4193

Rating of Industrial Noise affecting Mixed Industrial and Residential Areas

Interim Summary Report of Results

Site Name:	Stockport Road
Address:	1083 Stockport Road, Levenshulme, Manchester. M19 2RE.

Customer Name:	Vale Building Services Ltd
Address:	Cardiff Road, Cardiff, Wales. CF17 7PR.

KR Associates (UK) Ltd

Unit 2, Vancouver Wharf,

Hazel Road, Southampton, SO19 7BN.

Report Reference:	KR03417 (Interim)
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Test Date:	10/10/2013
Consultant:	Mr. J. D. Earwood

4193 Accredited to ISO/IEC 17025:2005	**Schedule of Accreditation** Issued by **United Kingdom Accreditation Service** 21 – 47 High Street, Feltham, Middlesex, TW13 4UN. **KR Associates (UK) Ltd** Issue No: 007 Issue Date: 25 May 2012

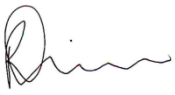
Material / Products Tested	Type of Tests / Properties Measured / Range of measurements	Standard specification/ Equipment/Techniques used	Location Code
Building Elements Partitions, walls, floors & facades	Field measurements of airborne sound insulation i.e. Level difference and related factors	The Building Regulations 2010 Approved Document E:2003 (Incorporating 2004 & 2010 amendments)	Any suitable customer site
Floors	Field measurement of impact sound insulation i.e. Impact Sound Pressure Level and related factors	The Building Regulations 2010 Approved Document E:2003 (Incorporating 2004 & 2010 amendments)	Any suitable customer site
Environmental Noise	Method for Rating industrial noise affecting mixed residential and industrial areas	BS 4142:1997	Any suitable customer site
Buildings	Building Air Leakage Tests	BS EN 13829:2001 ATTMA Technical Standard 1:2007	Any suitable customer site
Dwellings Non-dwellings	Building Air Leakage Tests	ATTMA TSL1:2010 ATTMA TSL2:2010	Any suitable customer site

Version Control

Version Number	Version Date	Details	Author
KR03417 v1.0 (Interim)	20/10/2013	Initial Issue of Report	Mr. J. D. Earwood

Declaration

This report has been prepared in line with the relevant test procedure and the scope of accreditation issued to KR Associates (UK) Ltd by the United Kingdom Accreditation Services on 25th May 2012. The report has been checked and released for issue by the relevant Technical Authority of KR Associates (UK) Ltd.



13th August 2012
Mr. R. M. Scrivener, MSc, MIOA

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1 EXECUTIVE SUMMARY

1.1 Instruction

KR Associates (UK) Ltd have been instructed by Vale Building Services Ltd to undertake an environmental noise survey at the proposed store at 0, 1083 Stockport Road, Levenshulme, Manchester to support the planning application. This report details the key noise data to allow the selection of the proposed plant.

1.2 Maximum Noise Levels

Name of Source	07:00 – 23:00 (Day Time) 32°C Ambient	23:00 – 07:00 (Night Time) 25°C Ambient
4 Fan Condenser	$L_{w(A)}$ 71 dB	$L_{w(A)}$ 67 dB
Treated Pack	$L_{w(A)}$ 66 dB	$L_{w(A)}$ 61 dB
Air Conditioning Unit	$L_{w(A)}$ 71 dB	$L_{w(A)}$ -99 dB
Air Conditioning Unit	$L_{w(A)}$ 63 dB	$L_{w(A)}$ -99 dB
Sound Power Level as defined in British Standard 13487:2003. Reference Level of 1 x 10^{-12} watts.		

1.3 Background Noise Levels

Background Noise Levels	07:00 – 23:00 (Day Time) 32°C Ambient	23:00 – 07:00 (Night Time) 25°C Ambient
Minimum Background Noise Level	$L_{A90,\ 16\ hours}$ 45 dB	$L_{A90,\ 8\ hours}$ 35 dB
Background Noise Levels as defined in British Standard 4142:1997. Reference Level of 2 x 10^{-5}Nm^{-2}.		

