RSK Acoustics

British Library Roof PV

Plant Noise Assessment

Report 206/0146/R2

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Plant Noise Assessment

Report 206/0146/R2

CBP Architects

44 The Ropewalk
Nottingham
NG1 5DW

Revision	Description	Date	Prepared	Approved
0	First Issue	1st September 2021	Alex Stronach	Adam Sharpe
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Table of Contents

1 Introduction 3

2 Site Description 3

3 Background Noise Survey 3
3.1 **Methodology** 3
3.2 **Results** 5

4 Plant Noise Limits 6

5 Plant Noise Assessment 7
5.1 **Proposed Installation** 7
5.2 **Methodology** 8
5.3 **Results** 8

6 Conclusions 9

Attachments

Glossary of Acoustic Terms

206/0146/SP1
Site plan illustrating unattended measurement and assessment positions.

206/0164/TH01
Time history graph illustrating unattended measurement results at position MP1.

206/0164/PNS1
Plant noise schedule.

206/0164/CS1-CS2
Plant noise assessment calculation sheets.

End of Section

Plant Noise Assessment

1 Introduction

1.1 It is proposed to install new solar energy equipment at rooftop level at the British Library, Euston Road, London. The proposed installation will comprise solar collectors, ballasted support framework, and pipework.

1.2 The report details an evaluation of noise emissions from the proposed plant strategy to the nearest noise sensitive areas in line with Local Authority guidance. Where necessary, mitigation measures have been set out with performance requirements for the various elements specified.

2 Site Description

2.1 The site, located at the British Library, Euston Road, London NW1 2DB is a large library site of varying storey height that sits on Euston Road between Midland Road to the east and Ossulston Street to the west. The site and its surrounds can be seen illustrated on the attached site plan 206/0146/SP1.

2.2 The site's eastern area is occupied by the library building, which extends to ascending heights from its southern to northern extents. Beyond Midland Road to the east sits the western façade of the St. Pancras Renaissance Hotel.

2.3 The site's western half is occupied by a large square on its southwestern corner, and the remainder of the library building, including its main entrance, accessible from the square, in the northwestern corner of site. Beyond Ossulston Street to the west is the 16 storey Pullman London St Pancras hotel on the corner of Ossulston Street and Euston Road, with five/six storey residential flats extending up Ossulston Street to the north.

2.4 Beyond Euston Road to the south of site sits a row of mixed use properties of various heights, the tallest of which being the nine storey Premier Inn London St Pancras.

2.5 Traffic around the site is predominantly busy along Euston Road, with traffic regularly queuing along both the road itself and its junctions with Midland Road and Ossulston Street.

2.6 The site sits within the jurisdiction of the London Borough of Camden.

3 Background Noise Survey

3.1 **Methodology**

3.1.1 An unattended noise survey was undertaken at the site commencing at 1100 hours on Tuesday 15th June, concluding at 1400 hours on Wednesday 16th June 2021.

3.1.2 Measurements of background noise levels were taken from a position roughly 1.2m above the library's level 4 roof. This has been illustrated in attached site plan 206/0146/SP1.

3.1.3 This position was selected to quantify background noise levels representative of those at the nearest noise sensitive receiver to the proposed installation, taken to be the western façade of the adjacent St Pancras Renaissance Hotel across Midland Road.

3.1.4 Measurements of the L_{Aeq}, L_{Amax} and L_{A90} indices were recorded over consecutive 15-minute periods for the duration of the survey using the equipment listed within table T1 (see attached Glossary of Acoustic Terms for an explanation of the noise units used).

Item	Manufacturer	Type
Sound Level Analyser	Rion	NL-52
Acoustic Calibrator	Rion	NC-74
Weatherproof windshield	Rion	WS-15

T1 Equipment used during unattended noise survey.

3.1.5 The microphone was fitted within a weatherproof enclosure, and the sound level meter calibrated before and after the survey in order to confirm an acceptable level of accuracy. No significant drift was noted to have occurred.

3.1.6 The weather conditions when setting up the noise monitoring equipment were warm and sunny with dry roads and a light breeze. When collecting the equipment, the weather was cloudy and mild with light rain, wet roads and a light breeze. These conditions are deemed acceptable and are not considered to have affected the measurement results. Publicly available weather data suggests that some periods of the survey duration were adversely affected by rainfall. These periods have been set out in table T2 and omitted from the noise survey results set out in the following section 3.2.

