Holborn Links Project 1

Report to Discharge Planning Condition 8 of Decision Notice 2022/3301/P

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Comments

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Revision		Status	
P*nn*	Preliminary (shared; non-contractual)	S1	Coordination
C*nn*	Contractual	S2	Information
		S3	Review & Comment
		S4	Review & Authorise
		S5	Review & Acceptance
		A0, A1, A*n*	Authorised & Accepted (*n*=work stage if applicable)

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1. Introduction

1.1 Waterman Infrastructure & Environment Ltd (hereafter referred to as 'Waterman IE') was appointed by Structuretone to undertake a noise assessment to discharge a planning condition 8 of decision notice 2022/3301/P relating to noise from external mechanical plant for works at Vernon & Sicilian House (London WC1A 2QR). For completion the condition is replicated below.

"Prior to relevant part of the works, details of the external noise level emitted from plant/ machinery/ equipment and mitigation measures as appropriate shall be submitted to and approved in writing by the Council. The measures shall ensure that the external noise level emitted from plant, machinery/ equipment will be lower than the typical existing background noise level by at least 10dBA, by 15dBA where the source is tonal, as assessed according to BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' at the nearest and/or most affected noise sensitive premises, with all machinery operating together at maximum capacity."

Site Description and Proposed Development

1.2 The Site lies within an urban area nearby Holborn Station, the surrounding land uses are predominantly commercial (office, retail, restaurants and cafes), with some residential dwellings in the nearby vicinity. The Site is bound by Sicilian Avenue, Southampton Row and Vernon Place; as such, the predominant noise source at the Site is road traffic noise from the surrounding transport network.

2. Assessment Criteria

Site Description and Proposed Development

2.1 The significance of building services noise impacts depends upon a number of factors including but not limited to, the absolute noise level, the nature of the noise, the time and duration at which the noise occurs, whether the noise is temporary, intermittent or permanent, whether the impact is as a result of a new source, or whether it is a change to an existing source and/or the sensitivity of the receptor.

2.2 The primary source of guidance in relation to noise which is commercial in nature, such as fixed building services plant, is provided in BS 4142:2014+A1:2019 '*Methods for rating and assessing industrial and commercial sound'*. BS 4142 provides an objective method for rating the likelihood of compliance from industrial and commercial operations and also provides a means of determining noise levels from fixed building services plant installations and prevailing background noise levels on, and around, proposed developments.

2.3 The standard sets out a methodology whereby the likelihood of complaints about an industrial noise source can be assessed. The measured or predicted noise level from the source in question, the 'specific noise' level, immediately outside the dwellings is compared with the 'background noise' level. Where the noise contains a "distinguishable discrete continuous note (whine, hiss, screech, hum, etc.)" or "if there are distinct impulses in the noise (bangs, clinks, clatters or thumps)", or "if the noise is sufficiently irregular as to attract attention", then a correction of is added based on the assessors' judgment of the potential effects these subjective characteristics could have on the extent of community annoyance due to the source. The corrected level is the referred to as the 'rating level' in dB $L_{Ar,Tr}$. The likelihood of noise provoking complaints is assessed by subtracting the background noise level from the rating noise level.

2.4 To meet the requirements of the planning condition external noise level emitted from plant, machinery/ equipment will be lower than the typical existing background noise level by at least 10dBA, and by 15dBA where the source is tonal.

3. Baseline Environmental Conditions

Nearest Noise Sensitive Receptors

3.1 Following a review of the site and surrounds, the closest existing residential sensitive receptors that have the potential to be adversely affected by the development have been identified and are presented as Table 3-1.

Table 3-1: Nearest Sensitive Receptors

Receptor	Type of Receptor	Description / Name	Approximate Distance to Site Boundary (m)
SR A	Residential	Residential Dwellings along Barter Street	Approx. 70m south west of Site boundary

3.2 Further to the above, a greater number of sensitive receptors have been identified around the site than are presented in Table 3-1; however, given their distance relative to the site and the above receptors, it is considered that so long as noise impacts are adequately controlled at the receptors identified above, further receptors would experience no significant noise effects. Receptors further to the above have therefore not been considered within these assessments.

