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Environmental Noise Assessment

Prepared: 29th January 2020

Report No	20715-1
Client	Darwin Group
Site	Kendrick School 41-43 London Road Reading RG1 5BN

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1. Quality Management

Report Number	20715 - 1
Issue	1
Prepared	29 th January 2020
Prepared By	Bill Whitfield PhD, MSc, MIOA
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3. Executive Summary

3.1.1. An environmental noise assessment has been carried out for a new condensing unit at Kendrick School, 41-43 London Road, Reading RG1 5BN ("Proposed Development").

3.2. Measurement, Assessment and Evaluation

3.2.1. The survey was carried out to BS7445-1:2003,¹ BS7445-2:1991² and BS4142:2014³ which are covered under our UKAS Accreditation.

3.2.2. The interpretation of the data and the specification of suitable mitigation or treatment are outside the scope of our UKAS accreditation but is covered in our 17025 Quality Management System and reporting procedure.

3.3. Scope

- 3.3.1. This report covers all aspects of the noise survey, including:
- the identification of acoustic design criteria;
 - the identification of specific sound sources;
 - an objective sound pressure level survey of the existing site;
 - calculation of the ambient, residual and specific sound levels;
 - assessment of the specific sound sources based on guidance contained in BS4142:2014; and
 - the design of any mitigation to meet the required internal noise criteria

3.4. Results Summary

3.4.1. A numerical BS4142 assessment indicates that the new specific sound will have a low impact on proposed residential receivers and, generally, the lower the rating level is relative to the background sound level, the less likely it is that the specific sound source will have an adverse impact.

3.4.2. A single credit is available in the BREEAM 2018 POL5 credit issue where any new specific noise sources on the proposed development comply with noise limits.

3.4.3. In this context the additional building plant is being introduced close to existing residential receivers which are already exposed to similar plant currently operational. This is likely to result in reduced impact when compared to the situation where new sources are being introduced close to existing residential receivers, in the absence of other similar sources.

3.4.4. In any event, calculated assessment levels as per the guidance in BS4142 indicate they are 11dB below the measured backgrounds levels for the day time period, thereby meeting the requirements of the planning condition.

3.4.5. Recommendations have been made to allow the following credits to be awarded at design stage.

Credit	Credits awarded
POL5:	
- Credit 1	✓

Table 1 – Credits awarded at design stage

¹ BS7445-1:2003 "Description and measurement of environmental noise – Part 1: Description of quantities and procedures"

² BS7445-2:1991 "Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use"

³ BS4142:2014 "Methods for rating and assessing industrial and commercial sound"

3.5. Consultant's qualifications

- 3.5.1. The person responsible for this report was Bill Whitfield. He holds a Masters degree in Environmental Engineering and a PhD in Acoustics from the University of Liverpool. He has more than 30 years experience in acoustics and is a full corporate member of the Institute of Acoustics.

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5. Background

5.1. Noise Policy Statement for England

- 5.1.1. The Noise Policy Statement for England (NPSE), published in March 2010, states the long-term vision of Government noise policy is to *“promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development”*.
- 5.1.2. This long-term vision is supported by the following aims; through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:
- Avoid significant adverse impacts on health and quality of life;
 - Mitigate and minimise adverse impacts on health and quality of life;
 - Where possible, contribute to the improvement of health and quality of life.
- 5.1.3. The intention is that the NPSE should apply to all types of noise apart from noise in the workplace (occupational noise).

5.2. National Planning Policy Framework

- 5.2.1. The National Planning Policy Framework (NPPF) was published in July 2018 and sets out the Government’s planning policies for England and how these are expected to be applied. The framework states that the planning system should contribute to and enhance the natural and local environment by:
- “preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability”*.
- 5.2.2. The NPPF requires that new developments be appropriate to their locations such that the effects of pollution on health have been taken into account. Planning policies and decisions should aim to:
1. avoid noise giving rise to significant adverse impacts on health and the quality of life;
 2. mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development; and,
 3. identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value.
- 5.2.3. Existing businesses near to proposed development should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.