Date		Measurement Start Time	Measurement End Time
Tue	15/06/2021	2045	2345
Wed	16/06/2021	2045	2345
Thu	17/06/2021	0015	0245
		0845	0930
		1015	1100
		1645	2315
Fri	18/06/2021	0045	1630
		1945	2359
Sat	19/06/2021	0000	0030
Sun	20/06/2021	0015	0315
		0445	1045
Mon	21/06/2021	0745	1400

T2 Noise survey periods omitted due to rainfall.

3.2 Results

3.2.1 The results of the noise measurements are presented in attached time history graph 206/0164/TH01.

3.2.2 The noise climate perceived onsite was noted to be controlled by traffic noise on the surrounding roads, predominantly that which was emanating from Euston Road.

3.2.3 The representative[1] background noise levels recorded during the day and night-time measurement hours during the survey duration are set out in table T3.

Location	Background Noise Level, L_{A90} dB	
	Daytime (0700-2300 only)	Night time (24-hour)
MP1: British Library Level 4 Roof	56	48

T3 Measured background noise levels, L_{A90}.

[1] Typical L_{A90} background levels quoted at the highest single values where the cumulative total of $L_{A90,15min}$ values in the relevant time period equals ≤25%.

4 Plant Noise Limits

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

4.2 Policy A4 of the London Borough of Camden's *Local Plan 2017* relates specifically to noise:

'We will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity.

Planning conditions will be imposed to require that plant and equipment which may be a source of noise is kept working efficiently and within the required noise limits and time restrictions.

Conditions may also be imposed to ensure that attenuation measures are kept in place and are effective throughout the life of the development.'

4.3 With regard to noise from new mechanical services plant, Appendix 3 of the Local Plan sets out the following:

'A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion).'

4.4 Based on the results of our background noise survey set out within T3, in addition to the guidance set out above, we recommend that the following plant emission limits are to apply at the nearest noise sensitive premises, illustrated in 206/0146/SP1.

Location	**Noise Emission Limit, $L_{Ar,Tr}$ dB (for plant with no distinguishing feature)**	
	Daytime (0700-2300)	**Night time (24-hour)**
AP1: St Pancras Renaissance Hotel Western Façade	46	38

T4 Plant noise emission limits at the nearest residential properties.

4.5 The noise limits will be applied at the nearest noise sensitive dwellings.

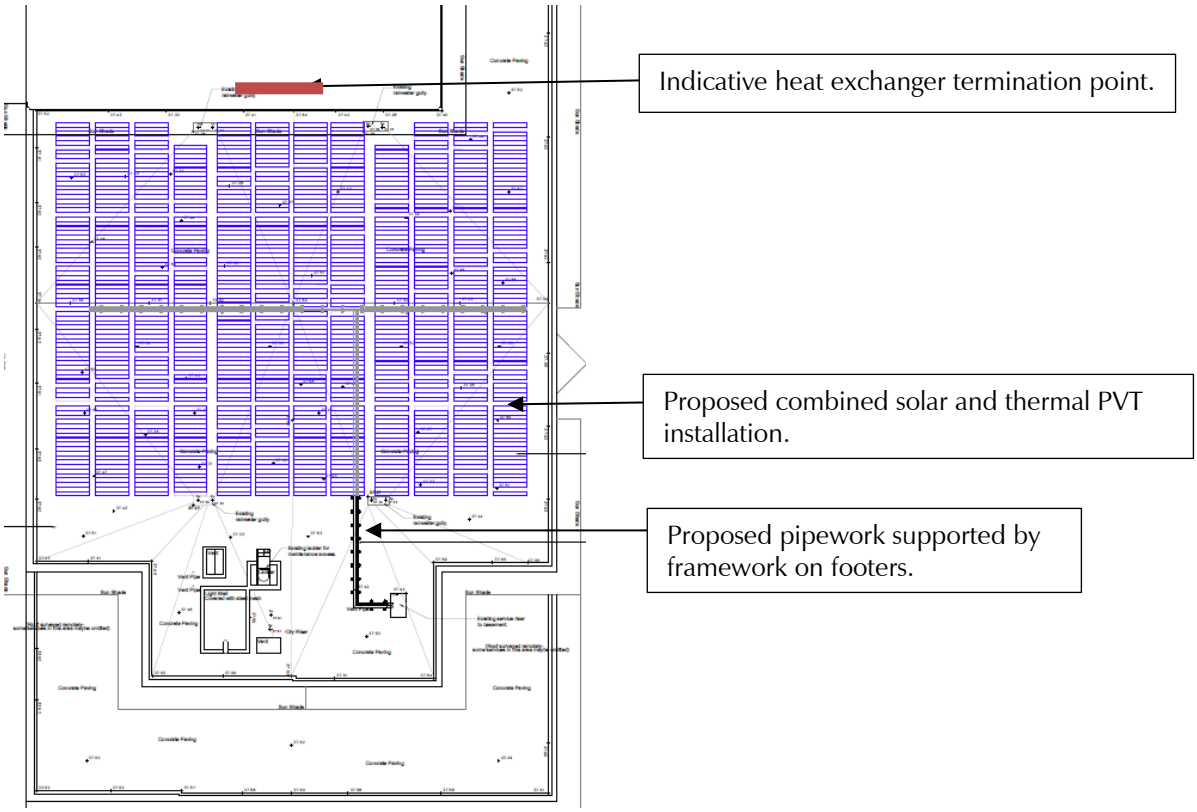
4.6 The noise limits apply at 1m from the outside of the closest residential windows. Plant noise that includes a tonal component would also be subject to a 5dB penalty as set out in the planning condition.

