

Project

WREN School, Reading
Plant Noise Impact Assessment

Prepared for

Kier Construction
Mulberry House
Old Bath Road
Newbury
RG14 1QL

By

Dave Clarke BEng(Hons) CEng MIOA

Published

28 February 2018

Quality Assurance	
Project Title	WREN School, Reading
Document Title	Plant Noise Assessment
Client	Kier Construction
Client Address	Mulberry House, Old Bath Road Newbury RG14 1QL
Author	Dave Clarke BEng(Hons), CEng, MIOA
Checker	Chris Wright BA(Hons), MIOA
Report Number	CI4310A/T25/DPC
Additional information	-

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 WREN School in Reading.

Reading Borough Council's policy is for plant noise to be no more than 10dB below background noise level (L_{A90}) at the nearest noise sensitive receptors.

The closest noise sensitive properties to the proposed schools are

- a dwelling just to the north of the site on Bath Road,
- hospital buildings to the east of the site and
- a proposed residential development just to the south of the site, off Southcote Lane.

The lowest L_{A90} measured during the day was typically 46-47dBA across most of the site and 52dBA at the closest property to the north on Bath Road.

All four boilers, fans EF 04 - EF 11, and the condensers will meet the Planning Condition requirement without any additional acoustic treatment. The following fans will need to be attenuated on the atmosphere side of the systems in order to meet Reading Borough Council's noise requirement:

Item of Plant	Noise Reduction	Comments
AHU01	20 dBA	Attenuator to the exhaust only
AHU02	18 dBA	Attenuator to the exhaust only
AHU03	12 dBA	
AHU04	20 dBA	Attenuator to the exhaust only
EF01	20 dBA	
EF02	15 dBA	
EF03	9 dBA	

Dave Clarke

Director

For and on behalf of

SRL Technical Services Limited

Tel: 01787 247595

Email: dclarke@srltsl.com

Contents

Summary.....	3
1.0 Introduction and Planning Condition.....	5
2.0 Noise Climate	6
3.0 Noise Assessment.....	7
4.0 Discussion and Recommendations.....	8
Appendix A - Drawings	10
Appendix B - Plant Noise Details.....	11

1.0 Introduction and Planning Condition

Kier Construction is building WREN School in Reading and the Planning Permission has a condition (42) relating to noise from building services plant, but the requirements of the condition did not seem to be appropriate in order to satisfactorily control noise from building services plant. Following further discussions with Reading Borough Council, Ross Jarvis (Senior Technical Officer) said:

“We also have a policy requiring new plant to be 10dB below background noise level at the nearest noise sensitive receptors, which will presumably be the new residential properties on site. In order to do this a BS4142:2014 assessment should be carried out by a suitably qualified person (i.e. a member of the institute of acoustics.)”

We have therefore agreed that satisfying the requirements of this policy will be sufficient to discharge Condition 42.

Figure 1 below shows the nearest noise sensitive uses which are a house on Bath Road (A), the NHS buildings to the East (B) and a proposed residential development to the south, marked C, D and E:

Figure 1.1 - Site of Proposed School in relation to the Nearest Noise Sensitive Properties



2.0 Noise Climate

The existing noise levels around the site were reported in SRL document “I3765A - T01C - Baseline Noise Survey” dated 22 September 2016. Sample noise measurements were taken during the daytime at 4 locations (1 to 4). A noise logger (L) was left at location 2 to establish the noise climate over a longer period:

Figure 2.1 - Ambient Noise Survey Locations



Results from the noise logger reveal that the noise climate is relatively constant from early morning (7am) until late evening (10pm) and Table 2.1 shows the typical lowest background noise levels measured around the site during this period, along with corresponding plant noise limits on the basis that plant only operates during this period.

Table 2.1 - Typical Lowest Background Noise Levels (L_{A90}) and Plant Limits

	Pos 1	Pos 2 / L	Pos 3	Pos 4
Typical Lowest Background Noise Levels (L_{A90}) - 0700-2200h	63 dB	52 dB	46 dB	47 dB
Plant Noise Limits (L_{Aeq}) - 0700-2200h	53 dB	42 dB	36 dB	37 dB

In our assessment we have deemed the following noise limits as the being most appropriate:

- 42dB L_{Aeq} for the house on Bath Road (“A” on figure 1.1) and
- 36 dB L_{Aeq} for all other noise sensitive properties.

3.0 Noise Assessment

We have predicted the noise levels due to all noisy items of plant at the nearest properties without any acoustic attenuation, see Table 3.1 below. Items of plant with noise levels below 10dBA at these locations are not included. The results below show that the predicted noise levels when all plant is running slightly exceeds Reading BC's Senior Technical Officer's requirement at all 5 locations:

Table 3.1: Plant noise predictions at housing with all plant operating (dB, L_{Aeq})

Item of Plant	On-time	Location	A	B	C	D	E
Boilers BO01 & 02	50%	Plantroom 1	24	24	-	16	16
AHU 01	100%	Main building roof	43	30	29	-	-
AHU 02	100%	Main building roof	40	35	29	26	20
AHU 03	100%	Main building roof	18	22	30	28	21
EF 01	100%	Main building roof	39	40	38	36	30
EF 02	100%	Main building roof	21	26	33	27	21
EF 03	100%	Main building roof	32	20	20	23	16
EF 04	100%	Main building roof	-	-	10	16	17
EF 05	100%	Main building roof	11	-	13	19	20
OU 01	50%	Main building roof	28	28	29	26	20
OU 02	50%	Main building roof	30	27	32	34	26
OU 04	50%	Main building roof	-	-	-	10	-
OU 05A & 05B	50%	Main building roof	-	10	13	11	-
OU 06	50%	Main building roof	-	-	-	-	-
Boilers BO03 & 04	50%	Plantroom 6	-	-	-	16	16
AHU 04	100%	Plantroom 6	-	-	-	36	38
OU 03	50%	Sports building roof	17	15	21	28	24
TOTAL			46	42	41	41	39
CRITERION			≤ 42	≤ 36	≤ 36	≤ 36	≤ 36

