



Premier Inn Baker's Road, Uxbridge

Whitbread plc

Noise Impact Assessment

Revision 02

10/02/2021

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Project Particulars

Client Name: Whitbread plc

Project Name: Premier Inn Baker's Road, Uxbridge

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1 Introduction

- 1.1 Proposals are in place to redevelop the existing Travelodge at Baker's Road, Uxbridge, UB81RG into a new Premier Inn hotel.
- 1.2 An external noise survey has been conducted at the site of the proposed hotel to establish the prevailing ambient, maximum and background noise levels affecting the site and neighbouring noise sensitive properties.
- 1.3 The measurement data have been used to determine the acoustic specification for the façade to control external noise intrusion into the new hotel bedrooms. External noise emission from building services plant associated with the new hotel has also been assessed to determine the need for any attenuation measures.
- 1.4 Chapter 2 of this report describes the external noise survey and the assessments of noise intrusion and emission are presented in Chapters 3 and 4 respectively.
- 1.5 Definitions of some of the terminology used throughout the report have also been included in Appendix A.

2 External noise survey

2.1 Site description

- 2.1.1 The site is in central Uxbridge, London, with frontage onto Baker's Road, which primarily serves the nearby bus station and acts as a hub for the start and end of the main bus routes in Uxbridge. As a result, there are frequent and regular bus movements at all times of the day and night in proximity to the hotel site. Uxbridge station is across the road from the site and it is a terminus. During each site visit, it was observed that there were many pedestrians moving around the site; waiting or alighting from buses, moving from the busy shopping areas of central Uxbridge, using the train station and other general movements.
- 2.1.2 Neighbouring properties are mostly commercial in nature, although it is understood that there are some residential properties in the area. The nearest residential neighbours are believed to be those in the building directly to the north west. There are apartments at various levels within this building with windows that face onto the hotel site.

2.2 Measurement methodology

- 2.2.1 Continuous, unattended noise level measurements were conducted at two locations around the existing building. The microphones were extended out of windows at a distance of about 0.5m from the façade in an approximation of façade-reflected conditions. One microphone was placed at 2nd floor level facing Baker's Road, to measure the noise from buses and other activities affecting the frontage of the hotel building. The other microphone was extended at 8th floor level to the rear of the building, to measure background noise levels considered to be representative of that affecting the adjacent residential property.
- 2.2.2 The measurement locations are shown in Figure 2-1, overleaf.
- 2.2.3 Statistical and spectral data were recorded in 15-minute samples between 11:00 on Friday 18th and 11:30 on Monday 21st December 2020 (with minor variations in the start and end times between measurement locations). The "fast" (125ms) time constant was used.
- 2.2.4 Data are considered representative of the maximum noise levels anticipated to occur at the façades of the proposed redevelopment, and also the lowest background noise levels experienced at the nearest neighbouring properties.

2.2.5 The following equipment was used:

Type	Model	Serial No.	Location
Class 1 Sound level meter	Norsonic 131	1313605	2 nd floor
Outdoor microphone enclosure	Norsonic 1218	12182561	2 nd floor
Class 1 Sound level meter	Norsonic 131	1312766	8 th floor
Outdoor microphone enclosure	Norsonic 1218	12182556	8 th floor
Portable sound calibrator	Brüel & Kjær 4231	2291098	Both

Table 2.1 Noise level measurement equipment

2.2.6 The calibration of the sound level meters and associated microphones was checked prior to and on completion of the measurement period in accordance with recommended practice. No significant drift in calibration occurred during the measurement period. The accuracy of the calibrator can be traced to National Physical Laboratory Standards.

