

REPORT N° 20161212-A001

HSBC, READING

ACOUSTIC REPORT

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ACOUSTIC REPORT

Project no: 20161212
Date: June 2017

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QUALITY MANAGEMENT

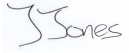
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1 INTRODUCTION

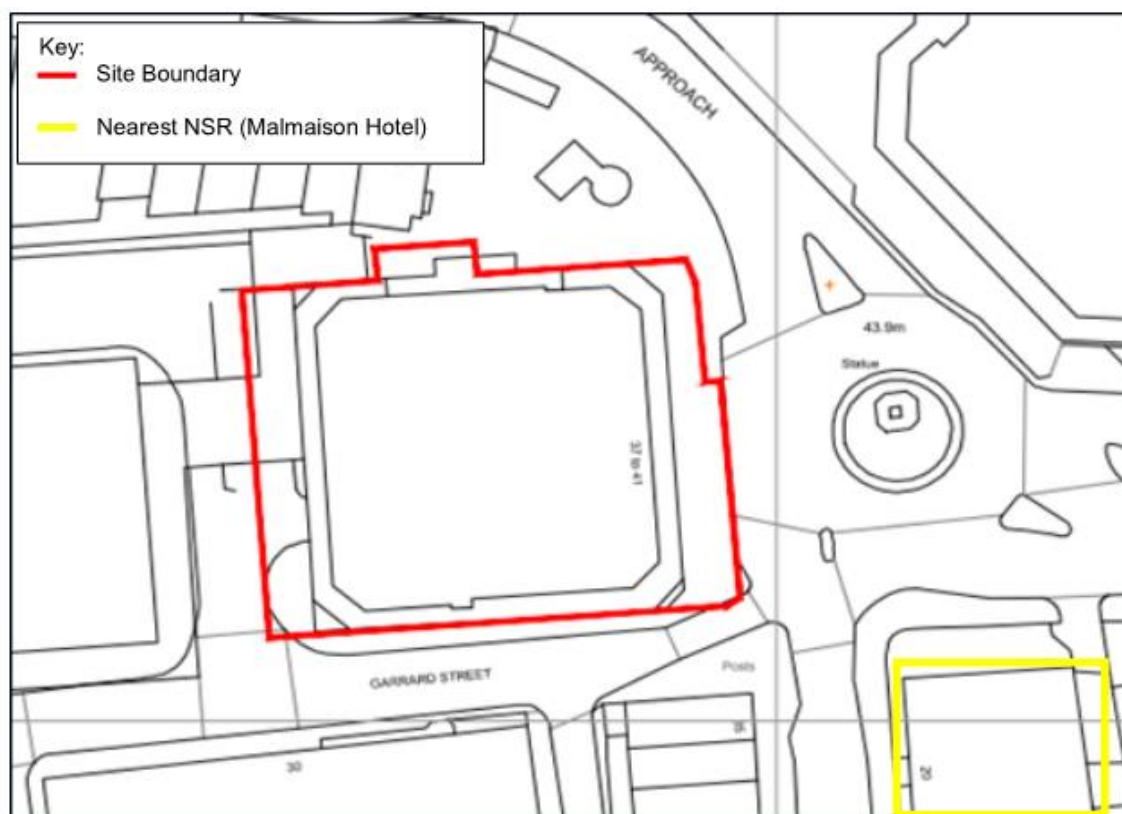
- 1.1.1 WSP has been commissioned to undertake an acoustic assessment for 2 No. proposed condenser units at the Thames Tower, Reading. The proposed plant is to serve an area of the building which is to be occupied by HSBC.
- 1.1.2 Reading Council have advised that the noise impact of these condensers needs to be assessed taking into account the pre-existing noise assessment of the landlord's existing plant, to determine whether the noise levels will be acceptable or whether further mitigation is required.
- 1.1.3 This report details an acoustic assessment undertaken in accordance with the methodology of BS4142:2014 *'Methods for rating and assessing industrial and commercial sound'*, and demonstrates the likely noise impact resulting from the proposals.
- 1.1.4 The assessments are based on available design details for the proposed site and the results of a baseline noise survey undertaken by Environoise, from which details of the existing ambient and background sound levels have been determined. Full details of the survey and methodology can be found in their Acoustic Report reference 20523R04KDmdw, dated 6th November 2015.
- 1.1.5 This report employs technical acoustic terminology and, in order to assist the reader, Appendix A presents a summary of the technical descriptors used in this report.