5.3. National Planning Practice Guidance

- 5.3.1. The National Planning Practice Guidance (PPG) is a web-based resource, launched by the Department for Communities and Local Government (DCLG) in March 2014 to support the NPPF and make it more accessible.⁴
- 5.3.2. It advises on how planning can manage potential noise impacts in new development. The guidance is regularly reviewed and updated and noise is listed as a specific category.
- 5.3.3. A summary of the effects of noise exposure (in terms of health and quality of life) associated with both noise generating developments and noise sensitive developments is presented within the PPG and reproduced in Table 2.

Perception	Examples of outcomes	Effect level	Action
Not noticeable	No effect	No observed effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect (NOAEL)	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very intrusive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

Table 2 – Noise exposure hierarchy

⁴ <http://planningguidance.communities.gov.uk/>

6.4. Proposed Specific Sound Sources

- 6.4.1. The current proposals are to install a single condensing unit in an external enclosure. Details of the unit have been supplied and have been summarised in Table 3.

Illustration	Specific Sound Source
	Toshiba SHRMe 1200 VRF 3 Pipe Heat recovery outdoor unit

Table 3 – Description of the specific sound sources as proposed

7. Assessment criteria

7.1. POL05: Reduction of noise pollution

- 7.1.1. There is a single credit available for the POL5 credit issue. The credit seeks to protect existing nearby sensitive receivers from any potential new environmental noise sources on the proposed scheme such as fixed mechanical and electrical plant. Nearby sensitive receivers could include: residential areas, healthcare facilities, education establishments, libraries, places of worship, wildlife areas and parks.
- 7.1.2. Where there are no noise sensitive areas or buildings within 800m of the assessed site the credit can be awarded by default. Where there are noise sensitive areas or buildings within 800m of the site, one credit can be awarded where a noise impact assessment in compliance with BS4142:2014⁵ has been carried out and:
- The existing background sound pressure level and expected rating sound level of the new noise sources have been compared
 - The rating sound level exceeds the background sound pressure level by no more than 5dB during the day (0700-2300) and 3dB during the night (2300-0700)
 - If this is not that case, mitigation will be applied to ensure that the above criteria are adhered to
- 7.1.3. The noise impact assessment must be carried out by a suitably qualified acoustics consultant holding a recognised acoustics qualification and membership of an appropriate professional body.
- 7.1.4. The BS7445 series of standards are guidance only for the acquisition, evaluation and interpretation of environmental sound data. BS4142:2014 provides guidance on the measurement, evaluation and assessment of industrial sound affecting other sensitive receivers. At all times the survey and data analysis have been in accordance with the BS7445^{6,7,8} series of standards however the assessment of plant noise is in accordance with BS4142:2014 as required by BREEAM 2018.

7.2. BS7445 (Parts 1-3)

- 7.2.1. The aim of the BS7445 series is to provide material for the description of noise in community environments.
- 7.2.2. BS7445-1:2003 defines the basic quantities to be used for the description of noise in community environments and describes base procedures for the determination of these quantities. It standardises the quantities and procedures for measuring noise from rail, road, aircraft and industrial plant. The standard specifies the use of the A-weighted equivalent continuous sound pressure level, " $L_{Aeq,T}$ ", to quantify the sound pressure levels of mixed sources over a time period, T. The results are always expressed in terms of this quantity even if supplemented by corrections or other descriptors that, in certain cases, may be deemed appropriate.
- 7.2.3. BS7445-2:1991 describes the methods to be used for measuring and describing environmental noise relevant to general land use. The document uses the concept of a rating level to determine a sound pressure level corrected for on-time, tone audibility, impulsivity and meteorological effects. Percentile levels may be used where the distribution of A-weighted sound pressure levels are of interest (such as the determination of a background sound pressure level).

⁵ BS4142:2014, 'Method for rating and assessing industrial and commercial sound'

⁶ BS7445-1:2003, 'Description and measurement of environmental noise – Part 1: Guide to quantities and procedures'

⁷ BS7445-2:1991, 'Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use'

⁸ BS7445-3:1991, 'Description and measurement of environmental noise – Part 3: Guide to the application of noise limits'

7.2.4. Extensive guidance on outdoor sound measurement is also provided, this includes:

- Location of monitoring equipment
- Appropriate measurement period relative to reference time interval
- Suitable meteorological conditions for a survey
- Sampling techniques used to minimise measurement time
- Information to be reported

7.2.5. BS7445-3:1991 gives guidance on the application of noise limits. It gives details on the information required for specifying noise limits for specific noise sources based on the typical activity of the source and receiver, the sources operating conditions and its location.