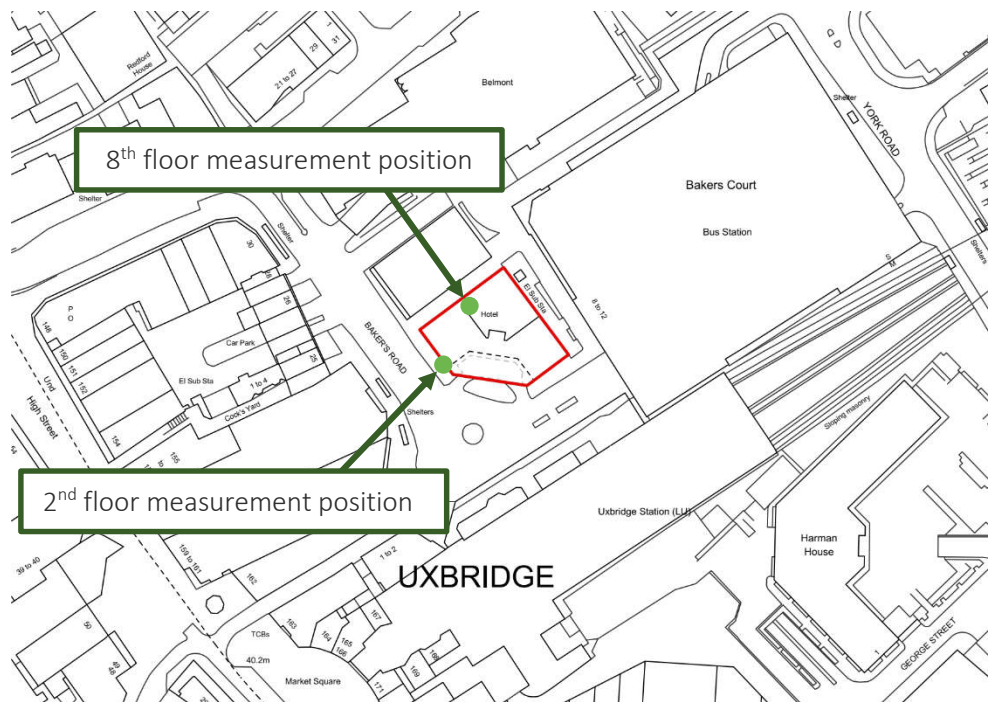


Figure 2-1 Site map highlighting the measurement locations

2.3 Weather

2.3.1 Historical weather conditions monitored at a nearby location (Brunel University, 51.532° N, 0.48° W) shows that the area experienced periods of moderate wind speeds and light precipitation. The data indicates that there were periods of low wind speeds and no precipitation during the measurement duration. The measurement data are not believed to have been adversely affected by the weather in the context of this assessment.

2.4 Measurement results

2.4.1 Graphs of the noise level histories are presented below. The full measurement data are available upon request.

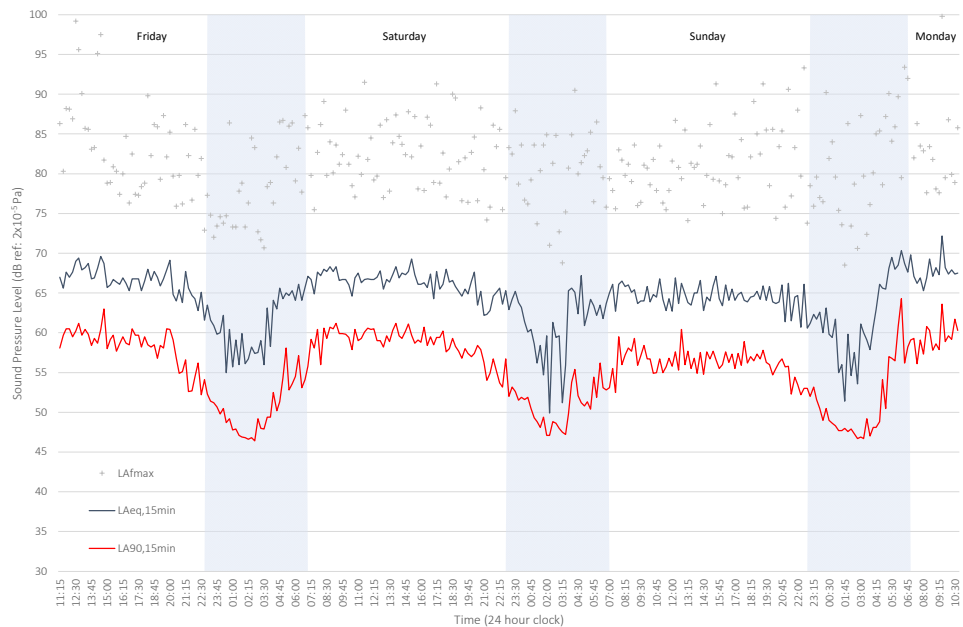


Figure 2-2 Noise level history measured on the 2nd floor (facing Baker's Road)

