Environmental Noise Assessment

(new air source heat pump)

Flat 16, St Stephen's Close, Avenue Road, London, NW8 6DB

On Behalf of Andrew Neil Associates Ltd
D'Abernon
Station Road
Gilling East
York YO62 4JL

Project Ref: 7578 St Stephen Close| Rev: 0 | Date: 9th September 2021

Office Address: Bampfylde House, Poltimore, Exeter, EX4 0AF
T: +44(0)1392 469090 E:peter@acousticassociatessw.co.uk

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Project Name: Flat 16, St Stephen's Close, Avenue Road, London, NW8 6DB
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Report Title: Environmental Noise Assessment
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	Name	Position	Signature
Prepared by	Peter Ashford BSc MIoA ANC	Managing Director	
Reviewed by	John Hammond TechIOA	Senior Acoustician	

Revision	Date	Description

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1 Executive Summary

A planning application is shortly to be made to Camden Council for permission for various upgrade works on Flat 16 Stephen Close, Avenue Road, NW8 6DB, one element of which is the installation of an air source heat pump (ASHP).

Pre-app advise was sought and Mr David Peres da Costa (Senior Planning Officer) responded (letter dated 13th November 2020) saying that a Noise Assessment would need to be submitted with this application demonstrating that the proposed ASHP will meet Camden Council noise and vibration criteria.

AASW Ltd have been instructed by Andrew Neil Associates to provide such a report.

This report sets out the findings of a 5 day on-site background noise survey, which shows the night time background noise level was 36 dB $L_{A90,modal}$ and therefore any ASHP noise will have to be limited to 10 dB less than this to comply with Camden's requirements.

The heat pump will be located on the 5th floor roof, directly above Flat 16, which it will serve and will be fully screened from view from all its neighbours. The heat pump selected, an Hitachi, is one of the quietest on the market and predicted noise levels, at the neighbour's windows, are very low, 22 dB L_{Aeq} or less and therefore will comply with Camden's requirements.

Vibration will also be suitably controlled using high deflection neoprene turret mounts and the required type are also set out in this report.

In this way plant noise can be adequately controlled and will meet Camden Council's planning policy objectives.

2 Planning Requirements

A planning application is shortly to be made to Camden Council for permission for various upgrade works on Flat 16 Stephen Close, Avenue Road, NW8 6DB, one element of which is the installation of an air source heat pump (ASHP).

Pre-app advise was sought and Mr David Peres da Costa (Senior Planning Officer) responded (letter dated 13th November 2020) and stated the following regarding the proposed ASHP;

> *As you are proposing an ASHP, you will need to submit a Noise Impact Assessment and mitigation report with any formal planning application. Noise and vibration thresholds in Appendix 3 of the Camden Local Plan can provide the starting point for acoustic reports. A 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion. The assessment should be carried out by a suitably qualified and competent consultant and conform to the relevant British standards. Further detailed advice on the content of the report can be found in the Camden Planning Guidance on Amenity.*

Appendix 3 of Camden Local Plan[1] sets out limits for both noise and vibration within the home.

2.1 Vibration

Table A "*Vibration levels from uses such as railways, roads, leisure and entertainment premises and/or plant or machinery at which planning permission will not normally be granted*" provides a Vibration Dose Value (VDV) inside dwellings at night of 0.13 $ms^{-1.75}$. This is the most onerous requirement.

2.2 Noise

Table C: "*Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)*" provides a night time noise criteria, to be measured outside bedroom window, namely;

'*Rating level' 10dB*[2] *below background and no events exceeding 57dB* L_{Amax}"

[1] Camden Local Plan 2017

[2] 10dB should be increased to 15dB if the noise contains audible tonal elements. (day and night). However, if it can be demonstrated that there is no significant difference in the character of the residual background noise and the specific noise from the proposed development then this reduction may not be required. In addition, a frequency analysis (to include, the use of Noise Rating (NR) curves or other criteria curves) for the assessment of tonal or low frequency noise may be required.

3 Proposed ASHP

The proposed ASHP is to be mounted on a clerestory directly above Flat 16. The photograph below shows this, to the right of the door;

The ASHP will be fully screened from all neighbours in the main building as well as the two lower ones immediately to the west.

The general arrangement is shown on Andrew Neil Associates' drawing No. PL-206, a copy of which is included at the rear of this report.

The ASHP is to be an Hitachi YUTAKI-M RASM-5(V)NE with a rated sound power level of 64 dB $L_{A,w}$[3] or 56 dB $L_{p,A\ at\ 1m}$. These units are some of the quietest available.

