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Mr P Segal
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Dear Paul

AS8175 UCLH PROTON BEAM THERAPY UNIT

Condition 21 Kitchen Extract Fan Sound Attenuation

Noise emissions from the proposed extract fan serving the Level 5 kitchen on the UCLH Proton Beam Therapy unit are subject to the following Condition 21:

Prior to the installation of any kitchen extract system, details of how the system will be sound attenuated and isolated from the structure shall be submitted to and approved by the Council such that the use can be carried out without detriment to the amenity of adjoining or surrounding premises and in accordance with the noise criteria outlined in condition number 24. Prior to occupation, the approved measures shall be installed and remain in place for the lifetime of the development.

The referenced Condition 24 states;

Noise levels at a point 1 metre external to sensitive facades shall be at least 5dB(A) less than the existing background measurement (LA90), expressed in dB(A) when all plant/equipment (or any part of it) is in operation unless the plant/equipment hereby permitted will have a noise that has a distinguishable, discrete continuous note (whine, hiss, screech, hum) and/or if there are distinct impulses (bangs, clicks, clatters, thumps), then the noise levels from that piece of plant/equipment at any sensitive façade shall be at least 10dB(A) below the LA90, expressed in dB(A).

Clarke Saunders Associates has undertaken a desktop assessment of noise emissions from the proposed kitchen extract fan, as required, prior to its installation.

The fan (item ref. EF-6 18) is to be located on the Level 6 roof, close to Core 1 at the western end of the Grafton Way building, as shown in the attached figure AS8175/SP21.1. Duct-mounted attenuators are to be provided on the fan intake and discharge sides. The discharge duct will be orientated with its axis vertical, with an air velocity at termination of 15m/s.

The roof around Core 1 plant will be fitted with acoustic louvres which, in conjunction with rooftop plantroom structures, will form an open-top enclosure around the plant.

The nearest sensitive facade has been identified at the top floor apartment at the northern end of Paramount Court. Please refer to figure AS8175/SP21.1. This window is approximately one storey below the Level 6 roof.

Windows of apartments at the upper storey of the address at 30 – 40 Grafton Way will be further from the fan, but at generally similar elevation.

Noise emissions have been confirmed by the fan supplier as follows.

Frequency (Hz)	63	125	250	500	1k	2k	4k	8k	dB(A)
L_{WA} in-duct discharge, dB	48	66	70	72	71	68	63	56	77
L_{WA} casing, dB	31	49	53	55	54	51	46	39	60

Fan Sound Power Levels dB re. 1 pW

The fan discharge attenuator has been specified with the following performance in terms of insertion loss:

Frequency (Hz)	63	125	250	500	1k	2k	4k	8k	dB(A)
Attenuator insertion loss, dB	3	6	7	7	9	7	6	7	-

Discharge attenuator insertion loss (minimum values) dB re. 20µPa

Background noise levels surveyed on the Grafton Way boundary of the vacant development site did not fall below 52dB $L_{A90,15min}$ in any surveyed 24-hour period. It is expected that, with its view of Tottenham Court Road, background noise levels at the Paramount Court receptor window were no lower and, in all probability, slightly higher than the measured levels.

In order for the cumulative noise level from all plant affecting the ambient noise at the receptors not to exceed the conditioned 47dB L_{Aeq}, an individual noise emission limit of 27dB L_{Aeq} has been adopted for fan design purposes.

Fan noise levels have been calculated to whole number precision at the windows of the nearest affected receptors. Please refer to Appendix B. These show that kitchen extract noise is not expected to exceed 27dB L_{Aeq} at the upper floors of Paramount Court or 26dB L_{Aeq} at 30 – 40 Grafton Way. Noise is not expected to contain discrete tonal characteristics or be impulsive in nature.

The fan will be mounted upon the roof by means of vibration isolators incorporating steel springs, thereby controlling structure-borne noise transfer within the patient bedrooms below.

This assessment shows that fan noise at the most affected receptors is expected to be at least 25dB below the background noise level and, when considered cumulatively with other plant, is unlikely to result in overall noise emissions exceeding the requirements of Condition 24. Subsequently, Condition 21 is expected to be satisfied.