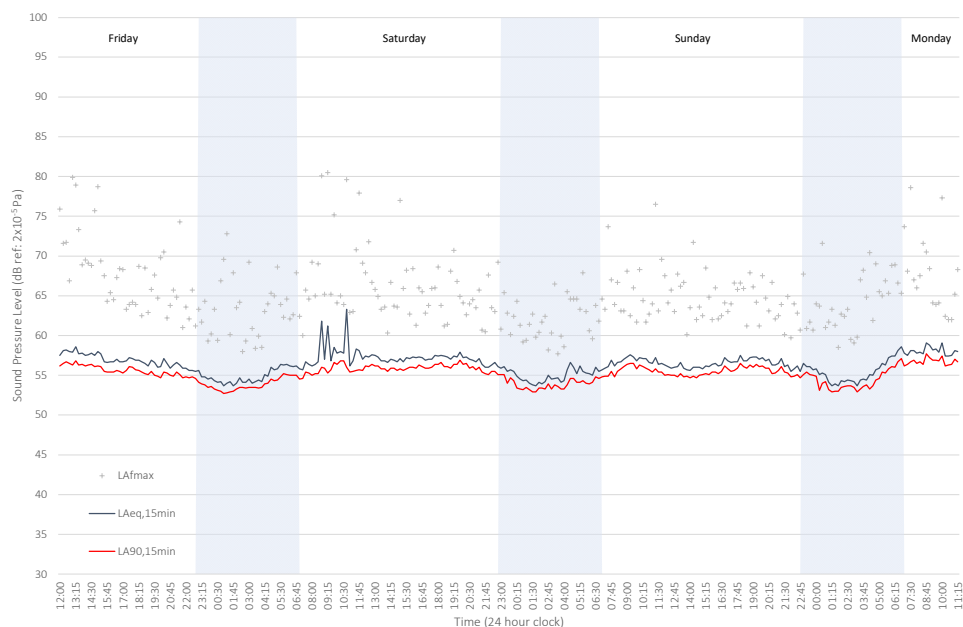


Figure 2-3 Noise level history measured on the 8th floor (rear of the building)

- 2.4.2 The lowest measured background noise levels for the daytime, evening and night-time are set down in Table 2.2. These levels include a -3 dB correction applied to covert the measured façade-reflected levels into estimated free-field levels, and are considered to be representative of the background sound levels at the nearest noise sensitive receivers.

Time	Facades facing Baker's Road	Facades to the rear of the building
Day (07:00-23:00)	49 dB $L_{A90,15min}$	52 dB $L_{A90,15min}$
Night (23:00-07:00)	43 dB $L_{A90,15min}$	49 dB $L_{A90,15min}$

Table 2.2 Lowest background noise levels obtained during the survey (corrected to free-field)

2.5 Discussion on the effects of the ongoing coronavirus pandemic

- 2.5.1 A national “lockdown” was in effect for the duration of the survey period as a result of the ongoing coronavirus pandemic. The government guidance at the time was such that some activities were permitted (e.g. traveling for work purposes if not possible to work from home, essential services still operational etc), but many activities were not permitted. The lockdown measures can be expected to have had an influence on the measured noise levels.

- 2.5.2 Noise from bus movements is considered to be the dominant source of ambient and maximum noise affecting the frontage of the building (i.e. facades facing Baker's Road). It may be assumed that the number of buses operating during the survey period was lower than would ordinarily be expected. This can be expected to reduce the ambient noise level, which is a form of energy average over time. The peaks or “maximum” noise levels of bus movements was observed to vary during the survey. The principal sources of noise from bus movements are as follows:

- Buses accelerating away from the bus stops
- Buses idling at bus stops with their engines left on
- Buses moving directly into / out of the bus depot and past the site

- 2.5.3 There were still a large number of bus movements in proximity to the site. It is estimated that were at least 20 buses passing the site in a typical daytime hour during the survey. The number of bus movements can be expected to reduce overnight, although not significantly during certain hours within the time-period defined as “night” as defined in the PI Spec (23:00-07:00). So, while the *number of occurrences* of peaks in noise may have been reduced during the survey, the *measured noise levels* are expected to be similar to those that may affect the site outside of the ongoing coronavirus pandemic.

- 2.5.4 There is expected to have been a significant reduction in the number of people in the area, whether that be those travelling for work or carrying out essential services, or those passing the site because they had been shopping or other similar activities. Whilst pedestrians in the area would impact on the noise measurement results, they are not considered the dominant source of noise. The impact this effect may have on the assessments presented in this report is therefore considered negligible.

- 2.5.5 Trainlines using Uxbridge Station may also have been operating a reduced service during the survey. Noise from trains was audible around the hotel building, although only as a distant noise and not immediately noticeable. The effect a reduced number of trains may have on the assessments presented in this report is therefore considered negligible.
- 2.5.6 The dominant source of noise at the rear of the hotel building was noted as being mechanical plant serving other buildings. Of note was a very large area of louvre at a lower level on the nearby bus station. This emitted a relatively high level of constant noise. It is expected that this would be the source for the underlying background noise levels at the nearest residential property to the hotel building.
- 2.5.7 As discussed, the bus depot was operational, although it is unclear if the emitted building services noise would ordinarily be higher outside of the ongoing coronavirus pandemic. The level of noise is not, however, ordinarily expected to be lower. The measured background noise levels on the 8th floor are therefore expected to be considered a reasonable worst-case in the context of the assessment presented within this report.
- 2.5.8 In summary, the "lockdown" is expected to have had an effect on the measured noise levels, but the data collected during the survey are considered suitable as the basis for the assessments presented within this report.