7.3. BS4142:2014

- 7.3.1. BS4142 provides methods for rating and assessing sound of an industrial and/or commercial nature, which includes sound from industrial and manufacturing processes, fixed services plant, sound generated by the loading/unloading of goods and sound from mobile plant/vehicles associated with industrial/commercial premises (e.g. fork-lift trucks).
- 7.3.2. The standard utilises various descriptors to assess complaints, the impact of sound associated with proposed industrial/commercial activities on existing noise-sensitive receivers, or the impact and likely suitability of siting new noise-sensitive receivers in the vicinity of existing industrial/commercial noise sources.
- 7.3.3. The standard is specifically precluded from being used to determine likely internal sound levels arising from external noise, or from the assessment of various sound sources for which other (more relevant) guidance exists, including music/entertainment noise, person noise and construction noise.
- 7.3.4. The magnitude of impact is assessed by subtracting the measured background sound level at a location representative of the nearest noise-sensitive receiver, from the 'rating level' (the specific sound source to be introduced into the locality, corrected for acoustically distinguishing characteristics which may make it more subjectively prominent).
- 7.3.5. Typically, the greater the difference between the background and rating level, the greater the magnitude of impact, although BS 4142 emphasises that this is highly context-specific.
- 7.3.6. As a guideline, BS4142 states that:
- A difference (between the background and rating level) of around +10 dB or more is likely to be indicative of significant adverse impact, depending on context
 - A difference (between the background and rating level) of around +5 dB or more is likely to be indicative of adverse impact, depending on context
 - The lower the rating level relative to the background level, the less likely it is that the specific sound will have an adverse impact
 - Where the rating level does not exceed the background level, this is an indication that the specific sound will have a low impact, depending on context
- 7.3.7. It should be noted that BS 4142:2014 draws a clear distinction between the detailed and flexible assessment methods contained within, and the more limited versions contained in the previous (1997) edition.

Definitions

- 7.3.8. BS 4142 uses several specific terms to define the various levels used in assessments, as follows:
- Specific sound – the commercial/industrial noise source under consideration
 - Residual sound – the sound level at the noise-sensitive receivers in the absence of the specific sound
 - Ambient sound – the sound level at the noise-sensitive receivers in the presence of the specific sound (i.e. ambient = residual + specific)
 - Background level - the sound pressure level which is exceeded by the residual sound for 90% of the measurement period
 - Rating level – the specific sound, corrected for acoustically distinguishing characteristics

Background Sound Level

- 7.3.9. BS4142 emphasises that the background level ($L_{A90,T}$) is in fact a range of levels, not one absolute value. Whilst stating that the measurements of background sound should be normally not less than 15 minutes, the focus is on obtaining a level for use in assessment that is representative of typical conditions at the noise-sensitive receivers.
- 7.3.10. An example methodology by which this typical value may be obtained is given in the document. In this example, monitoring of $L_{A90,15mins}$ is undertaken during periods which represent when the specific noise will be operational. After obtaining a sequence of representative contiguous or disaggregated results, it is then proposed that the modal value is representative of the 'typical' background level.

Specific sound

- 7.3.11. BS 4142 requires that the specific sound ($L_{Aeq,Tr}$) is obtained over a reference period of 1 hour (daytime) and 15 mins (at night). Ideally, measurements would be taken of the ambient sound and residual sound at the assessment location, with these measurements used to accurately calculate the specific sound (ambient – residual = specific).
- 7.3.12. Where the source (specific sound) is not yet operational, it is permissible to measure the specific sound elsewhere (or to use known manufacturers' or library data) and then model the impact of this against the known background level.

Rating level

- 7.3.13. Once the specific sound level has been determined, this must be corrected in terms of the need to consider the subjective prominence of the impact of the sound at noise-sensitive receivers, and the extent to which acoustically distinctive characteristics will attract attention.
- 7.3.14. BS4142 states that this is normally possible to carry out a subjective assessment of characteristics, based on the following correction guidelines:
- Tonality: +2dB for a 'just perceptible' tone, +4dB for 'clearly perceptible', and rising to +6dB for 'highly perceptible' tones.
 - Impulsivity (rapidity of change and overall change in level): +3 dB for 'just perceptible' impulsivity, +6dB for 'clearly perceptible', rising to +9 dB for 'highly perceptible' impulsivity.
 - Intermittency: if the on/off-time of the specific sound is readily distinctive at the noise-sensitive receivers, +3dB.
- 7.3.15. It should be noted that where one feature is clearly perceived as dominant, it may be applicable to correct for that feature only. Where multiple features are likely to affect perception and response, each should be added arithmetically.