Yours sincerely
for CLARKE SAUNDERS ASSOCIATES
Matt Sugden

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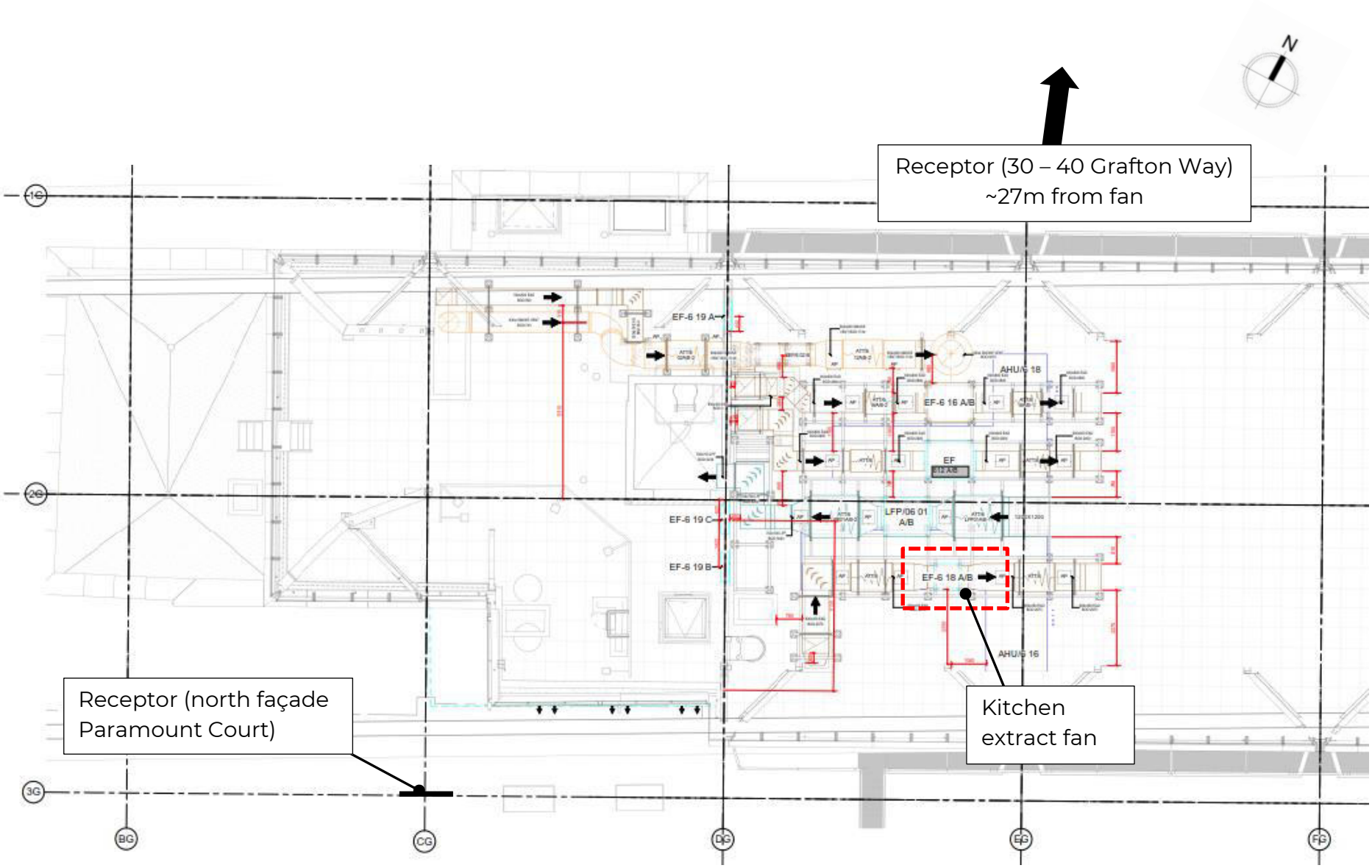
Encl.


