Noise & Vibration Consultants
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Acoustic Note AP01.ph.102819 for client information **17th January 2017**

Re: 17 Branch Hill, London, NW3 7NA
Noise from external condensers and swimming pool plant

Ref Docs

[1] 102819.ph.Issue2

We write to report our findings with regard to noise egress from the swimming pool plant and the external condenser units.

The basis of compliance with draft planning consent condition 7 is that *"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)".* The lowest measured daytime background noise is 43dBA. The lowest measured night time background noise is 34dBA. The planning

The proposed location of the condenser units is shown below in Diagram 1 below.

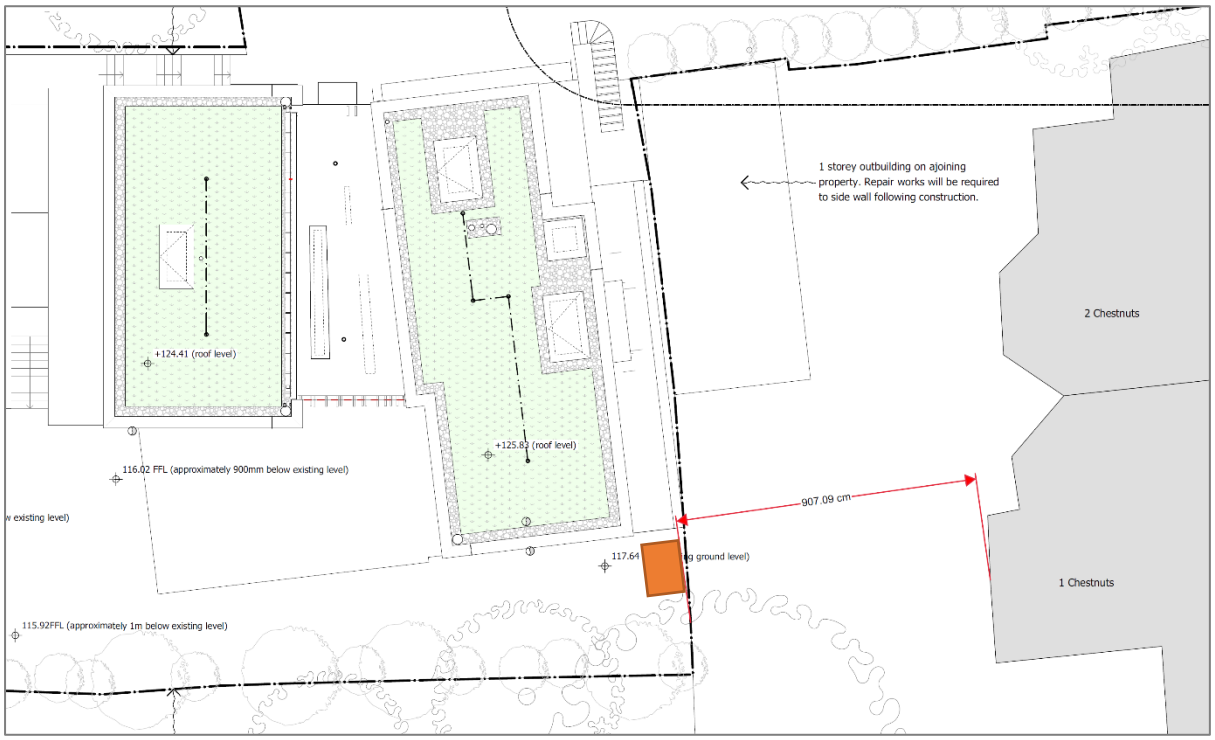

Diagram 1

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The condenser units will be 2No. Mitsubishi PUHY-P250YKB. These units will be fitted with acoustic kits and located in a screened 'compound'. They will be operated in normal mode during the day time period (0700-2300hrs) and low noise mode during the night time period (2300-0700hrs). Based on the site plan the distance from the condenser 'compound' to the adjacent noise sensitive property (1 Chestnuts) is approximately 9m. The calculation exercise follows in Tables 1 and 2.

