

Report

27th October 2015



TEMPLE

LEADERS IN ENVIRONMENT,
PLANNING & SUSTAINABILITY.

Report for – Bond Bryan Architects Limited
175-185 Gray's Inn Road
Mechanical Plant Noise Assessment
Final

Document Version Control

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1.0 Introduction

1.1 Project Background

Temple Group Ltd (Temple) has been instructed by Bond Bryan Architects Limited to undertake an environmental noise assessment for the proposed mechanical plant at 175-185 Gray's Inn Road, London WC1X.

The purpose of the noise assessment is to analyse the operational noise impact on surrounding sensitive properties to assess the suitability of the proposed development. This has been assessed in line with the London Borough of Camden's (LBC) guidance and relevant national standards.

Details of the assessment methodology used, together with the results of the survey undertaken and the subsequent conclusions and recommendations, are presented within the following report.

2.0 Planning Policies, Standards and Guidance

2.1 National Policy

2.1.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF)¹ was introduced by the Department of Communities and Local Government in March 2012. The document sets out the Government's planning policies for England and how these are expected to be applied.

The planning system is required to contribute to and enhance the natural and local environment. Consequently, the aim is to prevent both new and existing development from contributing to or being put at unacceptable risk from noise, or being adversely affected by unacceptable levels of noise pollution.

Therefore 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 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; and
- Identify and protect areas of tranquillity that have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

2.1.2 Noise Policy Statement for England

The Noise Policy Statement for England (NPSE)² seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise. The statement applies to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise.

The statement sets out the long-term vision of the government's noise policy, which is to *"promote good health and a good quality of life through the effective management of noise within the context of policy on sustainable development"*.

The guidance promotes the effective management and control of noise, within the context of Government policy on sustainable development and thereby aims to:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life; and
- Where possible, contribute to the improvements of health and quality of life.

¹ Department for Communities and Local Government, (March 2012): 'National Planning Policy Framework'.

² Department for Environment, Food and Rural Affairs, (March 2010): 'Noise Policy Statement for England'.

The statement adopts established concepts from toxicology that are currently being applied to noise impacts. The concept details noise levels, at which the effects of an exposure may be classified into a specific category. The classification categories as detailed within NPSE are as follows:

- No Observed Effect Level (NOEL) - the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established;
- Lowest Observed Adverse Effect Level (LOAEL) - the level above which adverse effects on health and quality of life can be detected; and
- Significant Observed Adverse Effect Level (SOAEL) - the level above which significant adverse effects on health and quality of life occur.

It is recognised that SOAEL does not have a single objective noise-based level that is applicable to all sources of noise in all situations and therefore the SOAEL is likely to be different for different sources, receptors and at different times of the day.

No guidance has been issued at the time of writing to identify the SOAEL and LOAEL for typical noise sources and receptors.

2.1.3 Planning Practice Guidance Noise

The Planning Practice Guidance (PPG)³ expands on the use of SOAEL: *“If the exposure is above this level the planning process should be used to avoid this effect occurring, by use of appropriate mitigation such as by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of the activity causing the noise, but it is undesirable for such exposure to be caused.”*

The PPG also goes on to identify unacceptable noise exposure: *“At the highest extreme, noise exposure would cause extensive and sustained changes in behaviour without an ability to mitigate the effect of noise. The impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise, this situation should be prevented from occurring.”*

2.2 Regional Policy

2.2.1 The London Plan – Spatial Development Strategy for Greater London

The Mayor of London has published the London Plan 2011. With specific reference to noise, the London Plan contains Policy 7.15: Reducing Noise and Enhancing Soundscapes:

“Planning Decisions:

B) Development proposals should seek to reduce noise by:

Minimising the existing and potential adverse impacts of noise on, from, within, or in the vicinity of, development proposals;

Separating new noise sensitive development from major noise sources wherever practicable through the use of distance, screening, or internal layout in preference to sole reliance on sound insulation;

³ Department for Communities and Local Government, (March 2014): ‘Planning Practice Guidance’.

Promoting new technologies and improved practices to reduce noise at source.”