2 DEVELOPMENT CONTEXT

- 2.1.1 The Thames Tower is an office development located in the centre of Reading. Originally constructed in 1974, the building has recently been refurbished and extended to include additional floor space. The building comprises ground floor retail area with 14 floors of office accommodation above.
- 2.1.2 The site is bounded by Garrad Street to the south and a NCP multi-storey car park to the west. Reading train station lies directly to the northeast.
- 2.1.1 HSBC are to occupy part of the 7th floor of the building. To facilitate this occupation it is proposed that two external air conditioning condenser units are installed on the roof of the building. These units are to be located in the north-eastern corner of the rooftop.
- 2.1.2 The rooftop area already contains a number of plant items, including air handling units and chillers, which serve the common areas of the building and are run by the landlord. The rooftop plant area is surrounded by an acoustic screen. Whilst the exact specification and any properties of this screen are unknown, it provides a visual barrier to the rooftop equipment.
- 2.1.3 It is noted that Environoise have undertaken a commissioning noise survey of the landlord's existing plant equipment. Details of this survey and the predicted noise levels are appended to this report. They have described a conservative noise reduction of 10 dB afforded by the rooftop screen and predict that the plant noise level as a result of the landlord's existing equipment to be 35 dB $L_{Ar,Tr}$.

- 2.1.4 The nearest noise sensitive receptors to the development are the residential guestrooms within the Malmaison hotel approximately 30m to the nearest southeast corner of the Thames Tower, as shown in Figure 2.1 below.
- 2.1.5 Accounting for the relative height difference between The Malmaison hotel (4 storeys) and the rooftop of the Thames Tower (15 storeys), the proposed condenser units will be approximately 60m away from the hotel.

Figure 2.1: Site Plan



3 DESIGN CRITERIA METHODOLOGY

3.1 PLANNING REQUIREMENTS

3.1.1 A memorandum circulated by Rebecca Moon, an Environmental Health Officer at Reading Council, dated 5th May 2017 states the following with regards to noise generating development:

"I understand that a noise assessment has already been carried out to assess the impact of proposed roof top plant at this location.

The noise impact of these additional condensers needs to be assessed taking into account the existing noise assessment to determine whether the noise levels will be acceptable or whether further mitigation is required.

The criteria to be achieved is as below but the other proposed plant needs to be taken into account.

"The assessment should be carried out for in accordance with BS4142:2014 methodology. The predicted specific sound level ($L_{Aeq,Tr}$) as measured at a point 1 metre external to sensitive facades shall be at least 10dB below the existing background sound level, $L_{A90,T}$ when all plant/equipment (or any part of it) is in operation. The predicted rating level, $L_{Ar,Tr}$ (specific sound level plus any adjustment for the characteristic features of the sound) as measured at a point 1 metre external to sensitive facades shall not exceed the existing background sound level, $L_{A90,T}$ when all plant/equipment (or any part of it) is in operation."

3.1.2 Considering the above it is proposed that condenser units are assessed in accordance with BS 4142:2014 'Methods for rating and assessing industrial and commercial sound'.

3.1.3 Once predicted, the plant noise rating level as a result of the proposed condenser units will be summed with that of the landlord's plant to ensure the requirements of Reading Council are satisfied.

3.2 BS 4142:2014

3.2.1 BS 4142:2014 sets out appropriate methods for determining noise levels and associated impacts from industrial processes and new fixed installations, such as building plant and machinery. It has therefore been used in this instance to assess the likelihood of any adverse impacts based on the resultant sound level from the mechanical equipment, including any corrections for the character of the sound against the existing background sound level.

3.2.2 BS 4142 gives guidance on assessing the likelihood of adverse impacts by calculating a 'rating' level of the sound source and comparing its magnitude at noise-sensitive locations against the underlying background sound level. The background sound level is subtracted from the rating level to assess the likelihood of complaints. The resulting difference is then considered against the following indicators of potential adverse impact:

- A difference of around +10dB or more is an indication of a significant adverse impact, depending on the context.
- A difference of +5dB is likely to be an indication of an adverse impact, depending on the context.

- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low sound impact, depending on the context.

3.2.3 The rating level of the source is obtained taking the following factors into consideration:

- The new noise source (i.e. the specific sound) is measured or predicted in terms of $L_{Aeq,T}$ (where 'T' is 1 hour for day-time based assessments 15 minutes for night-time assessment).
- An additional correction shall be included if the sound contains a distinguishable, discrete continuous note, if the sound contains distinct impulses or if the sound is irregular enough to attract attention. The value for any tonal sound can be an addition of up to 6dB, the value for any impulsive sound of up to 9dB, and for any intermittent sound up to 3dB.
- Where multiple characteristics are present in the specific sound within the same reference period it may be relevant to apply only a single correction, depending on the context.

3.2.4 It is advised that where the initial estimate of the impact needs to be modified due to the context, all pertinent factors should be taken into consideration, including the absolute level of sound. That is, for a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.

4 NOISE SURVEY

4.1.1 A noise survey of the existing site was undertaken by Environoise in April 2015. A summary of the noise levels measured at site are shown below. Full details of the survey and methodology as well as additional commentary can be found in the Environoise Mechanical Service Plant Noise Impact Assessment Report, dated 6th November 2015.

Table 4.1: Summary of Background Free-field Sound Levels Measured by Environoise

Period	Measurement Location	Background Noise Level range [$L_{A90,(15minutes)}$ (dB)]
(17:50hrs – 23:05hrs) Wednesday	1a	55 - 60
(23:05hrs – 07:00hrs) Wednesday - Thursday		43 - 58
(07:05hrs – 09:05hrs) Thursday		58 - 62
(17:35hrs – 23:05hrs) Wednesday	1b	56 - 61
(23:05hrs – 07:00hrs) Wednesday - Thursday		46 - 61
(07:05hrs – 08:35hrs) Thursday		60 - 63
(16:30hrs – 23:00hrs) Thursday	2a	58 - 63
(23:05hrs – 07:00hrs) Thursday - Friday		46 - 62
(07:00hrs – 09:00hrs) Friday		60 - 66
(18:30hrs – 23:00hrs) Thursday	2b	57 - 61
(23:05hrs – 07:00hrs) Thursday – Friday		51 - 61
(07:00hrs – 09:00hrs) Friday		60 - 63
(17:15hrs – 18:15hrs) Thursday	3	53 - 59

4.1.2 Measurement location 2 is considered to be representative of The Malmaison Hotel.

5 DESIGN CRITERIA

5.1.1 It is proposed to set a plant noise emission limit in line with the guidance in BS 4142:2014. The approach proposed will be as follows:

- Set the cumulative plant noise rating level 10 dB below the typical background sound level, in accordance with the local authority's requirements, and guidance in BS 4142:2014.
- Any character corrections will be taken into account following the guidance within BS 4142:2014, once the plant selections have been finalised.
- The background sound level will be derived following the guidance in BS 4142:2014 whereby the $L_{A90,15min}$ values will be analysed to determine the lowest most commonly occurring value. As stated within BS 4142, *"the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods"*. The typical background sound level will therefore be quantified using the statistical method outlined for both the day (07:00 – 23:00 hrs) and night-time period (23:00 – 07:00 hrs).

5.1.2 Based on the results summarised above the adopted design criteria for noise generated by mechanical services equipment are as follows. These limits are consistent with the plant noise limits adopted by Environoise.

Table 5.1: Summary of Adopted Free-field Criteria

Location	Daytime Plant Noise Limit 07:00 - 23:00 hrs	Night-time Plant Noise Limit 23:00 - 07:00 hrs
At 1m outside Malmaison Hotel, free-field	50 dB $L_{A,r,1hr}$	39 dB $L_{A,r,15min}$

5.1.3 The above limits are cumulative rating levels to be achieved with all mechanical services equipment associated with the development operating simultaneously. It will therefore be necessary to include the noise levels predicted for the existing landlord's plant equipment within the subsequent noise assessment.

