Project

iMRI Building, Southwood Courtyard GOSH
Plant Noise Impact Assessment

Prepared for

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Revision History

Revision	Date	Comments

Summary

SRL Technical Services Limited has been commissioned by Kier Construction to assess the noise impact of plant to be installed at the iMRI Building which is being constructed in Southwood Courtyard at Great Ormond Street Hospital.

London Borough of Camden granted planning with a condition (no 7) requiring noise emitted from plant to be at least 10dBA below the existing background noise level at the nearest and/or most affected noise sensitive premises, with all machinery operating together at maximum capacity. Condition no 8 requires all plant equipment and ducting to be adequately vibration isolated and silenced prior to occupation.

The closest noise sensitive properties to the proposed building are:

- hospital bedrooms in the adjacent Southwood Building and
- dwellings on Great Ormond Street, around 125m away.

Cole Jarman measured the background noise level (L_{A90}) in Southwood Courtyard at Great Ormond Street Hospital. The noise level in Southwood Courtyard remains constant over the 24 hour period (at around 56dBA) so a limit of 46dBA applies at the façade of the hospital bedrooms. The typical lowest L_{A90} at the nearest dwellings on Great Ormond Street is 54dBA (day) and 47dBA (night). The plant noise limit is therefore 44dBA (day) and 37dBA (night).

Our assessment reveals that:

- the requirements at the dwellings on Great Ormond Street are comfortably achieved with all plant running at maximum normal duty;
- the fresh air intakes of AHU's 401 & 402 exceed the requirement at the nearest bedrooms in Southwood Building and the attenuation to these intakes will need to be increased.

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Contents

1.0 Introduction and Planning Conditions

Kier Construction is to construct the iMRI Building in Southwood Courtyard at Great Ormond Street Hospital. London Borough of Camden have granted planning subject to two planning conditions (7 and 8) relating to noise and vibration.

Condition no. 7:

"*The external noise level emitted from plant, machinery or equipment and specified noise mitigation at the development hereby approved shall be lower than the existing background noise level by at least 10dBA as assessed in accordance to BS4142:2015 at the nearest and/or most affected noise sensitive premises, with all machinery operating together at maximum capacity*".

Condition no. 8:

"*Prior to the use of the development, the plant equipment and ducting shall be mounted with proprietary anti-vibration isolators and fan motors shall be vibration isolated from the casing and adequately silenced. The measure shall be implemented prior to occupation of the development and thereafter be permanently retained*".

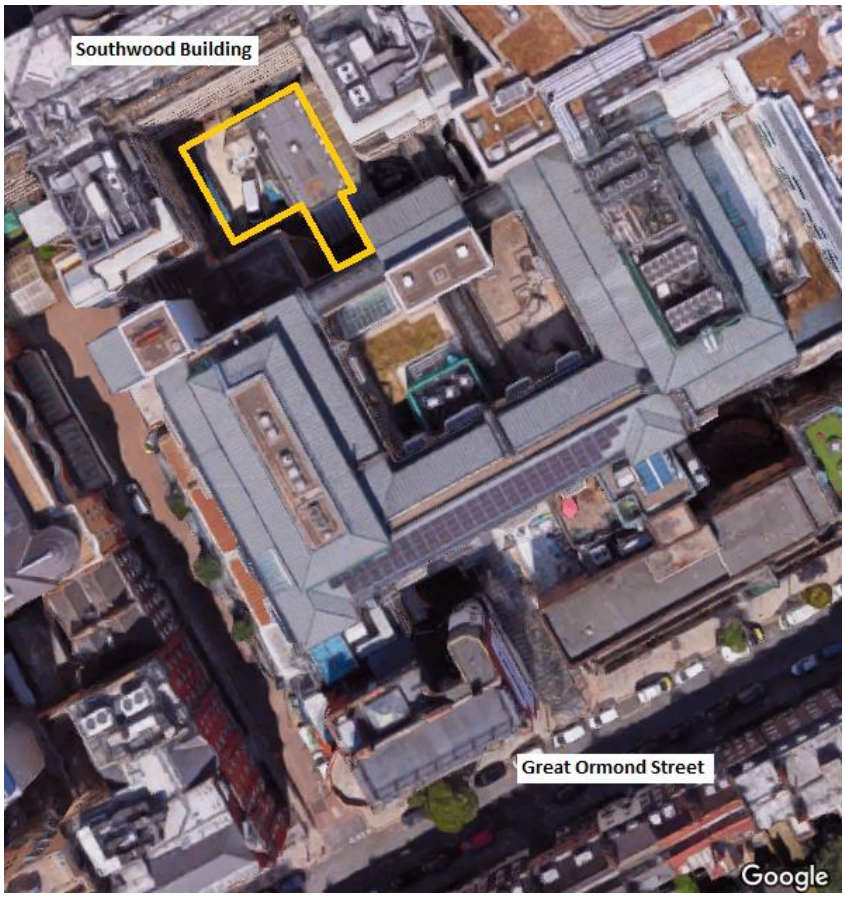
The existing background noise levels were measured by Cole Jarman and reported in document "17/0132/R1-1 Great Ormond Street Hospital, iMRI Plant Noise Assessment Report" dated 26th May 2017. One noise logger was set up within the Southwood Courtyard and a second logger outside the dwellings on Great Ormond Street to establish the noise climate over a four day period. The results of their survey are reproduced in the table below.