5 Plant Noise Assessment

5.1 Proposed Installation

5.1.1 The plant items installed on the level 4 roof will include solar collectors, ballasted support framework, and the associated pipework. None of these items are considered to generate any significant noise.

5.1.2 The noise generating equipment will be installed internally within the basement of the building and will expel heat into an existing riser which extends 45m up to the level 4 roof. This is shown on the figure below.



Level 4 roof plan showing propose plant layout and indicative heat exchanger termination point.

5.1.3 The proposed internal units ducted to atmosphere are as follows:

- 1x 340 kW Finned Tube Heat Exchanger Unit.

5.1.4 The locations have been obtained from the following drawings provided to us:

- *210127-CBP-XX-04-DR-A-3400-P01_Proposed Level 4 Roof Plan.pdf*;
- *EN1721-KJT-ZZ-03-DR-M-5001-S2-P02.pdf*;
- *EN1721-KJT-ZZ-B1-DR-M-5001-S2-P04.pdf*.

5.1.5 The plant is proposed to operate 24-hours a day and thus it is the night-time limit presented in table T4 above which is to apply here.

5.2 Methodology

5.2.1 Our assessment has used manufacturer's noise data for the proposed installation as shown in the attached schedule 206/0164/PNS1. The data provided is a single figure sound pressure level at 10m. No octave-band data is available for this unit and thus the spectrum of a similar unit has been used as a guide. This similar spectrum has been used to ascertain the overall shape of the spectrum at the relevant frequencies. The reference spectrum is included in the attached schedule. RSK Acoustics' experience with such units suggests that no tonality correction need be applied. It is also not expected that any other feature corrections would be necessary.

5.2.2 The nearest noise sensitive receiver to the proposed plant installation is described below and illustrated on the attached site plan 206/0146/SP1.

- AP1: Upper floor windows of St Pancras Renaissance Hotel, Midland Road.

5.2.3 As mentioned in paragraph 5.2.1, the unit will be located in the basement of the building and terminate into an existing riser. Our calculations have accounted for the reverberant field within the riser, based on the volume and assumed reflective surface finishes. The noise level emanating from the riser termination has been corrected for distance and radiation losses, as well as façade corrections where each is appropriate.

5.2.4 Summary sheets showing the unit's contribution to the noise climate at the assessment position above are set out on attached sheets 206/0164/CS1-CS2. Full calculation sheets are available upon request.

5.3 Results

5.3.1 Based on the above, the rating noise level calculated within our assessment are presented in table T5.

Assessment Position	Rating Noise Level, $L_{Ar,Tr}$ dB *(Limit)*
AP1: Upper floor windows of St Pancras Renaissance Hotel, Midland Road.	36 *(38)*

T5 Plant noise emission levels at the assessment position.

6 Conclusions

6.1 It is proposed to install new solar energy equipment at rooftop level at the British Library, Euston Road, London. The proposed installation will comprise solar collectors, ballasted support framework, and pipework.

6.2 A noise survey has been undertaken at the site to quantify the local noise climate and plant noise limits derived in accordance with the requirements of the Local Authority.

6.3 A subsequent assessment of noise emissions from the proposed services scheme has shown that the proposed plant will meet the plant noise limits at all times with no additional acoustic mitigation measures required.