6 NOISE IMPACT ASSESSMENT

6.1.1 It is proposed that two Mitsubishi PUHZ-ZHP60VHA condenser units are installed on the northeast corner of the rooftop. These units have a manufacturer's published maximum sound pressure level of 48 dB(A) at 1m each.

6.1.2 The operating hours for the condensers are currently unknown. Therefore in order to present a worst case and robust assessment it will be assumed they run continuously throughout the day and night-time periods. Consequently the more onerous night time criterion will apply.

6.1.3 The landlord's plant is assumed to result in a rating level of 35 dB $L_{A,r,Tf}$ at 1m from the Malmaison hotel as detailed in the Environoise report.

Table 6.1: Plant Noise Calculation

Item	Level, dB	Comment
2 No. PUHZ-ZHP60VHA condenser units	51 L_{Aeq}	Sound Pressure level at 1m
Reflective Surfaces	+ 6	+10log(Q), Q=4
Distance Attenuation	- 36	Over 60m
Acoustic Screening	- 10	From rooftop acoustic screen
Specific Sound Level	11 $L_{Aeq,T}$	At 1m from Malmaison Hotel
Tonal Character Correction	+ 2	Just perceptible
Resultant Rating Level	13 $L_{A,Tr}$	At 1m from Malmaison Hotel
Landlord's Plant Rating Level	35 $L_{A,Tr}$	At 1m from Malmaison Hotel
Cumulative Rating Level	35 $L_{A,Tr}$	At 1m from Malmaison Hotel

6.1.4 Analysis of the predicted noise levels is discussed further below.

7 DISCUSSION

7.1.1 Suitable maximum noise limits have been set for the mechanical services systems, based on the methodology of BS 4142:2014. Achieving these limits will sufficiently mitigate the risk of adverse impact. As described in BS 4142 where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low sound impact, depending on the context. In this instance the limit has been set at 10 dB below the background level in accordance with the guidance provided by Reading Council.

7.1.2 The predictions have shown that the noise level as a result of the two proposed condensers does not increase the existing noise level resulting from the landlord's plant. Therefore it is concluded that the proposed condenser units will have a negligible impact on the surrounding area.

7.2 UNCERTAINTY

7.2.1 Uncertainty is an unavoidable feature of measurements in the field, predictions and assessments in general, which can be subject to many factors; the weather typically being the most significant with respect to the measurement of sound, and which can also result in variations in the received level from future sources where reasonable distances are involved.

7.2.2 It is possible that some wind conditions (e.g. where there is a strong wind blowing towards the dominant source of background sound) could give rise to lower background levels (reduced by up to 10dB^[1] due to propagation modulation). However, in strong wind conditions, any reduction in measured background sound as a result of propagation modulation would be likely to be masked and offset by additional noise due to wind turbulence in local vegetation.

^[1] BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings*, Paragraph 6.8.

- 7.2.3 Additionally, certain wind and other meteorological conditions could increase the sound from the source(s) in question. However, such increases are usually relatively small (up to +2dB in the case of wind effects^[2]) particularly where the source and receiver are within 100m.
- 7.2.4 There is also the uncertainty of people's reactions, which can be influenced by a number of factors, not just the magnitude or character of the sound in question.
- 7.2.5 In keeping with the scale of each project, therefore, WSP aim to minimise uncertainty at each stage as far as reasonably practicable, whilst generally erring on the side of caution and accounting for realistic worst case conditions.
- 7.2.6 In terms of this assessment, crucially, the predictions have also been undertaken by suitably qualified staff, whilst using the best available information and applicable calculation procedures.
- 7.2.7 Notwithstanding this, naturally some uncertainty remains. Given the sheer number of factors involved, however, it is not feasible to place a value on the level of uncertainty, without resulting in an unhelpful range of possible outcomes. It is WSP's professional position that uncertainty has been kept to a realistic minimum and that the outcome of this assessment is sufficiently representative of the likely worst case conditions.
- 7.2.8 Where, however, the details and assumptions given in this report do not remain valid, this would present a risk of the conditions in practice being different from those described herein.

