

# Design Note

project   BSF Camden  
subject   Fixed plant noise assessment  
project no   025901  
date   20 December 2012

Revision	Description	Issued by	Date	Approved (signature)
00	Fixed plant noise assessment, UCL	IT	20/12/12	IT
01	Revised calculations	IT	13/02/13	IT

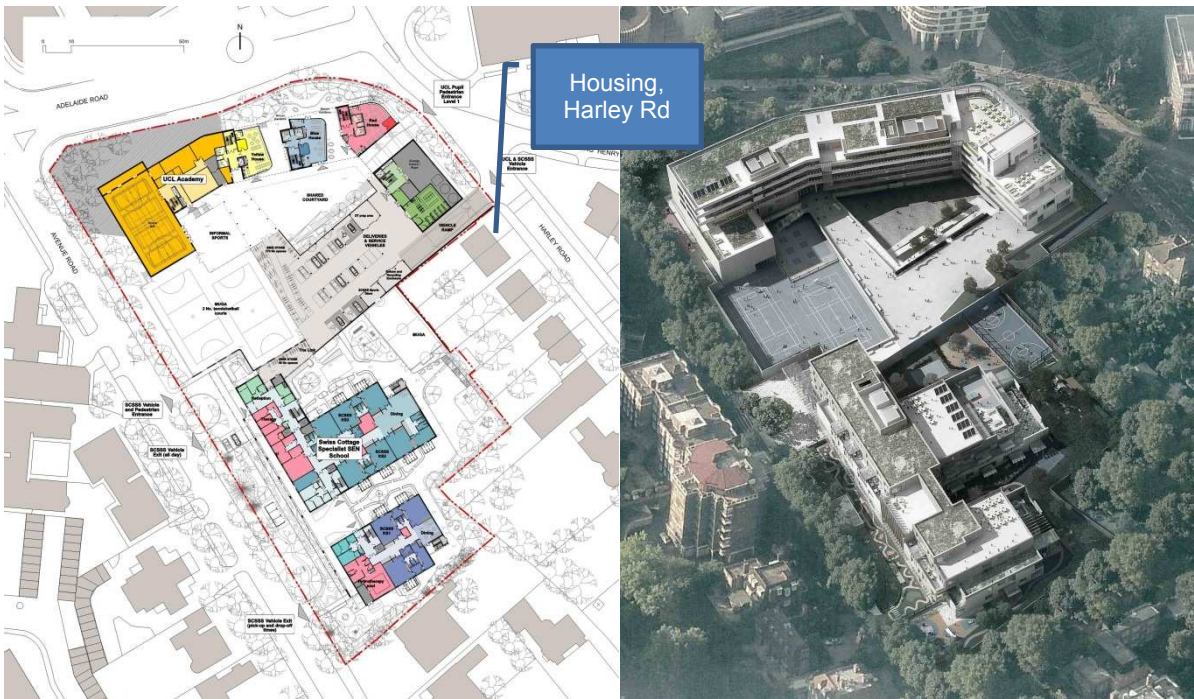
## 1.1 Scope & approach

This Design Note has been prepared by Buro Happold following a request by BAM Construction. It provides an estimate of the environmental noise levels created by the operation of fixed building services plant associated with the new University College London Academy (UCLA) school at Swiss Cottage, and assessment against the requirements for noise control included with Condition 10 of the planning permission.

Estimates of environmental noise levels due to operation of fixed plant have been prepared with reference to the details of the installed equipment, based on the construction drawings and the technical data sheets for individual plant and equipment items.

The sound level from each item of equipment has been evaluated, with appropriate corrections for source directivity, screening, attenuation with distance and local reflection at the façade.

Sound levels are calculated for the nearest noise sensitive façade. In the case of UCL this is taken to be houses in Harley Road, as indicated on the Figure below.



**Figure 1**Error! No text of specified style in document.—1 Site layout drawing (excerpt from AR-Arch 1000) and illustration of proposals in context

### 1.1.1 External plant areas included within assessment

Enclosed plantroom at level 6, gridlines 20 to 21 (air handling equipment)

Roof level plant area, gridlines 20 to 21 (extract fans)

Roof level plant area, gridlines 11 to 14 (extract fans, air handling equipment)

Roof level plant area, gridlines 4 to 6 (extract fans, air handling equipment)

## 1.2 Calculations

Calculation sheets setting out the base data and assumptions made in calculation are appended to this Design Note for information.

