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TED BAKER, THE UGLY BROWN BUILDING, LONDON

PLANNING COMPLIANCE REPORT

Report 13232.PCR.01

For:

Maris Interiors LLP

The Harlequin Building

65 Southwark Street

London SE1 0HR

Site Address	Report Date	Revision History
Ted Baker, The Ugly Brown Building, 6A St. Pancras Way, London NW1 0TB	14/10/2015	-

CONTENTS

List of Attachments

1.0 INTRODUCTION

KP Acoustics Ltd, Britannia House, 11 Glenthorne Road, London, W6 0LH, has been commissioned by Maris Interiors LLP, The Harlequin Building, 65 Southwark Street, London SE1 0HR to undertake an environmental noise survey at Ted Baker, The Ugly Brown Building, 6A St. Pancras Way, London, NW1 0TB. The background noise and vibration levels measured will be used to determine daytime and night-time noise emission criteria for a generator room in compliance with the London Borough of Camden.

This report presents the overall methodology and results from the environmental survey followed by calculations to demonstrate the feasibility of the plant installation to satisfy the emissions criterion at the closest noise-sensitive receiver and outline mitigation measures as appropriate.

2.0 ENVIRONMENTAL NOISE SURVEY, VIBRATION MEASUREMENTS AND EQUIPMENT

2.1 Procedure

Automated noise monitoring was undertaken, at the site as shown in Site Plan 13232.SP1. The choice of position was based both on accessibility and on collecting representative noise data in relation to the nearest noise sensitive receiver relative to the proposed plant installation. The duration of the survey was between 12:00 on the 09/10/2015 and 10:00 on the 12/10/2015.

Initial inspection of the site revealed that the background noise profile at the monitoring location was dominated by general environmental noise from the surrounding areas.

The weather during the course of the survey was generally dry with wind speeds within acceptable tolerances and therefore suitable for the measurement of environmental noise. The measurement procedure complied with BS7445:1991 "*Description and measurement of environmental noise, Part 2- Acquisition of data pertinent to land use*".

In addition to the environmental noise survey, manual vibration measurements were taken in conjunction with BS6472-1:2008 '*Guide to evaluation of human exposure to vibration in buildings*' to assess the current background vibration profile.

2.2 Equipment

The equipment calibration was verified before and after the survey and no calibration irregularities were observed.

The equipment used was as follows.

- 1 No. Svantek Type 958A Class 1 Sound Level Meter
- B&K Type 4231 Class 1 Calibrator
- Dytran accelerometer, Model 3100D24

3.0 RESULTS

The results from the continuous noise monitoring are shown as a time history of L_{Aeq}, L_{Amax}, L_{A10} and L_{A90} averaged over 5 minute sample periods in Figures 13232.TH1.

Minimum background noise levels are shown in Table 3.1.

	Minimum background noise level $L_{A90: 5min}$ dB(A)
Daytime (07:00-23:00)	50
Night-time (23:00-07:00)	46

Table 3.1: Minimum measured background noise levels

The results from the manual vibration measurements from the x, y and z axes are shown in mm/s^2.

Minimum background vibration levels are shown in Table 3.2

X-axis (mm/s^2)	**Y-axis (mm/s^2)**	**Z-axis (mm/s^2)**
0.1	0.1	0.1

Table 3.2 Minimum measured background vibration levels

4.0 NOISE CRITERIA

The criterion of The London Borough of Camden states that noise emission level from machinery at 1m from the closest noise sensitive receiver should be at least 5 dB below background noise level. If the proposed plant units generate noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) or distinct impulses the noise emission level should be at least 10 dB below background noise level.

It is anticipated that the proposed generator will not generate distinct impulses and spectral noise levels at any tonal compornent, therefore the unit should be 10 dB below the background noise level criterion as proposed and shown in Table 4.1 to fully comply with The London Borough of Camden's noise emission criteria.