2.6 Other influencing factors

- 2.6.1 There were intermittent investigative activities taking place within the hotel building on the 8th floor during measurements. Measured noise levels may have therefore been affected by these activities, but are expected to have resulted in only intermittent elevated noise levels on occasion, for short durations and only during daytime hours. These activities are therefore not expected to have negatively influenced the results in the context of the assessments presented later in this report.

3 Noise intrusion assessment

3.1 Criteria

- 3.1.1 All new Premier Inn hotels are constructed so as to comply with the standards set down within the *Premier Inn Generic specification for a Turnkey development*. The internal noise limits in bedrooms for external noise sources are presented below in Table 3.1

Time	Limit
Day (07:00-23:00)	35 dB $L_{Aeq,1hr}$
Night (23:00-07:00)	30 dB $L_{Aeq,1hr}$ 42 dB L_{AFmax} *

*The maximum criterion applies to all vehicle and railway train passbys and all aircraft flyovers. It also applies to the noise from all street activities including those associated with patrons attending and leaving adjacent, neighbouring or connected entertainment venues; noise associated with commercial and industrial neighbouring premises including delivery activities and process equipment; seagulls and church bells. Genuinely infrequent and unpredictable sources of noise such as car alarms occurring no more than twice a night are excluded.

Table 3.1 Internal noise limits for external noise sources

- 3.1.2 The standards have been chosen to complement the Goodnight Guarantee offered by Premier Inn which refunds guests if they have been disturbed by noise. These standards are more onerous than those recommended in *British Standard 8233* and *ProPG – Planning & Noise*, the usual guidance adopted for controlling noise intrusion into residential accommodation.
- 3.1.3 It is therefore intended to control noise intrusion in line with the requirements of the Premier Inn Generic Specification for a Turnkey Development. Complying with these requirements can also be expected to enable compliance with any conditions to planning on noise intrusion, the Local Authority may choose to impose.

3.2 Reference noise levels

- 3.2.1 The following reference noise levels have been derived from the measurement data for use in façade calculations.

Period	Frequency (Hz)						
	63	125	250	500	1000	2000	4000
<i>Front facing facades</i>							
Daytime $L_{eq,1hr}$	75	69	68	64	63	64	59
Night-time $L_{eq,1hr}$	75	69	67	63	63	63	59
Night-time L_{Fmax}	95	87	84	82	83	84	82
<i>Rear facing facades</i>							
Daytime $L_{eq,1hr}$	67	60	57	53	54	56	46
Night-time $L_{eq,1hr}$	69	61	58	53	54	49	41
Night-time L_{Fmax}	81	75	69	66	66	64	62

Table 3.2 Reference noise levels for use in façade calculations (façade-reflected levels)

3.2.2 The level of external noise intrusion into the hotel bedrooms is a function of the volume and surface finishes of the rooms, and the sound insulation performance provided by the building envelope. The latter is dependent upon the combined sound insulation performance of the glazing and solid elements and, where relevant, ventilation openings and the roof.

3.3 Recommended façade specifications

3.3.1 The required sound insulation performance of façade elements to achieve the criteria set out in Table 3.1 have been determined based on the ratio of glazing to solid façade and room sizes shown in the architectural drawings. The minimum recommended performance figures are set down in Table 3.3.

Façade element	Frequency (Hz)					
	125	250	500	1000	2000	4000
All external walls	40	46	51	53	50	50
Front facing bedroom windows	29	35	45	56	52	50
Rear facing bedroom windows	20	19	29	38	36	45

All values are sound reduction indices in dB, measured in accordance with BS EN ISO 10140-2

Table 3.3 Recommended acoustic specification for the proposed façade

3.4 Discussion of suitable constructions

3.4.1 The existing building is built using a Verbus system which comprises metal shipping containers laid to create bedrooms with external brick facades and internal plasterboard linings.

All external walls

- 3.4.2 The performance of the Verbus system, along with the external façade and internal lining is expected to satisfy the performance specifications for “all external walls” presented in Table 3.3.