## 1.3 Assessment

### Receiver 1, (Rear of) houses in Harley Road.

From calculation, the daytime noise level from fixed plant is estimated to be 38 dBL<sub>Aeq</sub> at 3.5m from the façade of the nearest housing.

The pre development noise survey<sup>1</sup> reported ambient noise levels at the nearest housing as follows (*data as report section 4.1 Table 4 and Figure C2*):

Daytime ambient noise levels at nearest residential, 3.5m from façade: 53 dB L<sub>Aeq</sub>/ 43dB L<sub>A90</sub>

Night time ambient noise levels at nearest residential, 3.5m from facade: 45 dB L<sub>Aeq</sub> / 35dBL<sub>A90</sub>

The daytime design basis criterion for housing in Harley Road is taken to be 38dB L<sub>A90</sub> ie 5 dB below the measured background of 43 dBL<sub>A90</sub>.

On the basis of the information reviewed, the noise level from operation of fixed plant is estimated to meet the design basis daytime background noise level.

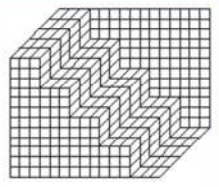
It is assumed that plant and equipment will not operate at night. At this stage no assessment has been made against the night time noise criteria.

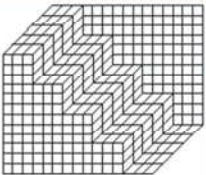
## Supporting information

1. Calculation summary sheet
2. Calculations
3. Design drawing s and equipment data

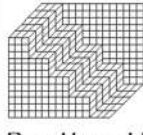
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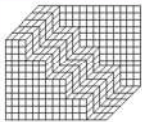
<sup>1</sup> Swiss Cottage School, Adelaide Road, London – Acoustic Strategy Report Rev 0 (prepared by Hoare Lee, issued 10 July 2008)

<div></div> <div>Buro Happold</div>				Project	BSF Camden				Sheet:	1 of			
					ULC Academy				Prepared	IT		date:	20-Dec
				Area of Project	External plant noise checks				Checked	IT		date:	
									Revisions	Feb 2013: Calc revised; façade correction			
				Element Description	Summary sheet				Notes				
								From as built dwgs					
					Octave band centre frequency, Hz								
					63	125	250	500	1000	2000	4000	8000	
Plantroom													
Lp at façade						30.5	31.5	24.5	17.5	13.5	11.5		30 dBA
Roof plant L05, Grid line 21													
Lp at façade						34.0	30.3	23.4	16.5	11.7	11.6		26 dBA
Roof plant L06, Grid line 21													
LP at façade						34.1	35.9	32.6	25.5	13.4	9.4		33 dBA
Roof plant, Grid line 14													
LP at façade						34.4	35.8	31.9	24.9	14.0	10.4		32 dBA
Roof plant, Grid line 05													
LP at façade						30.0	32.0	28.1	21.1	10.3	6.7		28 dBA
Total at façade													38 dBA
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				Area of Project	External plant noise checks			Prepared		date:	
								Checked:		date:	
								Revisions			
Element Description				UCL Roof Plant L06 GL 21			Notes				

				63	125	250	500	1000	2000	4000	8000	
L06 plantroom												
AHU R03A	extract fan	outlet	in duct Lw		83	86	86	82	77	73		
end reflection, m2	1				-1	0	0	0	0	0		
Lw to atmosphere					82	86	86	82	77	73		
AHU R03B	supply fan	inlet	in duct Lw		86	90	90	86	82	77		
			heat wheel		-3	-3	-3	-3	-4	-4		
			filter		-3	-5	-7	-8	-8	-8		
			coils		-3	-3	-3	-3	-4	-4		
end refn, m2					-1	0	0	0	0	0		
Lw to atmosphere					76	79	77	72	66	61		
Total Lw					83	86.8	86.5	82.4	77.3	73.3		
nearest façade, m	35	14 Harley Rd	20log-11		-42	-42	-42	-42	-42	-42		
Directivity Q=	2				3	3	3	3	3	3		
screening	0.5m path Δ				-10	-12	-15	-18	-25	-25		
Lp (free field)					34	36	33	26	13	9		
Façade correction	Assume 3.5m from façade				0	0	0	0	0	0		
LP at façade					34	36	33	26	13	9		33 dBA