2.2.2 Souder City: The Mayor’s London Ambient Noise Strategy

The London Ambient Noise Strategy aims to minimise the adverse impacts of noise on people living, working in and visiting London by using the best available practices and technologies within a sustainable development framework.

The Strategy aims to work towards more compact city development, while minimising noise. This requires careful consideration of the adverse impact of noise on, from, within or in proximity to a development.

2.3 Local Policy

2.3.1 Camden Development Policies 2010

Camden Development Policies DP28: Noise and Vibration⁴ seek to ensure that noise and vibration is controlled and managed and will not grant planning permission for developments that exceed Camden’s thresholds as shown in **Table 1**.

Table 1 – Noise levels from plant and machinery at which planning permission will not be granted

Noise description and location of measurement	Period	Time	Specific Noise level
Noise at 1 metre external to a sensitive façade	Day, evening and night	00.00 – 24.00	5 dB(A) < L_{A90}
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive façade	Day, evening and night	00.00 – 24.00	10 dB(A) < L_{A90}
Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade	Day, evening and night	00.00 – 24.00	10 dB(A) < L_{A90}
Noise at 1 metre external to sensitive façade where $L_{A90} > 60$ dB	Day, evening and night	00.00 – 24.00	55 dB L_{Aeq}

In addition in terms of operational noise i.e. mechanical noise “...A condition will be imposed to require that the plant and equipment which may be a source of noise pollution is kept working efficiently and within the required noise limits and time restrictions. Conditions may also be imposed to ensure that attenuation measures are kept in place and effective throughout the life of the development.”

2.3.2 Planning Condition from Local Authority

Planning permission has been granted for installation of mechanical plant equipment at room levels subject to the following condition:

⁴ Camden Local Development Framework (LDF), (2010): ‘Camden Develop Policies’.

Prior to the implementation of the proposed air conditioning unit, full details and specifications of the equipment shall be submitted to and approved in writing by the Council including details of the external noise level emitted and any mitigation measures as appropriate. The measures shall ensure that the external noise level emitted from the plant equipment will be lower than the lowest existing background noise level by at least 10dBA as assessed according to BS4142:1997 at the nearest and/or most affected noise sensitive premises, with the plant operating at maximum capacity. Approved details shall be implemented prior to the use of the development and thereafter be permanently retained.

Reason: To safeguard the amenities of the adjoining premises and the area generally in accordance with the requirements of policy CS5 of the London Borough of Camden Local Development Framework Core Strategy and policies DP26 and DP28 of the London Borough of Camden Local Development Framework Development Policies.

Figure 1 – Planning conditions from London Borough of Camden

2.4 Standards and Guidance

2.4.1 British Standard 4142 – Methods for Rating Industrial Noise affecting Mixed Residential and Industrial Area

British Standard 4142 (BS 4142:1997)⁵ provides a method for determining the likelihood of complaints due to noise. The method compares the 'Rating Noise' with the 'Background' noise.

- The 'Rating Noise' is the specific noise level due to the noise source under investigation plus any adjustment for the characteristic features of the noise. An additional 5 dB is added if the noise is irregular enough to attract attention.
- The 'Background Noise' is the LA90 value (noise level exceeded for 90% of the time) measured at the receptor, in the absence of the specific noise.

BS 4142:1997 assesses the likelihood of complaints as follows:

- Rating level 10 dB below background level – complaints unlikely
- Rating level 5 dB above background level – marginal significance
- Rating level 10 dB above background level – complaints likely

2.4.2 ISO 9613 Attenuation of sound during propagation outdoors

ISO 9613 part 2⁶ gives general methods of calculating sound propagation outdoors including attenuation due to geometrical divergence (distance); air and ground absorption; screening; reflections and other effects.

⁵ British Standard Institute (BSI), (1997): 'BS 4142 – Methods for rating industrial noise affecting mixed residential and industrial areas', BSI, London.

3.0 Site and the Surrounding Area

The proposed site is an existing four storey office building at Gray's Inn Road, London WC1X.