Front facing bedroom windows

- 3.4.3 The existing windows are double-glazed and understood to comprise a 6mm inner plane, 12mm gas filled cavity and 10mm outer pane. The precise acoustic performance is unknown but it is estimated to be between 37 dB and 40 dB R_w .
- 3.4.4 The existing windows include a Passivent acoustic ventilator within the metal framing. This is shown in the O&M Manuals as an “AL-dB 800/42” model, which is assumed to have an acoustic performance of 42 dB $D_{n,e,w}$.
- 3.4.5 Proposals are in place to install a secondary glazed unit to bedrooms facing Baker's Road, which will comprise 8.8mm acoustic laminate glass set back from the external windows to form a c. 150mm deep cavity. A new trickle ventilator specified at c. 42 dB $D_{n,e,w}$ will be installed atop the secondary glazing system.
- 3.4.6 The combined acoustic performance of the retained and proposed new window constructions (including ventilators) is expected to meet the specifications presented in Table 3.3.
- 3.4.7 The acoustic performance will depend on how well the existing windows are sealed when in their closed position. It is therefore recommended that the existing windows are made good as far as is practicable. It should be appreciated that it may not be feasible to perfectly make good every existing window, and therefore there may be some windows that do not fully seal, which would impact their acoustic performance.

Rear facing bedroom windows

- 3.4.8 The acoustic specifications presented in Table 3.3 are not considered onerous and are expected to be achievable with standard double-glazed systems. The existing windows are expected to be suitable without the need to provide new secondary glazing.

4 Noise emission assessment

4.1 Criteria

- 4.1.1 London Borough of Hillingdon are not believed to have quantitative requirements regarding noise emission, although it is expected that they will want to ensure that noise emission to nearby residential properties is minimised to within industry guidelines. Reference is made to an older (2006) Supplementary Planning Document although it is unclear if that SPD is still valid as it does not appear on the current planning section of Hillingdon Council's website. The SPD makes reference to an older version of British Standard 4142 (1997) which was superseded in 2014.
- 4.1.2 The commonly accepted method to assess the potential impact of a new noise source is to complete a noise emission assessment using the methodology described in British Standard 4142:2014. Considering the latest version of this standard, it is believed that the level of noise emission may be considered acceptable by the Local Authority if the assessment concludes that new plant would have a **low impact** on nearby residential properties.

4.2 British Standard 4142:2014

- 4.2.1 British Standard 4142:2014 *Methods for rating and assessing industrial and commercial sound* presents a methodology by which to assess plant noise emission to sensitive neighbours. BS 4142:2014 provides guidance on the assessment of the *impact* of a noise source. The standard presents a methodology for comparing the noise level of the new source (the specific sound level) with that of the existing background noise level in the area in the absence of the new source (the background sound level).
- 4.2.2 The methodology requires consideration to be given to all aspects of the assessment process and also accounts for unusual acoustic features such as tonal, impulsive, or intermittency characteristics of the noise by the addition of various decibel corrections to the specific sound level. The corrected specific sound level is the rating level.
- 4.2.3 The rating level is then arithmetically subtracted from the background sound level. The greater the positive difference between the rating level and the background sound level, the greater the magnitude of the impact.
- A difference of around + 10 dB or more is likely to be an indication of a significant adverse impact, depending upon the context.
 - A difference of around + 5 dB or more is likely to be an indication of an adverse impact, depending upon the context.
 - Where the rating level does not exceed the background sound level, this is an indication of a **low impact**, depending upon the context.

4.3 Plant proposals

4.3.1 The following items of building services plant are proposed along with the emitted noise levels as quoted by the manufacturers:

Item	Qty	Location	Maximum emitted noise level
Mitsubishi PURY P200 air source heat pump.	12	Uppermost roof	Day and evening operation: 59 dB L_{pA} at 1 metre, per unit
Mitsubishi PUHZ RP35 air source heat pump	1	1 st floor roof	46 dB L_{pA} at 1 metre
Extract fan(s)	As existing	Uppermost roof	≤ 55 dB L_{pA} at 1 metre from atmosphere terminations (note that this will be readily achievable with installation of in-duct attenuators / silencers)

