} (S time weighting)	>82dB L_{Amax} (S time weighting)

Table E: Noise levels from plant and machinery at which planning permission will not be granted

Noise description and location of measurement	Period	Time	Noise level
Noise at 1 metre external to a sensitive façade	Day, evening and night	0000-2400	5dB(A) <LA90
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive façade.	Day, evening and night	0000-2400	10dB(A) <LA90
Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade.	Day, evening and night	0000-2400	10dB(A) <LA90
Noise at 1 metre external to sensitive façade where LA90>60dB	Day, evening and night	0000-2400	55dB$_{LAeq}$

It should be noted that DP29 does not apply to this assessment.

5. Survey Method and Equipment

5.1 Survey

The noise survey was carried out between Thursday 18th and Friday 19th September 2014 to measure representative noise levels at the site of the proposed development during a typical weekday period.

The noise survey comprised of two unattended monitoring positions at the site which are described in detail below;

- North-east (MP1): Unattended continuous monitoring position recorded the noise levels from the roof of the existing building. This position is representative of the position of the proposed top floor window and recorded worst case noise levels that would be incident on the proposed development.
- South-east (MP2): Unattended continuous monitoring position recorded the noise levels from the roof of the existing building. This position is representative of the position of the proposed top floor window and recorded worst case noise levels that would be incident on the proposed development.

Noise monitoring was carried out at a height greater than 1.5m above local ground level.

Noise measurements were made with a calibrated precision grade sound level meter which achieves the requirements of BS EN 61672:2003. The survey was carried out in accordance with the principles of BS 7445:1997 Parts 1-3, 'Description and Measurement of Environmental Noise', British Standard BS4142: 1997, Method for Rating Industrial Noise affecting Mixed Residential and Industrial Areas, and following the guidance given in PPG 24 'Planning and Noise'.

5.2 Measurement Parameters

Human ears are able to respond to sound over the frequency range of about 20 Hz to 20 kHz and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, and is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates to the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear. The most widely used weighting mechanism that corresponds to the response of the human ear is the A-weighting scale. This is widely used

for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq}, L_{A90}, etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) of a steady source is generally regarded as the minimum difference needed to perceive a change.

Environmental noise has been measured in the following indices;

$L_{Aeq, T}$ - The A-weighted equivalent continuous sound pressure level. A representation of a continuous sound level containing the same amount of sound energy as the measured varying noise over the measurement period, t.

$L_{A90, T}$ - The A-weighed sound pressure level that is exceeded for 90% of the measurement period, t. This is commonly used as the 'Background Noise Level' for assessing the effects of industrial noise in the UK.

L_{Amax} - The highest A-weighted noise level recorded during a noise measurement period.

5.3 Equipment

Norsonic Nor131 precision grade sound level meter

Cirrus CR811B precision grade sound level meter

Norsonic Nor1251 calibrator

Environmental wind shield

The sound level meters were calibrated before and after the survey. No drift was noted between the two reference checks.

5.4 Weather

The climatic conditions during the noise surveys were warm with light winds (< 2m/s). Conditions were considered conducive to environmental noise measurement.

6. Survey Results

The measurement survey at all monitoring locations comprised of consecutive measurement periods in terms of the most relevant standards and guidelines.

The tables below show the period noise levels measured at all monitoring locations. These have subsequently been used as a basis establishing dominant noise levels across the site.

Table 6.1: Measured continuous noise level at MP1 (dB)

Period	**Time**	**Period** $L_{Aeq, T}$ **(Log Average)**	$L_{Amax, T}$	$L_{A90, T}$ Minimum Background
Weekday	16hr (07:00 – 23:00)	67.0	N/A	46.0
	8hr (23:00 – 07:00)	62.7	75.2 (Mean) 78.9 (90th Percentile) 85.5 (Max)	42.0

Table 6.2: Measured continuous noise level at MP2 (dB)

Period	**Time**	**Period** $L_{Aeq, T}$ **(Log Average)**	$L_{Amax, T}$	$L_{A90, T}$ Minimum Background
Weekday	16hr (07:00 – 23:00)	66.5	N/A	45.7
	8hr (23:00 – 07:00)	62.4	74.1 (Mean) 77.6 (90th Percentile) 85.2 (Max)	41.1

In accordance with Camden Council's DP28, the noise levels measured indicate that attenuation measures will be required. It should also be noted that the measured noise levels are more than 3dBA below those at which DP28 states that planning permission should not be granted. Sound is measured on a logarithmic scale and therefore 3dBA is a doubling in sound energy. The measured levels therefore contain half the sound energy of those that would mean planning permission should not be granted. The road traffic noise levels are therefore well within the acceptable range for residential development and do not provide any grounds for the refusal of planning permission.