1.4 Proposed British Standard 4142:1997 Assessment

British Standard 4142: 1997	07:00 – 23:00 (Day Time) 32°C Ambient	23:00 – 07:00 (Night Time) 25°C Ambient
Specific Noise Levels	$L_{Aeq,1\ hours}$ 28 dB	$L_{Aeq,5\ minutes}$ 21 dB
Character Correction	+0 dB	+0 dB
Rating Noise Level	$L_{Aeq,1\ hours}$ 28 dB	$L_{Aeq,5\ minutes}$ 21 dB
Background Noise Level	$L_{A90,\ 16\ hours}$ 45 dB	$L_{A90,\ 8\ hours}$ 35 dB
Assessment	-17 dB below 'Complaints Unlikely'	-14 dB below 'Complaints Unlikely'

1.5 Specific Site Criteria

It would be recommended that criteria of -5 dB should be achieved to ensure the proposed plant does not have an adverse effect on the local amenity in terms of noise and ensure that the planning application has the best chance of success through the planning process.

1.6 Conclusions

It would be recommended that the plant is selected with the maximum noise levels detailed in section 1.2 above.

2 SITE LAYOUT

2.1 Location Plan



4 Fan Condenser	Latitude:	53.436603	Longitude:	-2.184268	Elevation:	63.5
Treated Pack	Latitude:	53.436603	Longitude:	-2.184268	Elevation:	63.0
Air Conditioning Unit	Latitude:	53.436603	Longitude:	-2.184268	Elevation:	63.0
Air Conditioning Unit	Latitude:	53.436603	Longitude:	-2.184268	Elevation:	63.0
Assessment Position	Latitude:	53.436807	Longitude:	-2.184013	Elevation:	66.0
Background Position	Latitude:	53.436572	Longitude:	-2.183948	Elevation:	65.0

2.2 Relative Distances

Proposed Source	Source Height	Barrier Height	Receiver Height	Source to Barrier	Barrier to Receiver	Overall Distance
4 Fan Condenser	63.5 m	64.0 m	66.0 m	1.0 m	27.5 m	28.6 m
Treated Pack	63.0 m	64.0 m	66.0 m	1.0 m	27.5 m	28.6 m
Air Conditioning Unit	63.0 m	64.0 m	66.0 m	1.0 m	27.5 m	28.6 m
Air Conditioning Unit	63.0 m	64.0 m	66.0 m	1.0 m	27.5 m	28.6 m

2.3 Assessment Position

The nearest noise sensitive property is located at residential property on Cringle Road behind site..

2.4 Background Position

The background noise levels were measured at grass area behind assessment position.

2.5 Source Locations

2.5.1 4 Fan Condenser

It is proposed to locate the 4 Fan Condenser at Located at left, rear of site..

2.5.2 Treated Pack

It is proposed to locate the Treated Pack at Located at left, rear of site..

2.5.3 Air Conditioning Unit

It is proposed to locate the Air Conditioning Unit at Located at left, rear of site..

2.5.4 Air Conditioning Unit

It is proposed to locate the Air Conditioning Unit at Located at left, rear of site..

3 CONCLUSIONS

3.1 Background Noise Survey

The background noise levels were measured at the site between 07:00 on 10/10/2013 and 07:00 on 11/10/2013 and were found to be $L_{A90,16\ hours}$ 45 dB during the day time period between 07:00 and 23:00 hours and $_{LA90,\ 8\ hours}$ 35 dB during the night time period between 23:00 and 07:00 hours.

3.2 Proposed British Standard 4142:1997 Assessment

It would be recommended that the plant noise, when measured at the nearest noise sensitive property, remains at least 5 dB below the underlying background noise levels at all times when measured in accordance with British Standard 4142:1997.

3.3 Plant Maximum Levels

3.3.1 4 Fan Condenser

It would be recommended that the proposed 4 Fan Condenser has noise emissions that do not exceed $L_{w(A)}$ 71 dB(A) during the day time period between 07:00 and 23:00 hours and $L_{w(A)}$ 67 dB(A) during the night time period between 23:00 and 07:00.

3.3.2 Treated Pack

It would be recommended that the proposed Treated Pack has noise emissions that do not exceed $L_{w(A)}$ 66 dB(A) during the day time period between 07:00 and 23:00 hours and $L_{w(A)}$ 61 dB(A) during the night time period between 23:00 and 07:00.