8.3. Measurement and Timescale

8.3.1. Unattended monitoring was carried out between 23rd January 2020 and 24th January 2020. The measurements that have been made are summarised in Table 5.

Monitoring position	Date	Type	Quantity
1	23 rd January 2020 – 24 th January 2020	Unattended	$L_{Aeq,15min}$; $L_{A90,15min}$

Table 5 – Measurements made at the site of the Proposed Development

8.3.2. Sound pressure measurements were subsequently averaged into hourly, daytime and night-time periods. The acoustic measurements and their interpretation have been in accordance with BS 7445: Parts 1, and 2¹⁰. All sound pressure levels are in dB (re 20 μ Pa).

8.4. Results Summary

Background Sound Levels

8.4.1. Figure 3 and Figure 4 shows the results of the data analysis in terms of the frequency of occurrence of each data value during the daytime and the night-time respectively.

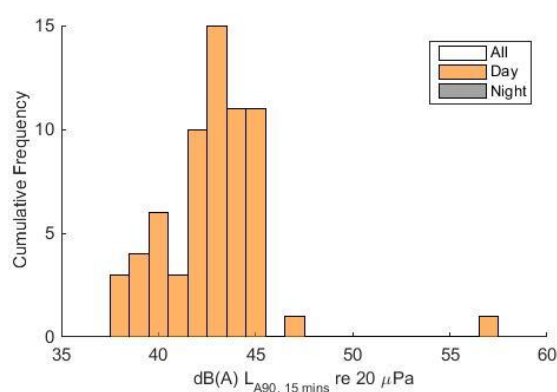


Figure 3 – Distribution of background sound levels during the daytime (07:00-23:00)

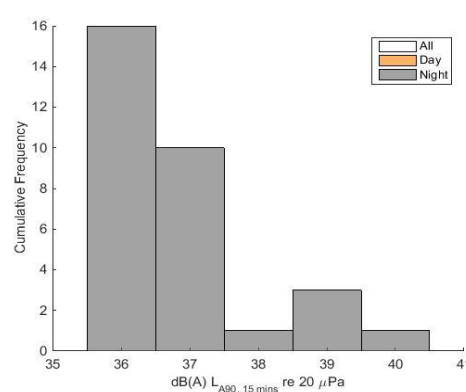


Figure 4 – Distribution of background sound levels during the night-time (23:00-07:00)

8.4.2. As can be seen in Figure 3 the background sound levels ranged between 38dB $L_{A90,15min}$ and 45dB $L_{A90,15min}$ during the daytime period. Figure 4 shows that the background sound levels ranged between 36dB $L_{A90,15min}$ and 40dB $L_{A90,15min}$ during the night-time period.

8.4.3. The typical background sound level has been taken to be 43dB $L_{A90,15min}$ during the daytime and 36dB $L_{A90,15min}$ for the night-time.

Specific Sound Levels

8.4.4. Details of the sound levels from the proposed condensing unit were provided by the manufacturer. This is set out in Figure 5 below:

¹⁰ BS7445-2:1991 "Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use"



SHRMe - VRF 3-Pipe Heat Recovery Outdoor Unit (continued)