Environmental Noise Survey – July 2016

3.3 A baseline environmental noise survey was previously conducted by Waterman from Tuesday 12th July until Wednesday 13th July 2016, to establish the prevailing ambient noise levels. To allow continuous noise monitoring at secure locations, an environmental sound level meter was installed on a balcony at 5th floor level of 21 Southampton Row overlooking Southampton Row. In addition to this an environmental noise logger was installed at the rear of the building at ground floor level and is considered representative of the background noise level at the rear of buildings on Southampton Place.

3.4 Supplementary short-term attended noise monitoring was conducted within the alleyway that connects Southampton place to the courtyard to the rear of the Site.

3.5 Table 3-2 presents the results of the baseline noise survey with monitoring locations described above. The daytime period is taken as 07:00 – 19:00, evening period as 19:00 – 23:00 and night-time period as 23:00 – 07:00.

Table 3-2: Summary of Baseline Survey Results

ID	Description	Period	L_{Aeq}[1]	L_{AFmax}[2]	L_{A10}[3]	L_{A90}[3]
LT1	21SH 5th Floor Balcony	Day	70	87	70	64
		Night	65	82	68	58
LT2	Rear of 21SH Ground Floor	Day	56	79	56	53
		Night	51	69	52	49
ST1	Alley Way (Under croft South of 21SH)	Day	70	86	71	64

Note: [1] Logarithmic average. [2] 90th Percentile. [3] Arithmetic average.

3.6 The weather conditions during the survey period were monitored remotely, weather station ID IGREATER13 at Bloomsbury. Wind speeds throughout out the survey period were less than 5 m/s. During the afternoon period of Tuesday 12th July 2016 some light rain was recorded with a rain event during the evening and night-time period. Although the rain did not appear to have affected the measured noise levels, these data sets when rain was presents were removed from the subsequent data analysis.

3.7 The noise climate at all locations was dominated by road traffic noise although at the rear of the building the building structure itself affords attenuation against road traffic noise. At the rear of the building it is considered that there is also some contribution to the noise climate from existing building services plant although the selected noise monitoring location was shielded from plant within the rear courtyard area of 21 Southampton Row.

3.8 Full details of the baseline survey are available on request.

Survey Data Validation

3.9 Given the existing high traffic flows on the surrounding road network, it is considered that the noise levels around the Site would have been unlikely to have changed since the surveys in 2016.

3.10 To check the validity of the noise survey data, a noise propagation model of the Site and its surrounds was built using the CadnaA software package and calibrated to the measurements above. The calibrated model was then compared to the DEFRA strategic noise mapping for England and Wales[1]. The model calibrated to the 2016 data shows good correlation with the DEFRA noise maps and, as such, is considered suitable for use within this assessment.

3.11 A comparison of the 2016 data plots and DEFRA noise mapping is presented within Appendix B.

4. Noise Impact Assessment

Plant Noise Limiting Criteria

4.1 To ensure that noise emissions from fixed mechanical plant are adequately controlled, noise level limits have been recommended based on the existing noise levels around the Site (dB L_{A90}, see Table 3-2) and the guidance provided in BS 4142:2014+A1:2019.

4.2 Table 4-1 presents the plant noise limits that should be achieved to allow the planning condition to be discharged.

Table 4-1: Recommended Plant Noise Limits

Measurement Location	Period	Representative (Modal Average) Background Noise Level dB L_{A90}	Plant Noise Limit dB $L_{Ar,Tr}$
All Sensitive Receptors (night-time period only applicable to residential receptors)	Day	53	≤43
	Night	49	≤39

Notes: [1]LT2 background noise levels used for all SRs.

[1] Accessed via: http://www.extrium.co.uk/noiseviewer

Installed Mechanical Plant

4.3 The main items of noise generating external plant have been identified and are listed as Table 4-2 below.

Table 4-2: External Noise Generating Plant

Equipment Reference	Type	Manufacturer's Reference	Location	Source	Sound Power Level, dB(A)
AHU.SR.01	AHU	GOLD 050 F RX	ROOF	Intake	58
				Exhaust	60
				Casing	64
AHU.VS.01	AHU	GOLD 050 F RX	ROOF	Intake	55
				Exhaust	53
				Casing	62
AHU.SR.02	AHU	GOLD 025 F RX TOP	BASEMENT	Intake	43
				Exhaust	43
				Casing	55
Various (COND.XX.XX.XX)	CONDENSER	REYQ8U	ROOF	Unit	73
Various (COND.XX.XX.XX)	CONDENSER	REYQ10U	ROOF	Unit	79
ASHP.SR.01, 02, 03 & 04	ASHP	EDLA09D3V3	ROOF	Unit	62
TEF.SR.01	EXTRACT FANS	KV DUO 400 EC	ROOF	Exhaust	65
TEF.VS.01	EXTRACT FANS	KV DUO 250 EC	ROOF	Exhaust	65
TEF.VS.02	EXTRACT FANS	KV DUO 250 EC	ROOF	Exhaust	65