7. Site Suitability for Residential Development

7.1 Noise Assessment

External noise levels have been predicted for the sensitive façades of the proposed development that will be exposed to the highest levels of noise. All calculations are based on the results of the noise monitoring exercise.

It is clear that the development may be affected by road traffic noise due to the positioning of the site.

It will be important to construct the envelope of the building using materials with adequate sound insulating properties as to provide good internal noise conditions. If the envelope is built to a high enough standard, it will be possible to achieve the appropriate internal noise levels recommended for noise-sensitive developments.

The noise levels used in the building envelope assessment are shown below. Note that the maximum night-time noise levels are based on the 90th percentile of the levels measured during the survey.

Table 7.1 – Octave noise levels used for building envelope calculations

Freq. Hz	63	125	250	500	1 k	2 k	4 k	Average
Day-time L_{eq}	71	65	64	61	63	61	54	67 dB(A)
Night-time L_{eq}	67	60	59	57	59	56	50	63 dB(A)
Night-time L_{max}	87	80	78	74	73	72	67	79 dB(A)

7.2 Ventilation Strategy

To ensure a good quality of life to future residents the ventilation strategy has been designed so that windows with a view of Grays Inn Road can remain closed. Background ventilation is to be provided by acoustic trickle ventilators in windows on the side and rear elevations whilst purge ventilation is to be provided by opening windows or rooflights positioned to the rear of the building. This strategy ensures that appropriate internal noise levels can be maintained in all habitable rooms at all times.

This strategy has been implemented further to comments from the Local Authority's planning officer and therefore exceeds the standard requirements for residential properties. Appropriate internal noise levels could be simply achieved by installing acoustic trickle ventilators and allowing all windows/rooflights to be openable for purge ventilation; this strategy is used in countless developments across London.

There are no grounds for the refusal of planning permission with regards to noise as appropriate internal ambient noise levels can be achieved under all ventilation conditions.

7.3 Building Envelope Sound Insulation

The envelope construction at façades worst affected by mixed noise sources will achieve the internal noise levels through a combination of measures such as those presented below:

Table 7.2 – Specification for the building envelope (MP1).

Freq. Hz	63	125	250	500	1 k	2 k	4 k	Average
Glazing (Bedrooms)	24	29	31	37	37	39	45	38 dB R_w
Glazing (Living Rooms)	18	23	23	32	38	42	44	35 dB R_w
Trickle Ventilators	40	39	42	43	43	39	40	42 dB $D_{n,e\ w}$
Wall	35	39	41	45	51	49	50	49 dB R_w
Roof	35	35	41	47	52	56	56	51 dB R_w

Note that indicative glazing specifications have been provided. Window suppliers must ensure that the sound insulation performance of the proposed glazing meets the performance requirements above in every octave.

By employing the above attenuating measures it will be possible to attain the internal noise levels recommended in British Standard BS 8233:2014. Night time noise levels resulting from single sound events are not expected to exceed 45 dB L_{Amax} in bedrooms more than 10 – 15 times per night in accordance with WHO guidelines.

Potential suppliers of construction elements must be able to satisfy the design team that the acoustic performance information supplied must relate to the products on offer for this project and should show laboratory test acoustic information measured in accordance with BS EN ISO 140-3.

7.4 Noise Break-In Calculations

The calculations below have been included to demonstrate compliance with BS8233:1999. It must be noted that the calculations assume that the worst-case noise levels measured on Grays Inn Road are incident on all facades of the building; therefore all calculations show the absolute worst case scenario and internal noise levels are expected to be lower in reality.