CODE		1064	1129	1200
Combination		MMY-	AP3816FT8P-UK	AP4016FT8P-UK
Model Name Heat Recovery		MMY-	MAP2006FT8P-UK MAP1806FT8P-UK	MAP2006FT8P-UK MAP2006FT8P-UK
Capacity Range		hp	38	40
Maximum Number of Indoor Units		QTY	64	64
Cooling Capacity		kW	106.4	112.0
Heating Capacity		kW	114.5	116.0
Operating Range Cooling/Heating		°C	-10.0 to 46.0/ -25.0 to 15.5	-10.0 to 46.0/ -25.0 to 15.5
Cooling	Power Consumption	kW	34.60	37.20
	EER/SEER/ESEER		3.08/6.88/7.35	3.01/6.65/7.11
Heating	Power Consumption	kW	29.60	31.80
	COP/SCOP/ESOP		3.59/4.55/4.75	3.52/4.49/4.70
Fan(s)	Standard Air Flow H	l/s	4972 + 4808	4972 + 4972
	Standard Air Flow H	m³/h	17900 + 17300	17900 + 17900
	External Static Pressure	Pa	40	40
Sound	Pressure Level C/H	dB(A)	64.5/65.5	64.5/65.5
	Power Level C/H	dB(A)	86.5/87.5	86.5/88
Unit(s)	Height x Width x Depth	mm	1830 x 3220 x 780	1830 x 3220 x 780
	Weight	kg	377 + 377	377 + 377
	Refrigerant Base Charge	kg	11 + 11	11 + 11
Pipe Connections	Suction Gas Pipe Brazing	inch	1-5/8	1-5/8
	Discharge Pipe Brazing	inch	1-3/8	1-3/8
	Liquid Pipe Flare	inch	7/8	7/8
	Balance Pipe Flare	inch	3/8	3/8
Maximum	Maximum Equivalent Length	m	200	200
	Real Length	m	180	180
	Total Pipe Length (Liquid Line Real Length)	m	1000	1000
	Length To First Branch Height Difference Between Indoor Units ≤ 3 m	m	100	100
	Length To First Branch Height Difference Between Indoor Units > 3 m	m	85	85
	Equivalent Length Of Outdoor Unit Connecting Pipe	m	10	10
	Real Length Between Single Port FS Unit and Indoor Unit (3 series)	m	50 (15)	50 (15)
	Real Length Between Multi Port FS Unit and Indoor Unit	m	50	50
	Real Length Of Indoor Unit Connecting Piping	m	30	30
	Equivalent Length Between Branches	m	50	50
	Height Difference Outdoor Higher Than Indoor Units	m	70	70
	Height Difference Outdoor Lower Than Indoor Units	m	30	30
	Height Difference Between Indoor Units	m	40	40
	Height Difference Between Outdoor Units	m	5	5
Electrical	Voltage Range Minimum/Maximum	V	342/456	342/456
	Electrical Characteristic Run Current Cooling/Heating	A	54.28/46.19	58.36/49.35
	Power Supply Wiring Starting Current		Soft Start	Soft Start
	Power Supply	V/ph/Hz	380-415/3/50	380-415/3/50
	Suggested Fused Supply(s)	A	40 + 32	40 + 40

Figure 5 – Proposed condensing unit manufacturer's noise data (highlighted)

9. POL 05 – BS4142 Assessment

9.1. Environmental Corrections

- 9.1.1. The proposed location for the condensing unit is set out in Figure 1. Based on the location, the noise levels from the unit will be subject to corrections due to distance and screening. Since the unit will be located on the ground, a further hemispherical radiation correction would also apply. These corrections are set out in Table 6 below:

Element	Measure	Correction (dB)
Distance (point source propagation)	40m	-32dB
Screening (CRTN Method)	Path difference = 2m	-18dB
Radiation Correction	Hemispherical (2π)	-8dB

Table 6 –Environmental corrections calculated based on proposed location

9.2. Rating level

- 9.2.1. The commercial sound sources were operating at the time of the attended survey. The sources have been assessed based on the character of the sound at the boundary with the proposed residential development. The adjustments to the specific sound levels for acoustic features have been discussed in the following sections.

Tonality

- 9.2.2. Since the unit is not currently operational, it has not been possible to ascertain the tonality of the unit objectively. Therefore, a nominal 2dB tonality correction has been applied to allow for a tone that is just noticeable at the residential window. This is based on and experience of similar installations at a similar distance to residences as measured in the past.

Impulsivity

- 9.2.3. Condensing units are not considered impulsive since they do not exhibit a rapid increase in noise levels during operation (such as with hammering etc.). As a result, no impulsivity corrections would apply.

Intermittency

- 9.2.4. It is reasonable to assume that the condensing unit will operate continuously during any single assessment period (1h in the daytime and 15min during the night time). As a result, no additional correction for intermittency has been applied.

9.3. Assessment

9.3.1. The plant is associated with the school and would therefore only operate in the day time period when the school was operational. Based on this, the BS4142 assessment has been undertaken for the day time period only.