End of Section

Glossary of Acoustic Terms

L_{Aeq}:

The notional steady sound level (in dB) which over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measurement over that period. Values are sometimes written using the alternative expression dB(A) L_{eq}.

L_{Amax}:

The maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise when occasional loud noises occur, which may have little effect on the L_{Aeq} noise level. Unless described otherwise, L_{Amax} is measured using the "fast" sound level meter response.

L_{A10} & L_{A90}:

If non-steady noise is to be described, it is necessary to know both its level and degree of fluctuation. The L_{An} indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n% of the time specified. L_{A10} is the level exceeded for 10% of the time and as such gives an indication of the upper limit of fluctuating noise. Similarly, L_{A90} gives an indication of the lower levels of fluctuating noise. It is often used to define the background noise.

L_{A10} is commonly used to describe traffic noise. Values of dB L_{An} are sometimes written using the alternative expression dB(A) L_n.

L_{AX}, L_{AE} or SEL

The single event noise exposure level which, when maintained for 1 second, contains the same quantity of sound energy as the actual time varying level of one noise event. L_{AX} values for contributing noise sources can be considered as individual building blocks in the construction of a calculated value of L_{Aeq} for the total noise. The L_{AX} term can sometimes be referred to as Exposure Level (L_{AE}) or Single Event Level (SEL).

End of Section

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Figure 206/0146/SP1

Title:

Site plan illustrating location of unattended measurement position and assessment position.

Key:

MP Unattended Measurement Position

AP Assessment Position

Approximate Internal Plant Termination Point

North

Project:

British Library Roof PV

Date: September 2021

Revision: -

Scale: Not to scale

RSK Acoustics Limited Addlestone | Bristol | Coventry | Glasgow
t +44 (0)1932 829007 Helsby | Hemel | Leeds | Manchester

Registered Office: Spring Lodge, 172 Chester Road, Helsby, WA6 0AR
e info@rskacoustics.com **w** www.rskacoustic.com