3.3.3 Air Conditioning Unit

It would be recommended that the proposed Air Conditioning Unit has noise emissions that do not exceed $L_{w(A)}$ 71 dB(A) during the day time period between 07:00 and 23:00 hours and $L_{w(A)}$ -99 dB(A) during the night time period between 23:00 and 07:00.

3.3.4 Air Conditioning Unit

It would be recommended that the proposed Air Conditioning Unit has noise emissions that do not exceed $L_{w(A)}$ 63 dB(A) during the day time period between 07:00 and 23:00 hours and $L_{w(A)}$ -99 dB(A) during the night time period between 23:00 and 07:00.

The above sound power level, $L_{w(A)}$ should have been established in accordance with British Standard 13487: 2003.

3.4 Overall Conclusions

If the plant is selected with the maximum noise levels detailed within the report, it is likely that planning permission will be granted by the Local Authority.

4 APPENDIX A - CRITERIA

4.1 British Standard 4142:1997

British Standard 4142:1997 defines 3 distinct categories based on the calculated assessment level:

> *"A difference of around +10 dB or more indicates that complaints are likely.*
> *A difference of around +5dB is of marginal significance.*
> *If the rating level is more than 10 dB below the measured background level then there is a positive indication that complaints are unlikely."*

In determining a suitable criteria care needs to be taken to ensure an *"unreasonable burden"* is not placed on the proposed development and that the rating and background levels fall within the scope of British Standard 4142:1997.

4.2 National Planning Policy Framework ("NPPF")

The National Planning Policy Framework sets out the Governments planning policies for England and how these are expected to be applied. In reference to noise in the environment, paragraph 123 states:

> *"Planning Policies and decisions should aim to:*
> *Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
>
> *Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*
>
> *Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established…"*

4.3 Noise Policy Statement for England ("NPSE")

The Noise Policy Statement for England provides the following guidance:

> *SOAEL – Significant Observed Adverse Effect Level: This is the level above which significant adverse effects on health and quality of life occur…*
>
> *Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of the Government policy on sustainable development."*

4.4 Guidelines for Community Noise (World Health Organisation)

Specific Environment	Critical health effect(s)	$L_{Aeq,t}$ dB	Time Base (Hours)	$L_{AMax,\ fast}$ dB
Outside Bedrooms	Sleep disturbance, window open (Outdoor Values)	45	8	60
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
Inside Bedrooms	Sleep disturbance, night time	30	8	45

4.5 Night Noise Guidelines (World Health Organisation - Europe)

Effect of Noise	Description	Indicator	Threshold , dB
Biological Effects	EEG awakening	$L_{Amax,inside}$	35
	Motility, onset of motility	$L_{Amax,inside}$	32
	Changes in duration of various stages of sleep, in sleep structure and fragmentation of sleep	$L_{Amax,inside}$	35
Sleep Quality	Waking up in the night and/or too early in the morning	$L_{Amax,inside}$	42
	Increased average motility when sleeping	$L_{Night,outside}$	42
Well Being	Self-reported sleep disturbance	$L_{Night,outside}$	42
	Use of somnifacient drugs	$L_{Night,outside}$	40
Medical Conditions	Environmental insomnia	$L_{Night,outside}$	42

4.6 Local Authority Criteria

KR Associates (UK) Ltd contacted Stockport Metropolitan Borough Council (Town Hall, Edward Street, 0, Stockport, SK1 3XE) to determine if there any specific noise criteria to be used when considering the application for the proposed plant.

4.6.1 Day Time Criteria

It is expected that the Local Authority will at this site require a criteria of -5 dB during the night time period

4.6.2 Night Time Criteria

It is expected that the Local Authority will at this site require a criteria of -5 dB during the night time period

5 APPENDIX B - SITE LAYOUT / PHOTOGRAPHS

5.1 Site Location



4 Fan Condenser	Latitude:	53.436603	Longitude:	-2.184268	Elevation:	63.5
Treated Pack	Latitude:	53.436603	Longitude:	-2.184268	Elevation:	63.0
Air Conditioning Unit	Latitude:	53.436603	Longitude:	-2.184268	Elevation:	63.0
Air Conditioning Unit	Latitude:	53.436603	Longitude:	-2.184268	Elevation:	63.0



Front of site.