9.3.2. The BS4142 assessment is detailed in Table 7.

	Level, dB	
	Daytime (07:00-23:00)	
Background sound level, dB $L_{A90,15min}$	43	
Specific sound power level, dB(A)	88	
Environmental Corrections (dB)	−58	
Acoustic feature corrections		
Tonality	+2	
Impulsivity		
Intermittency		
Other		
Rating level		
Specific sound level + corrections	32	
Assessment Level		
Rating level – Background sound level	−11	
<i>“Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context”</i>		
The manufacturer’s sound power level results in an assessment that is less than 5dB during the daytime Therefore, the POL5 credit can be awarded at design stage.		

Table 7 - The assessment procedure from BS4142

9.3.3. The above assessment level is also calculated to be over 10dB below the measured $L_{A90,15min}$ for the day time period. As a result the planning condition is deemed to be satisfied.

9.4. Context

9.4.1. In this situation, the new condensing unit is being introduced close existing receptors. The impact of the industrial/commercial sound is likely to be significantly reduced compared to the situation where new sound sources are being introduced close to existing residential receivers where similar sources do not already exist.

10. Conclusions

- 10.1.1. An environmental noise assessment has been carried out at the site of Kendrick School, 41-43 London Road, Reading RG1 5BN to determine typical background sound levels.
- 10.1.2. A numerical BS4142 assessment indicates that the new specific sound will have a low impact on residential receivers and, generally, the lower the rating level is relative to the background sound level, the less likely it is that the specific sound source will have an adverse impact.
- 10.1.3. Calculated Assessment levels are noted to be 11dB below the measured typical background. Therefore the planning condition is deemed to have been met.
- 10.1.4. In this context the new condensing unit is being introduced close to existing residential receivers where similar units are currently operational. This is likely to result in reduced impact when compared to the situation where new sources are being introduced close to existing residential receivers where such sources do not currently operate.
- 10.1.5. Recommendations have been made to allow the following credits to be awarded at design stage.

Credit	Credits awarded
POL5:	
- Credit 1	✓

Table 8 – Credits awarded at design stage

- 10.1.6. Based on the evidence in this report, if the specifications are carried out these credits can be awarded.
- 10.1.7. A set of commissioning tests will be required to provide evidence of this.
- 10.1.8. We strongly recommend that this report be passed to the BREEAM Assessor for approval before any works are carried out.

11. Appendix

APPENDIX A: Summary Information

Required ISO Test Report Information (cross referenced where required)			
		Measurements carried out to:	Analysed to:
A	Standards	BS 7445-1: 2003 BS 7445-2: 1991 BS4142:2014	BS4142:2014
B	Organisation performed the measurements	noise.co.uk Ltd, The Haybarn, Newnham Grounds, Kings Newnham Lane, Bretford, Coventry, CV23 0JU.	
C	Name of Client	Darwin Group	
D	Full site address	Kendrick School 41-43 London Road Reading RG1 5BN	
E	Date of surveys	Survey Date: 23rd January 2020 - 29th January 2020	
F	Description & identification of Proposed Development	It is proposed to a new condensing unit on site.	
G	Brief Description of details of Procedure & equipment	See Section 5 of this report.	

APPENDIX B: Technical Appendix

11.1.1. Measurements were made using the following equipment:

Monitoring Position	Sound Level Meter (Serial Number)	Calibrator (Serial Number)
1	Norsonic 140 (1405560)	Norsonic 1251 (33824)

11.1.2. The equipment has traceable calibration. The sound level meter was calibrated immediately prior to and immediately after the measurements were carried out.

Sound Level Meter	Before	After
Norsonic 140 (1405560)	114.0 dB	114.0 dB

11.1.3. There was no adverse deviation.

APPENDIX C: Average hourly levels

Start Time	End Time	L _{Aeq,1-hour}
		Position 1
11:30:00	12:30:00	53.2
12:30:00	13:30:00	61.8
13:30:00	14:30:00	54
14:30:00	15:30:00	55.2
15:30:00	16:30:00	55.7
16:30:00	17:30:00	54.1
17:30:00	18:30:00	52.7
18:30:00	19:30:00	53.2
19:30:00	20:30:00	51.2
20:30:00	21:30:00	49.6
21:30:00	22:30:00	48.7
22:30:00	23:30:00	46.6
23:30:00	24:30:00	48.6
00:30:00	01:30:00	42.1
01:30:00	02:30:00	41.6
02:30:00	03:30:00	40.1
03:30:00	04:30:00	42.3
04:30:00	05:30:00	45.1
05:30:00	06:30:00	48.2
06:30:00	07:30:00	49.2
07:30:00	08:30:00	55.1
08:30:00	09:30:00	56.5
09:30:00	10:30:00	54.1
10:30:00	11:30:00	52

