Cole Jarman

Brendan Timlin
Llewelyn Davies
44-46 Whitfield Street
London W1T 2RJ

6th November 2014
Ref: 2012/5570/L1

Dear Brendan

ISEH 163-170 Tottenham Court Road
MRI Chiller Plant Noise

In our original report 12/5570/R1 we assessed the noise levels from the plant associated with the ISEH development against noise limits derived from our noise survey at the site. Of particular note we assessed noise levels from the roof mounted plant to the residences north of the site on University Street. We concluded that the derived noise limits were achievable, but that mitigation would be required for the MRI chiller in the form of an acoustic screen. The screen was proposed to be made of acoustic louvers or solid panels at least .2m higher than the chiller itself. It was envisaged that the screen would wrap around the chiller on three sides. However ultimately the consented screen installed formed an L shape extending along the north edge of the roof to the stairwell. This was equally effective at screening the chiller, but also screened the other condenser plant items which our assessment assumed would be unscreened.

When we assessed the plant we were advised that the MRI chiller and MRI DX condenser would operate daytime only (0700-2300 hours), but that the other condensers would operate 24 hours per day.

You have advised however that the MRI equipment still requires some cooling at night so it is possible that the MRI chiller and condenser may operate at night, along with the other plant, i.e. all plant could operate at night. When we undertook our original assessment we concluded that the total plant noise levels at the University Street residences with all plant operating would be 51dBA. This met the daytime noise limit of 53 dBA, but would fail by 3dB to meet the 48dBA night-time limit. However, that assessment was on the basis of the five other condensers being unscreened. As noted above the screening installed does screen them as well as the MRI plant.

We have therefore rerun our calculations including for the full screening as installed. The calculations are in the attached schedules 12/5570/CS1-8. These show that with the screen as installed the total noise levels at the residences as 48dBA, thereby meeting the 24 hour noise limit without further mitigation.

Therefore the planning condition 4 to consent 2014/2082 that requires the plant and machinery to have time clocks so as to not operate 2400-0600 hours is unnecessary and can be deleted. The amenities of the residents are protected by planning condition 3 that limits

the noise levels at the residences and condition 2 which requires the installation and retention of the acoustic screen.

I trust the above is clear, however please call if you have any queries.

Yours sincerely

Neil Jarman

Calculation Sheet 12/5570/CS1

VRF-08: VRF-08 to AP1

	Octave Band Centre Frequency, Hz								
	63	125	250	500	1k	2k	4k	8k	dB(A)
VRF-08 DX unit for AHU-03	79	77	75	69	66	62	55	52	72
Radiation Loss Hemi-Spherical Radiation	-8	-8	-8	-8	-8	-8	-8	-8	
Distance Loss 17 metres Distance Loss	-25	-25	-25	-25	-25	-25	-25	-25	
Facade Correction Facade Correction	3	3	3	3	3	3	3	3	
Barrier Correction 0.44m Path Difference	-8	-10	-12	-15	-17	-20	-23	-26	
Total	**41**	**38**	**33**	**25**	**19**	**12**	**2**	**-4**	**29**

VRF-09: VRF-09 to AP1

	Octave Band Centre Frequency, Hz								
	63	125	250	500	1k	2k	4k	8k	dB(A)
VRF-09to12 Server Room VRF unit	73	75	66	63	61	56	49	44	67
Radiation Loss Hemi-Spherical Radiation	-8	-8	-8	-8	-8	-8	-8	-8	
Distance Loss 13 metres Distance Loss	-22	-22	-22	-22	-22	-22	-22	-22	
Facade Correction Facade Correction	3	3	3	3	3	3	3	3	
Barrier Correction 0.92m Path Difference	-10	-12	-15	-17	-20	-23	-26	-29	
Total	**36**	**36**	**24**	**19**	**14**	**6**	**-4**	**-12**	**23**

VRF-10: VRF-10 to AP1

	Octave Band Centre Frequency, Hz								
	63	125	250	500	1k	2k	4k	8k	dB(A)
VRF-09to12 Server Room VRF unit	73	75	66	63	61	56	49	44	67
Radiation Loss Hemi-Spherical Radiation	-8	-8	-8	-8	-8	-8	-8	-8	
Distance Loss 14 metres Distance Loss	-23	-23	-23	-23	-23	-23	-23	-23	
Facade Correction Facade Correction	3	3	3	3	3	3	3	3	
Barrier Correction 0.69m Path Difference	-9	-11	-14	-16	-19	-22	-25	-28	
Total	**36**	**36**	**25**	**19**	**14**	**6**	**-4**	**-12**	**24**