Note: All AHU SWLs are quoted with the acoustic attenuators attached as per technical submission: 34114-TSM017-Attenuators.pdf.

Noise Impact Assessment

4.4 To determine the likely noise levels at the nearest sensitive receptors, the above source levels have been input into a 3-dimensional noise propagation model of the Site and its surrounds built using the CadanA software package.

4.5 The resulting calculated noise levels at the nearest sensitive receptors are presented as Table 4-3 below.

Table 4-3: Highest Calculated Façade Noise Level at Sensitive Receptors

Sensitive Receptor	Period	Highest Calculated Plant Noise Level at Façade (dB $L_{Aeq,T}$)	Plant Noise Limit (dB $L_{Ar,Tr}$)	Meets Criteria?
SR A (Residential Dwellings along Barter Street)	Day (07:00 – 23:00)	43	≤43	Yes
	Night (23:00 – 07:00)	35	≤39	Yes

5. Summary and Conclusions

5.1 A noise impact has been prepared to discharge planning conditions relating to external mechanical plant noise to allow planning condition 8 of decision notice 2022/3301/P to be discharged.

5.2 The assessment indicates that noise associated with fixed mechanical plant falls at least 10dB below the monitored background sound levels and as such condition 8 can be discharged.

Appendices

Appendix A - Glossary of Acoustic Terms

Ambient sound	The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far.
Assessment period	The period in a day over which assessments are made.
A-weighting	A frequency weighting applied to measured or predicted sounds levels in order to compensate for the non-linearity of human hearing.
Background noise	Background noise is the term used to describe the noise measured in the absence of the noise under investigation. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L_{90} noise level (see below).
Broadband	Containing the full range of frequencies.
Decibel [dB]	The level of noise is measured objectively using a Sound Level Meter. This instrument has been specifically developed to mimic the operation of the human ear. The human ear responds to minute pressure variations in the air. These pressure variations can be likened to the ripples on the surface of water but of course cannot be seen. The pressure variations in the air cause the eardrum to vibrate and this is heard as sound in the brain. The stronger the pressure variations, the louder the sound that is heard. The range of pressure variations associated with everyday living may span over a range of a million to one. On the top range may be the sound of a jet engine and on the bottom of the range may be the sound of a pin dropping. Instead of expressing pressure in units ranging from a million to one, it is found convenient to condense this range to a scale 0 to 120 and give it the units of decibels. The following are examples of the decibel readings of every day sounds: Four engine jet aircraft at 100m 120 dB Riveting of steel plate at 10m 105 dB Pneumatic drill at 10m 90 dB Circular wood saw at 10m 80 dB Heavy road traffic at 10m 75 dB Telephone bell at 10m 65 dB Male speech, average at 10m 50 dB Whisper at 10m 25 dB Threshold of hearing, 1000 Hz 0 dB
dB(A): **A-weighted decibels**	The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the 'A' filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise.
Façade Noise Level	A noise level measured or predicted at the façade of a building, typically at a distance of 1m, containing a contribution made up of reflections from the façade itself (+3 dB).
L_{Amax} noise level	This is the maximum noise level recorded over the measurement period.
L_{Amin} noise level	This is the lowest level during the measurement period.
$L_{Aeq,T}$ noise level	This is the 'equivalent continuous A-weighted sound pressure level, in decibels' and is defined in British Standard 7445 as the 'value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time'. It is a unit commonly used to describe construction noise, noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise.