Table 4.1 Building services plant proposals

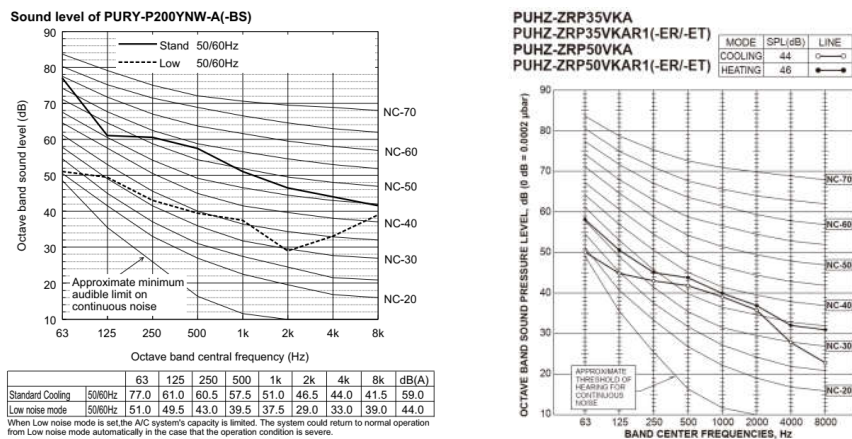


Figure 4-1 Manufacturer's data for the proposed air source heat pumps

4.3.2 The uppermost rooftop air source heat pumps will be installed behind a screen formed using an acoustic louvre. The specification of the louvre is presented below and is expected to be achieved with a 150mm deep acoustic louvre.

Frequency (Hz)							
63	125	250	500	1000	2000	4000	8000
4	4	5	8	12	16	15	13

All values are sound reduction indices in dB, measured in accordance with BS EN ISO 10140-2

Table 4.2 Recommended acoustic specification for the rooftop plant screen

- 4.3.3 Whilst it can be expected that demand for heating / cooling diminishes overnight, the systems are capable of being operated at full duty at any time of the day, evening or night. The assessment has therefore assumed that all plant is operating at full duty at any time of the day, evening or night.
- 4.3.4 The locations of the PURY air-source heat pumps are shown in **Error! Reference source not found.**, over the page.

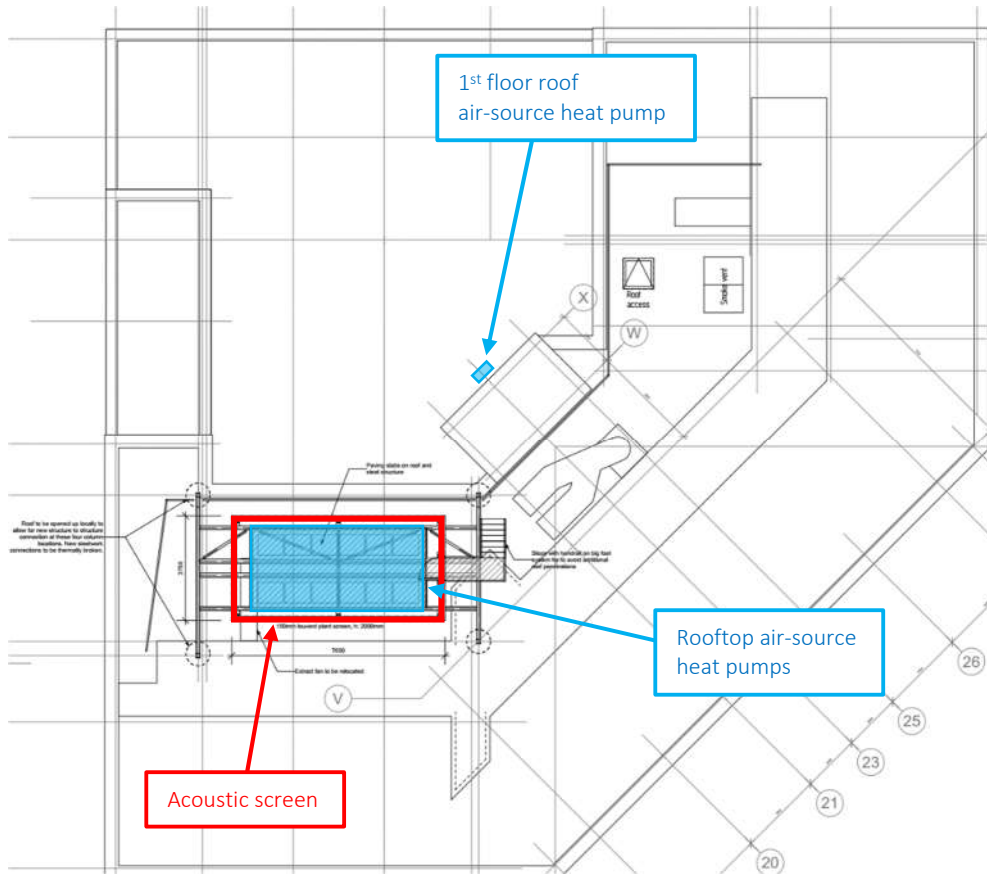


Figure 4-2 Location of air-source heat pump units on the uppermost rooftop

- 4.3.5 The existing extract fans are to be relocated but will still expel to atmosphere at the uppermost roof level.