The redevelopment will include the installation of mechanical plant at roof level as shown in **Figure 3** in **Appendix I**. The proposed plant is a VRF KX6 heat pump outdoor unit; plant data sheets including sound level data are shown in **Appendix II**.

It is understood that there are no residential receptors in close proximity to the proposed development. The nearest noise sensitive receptor is hotel rooms and is shown in **Figure 2** in **Appendix I**.

⁶ International Organisation of Standardisation (ISO), (1996): 'ISO 9613 – Acoustics – Attenuation of sound during propagation outdoors – part 2: General method of calculation', ISO, London.

4.0 Assessment

For the assessment the survey methodology and results have been taken from the report “175 – 185 Grays Inn Road – Environmental Noise Assessment” dated 20th February 2015

4.1 Background Noise Levels

The background noise levels measured during the noise survey are all free field. The measurement position is considered representative of the hotel receptors at the rear of the property which are exposed to the same noise sources as the measurement position. It was noted that during the attended survey none of the existing plant on the rooftop was operational and are therefore likely to represent the “worst case” least noisy existing conditions.

The background noise levels during the daytime used for assessment at the nearest noise sensitive receptors are shown in **Table 2**. The levels have been derived from the attended measurement at the rear of the rooftop at the point closest to the nearest noise sensitive receptor.

Table 2 – Measured Background Noise Levels for Assessment

Location	Measured Background Noise Level L_{A90} , dB	Operational Noise Limit 1m from the nearest sensitive receptor based on planning condition
	Daytime 07.00 – 19.00	Daytime 07.00 – 19.00
Rear of rooftop	53	43

4.2 Mechanical Plant Noise

Noise levels from the proposed mechanical services plant for the commercial unit must be controlled to protect the surrounding noise sensitive receptors. Typically, the plant will be operational during working hours between Monday to Friday 09:00 – 17:00.

4.2.1 Assessment and Mitigation

Details of the plant noise calculations can be found in **Appendix IV Table 3**. In our experience this type of plant is not tonal or impulsive and does not require an acoustic feature correction. **Table 4**, below gives details of the BS4142 assessment.

Table 4 – BS 4142:2014 Assessment

Results		dB	Commentary
Lowest background sound level	$L_{A90, 07:00-19:00}$	53	Measured during survey
Assessment made during the daytime, so reference time interval is 1hr			
Specific sound level	$L_{Aeq,1hr}$	43	1m from the closest window of the relevant sensitive property during that stated time period (without the influence of reflections from the façade of the building) For further details, see calculation in appendix III
Acoustic feature correction		0	The specific sound is not tonal or impulsive
Rating level		43	
Excess of rating level over background sound level		-10	The result of the assessment is a positive indication that complaints are unlikely.

With the proposed layout the rating noise level from the plant would be 10 dB below the existing background noise level and would be in line of sight of the nearest receptor. This would meet the requirement set out in the Camden Development Policies DP28: Noise and Vibration and the requirements of planning condition. No further mitigation is therefore required.

The nearest receptor in question has been identified as a hotel. The receptor would already be subject to external plant located on the ground floor and road traffic noise from Gray's Inn Road. Taking into consideration that the customers would primarily use the hotel as a place for rest outside of the operating time of the plant the receptor may have a lower noise sensitivity at this time than typical residential dwellings.

5.0 Conclusion

Temple Group Ltd (Temple) has been instructed by Bond Bryan Architects Limited to undertake an environmental noise assessment for the proposed mechanical plant at 175-185 Gray's Inn Road, London WC1X.

Consequently, Temple undertook a noise survey which has been used to assess plant noise affecting the nearest noise sensitive receptor. This has been assessed in line with the London Borough of Camden's (LBC) guidance and relevant national standards.

With the proposed layout the rating noise level from the plant would be 10 dB below the existing background noise level and would be in line of sight of the nearest receptor. This would meet the requirement set out in the Camden Development Policies DP28: Noise and Vibration and the requirements of planning condition. No further mitigation is therefore required.

The nearest receptor in question has been identified as a hotel. The result of the BS4142:1997 assessment is a positive indication that complaints are unlikely.