Table 1.1 - Representative background noise levels, L_{A90}

Location	Representative Background Noise Level, dB(A)	
	Operating Hours (1000-2200 only)	Night time (24-hour)
Courtyard Adjacencies	56	56
Nearest Residences	54	47

Figure 1.1 below shows the nearest noise sensitive uses which are Southwood Building and dwellings on Great Ormond Street:

Figure 1.1 - Site of proposed iMRI building in relation to the nearest noise sensitive properties



From the results in table 1.1 the following plant noise limits were set:

Table 1.2 - Plant noise emission limits at nearest noise sensitive receivers

Location	Noise Emission Limit, dB(A)	
	Operating Hours (1000-2200 only)	Night time (24-hour)
Courtyard Adjacencies	46	46
Nearest Residences	44	37

2.0 Noise Assessment

We have predicted the noise levels due to all noisy items of plant at the nearest properties with the proposed attenuation, see Table 2.1 below.

Table 2.1: Plant noise predictions with all plant operating (dB, L_{Aeq})

Item of Plant	Location	C3056 Bedroom	C5034 Bedroom	Dwellings on Gt Ormond Street
AHU 401 FAI	Theatre/MRI plantroom	**56**	-	-
AHU 401 exhaust	Theatre/MRI plantroom	28	27	-
AHU 402 FAI	Theatre/MRI plantroom	**58**	-	-
AHU 402 exhaust	Theatre/MRI plantroom	24	23	-
F201 FAI	Level 02	21	11	-
F201 exhaust	Level 02	31	-	-
F202 FAI	Level 02	26	16	-
F202 exhaust	Level 02	20	11	-
F203 exhaust	Level 02	22	15	-
F204 exhaust	Level 02	-	33	-
F401 exhaust	Level 04	31	23	-
TOTAL		**60**	**35**	**-**
CRITERION		**≤ 46**	**≤ 46**	**≤ 37**

Where no noise level is shown, the predicted noise level is <10dBA and so considered to be insignificant.

The results show that the predicted noise levels with all plant running is negligible at the dwellings and comfortably meets Camden's requirement at the bedrooms to the east of the new building (C5034).

The criterion at the bedrooms to the west of the building (eg. C3056) will be exceeded by the fresh air intakes of the two main AHUs (401 and 402). The noise here will be 4dBA above the L_{A90}, not 10dBA below. BS4142:2014 (referred to by Camden Council in condition 7) states that "Where the rating level does not exceed the background sound level, this is an indication of the sound source having a low impact". We therefore recommend that the acoustic louvres for these two intakes are increased to the double bank version which will reduce noise emissions by a further 10dBA to 6dBA below the L_{A90} and, according to BS4142, these sources will have very little or no impact (it is unlikely that the new plant will attract any of the penalties in BS4142 as there is already significant ventilation noise in the courtyard).

Appendix A - Drawings Used

Table A1 - Drawings Used

Author	Drawing no.	Revision	Title
RSP	1717M521	T1	Level 02 Ventilation Services
RSP	1717M541	T1	Level 4A Ventilation Services
Ansell + Bailey	(01)030	J	Proposed Level 03 (First Floor) Plan showing surrounding clinical uses
Ansell + Bailey	(01)031	J	Proposed Level 04 (Second Floor) Plan showing surrounding clinical uses
Ansell + Bailey	(01)031	L	Proposed Level 05 (Third Floor) Roof Plan showing surrounding clinical uses

Appendix B - Plant Noise Details

Table B1 - AHUs and Fans (octave band sound power levels, dB)

Plant Ref.	Octave band centre frequency, Hz						
	63	125	250	500	1k	2k	4k
AHU 401 FAI	72	70	74	71	71	67	64
AHU 401 exhaust	70	65	75	71	71	66	63
AHU 402 FAI	79	74	78	72	68	65	59
AHU 402 exhaust	66	61	71	67	67	62	59
F201 FAI	59	64	57	46	45	40	35
F201 exhaust	53	65	53	45	41	37	32
F203 exhaust	60	63	68	72	68	67	62
F204 exhaust	60	63	68	72	68	67	62
F401 exhaust	63	69	62	78	66	67	61

Table B2 - Fans (sound pressure levels)

Plant Ref.	Noise data
F202 FAI	40 dB @ 1.5m
F202 exhaust	40 dB @ 1.5m

Appendix C - Attenuation

Table C1 - Proposed Attenuators (octave band insertion losses)

Attenuator Ref.	Plant served	Octave band centre frequency, Hz						
		63	125	250	500	1k	2k	4k
A401	AHU 401 FAI	4	4	5	8	12	16	15
A403	AHU 401 exhaust	2	4	7	16	29	25	23
A402	AHU 402 FAI	4	4	5	8	12	16	15
A404	AHU 402 exhaust	2	4	7	16	29	25	23
A201	F201 FAI	4	8	12	16	20	15	13
A202	F201 exhaust	4	8	12	16	20	15	13
n/a	F202 FAI	-	-	-	-	-	-	-
n/a	F202 exhaust	-	-	-	-	-	-	-
A205	F203 exhaust	4	9	16	28	46	42	36
A211*	F204 exhaust	-	6	10	18	28	23	20
A405	F401 exhaust	4	8	13	19	26	22	18

* All values taken from Allaway Acoustics' attenuator selection schedule dated 25/4/2017 except items A211 which have been taken from 14.2 attenuator schedule (filename "1717m T3 sec 14.02 attenuator schedule")

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