4.4 Nearest noise-sensitive receivers

4.4.1 Image courtesy of Google

- 4.4.2 Figure 4-3 provides an aerial view of the area surrounding the development site highlighting the location of the rooftop plant and nearby noise sensitive receivers.

- 4.4.3 The nearest neighbouring residential property is north-west and directly adjacent to the site, across a small path. Line of sight to the nearest windows of this property are obscured from all plant and they will therefore be subject to the benefit of acoustic screening. The precise amount of screening is unknown but a conservative

5 dB has been assumed within the assessment, at all frequency bands.

- 4.4.4 Other nearby noise-sensitive receivers are understood to be either retail or commercial in nature, the closest of which are across the site on Baker's Road. Many of the retail / commercial properties will have a clear line-of-sight to the louvres surrounding the uppermost rooftop plant.

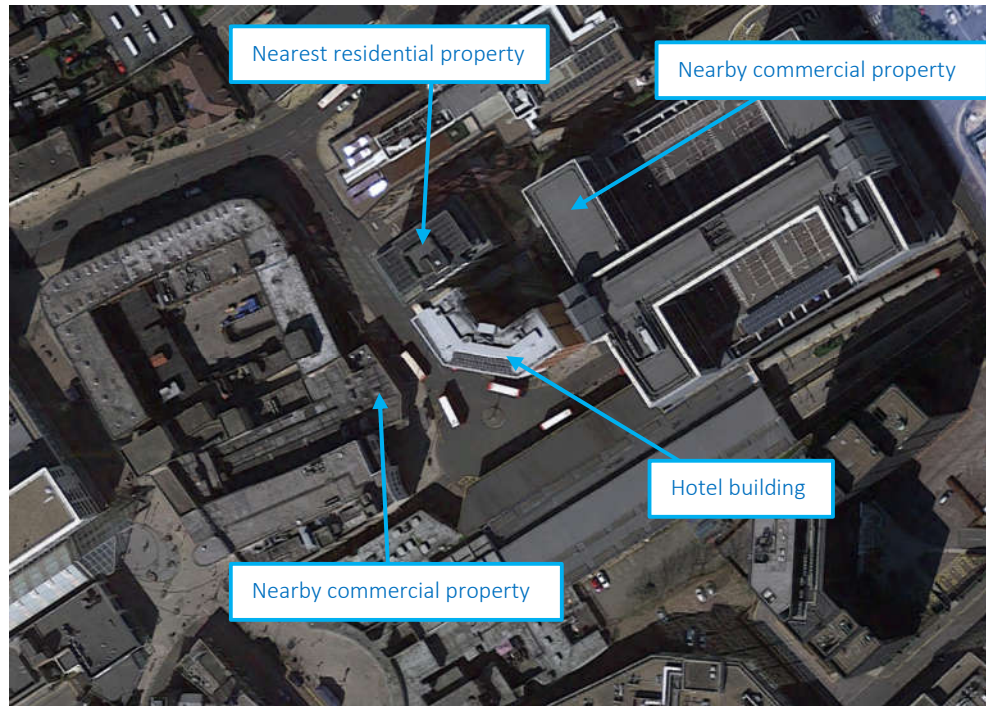


Figure 4-3 Image showing the existing site and nearby residential properties

- 4.4.5 The distance between new plant and the nearest residential window is estimated to be about 15m, although will be obscured. The distance between new plant and the nearest retail / commercial window is estimated to be at least 25m.

4.5 Predicted plant noise emission levels

- 4.5.1 The *specific sound levels* of all the plant operating simultaneously have been predicted at the nearest residential and commercial properties and are presented below (as free-field levels just outside the nearest window). Worst case assumptions have been made for attenuation owing to geometric divergence and acoustic screening.

- *Specific sound level* at the nearest residential property 39 dB L_{Aeq}
- *Specific sound level* at the nearest commercial property 40 dB L_{Aeq}

- 4.5.2 As previously discussed in Paragraph 4.2.2, corrections should be applied to the *specific sound levels* to account for acoustic characteristics associated with the equipment that might make their noise more noticeable.

- 4.5.3 The air-source heat pumps and kitchen ventilation system are known to operate with a character that some may perceive to be tonal. In our experience with these types of units and systems, and based on the results of the external noise survey, a tonal component to the noise from the new plant may be just perceptible against the prevailing noise climate. A correction of +2 dB has been applied to the new plant.
- 4.5.4 The air-source heat pumps would tend to operate at normal duty for prolonged periods of time, although will on occasion ramp up and down as the load differs. The ramping up and down of the units is gradual and is unlikely to be perceptible at nearby residential properties. The kitchen ventilation system will operate in a steady-state the duration of normal service and will be switched off when the kitchen is not in use. As noise from the equipment is expected to exhibit no noticeable stopping or starting, no corrections have been applied for impulsivity or intermittency.
- 4.5.5 The predicted *rating levels* have been calculated and are presented below (as theoretical free-field levels just outside neighbouring properties, which allows them to be directly compared to the background noise levels presented in Table 2.2).