	Octave Band Centre Frequency (Hz)								dBA
Standard mode	63	125	250	500	1000	2000	4000	8000	
Mitsubishi PUHY-P250YKB	75	65	62	57	50	46	42	38	59
Mitsubishi PUHY-P250YKB	75	65	62	57	50	46	42	38	59
Total	78	68	65	60	53	49	45	41	62
Acoustic kit	-3	-1	-3	-10	-12	-9	-10	-10	
Screening	-5	-5	-5	-5	-5	-5	-5	-5	
Distance attenuation	-19	-19	-19	-19	-19	-19	-19	-19	
Façade level	50	43	38	26	17	16	10	6	33

Table 1

	Octave Band Centre Frequency (Hz)								dBA
Low noise mode	63	125	250	500	1000	2000	4000	8000	
Mitsubishi PUHY-P250YKB	62	60	47	46	39	31	29	26	48
Mitsubishi PUHY-P250YKB	62	60	47	46	39	31	29	26	48
Total	65	63	50	49	42	34	32	29	51
Acoustic kit	-3	-1	-3	-10	-12	-9	-10	-10	
Screening	-5	-5	-5	-5	-5	-5	-5	-5	
Distance attenuation	-19	-19	-19	-19	-19	-19	-19	-19	
Façade level	37	38	23	14	5	0	0	0	23

Table 2

The calculation exercise demonstrates that the proposal meets with the Local Planning Authority (LPA) requirements with respect to noise. The following mitigation measures must be included in the design:

1. Acoustic kit fitted to both condensers
2. Screening around condenser location
3. Standard mode for condensers during period 0700-2300hrs – predicted noise impact 33dBA
4. Low noise mode for condensers during period 2300-0700hrs – predicted noise impact 23dBA

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The swimming pool air handling unit is located in the plant room at lower ground floor level and is ducted to atmosphere as highlighted below:

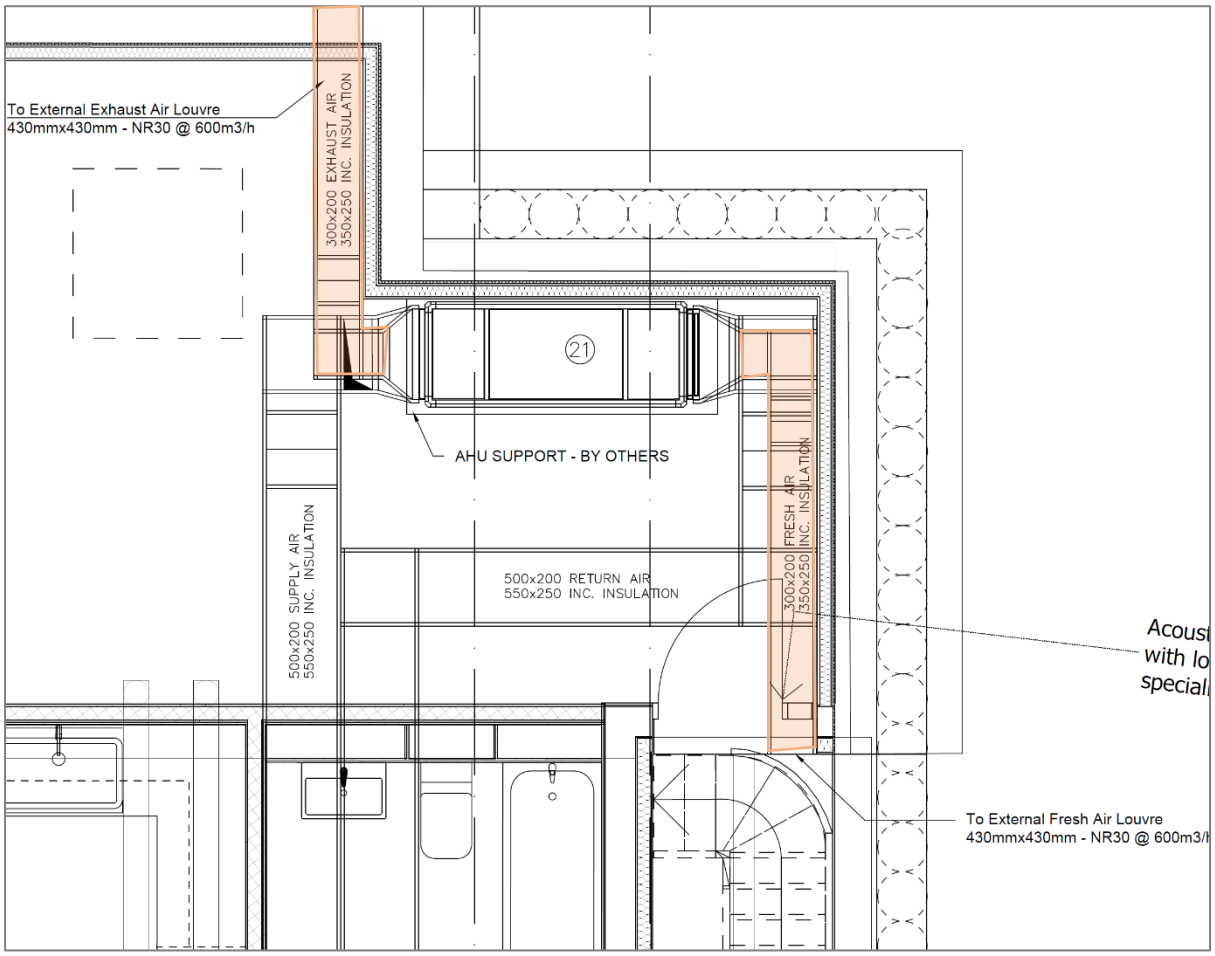

Diagram 2

In order to determine the atmosphere side noise level from the swimming pool air handling unit, consideration was given to attenuation through the duct system components.

Noise emanating from the atmosphere side fresh air and exhaust ducting was calculated as shown overleaf. The calculation exercise assumed that the terminating grilles for each duct run were Caice SS150 acoustic louvres (or equivalent acoustic performance). The fresh air duct run meets the requirements of the LPA. The calculated noise level is 23dBA. The exhaust air duct run fails to meet the requirements of the LPA. The calculated noise level is 31dBA. Additional attenuation will be required on the atmosphere side exhaust air duct run. This attenuator will need to reduce the noise by 7dBA. This can be readily achieved with an in-line silencer.

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ACOUSTICS PLUS

CONTRACT TITLE: 17 Branch Hill, London, NW3
SOUND SOURCE: Swimming Pool AHU
MAKE & MODEL: Phoenix EC 1000 Super Plus
From: Exhaust air