VRF-11: VRF-11 to AP1

	Octave Band Centre Frequency, Hz								
	63	125	250	500	1k	2k	4k	8k	dB(A)
VRF-09to12 Server Room VRF unit	73	75	66	63	61	56	49	44	67
Radiation Loss Hemi-Spherical Radiation	-8	-8	-8	-8	-8	-8	-8	-8	
Distance Loss 18 metres Distance Loss	-25	-25	-25	-25	-25	-25	-25	-25	
Facade Correction Facade Correction	3	3	3	3	3	3	3	3	
Barrier Correction 0.49m Path Difference	-8	-10	-12	-15	-18	-21	-24	-27	
Total	**35**	**35**	**24**	**18**	**13**	**6**	**-4**	**-12**	**23**

VRF-12: VRF-12 to AP1

	Octave Band Centre Frequency, Hz								
	63	125	250	500	1k	2k	4k	8k	dB(A)
VRF-09to12 Server Room VRF unit	73	75	66	63	61	56	49	44	67
Radiation Loss Hemi-Spherical Radiation	-8	-8	-8	-8	-8	-8	-8	-8	
Distance Loss 18 metres Distance Loss	-25	-25	-25	-25	-25	-25	-25	-25	
Facade Correction Facade Correction	3	3	3	3	3	3	3	3	
Barrier Correction 0.49m Path Difference	-8	-10	-12	-15	-18	-21	-24	-27	
Total	**35**	**35**	**24**	**18**	**13**	**6**	**-4**	**-12**	**23**

MRI chiller: MRI chiller to AP1

	Octave Band Centre Frequency, Hz								
	63	125	250	500	1k	2k	4k	8k	dB(A)
MRI Chiller Chiller for MRI unit	81	85	88	90	88	83	76	68	92
Radiation Loss Spherical Radiation	-11	-11	-11	-11	-11	-11	-11	-11	
Distance Loss 14 metres Distance Loss	-23	-23	-23	-23	-23	-23	-23	-23	
Facade Correction Facade Correction	3	3	3	3	3	3	3	3	
Barrier Correction 0.21m Path Difference	-7	-8	-10	-12	-14	-17	-20	-23	
Total	**44**	**46**	**48**	**47**	**43**	**35**	**25**	**14**	**48**

MRI DX: MRI DX to AP1

	Octave Band Centre Frequency, Hz								
	63	125	250	500	1k	2k	4k	8k	dB(A)
MRI DX DX unit for MRI exam room	60	69	63	62	59	50	49	46	63
Radiation Loss Hemi-Spherical Radiation	-8	-8	-8	-8	-8	-8	-8	-8	
Distance Loss 17 metres Distance Loss	-25	-25	-25	-25	-25	-25	-25	-25	
Facade Correction Facade Correction	3	3	3	3	3	3	3	3	
Misc Correction Tonality Feature Correction	5	5	5	5	5	5	5	5	
Barrier Correction 0.66m Path Difference	-9	-11	-13	-16	-19	-22	-25	-28	
Total	**27**	**33**	**24**	**21**	**15**	**3**	**0**	**-7**	**23**

Resultant Noise Levels at AP1 (Day and night) - University Street

	Octave Band Centre Frequency, Hz								
	63	125	250	500	1k	2k	4k	8k	dB(A)
VRF-08	41	38	33	25	19	12	2	-4	29
VRF-08 to AP1									
VRF-09	36	36	24	19	14	6	-4	-12	23
VRF-09 to AP1									
VRF-10	36	36	25	19	14	6	-4	-12	24
VRF-10 to AP1									
VRF-11	35	35	24	18	13	6	-4	-12	23
VRF-11 to AP1									
VRF-12	35	35	24	18	13	6	-4	-12	23
VRF-12 to AP1									
MRI chiller	44	46	48	47	43	35	25	14	48
MRI chiller to AP1									
MRI DX	27	33	24	21	15	3	0	-7	23
MRI DX to AP1									
AP1 (Day and night) Total	**47**	**48**	**48**	**47**	**43**	**35**	**25**	**14**	**48**