- *Rating level* at the nearest residential property 41 dB L_{Ar}
- *Rating sound level* at the nearest commercial property 42 dB L_{Ar}

4.6 Assessment of impact

- 4.6.1 The *rating levels* are predicted to not exceed the relevant lowest background noise levels presented in Table 2.2 at the neighbouring properties. An assessment under BS 4142:2014 would indicate that this is an indicator of a *low impact*, depending on the context.
- 4.6.2 The existing site is currently operated as a hotel and surrounding properties are generally retail or commercial in nature. The existing noise climate is dominated by bus movements with an underlying background noise shored up by existing building services. Plant noise from the bus depot is particularly noticeable around the site.
- 4.6.3 The noise emission from new plant has been assessed against the lowest measured background noise levels during the day / evening and night-time periods. As the dominant noise source around the site is road traffic from vehicles using the surrounding roads, background noise levels are typically higher than those used in the assessment. This is because the lowest measured background noise levels would have occurred during periods when very few vehicles passed the site.
- 4.6.4 It is therefore expected that plant noise associated with the hotel can be adequately limited so as not to cause noise disturbance to the hotel's noise-sensitive neighbours.

Appendix A – Terminology

This appendix provides an explanation of some of the terms used in this report.

A-weighting L_A or L_{pA} , L_{WA}	Within its operating limits a precision measurement microphone measures all frequencies the same so the output it produces does not reflect what we would actually hear. The A-weighting is an electronic filter that matches the response of a sound level meter to that of the human ear. When A-weighted the Sound Pressure Level L_p becomes L_{pA} (or L_A) and the Sound Power Level L_W becomes L_{WA}.
L_p	<i>The instantaneous sound pressure level (L_p)</i>
L_{pA} (or L_A)	<i>The A-weighted instantaneous sound pressure level (L_{pA} or L_A). This is the root mean square size of the pressure fluctuations in the air. This level can fluctuate wildly even for seemingly steady sounds. To make sound level meters easier to read the values on the display are smoothed or damped out. This is effectively done by taking a rolling average of the previous 0.125s (FAST time constant) or the previous 1s (SLOW time constant).</i>
L_{AF} , L_{AS}	The letters F or S are added to the subscripts in the notation to indicate when the FAST or SLOW time constant has been used. These are often omitted but it is good practice to include them.
L_{max}	<i>The maximum instantaneous sound pressure level (L_{max}),</i>
L_{Amax}	<i>The A-weighted maximum instantaneous sound pressure level (L_{Amax})</i>
L_{AFmax}	<i>The A-weighted maximum instantaneous sound pressure level with a FAST time constant (L_{AFmax}).</i>
$L_{N,T}$	<i>The percentage exceedance sound pressure level ($L_{N,T}$),</i>
$L_{AN,T}$, $L_{AFN,T}$ N = %age value, 0-100 T = measurement time eg. L_{A90} , L_{A10} , L_{AF90} , 5 min	<i>The A-weighted percentage exceedance sound pressure level ($L_{AN,T}$), the A-weighted percentage exceedance sound pressure level with a FAST time constant ($L_{AFN,T}$). This is the sound pressure level exceeded for $N\%$ of time period T. e.g. If an A-weighted level of x dB is exceeded for a total of 6 minutes within one hour, the level will have been above x dB for 10% of the measurement period. This is written as $L_{A10,1hr} = x$ dB. L_{A0} (the level exceeded for 0 % of the time) is equivalent to the L_{Amax} and L_{A100} (the level exceeded for 100 % of the time) is equivalent to the L_{Amin}. It is good practice to include the letter which identifies the time constant used as this can make a significant difference to the value.</i>
$L_{eq,T}$	<i>The equivalent continuous sound pressure level over period T ($L_{eq,T}$),</i>
$L_{Aeq,T}$ T = measurement time eg. $L_{Aeq,5min}$	<i>The A-weighted equivalent continuous sound pressure level over period T ($L_{Aeq,T}$). This is effectively the average sound pressure level over a given period. As the decibel is a logarithmic quantity the L_{eq} is not a simple arithmetic mean value. The L_{eq} is calculated from the raw sound pressure data. It is not appropriate to include a reference to the FAST and SLOW time constants in the notation.</i>

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