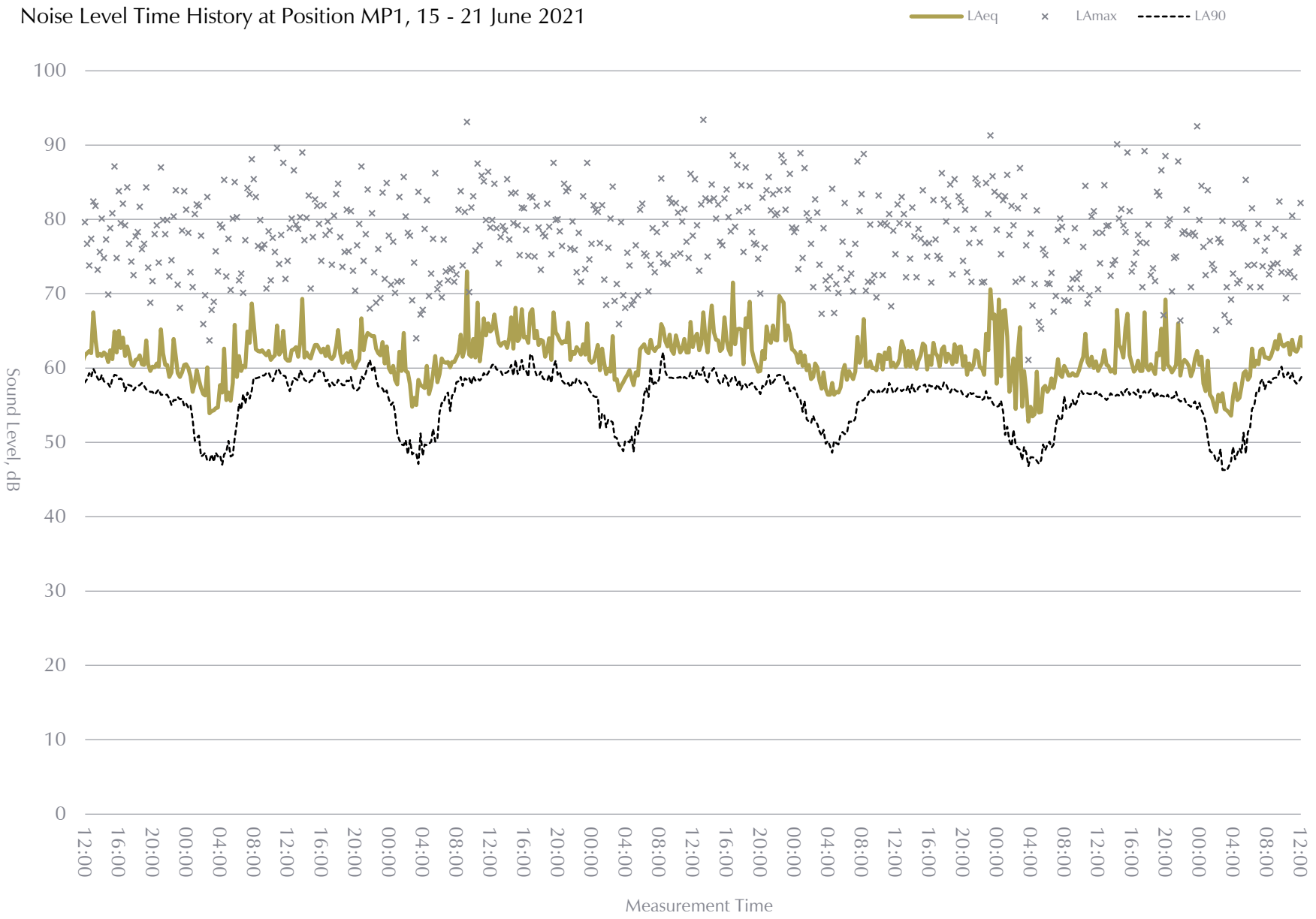


Figure 206/0146/TH01

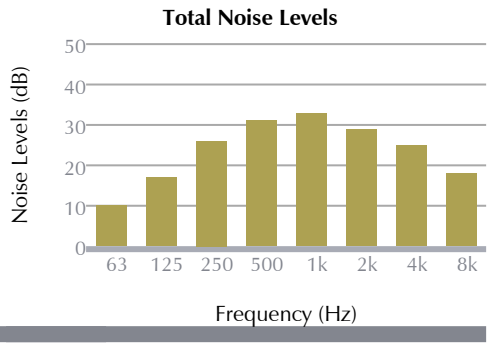
Schedule of Plant and Air Handling Equipment Sound Levels, dB

Reference	Description	Data Source[1]	Noise Level Type	Noise Levels (dB)								dB(A)
				63	125	250	500	1k	2k	4k	8k	
EX-01	ABC8-2190-AX - Table Style Heat Exchanger	Man	Sound Pressure, Lp @ 10m									45.0
EX-01 (Shaped)	ABC8-2190-AX - Table Style Heat Exchanger	Man	Sound Pressure, Lp @ 10m	18.0	25.0	34.0	39.0	42.0	38.0	34.0	27.0	

Notes

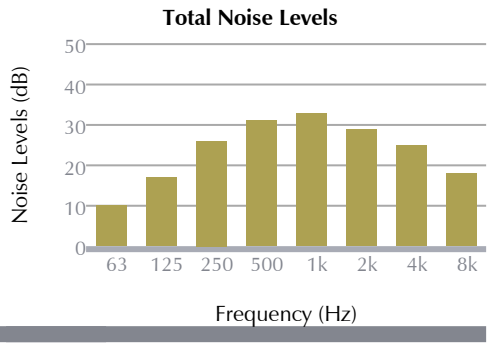
1 - Man refers to data supplied by the equipment manufacturer or supplier, Emp refers to data calculated using empirical formulae, and Meas refers to data measured by Cole Jarman

Project Name	British Library Roof PV
Project Reference	206/0146
Receiver Reference	AP1 Day
Description	St Pancras Chambers
Noise Limit	46
dBA	36.1



Reference	Noise Levels (dB)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
EX-01 (Shaped)	10.0	17.0	26.0	31.0	32.9	28.9	24.9	17.9

Project Name	British Library Roof PV
Project Reference	206/0146
Receiver Reference	AP1 Night
Description	St Pancras Chambers
Noise Limit	38
dBA	36.1



Reference	Noise Levels (dB)							
	63	125	250	500	1k	2k	4k	8k
EX-01 (Shaped)	10.0	17.0	26.0	31.0	32.9	28.9	24.9	17.9

RSK Acoustics Limited Reg. in England and Wales No. 7102436
rskacoustics.com info@rskacoustics.com +44 (0)1932 829007

Registered Office: Spring Lodge, 172 Chester Road, Helsby, WA6 0AR
Addlestone | Bristol | Coventry | Glasgow | Helsby | Hemel | Leeds | Manchester