Side of site.

5.2 Assessment Position



Assessment position 1:	Latitude:	53.436807	Longitude:	-2.184013	Elevation:	66.0



Front of assessment area.



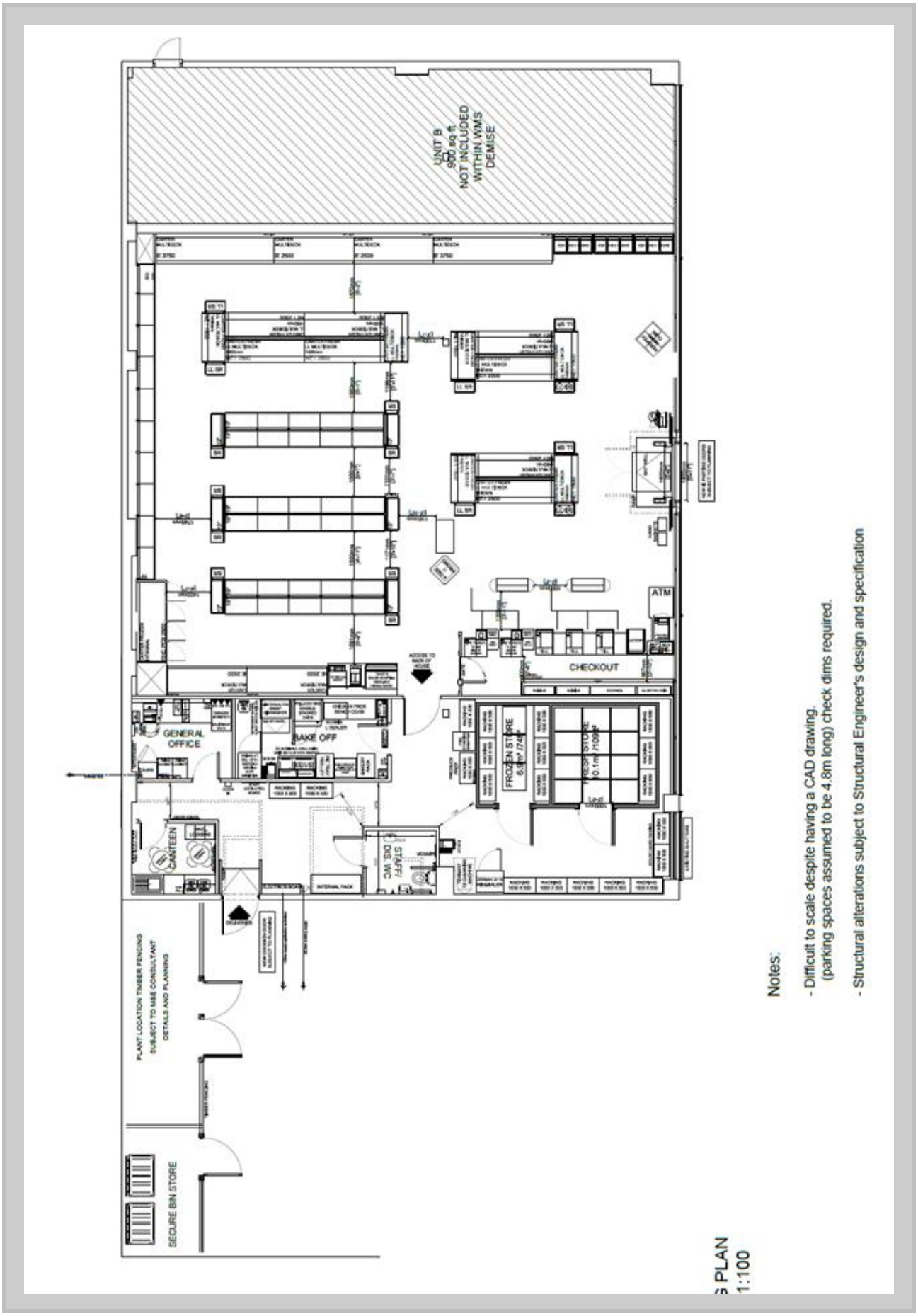
Assessment position facing site.