4.0 Discussion and Recommendations

The above results are with no attenuation and to meet the requirement, we recommend the following AHUs and fans are fitted with attenuators which reduce fan noise to atmosphere by the dBA values listed in Table 4.1 below:

Table 4.1: Plant Noise Reduction Required

Item of Plant	Noise Reduction	Comments
AHU01	20 dBA	Attenuator to the exhaust only
AHU02	18 dBA	Attenuator to the exhaust only
AHU03	12 dBA	
AHU04	20 dBA	Attenuator to the exhaust only
EF01	20 dBA	
EF02	15 dBA	
EF03	9 dBA	

With this mitigation, the predicted noise levels at the nearest noise sensitive receptors are as shown in Table 4.2 overleaf, and meet the plant noise policy requirements of Reading Borough Council.

Table 4.2: Plant noise predictions at housing with attenuators fitted (dB, L_{Aeq})

Item of Plant	Location	A	B	C	D	E
AHU 01	Main building roof	26	13	12	-	-
AHU 02	Main building roof	27	22	16	13	-
AHU 03	Main building roof	-	10	18	16	-
EF 01	Main building roof	19	20	18	16	10
EF 02	Main building roof	-	11	18	12	-
EF 03	Main building roof	23	11	11	14	-
EF 04	Main building roof	-	-	10	16	17
EF 05	Main building roof	11	-	13	19	20
AHU 04	Plantroom 6	-	-	-	17	19
Boilers & Condensers	Various	33	32	34	35	29
TOTAL		35	32	35	36	30
CRITERION		≤ 42	≤ 36	≤ 36	≤ 36	≤ 36

Appendix A - Drawings

Avoca Consulting Engineers drawings:

Drawing no.	Revision	Title
715 - M-004	A	Main Building - Plant Room 1 - Layout
715 - M-007	A	Sports Building - Plant Room 3, 5 & 6 - Layout
715 - M-230	A	Sports Building Roof - Ventilation Layout
715 - M-232	B	Main Building - Third Floor - Sheet 3 of 4 - Ventilation Layout
715 - M-241	A	Main Building - Roof - Sheet 1 of 2 - Ventilation Layout
715 - M-242	B	Main Building - Roof - Sheet 2 of 2 - Ventilation Layout
715 - M-740	A	Main Building - Roof - Sheet 1 of 2 - Air Conditioning
715 - M-741	A	Main Building - Roof - Sheet 2 of 2 - Air Conditioning

Appendix B - Plant Noise Details

Table B1 - Boilers and Condensers

Plant Ref.	Unit Details	Noise data
BO 01 & 02	Valliant ecoCRAFT 280kW	69 dB L _{WA}
BO 03 & 04	Valliant ecoTEC 80kW	54 dB L _{WA}
OU 01	Samsung AM280MXVGNR/ET	86 dB L _{WA}
OU 02	Samsung AM280MXVGNR/ET	90 dB L _{WA}
OU 03	Samsung AM140JXVHGR/ET	81 dB L _{WA}
OU 04, 05A, 05B	Samsung AM100MXADKH/EU	65 dB L _{WA}
OU 06	Samsung AM071MXADKH/EU	65 dB L _{WA}

Table B2 - AHUs and Fans (sound power levels, dB)

Plant Ref.	Octave band centre frequency, Hz						
	63	125	250	500	1k	2k	4k
AHU-01 FAI	59	67	62	57	55	51	51
AHU-01 exhaust	66	76	71	74	74	74	76
AHU-02 FAI	68	73	68	62	56	49	44
AHU-02 exhaust	73	79	76	74	74	71	69
AHU-03 FAI	59	70	68	64	62	57	59
AHU-04 FAI	59	67	61	56	55	47	38
AHU-04 Exhaust	69	77	71	73	74	73	69
EF-01	82	85	83	83	76	77	77
EF-02	80	80	72	70	62	60	57
EF-03	80	81	73	71	63	61	57
EF-04	74	69	60	59	56	51	45
EF-05	75	70	62	62	60	55	49

**Sudbury Consultancy**

Holbrook House
Little Waldingfield
Sudbury
Suffolk
CO10 0TF
Tel: +44 (0)1787 247595

Manchester Consultancy

Lynnfield House
Church Street
Altrincham
Cheshire
WA14 4DZ
Tel: +44 (0)161 929 5585

London Consultancy

Citypoint, 12th Floor
1 Ropemaker Street
London
EC2Y 9HT
Tel: +44 (0)207 251 3585

Birmingham Consultancy

Cornwall Buildings
45 Newhall Street
Birmingham
B3 3QR
Tel: +44 (0)121 270 6680

South Africa Consultancy

Ground Floor, Liesbeek House
River Park
Gloucester Road
Mowbray
7700
South Africa
Tel: +27 (0)21 680 5305

Laboratory

Holbrook House
The Street
Sudbury
Suffolk
CO10 0TF
Tel: +44 (0)1787 247595

Website: www.srltsl.com
e-mail: srl@srltsl.com

SRL offers services in:

Acoustics
Air Quality
Air Tightness
BREEAM
Compliance
Fire
Laboratory and Site Testing

Registered Name and Address:

SRL Technical Services Limited
Holbrook House
Little Waldingfield
Sudbury
Suffolk
CO10 0TF

Registered Number: 907694 England