	Daytime (07:00 to 23:00)	Night-time (23:00 to 07:00)
Noise criterion at nearest receiver	40dB(A)	36dB(A)

Table 4.1: Proposed Noise Emissions Criteria

As the generator could operate at any time of the day, the night time criterion of 36dB (A) will be used to ensure that the amenity of the closest receiver will be protected.

4.1 Vibration Criteria

BS6472:1992 suggests limits of vibration at which adverse comment may begin to arise. These magnitudes of vibration, expressed in terms of vibration dose values (VDVs) can be seen below in Table 5.1.

Place	Low probability of adverse comment (mm/s^2)	Adverse comment possible (mm/s^2)	Adverse comment probable (mm/s^2)
Residential Buildings, 16hr day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential Buildings, 8hr night	0.13	0.26	0.51

Table 5.1 Vibration values at which various degrees of adverse comment may be expected

5.0 DISCUSSION

It is understood that the plant installation is comprised of the following units as shown in 13232.SP1.

- 1 No. Perkins 1106A-70TG

The closest noise sensitive receiver to the proposed Electric Power Generator, as shown in 13232.SP1, will be the Jubilee Waterside centre to the North East side of the canal.

The sound pressure levels for a Perkins 1106A-70TG Electric Power Generator as provided by the manufacturer are shown in Table 6.1.

	Sound Pressure Level (dB) in each Frequency Band (at 1m)							
Unit	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**
Perkins1106A-70TG	44	48	52	53	54	53	49	42

Table 6.1 Manufacturer's Sound Pressure Levels at 1m

5.1 Objective overview

Taking all acoustic corrections into consideration, including distance corrections, the noise level expected at the closest residential window would be as shown in Table 6.2. Detailed calculations are shown in Appendix B.

Receiver - Nearest Noise Sensitive Window	**Criterion**	**Noise Level at Receiver due to Electric Power Generator installation**
Operating hours of Electric Power Generator (24 hours)	36dB(A)	19dB(A)

Table 6.2 Predicted noise level and criterion at nearest noise sensitive location

As shown in Appendix B and Table 5.2, transmission of noise to the nearest sensitive window due to the effects of the plant installation fully satisfies the emissions criteria set, based on the requirements of London Borough of Camden. The proposed Electric Power Generator will not compromise the amenity of the closest receiver.

In addition to housing the Electric Power Generator in the proposed CAE modular acoustic enclosure, it is advised that the generator room walls are constructed with 100mm high-density blockwork (1850-2350kg/m^3) to avoid compromising the amenity of the workspaces above the proposed generator room. All blocks should be built off isolating strips (Regupol 6010XHT, or similar).

5.2 Vibration overview

The minimum background vibration levels as shown in Table 3.2 do not currently exceed the values outlined by BS6472:1992 as shown in Table 5.1. However, in order to ensure that any vibration caused by the generator operation is minimised not only to the neighbouring offices, but to the closest identified receiver on the opposite side of the canal, we would recommend the following anti-vibration strategy:

- Installation of 6 No. equally distributed mounts under the proprietary enclosure to comprise CR45 mounts from Farrat (25mm thickness, 100mm x 100mm dimensions)

The above strategy would be anticipated to provide a natural frequency of 17-18Hz, therefore minimising any potential vibration transfer to the aforementioned receivers.

6.0 CONCLUSION

An environmental noise survey has been undertaken at Ted Baker, London, by KP Acoustics Ltd between 09/10/2015 and 12/10/2015. The results of the survey have enabled criteria to be set for noise emissions.

Using manufacturer noise data, noise levels have been predicted at the nearby noise sensitive receivers for compliance with current requirements.

Calculations show that noise emissions from a Perkins 1106A-70TG Electric Power Generator would meet the requirements for the London Borough of Camden.

Further calculations have been undertaken with regards to the relevant British Standard and it has been ensured that the amenity of nearby residential receivers will be protected with a set of proposals in place.