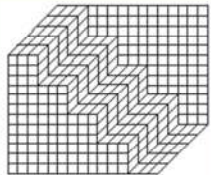
<div></div> <div>Buro Happold</div>				Project	BSF Camden			Sheet:	1 of			
				Area of Project	External plant noise checks			Prepared		date:		
								Checked:		date:		
				Element Description	UCL roof plant GL05			Revisions				
				Notes								
				63	125	250	500	1000	2000	4000	8000	
U TEF R01			in duct Lw		85	82	80	84	84	81		
Atten	900 circ				5	7	10	15	10	7		
Lw to env					80	75	70	69	74	74		
AHU R01A	extract fan	outlet	in duct Lw		82	86	85	81	77	72		
end reflection, m2		1			-1	0	0	0	0	0		
Lw to environment					81	86	85	81	77	72		
AHU R01A	supply fan	inlet	in duct Lw		84	88	88	84	80	75		
			heat wheel		-3	-3	-3	-3	-4	-4		
			filter		-3	-5	-7	-8	-8	-8		
			coils		-3	-3	-3	-3	-4	-4		
end refn, m2					-1	0	0	0	0	0		
Lw to environment					74	77	75	70	64	59		
AHU R01B	extract fan	outlet	in duct Lw		82	86	85	81	77	72		
end reflection, m2		1			-1	0	0	0	0	0		
Lw to room					81	86	85	81	77	72		
AHU R01B	supply fan	inlet	in duct Lw		84	88	88	84	80	75		
			heat wheel		-3	-3	-3	-3	-4	-4		
			filter		-3	-5	-7	-8	-8	-8		
			coils		-3	-3	-3	-3	-4	-4		
end refn, m2					-1	0	0	0	0	0		
Lw to environment					74	77	75	70	64	59		
U AHU R05	supply fan	inlet	in duct Lw		82	87	87	83	79	74		
			heat wheel		-3	-3	-3	-3	-4	-4		
			filter		-3	-5	-7	-8	-8	-8		
			coils		-3	-3	-3	-3	-4	-4		
end refn, m2					-1	0	0	0	0	0		
Lw to environment					72	76	74	69	63	58		
AHU R05	extract fan	outlet	in duct Lw		81	85	85	81	76	72		
end reflection, m2		1			-1	0	0	0	0	0		
Lw to environment					80	85	85	81	76	72		
Total Lw Ahus					86.2	91	90.2	86.1	81.7	77		
total Lw, Ahus + fans					87.1	91.1	90.2	86.2	82.4	78.8		
nearest façade, m	90	14 Harley Rd	20logr -11		-50	-50	-50	-50	-50	-50		
Directivity, Q=	2				3	3	3	3	3	3		
screening	0.5m path Δ				-10	-12	-15	-18	-25	-25		
Lp (free field)					30	32	28	21	10	7		
Façade correction	Assume 3.5m from façade				0	0	0	0	0	0		
LP at façade					30	32	28	21	10	7		28 dBA