[3] https://www.hitachi-hvac.co.uk/ranges/heating/yutaki-m

4 Sound Measurements

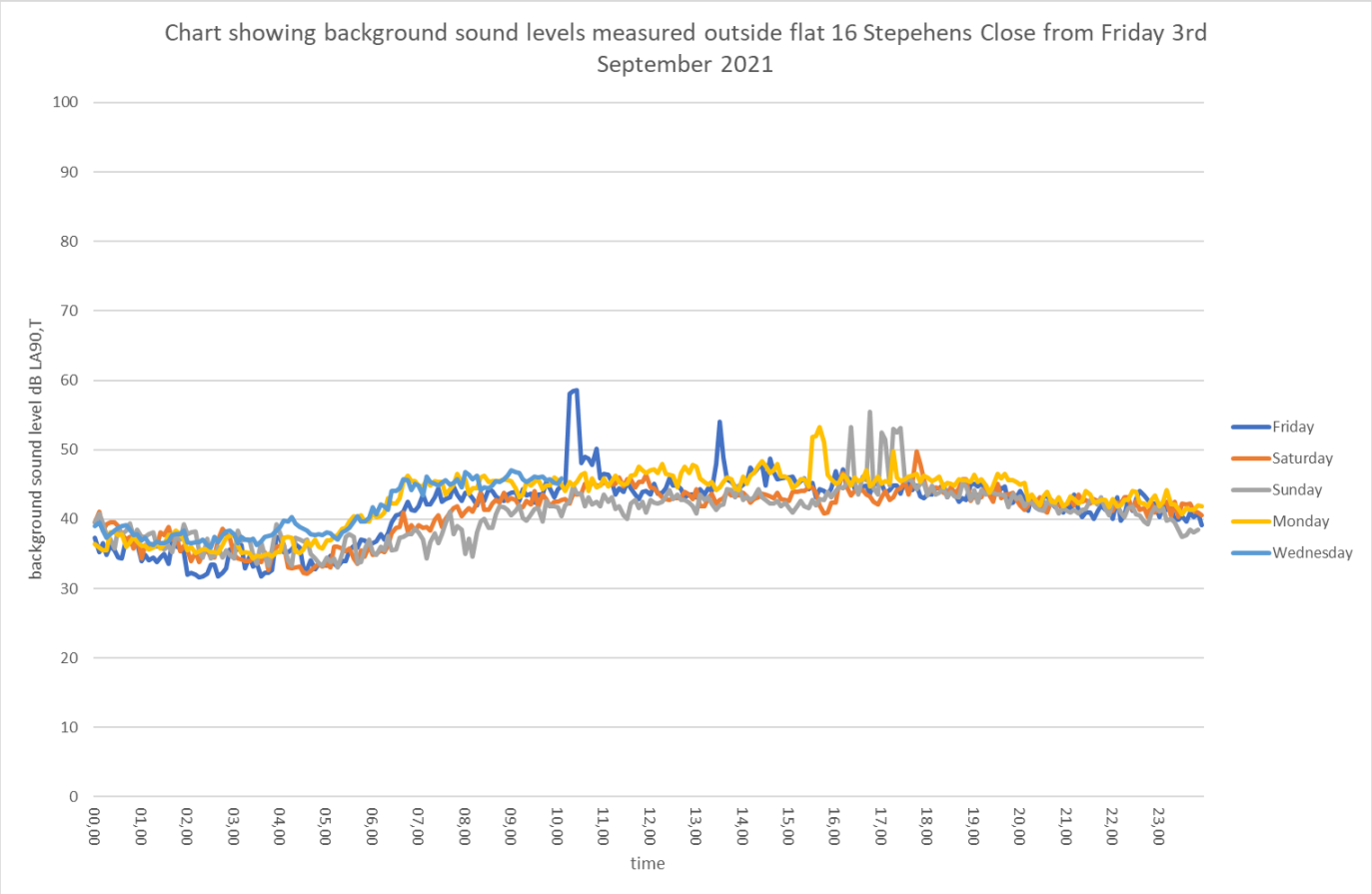
A sound logging meter was set up, with the microphone on a boom, outside one of the windows on the western facade of Flat 16 on Thursday 2nd September 2021. The meter was left to record sound levels through to the following Wednesday.

The weather during this period was fine with light winds[4]. No immediate plant was discernable as running close by and the background sound climate at the time of setting up and collecting the meter was dominated by adjacent traffic.

The sound meter/pre-amp/microphone was calibrated using a hand held calibrator before and after my survey, with no adverse variants being observed. Details of the equipment used are given in the table below.

Meter Make	Model	Serial No.	Calibration Date	Calibration Certificate No.	Calibration due date
Rion	NL52	00732148	22-5-20	199433	22-5-22
Rion	NC74	34794316	10-6-21	1112988	10-6-22

The chart below shows the sound levels recorded, ($L_{A90,5minute}$);



[4] https://www.timeanddate.com/weather/uk/london/historic

This chart shows the background sound level hovering in the mid 40's dB during the day, dropping down to 40 dB by 11pm and fell as low as 32 dB L_{A90} in the small hours of the night. The modal night background sound level was 36 dB $L_{A90.modal}$ across the 5 nights of the survey.