Bedroom Night-time LAmax (Requirement = 45dBA LAmax)

BS8233:1999 Calculation of Sound transmission into a building

Project:	Gray's Inn Road	**Date:**	08-Sep-15
Client:	**EUD**	**Consultant:**	JW

Building elements & Areas	**Total M²**
S_{ew} - External Wall Area	3.24
S_{wi} - Area of Windows within Room	5.51
S_{rr} - Area of Ceiling within Room	11.20
Total Façade Area:	**8.75**
Total Area of transmitting elements:	**19.95**

Constants	
A0	10
A (0.16v/T)	14.93333
No. Vents	1

	W	L	H	V	Rt (s)
Room Data	3.2	3.5	2.5	28	0.3

Constructions & Performance Data:

Construction	*63*	*125*	*250*	*500*	*1K*	*2K*	*4K*	
Window: 8mm-12mm-10mm	24	29	31	37	37	39	45	38 (C: -1;
Vent: 100mm x 1.2m open wir	40	39	42	43	43	39	40	42 (C: -1;
Wall:Techcrete 150mm	35	39	41	45	51	49	50	49 (C: -1;
Ceiling:Resi floor above	35	35	41	47	52	56	56	51 (C: -2;

Source Noise & Element Contributions

	63	*125*	*250*	*500*	*1K*	*2K*	*4K*	
Source Lp	86.8	79.8	78.3	73.6	73.5	71.6	67.2	78.6
Window	-29.6	-34.6	-36.6	-42.6	-42.6	-44.6	-50.6	
Vent	-42.6	-42.4	-44.5	-46.4	-45.9	-41.5	-42.7	
Wall	-42.9	-46.9	-48.9	-52.9	-58.9	-56.9	-57.9	
Ceiling	-37.5	-37.5	-43.5	-49.5	-54.5	-58.5	-58.5	
Cumulative SRI	**-28.6**	**-32.2**	**-35.1**	**-40.3**	**-40.7**	**-39.6**	**-41.8**	
Plus 10log S/A	1.3	1.3	1.3	1.3	1.3	1.3	1.3	
Façade Effect	3	3	3	3	3	3	3	
RESULT	62.4	51.8	47.4	37.5	37.0	36.3	29.6	

A weighted Internal Level 45.0

Bedroom Night-time LAeq (Requirement = 30dBA LAeq)

BS8233:1999 Calculation of Sound transmission into a building

Project:	Gray's Inn Road	**Date:**	08-Sep-15
Client:	**EUD**	**Consultant:**	JW

Building elements & Areas	**Total M^2**
S_{ew} - External Wall Area	3.24
S_{wi} - Area of Windows within Room	5.51
S_{rr} - Area of Ceiling within Room	11.20
Total Façade Area:	**8.75**
Total Area of transmitting elements:	**19.95**

Constants	
A0	10
A (0.16v/T)	14.93333
No. Vents	1

	W	L	H	V	Rt (s)
Room Data	3.2	3.5	2.5	28	0.3

Constructions & Performance Data:

Construction	*63*	*125*	*250*	*500*	*1K*	*2K*	*4K*	
Window: 8mm-12mm-10mm	24	29	31	37	37	39	45	38 (C: -1;
Vent: 100mm x 1.2m open wir	40	39	42	43	43	39	40	42 (C: -1;
Wall:Techcrete 150mm	35	39	41	45	51	49	50	49 (C: -1;
Ceiling:Resi floor above	35	35	41	47	52	56	56	51 (C: -2;

Source Noise & Element Contributions

	63	*125*	*250*	*500*	*1K*	*2K*	*4K*	
Source Lp	66.8	60.1	58.9	57.0	59.1	56.1	49.8	62.7
Window	-29.6	-34.6	-36.6	-42.6	-42.6	-44.6	-50.6	
Vent	-42.6	-42.4	-44.5	-46.4	-45.9	-41.5	-42.7	
Wall	-42.9	-46.9	-48.9	-52.9	-58.9	-56.9	-57.9	
Ceiling	-37.5	-37.5	-43.5	-49.5	-54.5	-58.5	-58.5	
Cumulative SRI	**-28.6**	**-32.2**	**-35.1**	**-40.3**	**-40.7**	**-39.6**	**-41.8**	
Plus 10log S/A	1.3	1.3	1.3	1.3	1.3	1.3	1.3	
Façade Effect	3	3	3	3	3	3	3	
RESULT	42.5	32.2	28.1	21.0	22.7	20.8	12.3	

A weighted Internal Level 27.8

Living Room Daytime LAeq (Requirement = 35dBA LAeq)

BS8233:1999 Calculation of Sound transmission into a building

Project:	Gray's Inn Road	**Date:**	08-Sep-15
Client:	EUD	**Consultant:**	JW

Building elements & Areas	**Total M²**
S_{ew} - External Wall Area	7.75
S_{wi} - Area of Windows within Room	6.00
S_{rr} - Area of Ceiling within Room	27.50
Total Façade Area:	**13.75**
Total Area of transmitting elements:	**41.25**