8 CONCLUSIONS

- 8.1.1 WSP Acoustics has undertaken a noise impact assessment of the plant items proposed to be installed on the rooftop of the Thames Tower, Reading.
- 8.1.2 The purpose of the noise impact assessment is to discharge the planning requirements set by Reading Borough Council in relation to mechanical plant noise.
- 8.1.3 A plant noise limit has been set based on the methodology contained in BS 4142:2014 and the results of a baseline survey, in order to control the noise emissions from the proposed mechanical equipment.
- 8.1.4 Details of the noise emission levels of all the proposed plant items have been provided and have been used in a detailed assessment to calculate the resultant plant noise levels at the nearest noise sensitive receptors.
- 8.1.5 The assessment has demonstrated that when combined with the noise output of the existing landlord's rooftop plant, the predicted noise level is within the prescribed limits.
- 8.1.6 Therefore, it is considered that the proposals are acceptable in terms of noise output and are not likely to have any discernible impact on the local amenity.
- 8.1.7 On the basis of the assessment described herein, it is believed that noise impact should not form a basis for refusing planning approval, and the application should be considered acceptable.

^[2] BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings*, Paragraph 6.8.

Appendix A

ACOUSTIC TERMINOLOGY

APPENDIX A-1

ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq} , L_{A90} etc, according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

An indication of the range of sound levels commonly found in the environment is given in the following table.

Typical sound levels found in the environment

Sound Level	Location
0 dB(A)	Threshold of hearing
20 to 30 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a car
60 to 70 dB(A)	Typical high street
70 to 90 dB(A)	Inside factory
100 to 110 dB(A)	Burglar alarm at 1m away
110 to 130 dB(A)	Jet aircraft on take off
140 dB(A)	Threshold of Pain

Acoustic Terminology

Term	Definition
Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of $20\mu\text{Pa}$ (20×10^{-6} Pascals) on a decibel scale.
Sound Power	The sound energy radiated per unit time by a sound source. Measured in Watts (W).
Sound Power Level, L_W	Sound power measured on a decibel scale, relative to a reference value of 10-12 W
Background sound level, $L_{A90,T}$	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.
Ambient sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources both near and far.
Specific sound level, $L_S = L_{Aeq,Tr}$	Equivalent continuous A-weighted sound pressure level produced by the sound source being assessed, at the assessment location, over a given reference time interval.
Rating sound level, $L_{Ar,Tr}$	Specific sound level plus any adjustment for the characteristic features of the sound.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10} (s_1 / s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is $20\mu\text{Pa}$.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. L_{90} can be considered to be the "average minimum" noise level and is often used to describe the background noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5 metres.
Façade	At a distance of 1m in front of a large sound reflecting object such as a building façade.
Fast Time Weighting	An averaging time used in sound level meters. Defined in BS5969.
Attenuation	A general term used to indicate the reduction of noise or vibration, or the amount (in decibels) by which it is reduced.

Appendix B

ENVIRONOISE ACOUSTIC ASSESSMENT



Friday, 02 June 2017

Ref: 20523L05MWpak

Mr. Matthew Cruttendon
Bowmer and Kirkland
Southern Regional Office
1210 Arlington Business Park
Theale
Reading RG7 4TY

cc. Mr. Andrew Taylor, Bowmer & Kirkland Limited

Dear Matthew,

Roof-top Plant Noise and Planning Condition 14 – Thames Tower, Station Road, Reading RG1 1LX.

1.1 Condition 14 from Reading Borough Council

1.1.1 Condition 14 from Reading Borough Council¹ is reproduced below.

Condition 14 of permission 141043 states:

No occupation of the development shall take place until sound emission details of the proposed plant have been submitted to and approved in writing by the Local Planning Authority. The emission levels shall attain the levels outlined in the submitted document, Thames Tower, Reading: Noise Impact Assessment (dated 19 June 2014) by Ramboll (ref.: 33095-AC-R02). The plant shall thereafter only be installed as approved and be retained thereafter, to continue to achieve the levels indicated in the noise impact assessment, in accordance with BS4142:1997 methodology. Reason: as no details of fixed plant have been submitted and to ensure that plant noise does not disturb the nearest noise-sensitive receptors.

1.1.2 Reading Borough Council conclude in the same letter that:

Decision

Officers agree that the information submitted is acceptable and therefore Condition 14 of planning permission 141043 is hereby discharged, providing that the development is undertaken in accordance with the approved details.