N
Receptor (30 – 40 Grafton Way)
~27m from fan
EF-6 19 A
AHU/6 18
EF-6 18 A/B
EF
EF-6 19 C
LFP/06 01
A/B
EF-6 19 B
EF-6 18 A/B
AHU/6 16
Receptor (north façade
Paramount Court)
Kitchen
extract fan
1C
2C
3G
BG
CG
DG
EG
FG

AS8175 UCLH PROTON BEAM THERAPY UNIT

APPENDIX B

CONDITION 21 – KITCHEN EXTRACT FAN NOISE ASSESSMENT

CALCULATION 1: PARAMOUT COURT RECEPTOR

Kitchen extract fan		**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**	**dB(A)**
Fan discharge	L_{wA}	48	66	70	72	71	68	63	56	77
Attenuator		-3	-6	-7	-7	-9	-7	-6	-7	
Directivity (120^0)		0	0	0	-2	-2	-4	-4	-4	
Spherical propagation effect		-11	-11	-11	-11	-11	-11	-11	-11	
Distance loss (20m)		-26	-26	-26	-26	-26	-26	-26	-26	
Screening/louvre		-5	-5	-5	-5	-5	-5	-5	-5	
Contribution at receptor	L_{Aeq}	*3*	*18*	*21*	*21*	*18*	*15*	*11*	*3*	*26*
Fan casing	L_{wA}	31	49	53	55	54	51	46	39	60
Hemispherical propagation effect		-8	-8	-8	-8	-8	-8	-8	-8	
Distance loss (20m)		-26	-26	-26	-26	-26	-26	-26	-26	
Screening/louvre		-5	-5	-5	-5	-5	-5	-5	-5	
Contribution at receptor	L_{Aeq}	*-8*	*10*	*14*	*16*	*15*	*12*	*7*	*0*	*21*
Total fan noise level at receiver	L_{Aeq}	3	19	22	22	20	17	12	5	27

Discharge velocity noise		**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**	**dB(A)**
15m/s discharge (ref. VDI 2081)	L_{wA}	31	41	46	49	48	44	39	31	54
Directivity (120^0)		-11	-11	-11	-11	-11	-11	-11	-11	
Spherical propagation effect		-11	-11	-11	-11	-11	-11	-11	-11	
Distance loss (20m)		-26	-26	-26	-26	-26	-26	-26	-26	
Screening/louvre		-5	-5	-5	-5	-5	-5	-5	-5	
Contribution at receptor	L_{Aeq}	-22	-12	-7	-4	-5	-9	-14	-22	1

Compound noise level	L_{Aeq}	3	19	22	22	20	17	12	5	27

Night-time target 27dB(A)

CALCULATION 2: 30 - 40 GRAFTON WAY RECEPTOR

Kitchen extract fan		**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**	**dB(A)**
Fan discharge	L_{wA}	48	66	70	72	71	68	63	56	77
Attenuator		-3	-6	-7	-7	-9	-7	-6	-7	
Directivity (90^0)		1	1	0	0	-1	-3	-3	-3	
Spherical propagation effect		-11	-11	-11	-11	-11	-11	-11	-11	
Distance loss (27m)		-29	-29	-29	-29	-29	-29	-29	-29	
Screening/louvre		-5	-5	-5	-5	-5	-5	-5	-5	
Contribution at receptor	L_{Aeq}	*1*	*16*	*18*	*20*	*16*	*13*	*9*	*1*	*25*
Fan casing	L_{wA}	31	49	53	55	54	51	46	39	60
Hemispherical propagation effect		-8	-8	-8	-8	-8	-8	-8	-8	
Distance loss (27m)		-29	-29	-29	-29	-29	-29	-29	-29	
Screening/louvre		-5	-5	-5	-5	-5	-5	-5	-5	
Contribution at receptor	L_{Aeq}	*-11*	*7*	*11*	*13*	*12*	*9*	*4*	*-3*	*18*
Total fan noise level at receiver	L_{Aeq}	2	17	19	21	18	15	11	3	26

Discharge velocity noise		**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**	**dB(A)**
15m/s discharge (ref. VDI 2081)	L_{wA}	31	41	46	49	48	44	39	31	54
Directivity (90^0)		-8	-8	-8	-8	-8	-8	-8	-8	
Spherical propagation effect		-11	-11	-11	-11	-11	-11	-11	-11	
Distance loss (27m)		-29	-29	-29	-29	-29	-29	-29	-29	
Screening/louvre		-5	-5	-5	-5	-5	-5	-5	-5	
Contribution at receptor	L_{Aeq}	-22	-12	-7	-4	-4	-8	-13	-22	1

Compound noise level	L_{Aeq}	2	17	19	21	18	15	11	3	26

Night-time target 27dB(A)