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				Area of Project	External plant noise checks			Prepared		date:		
								Checked:		date:		
				Element Description	UCL roof plant GL 14			Revisions				
					Notes							
				63	125	250	500	1000	2000	4000	8000	
U TEF R02	as R01		in duct Lw		85	82	80	84	84	81		
Atten	900 circ				5	7	10	15	10	7		
Lw to environment					80	75	70	69	74	74		
AHU R02A	extract fan	outlet	in duct Lw		83	86	85	81	77	72		
end reflection, m2		1			-1	0	0	0	0	0		
Lw to environment					82	86	85	81	77	72		
AHU R02A	supply fan	inlet	in duct Lw		84	88	88	84	80	75		
			heat wheel		-3	-3	-3	-3	-4	-4		
			filter		-3	-5	-7	-8	-8	-8		
			coils		-3	-3	-3	-3	-4	-4		
end refn, m2					-1	0	0	0	0	0		
Lw to environment					74	77	75	70	64	59		
AHU R02B	extract fan	outlet	in duct Lw		83	86	85	81	77	72		
end reflection, m2		1			-1	0	0	0	0	0		
Lw to environment					82	86	85	81	77	72		
AHU R02B	supply fan	inlet	in duct Lw		84	88	88	84	80	75		
			heat wheel		-3	-3	-3	-3	-4	-4		
			filter		-3	-5	-7	-8	-8	-8		
			coils		-3	-3	-3	-3	-4	-4		
end refn, m2					-1	0	0	0	0	0		
Lw to environment					74	77	75	70	64	59		
U AHU R04	supply fan	inlet	in duct Lw		82	87	87	83	79	74		
			heat wheel		-3	-3	-3	-3	-4	-4		
			filter		-3	-5	-7	-8	-8	-8		
			coils		-3	-3	-3	-3	-4	-4		
end refn, m2					-1	0	0	0	0	0		
Lw to environment					72	76	74	69	63	58		
AHU R04	extract fan	outlet	in duct Lw		83	86	86	82	77	73		
end reflection, m2		1			-1	0	0	0	0	0		
Lw to environment					82	86	86	82	77	73		
Total Lw at 1m, AHUs					87.3	91.3	90.5	86.4	82	77.3		
total Lp at 1m, Ahus + fans					88	91.4	90.5	86.5	82.6	79		
nearest façade, m	60	14 Harley Rd	-20log r -11		-47	-47	-47	-47	-47	-47		
Directivity, Q=	2				3	3	3	3	3	3		
screening	0.5m path Δ				-10	-12	-15	-18	-25	-25		
Lp (free field)					34	36	32	25	14	10		
Façade correction	Assume 3.5m from façade				0	0	0	0	0	0		
LP at façade					34	36	32	25	14	10		32 dBA

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				Area of Project	External plant noise checks					Prepared		date:
										Checked:		date:
										Revisions		
Element Description	UCL roof plant GL 21					Notes						

				63	125	250	500	1000	2000	4000	8000	
U AHU 101	extract fan	outlet	in duct Lw		82	86	85	81	77	72		
end reflection, m2		1			-1	0	0	0	0	0		
Lw to room					81	86	85	81	77	72		
AHU R01B	supply fan	inlet	in duct Lw		81	85	86	82	78	73		
			heat wheel		-3	0	0	0	0	-4		
			filter		-3	-5	-7	-8	-8	-8		
			coils		-3	-3	-3	-3	-4	-4		
Attenuator	900mm 45%				-5	-11	-17	-20	-19	-12		
end refn, m2					-1	0	0	0	0	0		
Lw to environment					66	66	59	51	47	45		
directivity correctio	1m2				7	8	8	9	9	9		
nearest façade, m	30		-20logr		-30	-30	-30	-30	-30	-30		
hemi spreading					-8	-8	-8	-8	-8	-8		
screening	line of sight				-5	-5	-5	-5	-5	-5		
Total Lp, free field					30	31	24	17	13	11		
façade correction	Assume 3.5m from façade				0	0	0	0	0	0		
Lp at façade					30	31	24	17	13	11		27



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				Area of Project	External plant noise checks	Prepared		IT	date:							
						Checked:		date:								
						Revisions										
Element Description				UCL roof plant L05 GL 21				Notes								
								63	125	250	500	1000	2000	4000	8000	
TEF 03				in duct LW					77	84	76	76	77	74		
Atten				900 circ					5	7	10	15	10	7		
Lw to atmosphere									72	77	66	61	67	67		
V EF 501				in duct lw					84	84	86	86	78	74		
Atten				900 circ					5	7	10	15	10	7		
Lw to atmosphere									79	77	76	71	68	67		
U TEF R01				in duct Lw					85	82	80	84	84	81		
Atten				900 circ					5	7	10	15	10	7		
Lw to atmosphere									80	75	70	69	74	74		
Total Lw									82.9	81.2	77.3	73.4	75.6	75.5		
nearest façade, m				35	14 Harley Rd	-20log r -11			-42	-42	-42	-42	-42	-42		
Directivity, Q=				2					3	3	3	3	3	3		
screening				0.5m path Δ					-10	-12	-15	-18	-25	-25		
Total Lp, free field									34	30	23	17	12	12		
façade correction				Assume 3.5m from façade					0	0	0	0	0	0		
Lp at façade									34	30	23	17	12	12	26	