5.3 Background Measurement Position



Background Measurement:	Latitude:	53.436572	Longitude:	-2.183948	Elevation:	65.0

5.4 Supplied Drawings



6 APPENDIX C - BACKGROUND NOISE LEVELS

6.1 07:00 Thursday 10th October 2013 to 07:00 Friday 11th October 2013

Time Period	L_{Max}	Minimum 5 minute			1 Hour			Day and Night		
		$L_{Aeq,5\ min}$	$L_{A10,\ 5\ min}$	$L_{A90,\ 5\ min}$	$L_{Aeq,\ 1\ hour}$	$L_{A10,\ 1\ hour}$	$L_{A90,\ 1\ hour}$	$L_{Aeq,\ t}$	$L_{A10,\ t}$	$L_{A90,\ 16hours}$
07:00 – 08:00	73.8	48.5	51.2	38	52.4	53.5	42.1	53.3	55.4	44.6
08:00 – 09:00	65.9	48.4	51.1	43	50.9	53.1	44.4			
09:00 – 10:00	71	49.4	51.6	44	53.1	55.2	46.2			
10:00 – 11:00	73	51.7	53.3	46.3	54.6	56.1	47.6			
11:00 – 12:00	67.5	50.5	52.5	43.8	53.2	55.6	46.6			
12:00 – 13:00	70.7	52.3	54.6	47.5	54.6	56.5	49.1			
13:00 – 14:00	66.8	51.1	54.1	47.2	56.2	57.7	49.5			
14:00 – 15:00	70.7	53.9	55.7	48.8	56.3	57.9	50.4			
15:00 – 16:00	72.3	51.7	53.7	45.7	53.3	55.4	47.9			
16:00 – 17:00	69.2	52	53.4	45.5	53.8	55.6	47.1			
17:00 – 18:00	79.1	49.8	51.3	44	52.3	53.8	45.3			
18:00 – 19:00	81	49.1	50.9	42.7	52.2	53.3	44.8			
19:00 – 20:00	71.6	49.7	51.7	43.6	52.8	54.5	44.7			
20:00 – 21:00	64.6	49.9	51	43.5	51.8	54.1	45.1			
21:00 – 22:00	62.7	46	49	38.2	49.3	51.6	40.7			
22:00 – 23:00	69.7	46.5	49.1	38.7	50.1	51.1	40.4			
23:00 – 00:00	64.4	44.8	47.3	38.2	48	50.6	39.8	48.4	50.9	35.4
00:00 – 01:00	65.2	44.4	46.5	37.2	48.2	50.6	39.2			
01:00 – 02:00	61.8	42.4	43.3	34	44.6	46.9	35.9			
02:00 – 03:00	60.1	39	38.5	31.5	42.7	44.3	33.3			
03:00 – 04:00	69.2	38	36.4	33.2	46.3	45.2	34.4			
04:00 – 05:00	61.9	40.7	41.5	33.4	46.2	48.3	34.6			
05:00 – 06:00	67.9	48.5	50.4	39.7	50.3	52.6	41.7			
06:00 – 07:00	68	48.4	50.9	40.6	52.7	54.9	43.5			

Sound Pressure Levels, dB. Reference level of 2×10^{-5} Nm^{-2}

7 REFERENCES

7.1 British Standard 4142: 1997

Rating industrial noise affecting mixed residential and industrial areas.

7.2 British Standard 13487: 2003

Heat Exchangers – Forced air convection air cooled refrigerant condensers and dry coolers – Sound measurement.

7.3 International Standard Organisation 9613 – Part 1: 1993

Acoustics – Attenuation of sound propagation outdoors.

Part 1 - Part 1: Calculation of the absorption of sound by the atmosphere.

7.4 International Standard Organisation 9613 – Part 2: 1996

Acoustics – Attenuation of sound during propagation outdoors.

7.5 World Health Organisation Guidelines for Community noise: 1999

Published by Birgitta Berglund, Thomas Lindvall, Dietrich Schwela and Kee-Tai Goh.

7.6 World Health Organisation Europe Night Noise Guidelines 2009

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