Report by

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KP Acoustics Ltd

Checked by

Kyriakos Papanagiotou MIOA

KP Acoustics Ltd

Noise Survey Monitoring Position

Closest noise-sensitive receiver

Title:

Indicative site plan showing noise monitoring position
(Source: Google)

Date: 13 October 2015

FIGURE 13232.SP1

KP acoustics

Ugly Brown Building, London
Environmental Noise Time History
9th October to 12th October 2015

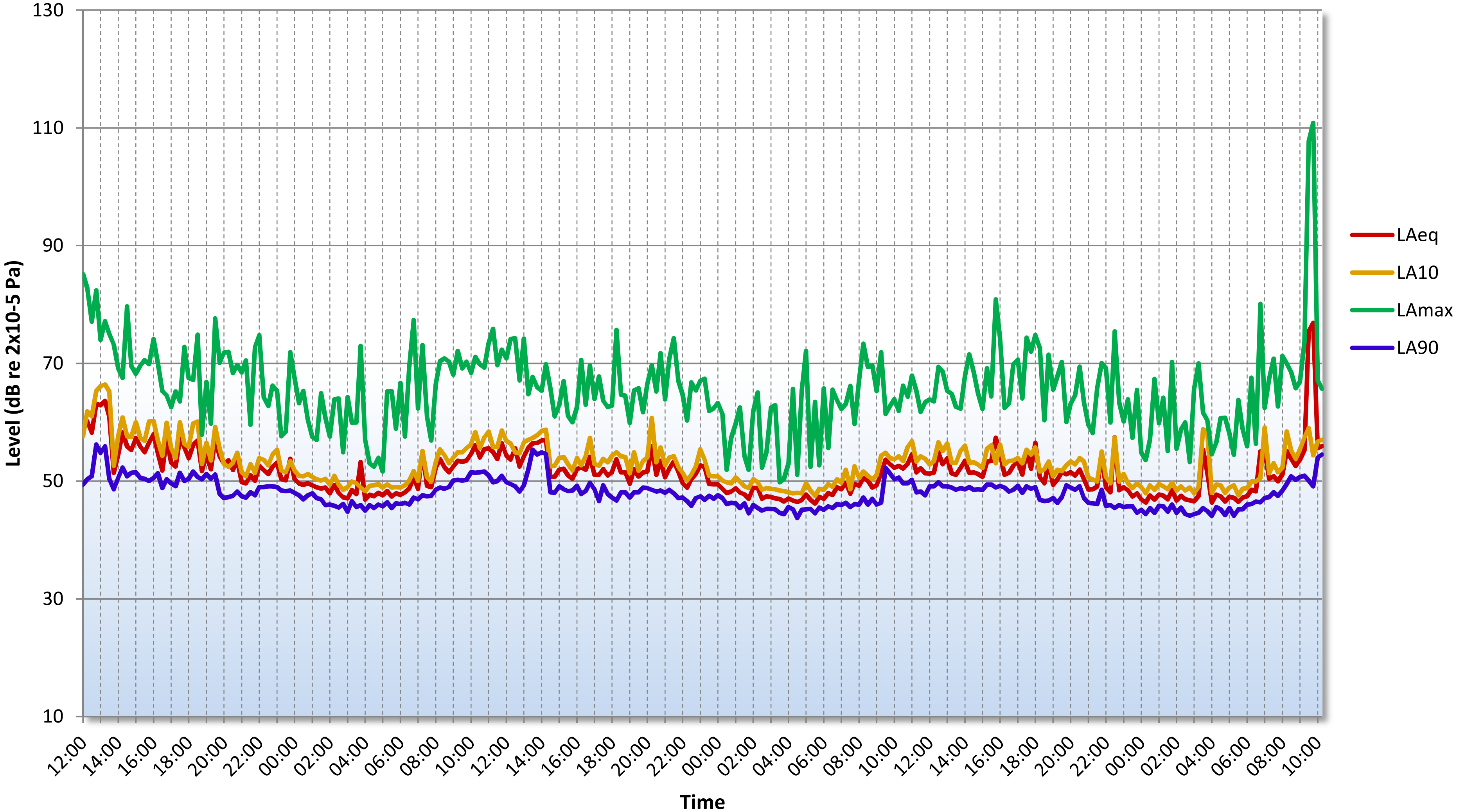

Figure 13232.TH1

APPENDIX A

GENERAL ACOUSTIC TERMINOLOGY

Decibel scale - dB

In practice, when sound intensity or sound pressure is measured, a logarithmic scale is used in which the unit is the 'decibel', dB. This is derived from the human auditory system, where the dynamic range of human hearing is so large, in the order of 10^{13} units, that only a logarithmic scale is the sensible solution for displaying such a range.

Decibel scale, 'A' weighted - dB(A)

The human ear is less sensitive at frequency extremes, below 125Hz and above 16Khz. A sound level meter models the ears variable sensitivity to sound at different frequencies. This is achieved by building a filter into the Sound Level Meter with a similar frequency response to that of the ear, an A-weighted filter where the unit is dB(A).

L_{eq}

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level L_{eq}. The L_{eq} is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

L_{10}

This is the level exceeded for no more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise.

L_{90}

This is the level exceeded for no more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

L_{max}

This is the maximum sound pressure level that has been measured over a period.

Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 11 such octave bands whose centre frequencies are defined in accordance with international standards. These centre frequencies are: 16, 31.5, 63, 125, 250, 500, 1000, 2000, 4000, 8000 and 16000 Hertz.

Environmental noise terms are defined in BS7445, *Description and Measurement of Environmental Noise*.

APPENDIX A

APPLIED ACOUSTIC TERMINOLOGY

Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than a single source and 4 sources produce a 6dB higher sound level.

Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3dB for each doubling of distance.

Subjective impression of noise