L_{A90} noise level	This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.
L_{A10} noise level	This is the noise level which is achieved for 10% of the monitoring period and is often used to describe road traffic noise.
Sound Reduction Index (R)	The sound reduction index is a single-number rating of the sound reduction through a wall or other building element. Since the sound reduction may be different at different frequencies, test measurements are subjected to a standard procedure which yields a single number that is about equal to the average sound reduction in the middle of the human hearing range.
Weighted Sound Reduction Index (R_W)	Single number rating used to describe the **laboratory** airborne sound insulation properties of a material or building element over a range of frequencies, typically 100-3150Hz.
C_{TR}	An adjustment to the Rw scale to take account of the lower performance against a typical spectrum of road traffic noise dominated by low frequencies.
$D_{ne,W}$	Weighted element normalised level difference.
VDV	This is the vibration dose value, a measure of vibration exposure; the fourth root of the integral, over the measurement period, of the fourth power of the frequency-weighted and time-varying acceleration.

Appendix B - Comparison of 2016 Noise Survey Data with DEFRA Strategic Noise Mapping

Figure B-1: Modelled Noise Levels Based on July 2016 Survey Data

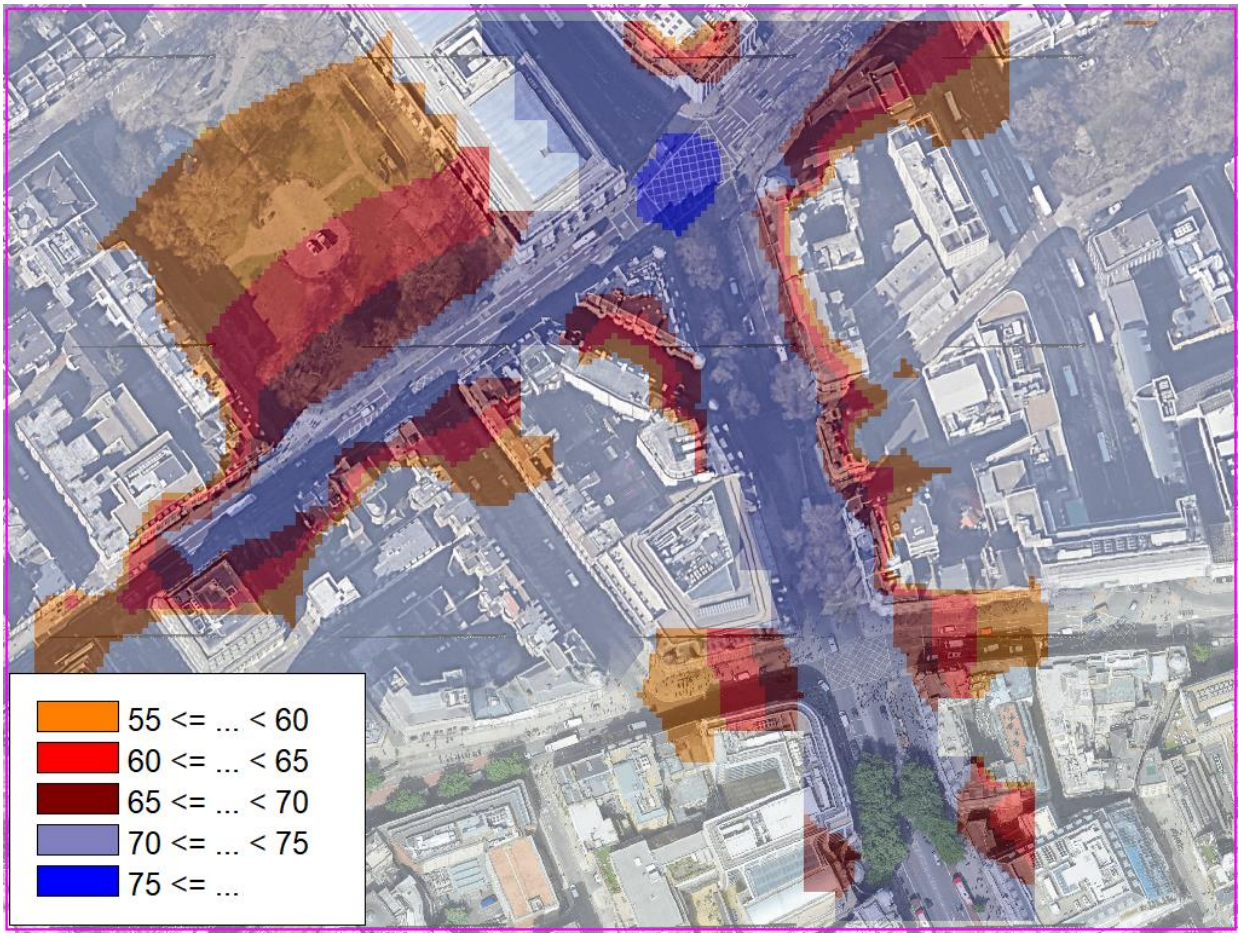
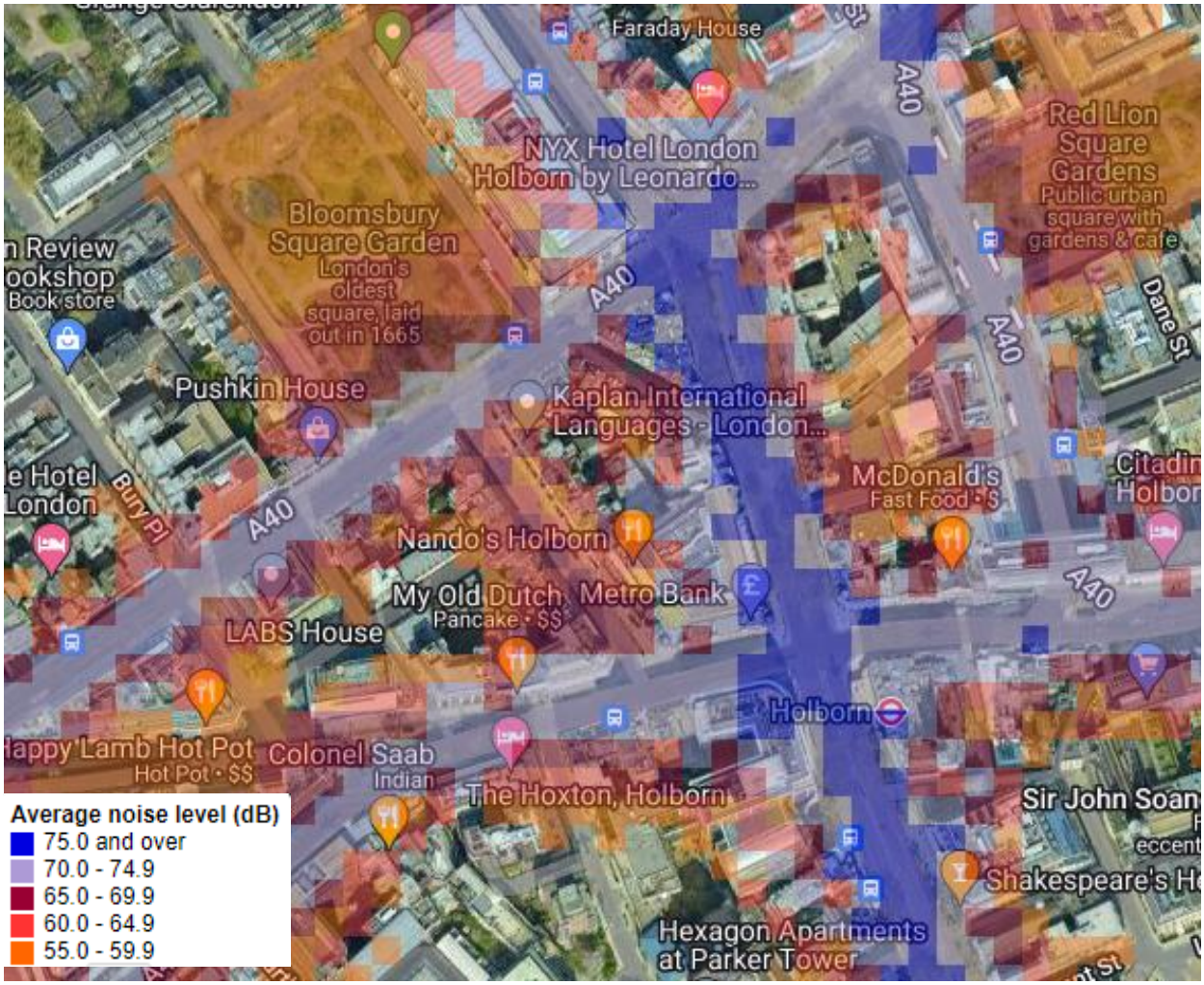


Figure B-2: DEFRA Strategic Noise Maps



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