Appendix I – Site Plans

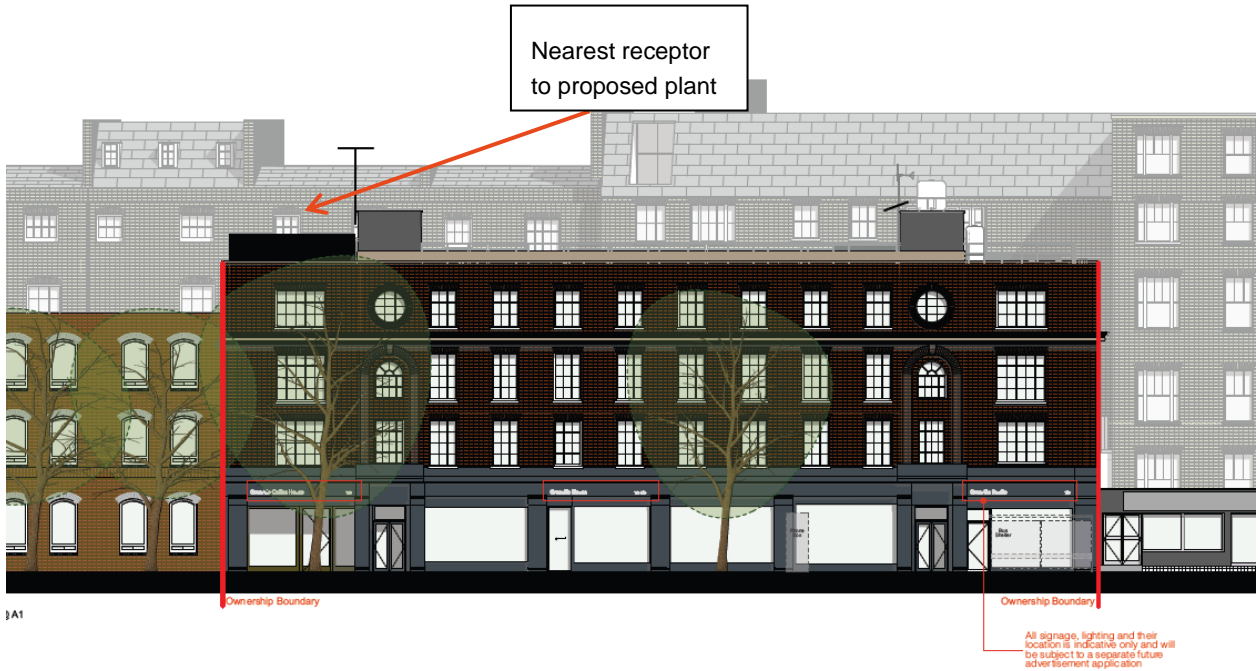


Figure 2 – Proposed Street Elevation

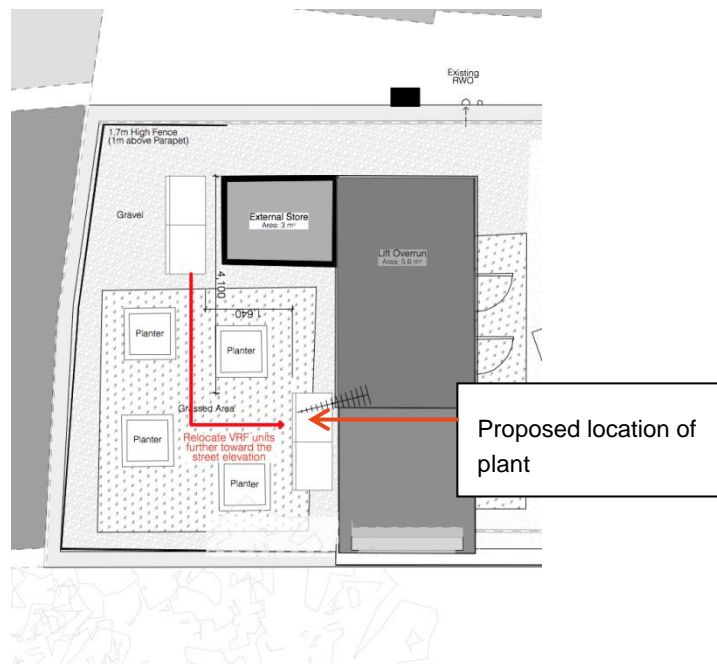



Figure 3 – Proposed roof plan

Appendix II – Data Sheets

the experts in air conditioning



VRF KX6 heat pump outdoor unit

Product Code: FDC680KXE6

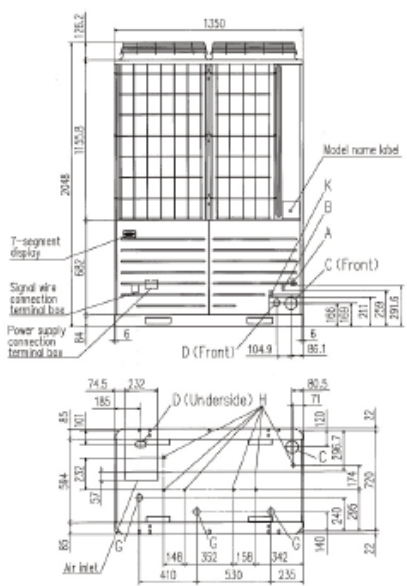
The KX6 heat pump 2-pipe systems offer high performance VRF for applications that require either cooling only or heating only, ideal for open plan areas.

- Connect multiple indoor units.
- wide operating range, down to -15°C in cooling
- High efficiency with high COP's and EER's
- KX6 employs DC inverter compressors only.
- Long pipe lengths, up to 1000m and a maximum pipe run of 160m.
- Blue Fin coating on outdoor unit coil

unit details

MODEL NUMBER	FDC680KXE6	
CONNECTION KIT	NA	
capacity code - horse power		680 - 24
nominal cooling	kW	68.0
nominal heating	kW	73.0