Constants	
A0	10
A (0.16v/T)	18.8
No. Vents	1

	W	L	H	V	Rt (s)
Room Data	5.5	5	2.5	58.75	0.5

Constructions & Performance Data:

Construction	*63*	*125*	*250*	*500*	*1K*	*2K*	*4K*	
Window: 8mm-12mm-10mm	18	23	23	32	38	42	44	35 (C: -1;
Vent: 100mm x 1.2m open wir	40	39	42	43	43	39	40	42 (C: -1;
Wall:Techcrete 150mm	35	39	41	45	51	49	50	49 (C: -1;
Ceiling:Resi floor above	35	35	41	47	52	56	56	51 (C: -2;

Source Noise & Element Contributions

	63	*125*	*250*	*500*	*1K*	*2K*	*4K*	
Source Lp	71.0	65.2	63.5	61.2	62.9	60.9	53.8	66.9
Window	-26.4	-31.4	-31.4	-40.4	-46.4	-50.4	-52.4	
Vent	-45.8	-45.6	-47.7	-49.6	-49.1	-44.7	-45.9	
Wall	-42.3	-46.3	-48.3	-52.3	-58.3	-56.3	-57.3	
Ceiling	-36.8	-36.8	-42.8	-48.8	-53.8	-57.8	-57.8	
Cumulative SRI	**-25.8**	**-30**	**-30.9**	**-39.1**	**-43.9**	**-43.2**	**-44.5**	
Plus 10log S/A	3.4	3.4	3.4	3.4	3.4	3.4	3.4	
Façade Effect	3	3	3	3	3	3	3	
RESULT	51.6	41.6	39.0	28.5	25.4	24.1	15.7	

A weighted Internal Level 34.8

8. Noise from Fixed Installations and Mechanical Plant

Noise levels generated by mechanical plant and experienced by local receptors depends upon a number of variables, the most significant of which are considered to be as follows.

- Noise generated by plant or equipment used on site, generally expressed as sound power levels (SWL)
- Distance between the noise source and the receptor
- Attenuation due to ground absorption, atmospheric and barrier effects
- Periods of operation of the plant on the site, known as its “on-time”

The proposal will include installations of extract ventilation plant. However, at this stage, the exact specification of the fixed installations and mechanical plant is not known as is normal for this stage of the development.

Consequently, it is not possible to present an inclusive assessment of the noise effects of such plant. However, in order to ensure that background noise levels at the nearest noise sensitive receptors do not increase significantly as a result of the development, design noise limits for electrical and mechanical plant have been provided. These limits can, and normally are, used by the local authority to condition external plant noise levels, therefore ensuring that any adverse impact on local residents is avoided.

The noise limits have been based on achieving 5dB below the quietest background noise level recorded during the 24 hour survey.

Table 7.1 : Noise Limit for Fixed Installations of Mechanical Plant, $L_{Ar,Tr}$ (dB)		
Location	Daytime	Night-time
MP1/MP2	41	36

Note: if plant noise is tonal or has distinct impulses then the limits shown above will reduce by 5dBA.

If fixed installations and mechanical plant are designed to achieve the above mentioned noise limits at the nearest residential receivers adverse impacts should be avoided.

There are a number of measures that can be introduced to control noise from the mechanical and fixed plant installation associated with the proposed development. Consideration should be given to reducing noise at point of generation (e.g. by selecting quieter plant) or containment of noise generated (e.g. by insulating buildings which house machinery and/or providing purpose-built barriers around the site).

9. Conclusions

The effect of noise associated with the proposed development at 195 – 199 Gray's Inn Road, London has been assessed. Throughout, the assessment has been undertaken with reference to British Standards and national and international guidance on noise impacts.

The noise levels have been assessed with consideration to the National Planning Policy Framework and the Noise Policy Note for England. Following these policies, figures from the WHO's 'Guidelines for Community Noise' and BS8233 'Guidance on sound insulation and noise reduction for buildings' have been used to assure that 'significant adverse impacts on health and quality of life' are avoided. To achieve internal noise levels which will provide a good living environment envelope constructions have been suggested. The ventilation strategy is designed to achieve good internal noise conditions, even during purge ventilation.

Plant noise limits have been provided in accordance with BS4142:2014 and Camden Council's DP28.