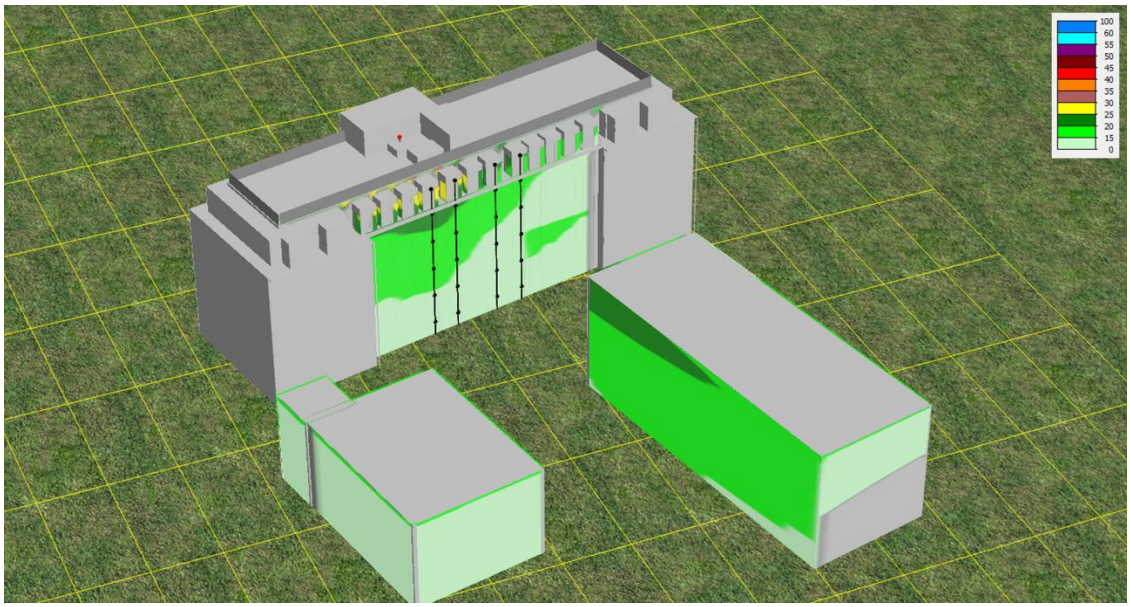
5 Plant Noise Criteria

The operation of the ASHP, according to the manufacturer, will be free of audible tones and therefore to comply with Camden Council noise requirement's noise from the unit will need to be no more than 36 – 10 = 26 dB $L_{Aeq,T}$.

6 Plant Noise Levels

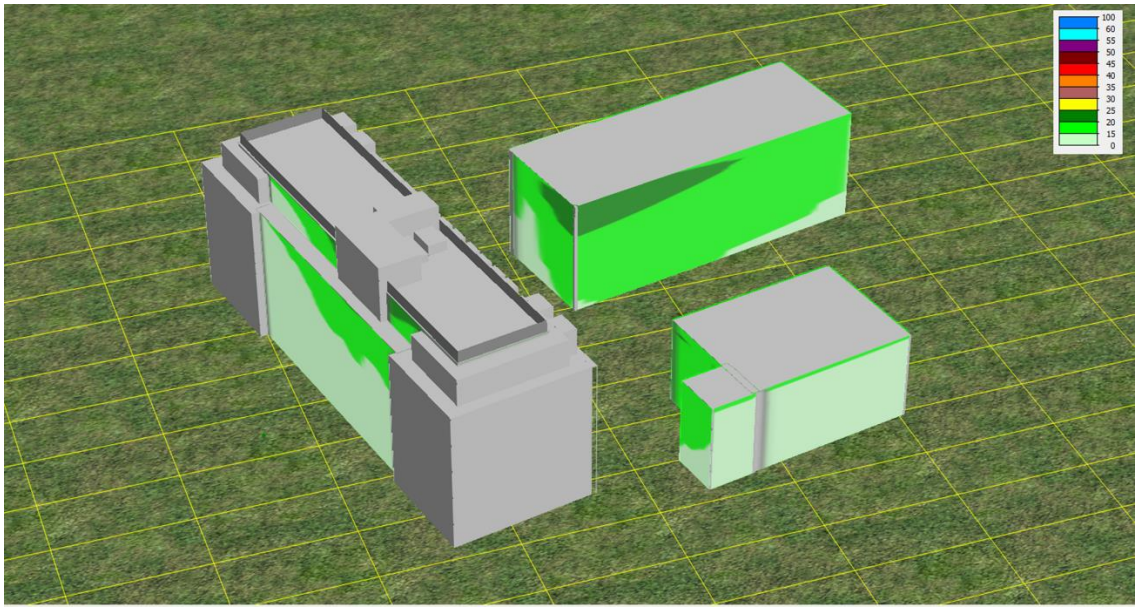
The noise created by the ASHP has been predicted using iNoise[5] 3-D noise modelling software, implementing the calculation procedures set out in ISO 9613: Part2[6]. This takes into account distance and screening losses as well as acoustic reflection off the neighbouring building in predicted noise levels outside the nearest residential windows, which in this case they belong to the neighbouring flats in the same building, also on the top floor.