					OCTAVE BAND CENTRE FREQUENCY (Hz)								
	OVERALL Lw				63	125	250	500	1k	2k	4k	8k	dBA
1			L_w of fan		68	70	68	69	66	68	65	56	73
2				1.000									
3			Lw at grille		68	70	68	69	66	68	65	56	73
4													
5	LENGTH (m)	C or R	x (mm)	x (mm)									
6	5.00	R	200-400	200-400	4.90	6.60	4.90	3.30	2.30	2.30	2.30	2.30	
7													
8													
9													
10													
11													
12													
13													
14													
15													
16	Bends (Unlined)												
17	NUMBER	TYPE	SIZE (mm)										
18	2	90	0250-0300		0.00	0.00	2.00	14.00	14.00	8.00	6.00	6.00	
19													
20													
21													
22													
23													
24													
25	BRANCHES												
26					0	0	0	0	0	0	0	0	
27													
28													
29	DUCT X-SECTIONAL AREAS												
30													
31													
32	OTHER ATTENUATION												
33	Caice SS150 acoustic louvre				4	4	6	8	11	11	11	10	
34	Building edge diffraction				5	5	5	5	5	5	5	5	
35													
36													
37	END REFLECTION SIZE (m)												
38	0.151 – 0.200				9	5	2	0	0	0	0	0	
39													
40				**Lw LEAVING SYSTEM**	45	49	48	39	34	42	41	33	47
41	Room Volume (m^3)			10000	-26	-26	-26	-26	-26	-26	-26	-26	
42	Mid-Frequency RT (s)			0.1	-10	-10	-10	-10	-10	-10	-10	-10	
43				**REVERBERANT SPL**	9	13	12	3	-2	6	5	-3	11
44	Distance to Listener			5	-25	-25	-25	-25	-25	-25	-25	-25	
45	Q=1 in free space			n/a	0	0	0	0	0	0	0	0	
46	Q=2 flush with surface			0.621 – 1.900	5	6	7	8	9	9	9	9	
47	Q=4 junction with 2 surfaces			n/a	0	0	0	0	0	0	0	0	
48				**DIRECT SPL**	25	30	30	22	18	26	25	17	31
49				**RESULTANT TOTAL SPL**	25	30	30	22	18	26	25	17	31
50	NR ACHIEVED/REQUIRED		30	20	51	39	31	24	20	17	14	13	30
51	Additional Attenuation Required				0	0	0	0	0	9	11	4	

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CONTRACT TITLE: 17 Branch Hill, London, NW3
SOUND SOURCE: Swimming Pool AHU
MAKE & MODEL: Phoenix EC 1000 Super Plus
From: Fresh air

					OCTAVE BAND CENTRE FREQUENCY (Hz)								
	OVERALL Lw				63	125	250	500	1k	2k	4k	8k	dBA
1			L_w of fan		66	66	64	64	62	63	61	52	69
2				1.000									
3			Lw at grille		66	66	64	64	62	63	61	52	69
4													
5	LENGTH (m)	C or R	x (mm)	x (mm)									
6	3.00	R	200-400	200-400	2.94	3.96	2.94	1.98	1.38	1.38	1.38	1.38	
7													
8													
9													
10													
11													
12													
13													
14													
15													
16	Bends (Unlined)												
17	NUMBER	TYPE	SIZE (mm)										
18	1	90	0250-0300		0.00	0.00	1.00	7.00	7.00	4.00	3.00	3.00	
19													
20													
21													
22													
23													
24													
25	BRANCHES												
26					0	0	0	0	0	0	0	0	
27													
28													
29	DUCT X-SECTIONAL AREAS												
30													
31													
32	OTHER ATTENUATION												
33	Caice SS150 acoustic louvre				4	4	6	8	11	11	11	10	
34	Building edge diffraction				5	5	5	5	5	5	5	5	
35													
36													
37	END REFLECTION SIZE (m)												
38	0.151 – 0.200				9	5	2	0	0	0	0	0	
39													
40				**Lw LEAVING SYSTEM**	45	48	47	42	37	42	41	33	48
41	Room Volume (m^3)			10000	-26	-26	-26	-26	-26	-26	-26	-26	
42	Mid-Frequency RT (s)			0.1	-10	-10	-10	-10	-10	-10	-10	-10	
43				**REVERBERANT SPL**	9	12	11	6	1	6	5	-3	12
44	Distance to Listener			13	-33	-33	-33	-33	-33	-33	-33	-33	
45	Q=1 in free space			n/a	0	0	0	0	0	0	0	0	
46	Q=2 flush with surface			0.621 – 1.900	5	6	7	8	9	9	9	9	
47	Q=4 junction with 2 surfaces			n/a	0	0	0	0	0	0	0	0	
48				**DIRECT SPL**	16	21	21	17	13	18	16	9	23
49				**RESULTANT TOTAL SPL**	17	22	21	18	13	18	17	9	23
50	NR ACHIEVED/REQUIRED		22	20	51	39	31	24	20	17	14	13	30
51	Additional Attenuation Required				0	0	0	0	0	1	2	0	