Hearing perception is highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a guide to explain increases or decreases in sound levels for many scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud

Transmission path(s)

The transmission path is the path the sound takes from the source to the receiver. Where multiple paths exist in parallel, the reduction in each path should be calculated and summed at the receiving point. Outdoor barriers can block transmission paths, for example traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and construction.

Ground-borne vibration

In addition to airborne noise levels caused by transportation, construction, and industrial sources there is also the generation of ground-borne vibration to consider. This can lead to structure-borne noise, perceptible vibration, or in rare cases, building damage.

Sound insulation - Absorption within porous materials

Upon encountering a porous material, sound energy is absorbed. Porous materials which are intended to absorb sound are known as absorbents, and usually absorb 50 to 90% of the energy and are frequency dependent. Some are designed to absorb low frequencies, some for high frequencies and more exotic designs being able to absorb very wide ranges of frequencies. The energy is converted into both mechanical movement and heat within the material; both the stiffness and mass of panels affect the sound insulation performance.

APPENDIX B

The Ugly Brown Building, London

PLANT UNIT EMISSIONS CALCULATIONS

Source: Perkins 1106A-70TG	*Frequency, Hz*								
Receiver: Nearest Residential Window	***63***	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***	***dB(A)***
Sound Pressure Level at 1m from Perkins 1106A-70TG	44	48	52	53	54	53	49	42	
Attenuation provided by Distance (minimum 10m)	-20	-20	-20	-20	-20	-20	-20	-20	
Assumed minimum attenuation by	-3	-6	-7	-16	-26	-35	-34	-40	
Sound Pressure Level 1m from Closest Noise Sensitive Receiver	**21**	**22**	**25**	**17**	**8**	**0**	**0**	**0**	**19**

Design Criterion	**36**

ANTI-VIBRATION MOUNTING SPECIFICATION REFERENCE DOCUMENT

1.0 General

1.1 All mountings shall provide the static deflection, under the equipment weight, shown in the schedules. Mounting selection should allow for any eccentric load distribution or torque reaction, so that the design deflection is achieved on all mountings under the equipment, under operating conditions.