¹ Letter reference 152007 dated 17 March 2016 to John Duthaler, De Novo Architecture Limited. from Richard Eatough, Planning, Reading Borough Council.

1.2 Noise Impact Assessment

- 1.2.1 Issued Environoise report 20523R04KDmdw which was referenced in the discharge letter from Reading Borough Council recommended mitigation measures so that the target was met at the nearest existing noise sensitive receptor namely Malmasion Hotel on 18-20 Station Rd, Reading RG1 1JX.
- 1.2.2 Environoise report 20523R04KDmdw demonstrated that plant noise is at least 10dB below the representative background level at the nearest identified receptor and therefore condition 14 could be discharged.

1.3 Installed Attenuation Measures

- 1.3.1 It was understood that the screening together with the recommend noise attenuation package recommended in Environoise report 20523R04KDmdw was installed by Derry Building Services under the supervision of Bowmer and Kirkland Limited.

1.4 Commissioning Tests

- 1.4.1 Commissioning tests included an indicative* noise measurement of roof-top plant to demonstrate that plant noise levels were suitably low. Both static and wandering roof-top noise measurements were taken which show that plant noise levels were suitably low, see below:

Measurement Position	Leq,1minute (dB) at octave band centre frequency (Hz)							LAeq,1minute (dB)
	63	125	250	500	1k	2k	4k	
(Static) AHU 02	64	63	55	52	45	43	43	54
Wandering between AHU and MVHR AHU	68	66	61	59	52	49	48	60
Wandering between chillers 1, 2 and 3	71	67	59	56	55	55	57	63

- 1.4.2 Environoise report 20523R04KDmdw stated the following with respect to the target background noise levels at the nearest noise sensitive receptor.

4.2.3 The plant noise limits were based on a lowest measured daytime and night-time background noise level of 60dB and 49dB LA90,15minutes. These values correlate with our measured background noise levels as detailed in Table 4.1.

- 1.4.3 The same report predicts that the level of distance and building attenuation between various items of plant will be between 18dB and 30dB to the considered receptor dependent on the plant item considered. Therefore, assuming the highest measured indicative plant noise level of 63dB LAeq,1minute was accurate, this would result in a noise level at least 15dB below (63-18dB) background noise level during the daytime.
- 1.4.4 However, noise levels were measured within the plant enclosure so would not account for the level of screening offered as measurements could not be done around the perimeter of the roof for safety reasons. Furthermore, measurements were not done outside of the enclosure to minimise the contribution from extraneous noise sources e.g. road and rail traffic.

1.4.5 If a conservative level of 10dB screening is assumed, then if measured daytime plant noise levels were used this would result in a noise level of:

- $63 - (18 + 10) = 35\text{dB}$

1.4.6 This results in a noise level 28dB less than the daytime background noise level and 14dB less than the night-time background noise level.

1.4.7 The noise results from the indicative assessment are in general accordance with the findings in Environoise report 20523R04KDmdw, reproduced below:

Table 6.2 BS4142 Assessment at Nearest NSR

Time Period	Specific Noise Level [L _{Aeq,T} (dB)]	BS4142 Penalty (dB)	Rating Level [L _{Aeq,T} (dB)]	Background Level [L _{A90} (dB)]	Excess over Background Level [L _{A90} (dB)]
Daytime (07.00 – 23.00hrs)	34	+5	39	60	-21
Night-time (23.00 – 07.00hrs)	34	+5	39	49	-10

1.5 Conclusion

1.5.1 Both indicative noise measurements and the desktop assessment done in Environoise report 20523R04KDmdw demonstrate that Thames Tower roof-top plant noise is at least 10dB below the representative daytime and night-time background level at the nearest receptor.

1.5.2 Therefore, the level of plant noise impact is in line with planning requirements.

Yours sincerely,



Miles Woolley MIOA
Managing Director
For and on behalf of Environoise Consulting Limited

***Statement of Uncertainty:** Noise from specific items of plant could not be measured due to the noise contribution from adjacent plant. Similarly, it was not possible to give a specific overall noise level from roof-top plant due to the contribution from the surrounding roads and rail.