APPENDIX D: Background Sound Levels

Date	Time	L _{A90,15-minutes}
		Position 1
23/01/2020	11:30:00	43.5
23/01/2020	11:45:00	45
23/01/2020	12:00:00	44
23/01/2020	12:15:00	44.5
23/01/2020	12:30:00	45.5
23/01/2020	12:45:00	57
23/01/2020	13:00:00	42.5
23/01/2020	13:15:00	42.5
23/01/2020	13:30:00	43
23/01/2020	13:45:00	43
23/01/2020	14:00:00	43.5
23/01/2020	14:15:00	43
23/01/2020	14:30:00	44
23/01/2020	14:45:00	43.5
23/01/2020	15:00:00	44
23/01/2020	15:15:00	45
23/01/2020	15:30:00	45
23/01/2020	15:45:00	45
23/01/2020	16:00:00	45
23/01/2020	16:15:00	42
23/01/2020	16:30:00	44.5
23/01/2020	16:45:00	45
23/01/2020	17:00:00	44.5
23/01/2020	17:15:00	43.5
23/01/2020	17:30:00	42.5
23/01/2020	17:45:00	43
23/01/2020	18:00:00	42.5
23/01/2020	18:15:00	42
23/01/2020	18:30:00	42.5
23/01/2020	18:45:00	43
23/01/2020	19:00:00	43
23/01/2020	19:15:00	42
23/01/2020	19:30:00	42.5
23/01/2020	19:45:00	41.5
23/01/2020	20:00:00	41.5
23/01/2020	20:15:00	40.5
23/01/2020	20:30:00	40.5
23/01/2020	20:45:00	39.5

Date	Time	L _{A90,15-minutes}
23/01/2020	21:00:00	40
23/01/2020	21:15:00	40
23/01/2020	21:30:00	40
23/01/2020	21:45:00	39.5
23/01/2020	22:00:00	39.5
23/01/2020	22:15:00	39
23/01/2020	22:30:00	38.5
23/01/2020	22:45:00	38.5
23/01/2020	23:00:00	38
23/01/2020	23:15:00	37
23/01/2020	23:30:00	37
23/01/2020	23:45:00	37
24/01/2020	00:00:00	37
24/01/2020	00:15:00	37
24/01/2020	00:30:00	37
24/01/2020	00:45:00	37
24/01/2020	01:00:00	37
24/01/2020	01:15:00	36.5
24/01/2020	01:30:00	36.5
24/01/2020	01:45:00	36
24/01/2020	02:00:00	36
24/01/2020	02:15:00	36
24/01/2020	02:30:00	36
24/01/2020	02:45:00	36
24/01/2020	03:00:00	36
24/01/2020	03:15:00	36
24/01/2020	03:30:00	36
24/01/2020	03:45:00	36
24/01/2020	04:00:00	36
24/01/2020	04:15:00	36
24/01/2020	04:30:00	36
24/01/2020	04:45:00	36
24/01/2020	05:00:00	36.5
24/01/2020	05:15:00	37
24/01/2020	05:30:00	37.5
24/01/2020	05:45:00	38
24/01/2020	06:00:00	39
24/01/2020	06:15:00	39
24/01/2020	06:30:00	39
24/01/2020	06:45:00	40
24/01/2020	07:00:00	40.5

Date	Time	L _{A90,15-minutes}
24/01/2020	07:15:00	41
24/01/2020	07:30:00	44.5
24/01/2020	07:45:00	45.5
24/01/2020	08:00:00	47.5
24/01/2020	08:15:00	45.5
24/01/2020	08:30:00	45
24/01/2020	08:45:00	44
24/01/2020	09:00:00	43.5
24/01/2020	09:15:00	45
24/01/2020	09:30:00	44.5
24/01/2020	09:45:00	44
24/01/2020	10:00:00	43
24/01/2020	10:15:00	42.5
24/01/2020	10:30:00	43.5
24/01/2020	10:45:00	43
24/01/2020	11:00:00	44.5
24/01/2020	11:15:00	43