The assessment of the proposed development demonstrates that a good quality of life, with regards to noise, can be achieved for both existing and future residents and therefore there is no viable way in which noise can be used as a reason for the refusal of planning permission.

10. References

1. National Planning Policy Framework
2. Noise Policy Statement for England
3. World Health Organisation Criteria – Environmental criteria
4. BS8233:1999 "Sound insulation and noise reduction for buildings"
5. British Standard BS4142: 1997, Method for Rating Industrial Noise affecting Mixed Residential and Industrial Areas

Figure 1: Site Location Plan and Monitoring Position

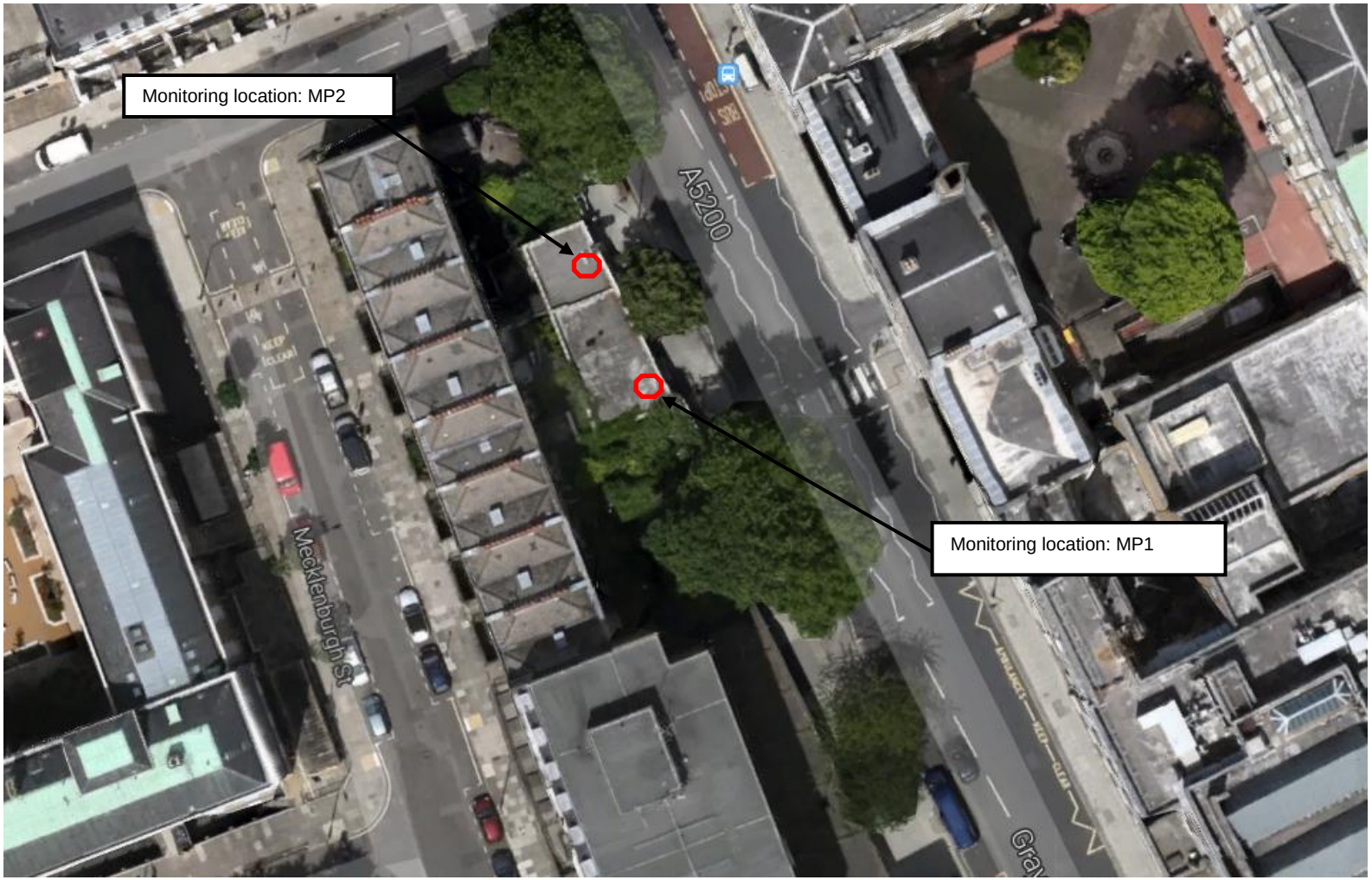
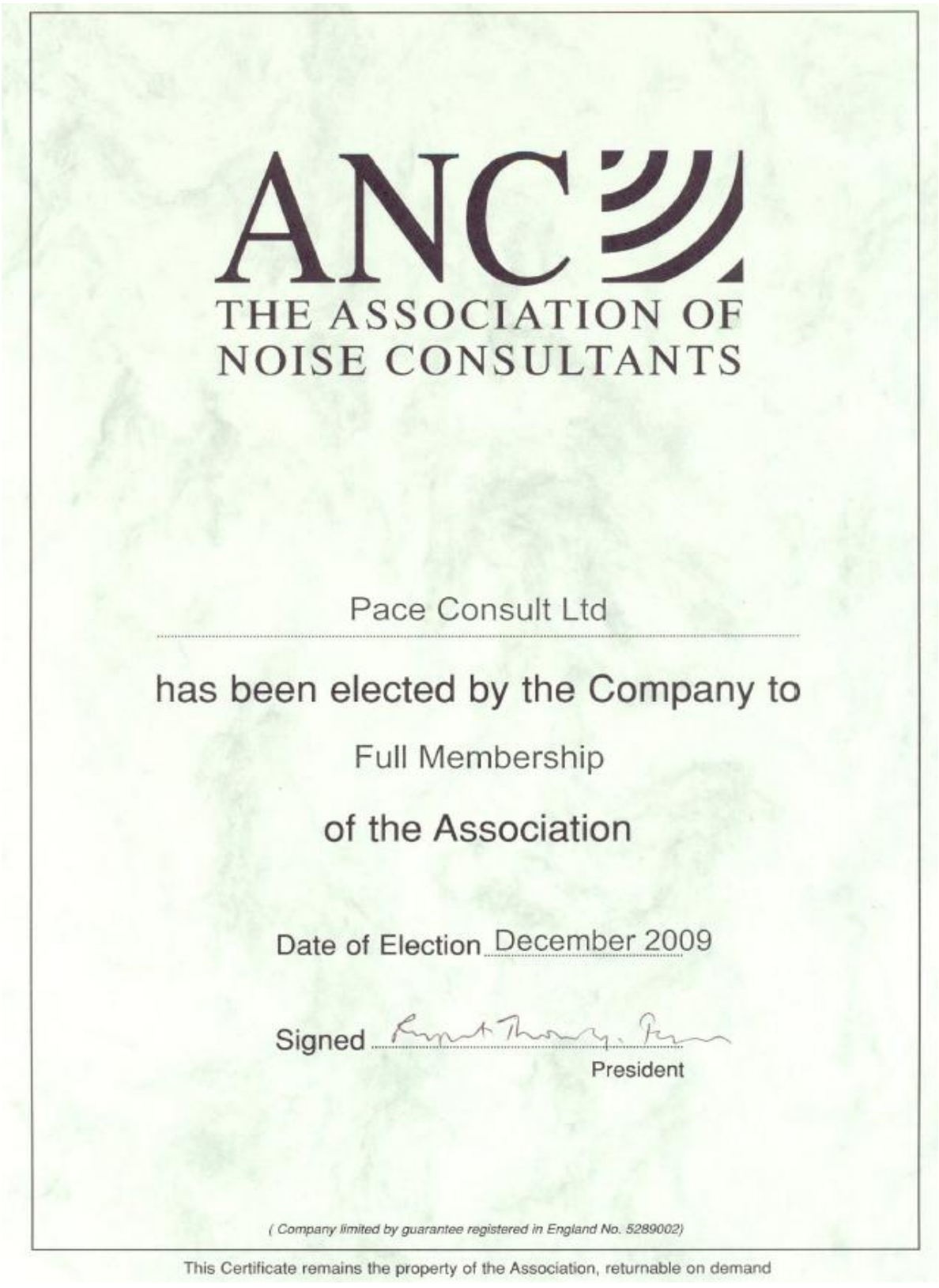


Figure 2: Site Photo

Appendix 1 – ANC Accreditation



ANC

THE ASSOCIATION OF NOISE CONSULTANTS

Pace Consult Ltd

has been elected by the Company to

Full Membership

of the Association

Date of Election December 2009

Signed

President

(Company limited by guarantee registered in England No. 5289002)

This Certificate remains the property of the Association, returnable on demand