1.2 It is the supplier's responsibility to ensure that all mountings offered are suitable for the loads, operating and environmental conditions which will prevail. Particular attention should be paid to mountings which will be exposed to atmospheric conditions to prevent corrosion.

1.3 All mountings shall be colour coded, or otherwise marked, to indicate their load capacity, to facilitate identification during installation.

Where use of resilient supports allows omission of pipe flexible connections for vibration/noise isolation, it shall be the Mechanical Service Consultant's or Contractor's responsibility to decide whether such devices are required to compensate for misalignment or thermal strain.

2.1 Type A Mounting (Caged Spring Type)

2.1.1 Each mounting shall consist of cast or fabricated telescopic top and bottom housings enclosing one or more helical steel springs as the principle isolation elements, and shall incorporate a built-in levelling device. The housing should be designed to permit visual inspection of the springs after installation, i.e. the spring must not be totally enclosed.

2.1.2 The springs shall have an outside diameter of not less than 75% of the operating height, and be selected to have at least 50% overload capacity before becoming coil-bound.

2.1.3 The bottom plate of each mounting shall have bonded to it a rubber/neoprene pad designed to attenuate any high frequency energy transmitted by the springs.

2.1.4 Mountings incorporating snubbers or restraining devices shall be designed so that the snubbing, damping or restraining mechanism is capable of being adjusted to have no significant effect during the normal running of the isolated machine.

2.1.5 All nuts, bolts or other elements used for adjustment of a mounting shall incorporate locking mechanisms to prevent the isolator going out of adjustment as a result of vibration or accidental or unauthorised tampering.

2.2 Type B Mounting (Open Spring Type)

2.2.1 Each mounting shall consist of one or more helical steel springs as the principal isolation elements, and shall incorporate a built-in levelling device.

2.2.2 The springs shall be fixed or otherwise securely located to cast or fabricated top and bottom plates, shall have an outside diameter of not less than 75% of the operating height, and shall be selected to have at least 50% overload capacity before becoming coil-bound.

2.2.3 The bottom plate shall have bonded to it a rubber/ neoprene pad designed to attenuate any high frequency energy transmitted by the springs.

2.3 Type C Mounting (Rubber/Neoprene Type)

Each mounting shall consist of a steel top plate and base plate completely embedded in oil resistant rubber/neoprene. Each mounting shall be capable of being fitted with a levelling device, and should have bolt holes in the base plate and a threaded metal insert in the top plate so that they can be bolted to the floor and equipment where required.

3.0 Plant Bases

3.1 **Type A Bases (A.V. Rails)**

An A.V. Rail shall comprise a steel beam with two or more height-saving brackets. The steel sections must be sufficiently rigid to prevent undue strain in the equipment and if necessary should be checked by the Structural Engineer.

3.2 **Type B Bases (Steel Plant Bases)**

Steel plant bases shall comprise an all-welded steel framework of sufficient rigidity to provide adequate support for the equipment, and fitted with isolator height saving brackets. The frame depth shall be approximately 1/10 of the longest dimension of the equipment with a minimum of 150 mm. This form of base may be used as a composite A.V. rail system.

3.3 **Type C Bases (Concrete Inertia Base: for use with steel springs)**

These shall consist of an all-welded steel pouring frame-work with height saving brackets, and a frame depth of approximately 1/12 of the longest dimension of the equipment, with a minimum of 100 mm. The bottom of the pouring frame should be blanked off, and concrete (2300 kg/m^3) poured in over steel reinforcing rods positioned 35 mm above the bottom. The inertia base should be sufficiently large to provide support for all parts of the equipment, including any components which over-hang the equipment base, such as suction and discharge elbows on centrifugal pumps.