The image below shows ASHP noise levels across the western façade;

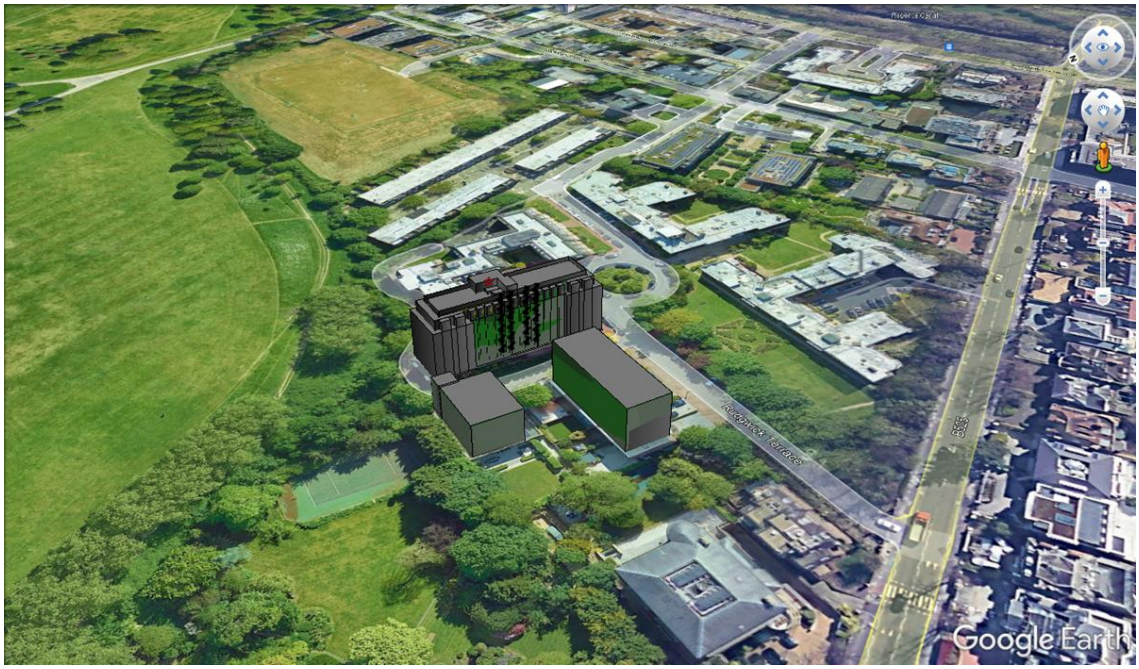


[5] https://dgmrsoftware.com/products/inoise/
[6] ISO 9613-2:1996 Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation

The image below shows noise levels across the two adjacent building on Rudgwick Terrace;



And superimposed on to Google Earth;



The table below details the predicted noise levels;

Location	Floor	ASHP Noise dB Laeq
neighbour directly below	4th	22
neighbours to the side	5th	21
neighbours opposite (Rudgwick Terrace)	3rd	19

7 Vibration control

The ASHP will be fitted with high performance neoprene turret mounts to limit vibration passing into the building.

The ASHP an Hitachi YUTAKI-M RASM-5(V)NE has a gross weight of 140 kg and will require mounts offering 10mm static deflection such as Eurovib's VT4 Blue[7]. Four of these mounts will provide 95% vibration isolation efficiency for this 50 Hz equipment.

8 Assessment of ASHP noise & Vibration

Noise from the proposed ASHP will be no more than 22 dB L_{Aeq} outside the windows of the closest neighbour and therefore demonstrated compliance with Camden Council requirement to ensure plant noise should be at least 10 dB below the night time background sound level.

The ASHP will be fitted with high performance neoprene turret anti-vibration mounts that will ensure vibration transfer will be less than 0.13 $ms^{-1.75}$ VDV and will therefore comply with Camden Council's requirement set out in Appendix 3 of their Local Plan.

[7] http://www.eurovib.co.uk/www.eurovib.co.uk/mounts/vt.html

Andrew Neil Associates' drawing No. PL-206