maximum number of indoor units		49
min - max connected cap. code		340 - 1098
EER - COP		2.72 - 3.83
SEER (office profile)		3.92
SCOP (office profile)		4.72
number of modules		1
size of modules		24HP
height	mm	2048
width*	mm	1350
depth	mm	720
weight	kg	35.5
sound pressure level	dB(A)	65.0
airflow rate	l/s	4500
max external static pressure**	Pa	ftc
gas pipe size	in	1 1/8"
liquid pipe size	in	1/2"
discharge pipe size	in	na
R410A refrigerant base charge	kg	11.5
power supply	V-Ph-Hz	400 - 3 - 50
suggested fuse size	A	50A
power input cool - heat	kW	24.98 - 19.08
running current cool - heat	A	40.3 - 31.6
starting current	A	8

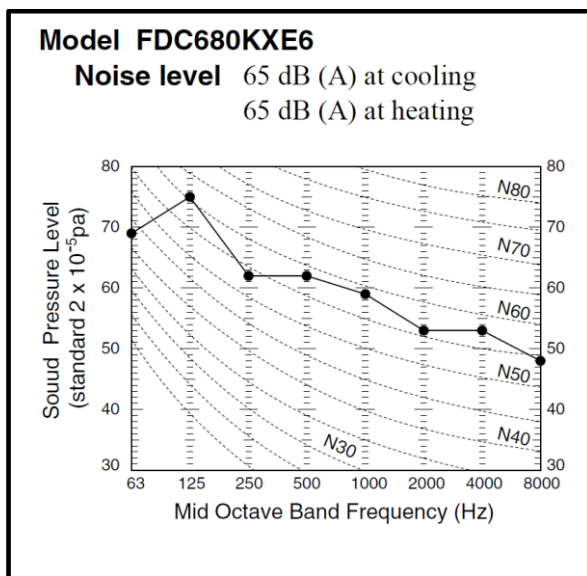
* assumes a 20mm gap between modules, where applicable
 ** conditions apply, see technical manual for details



for product information visit www.ampair.co.uk

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Figure 4 – VRF KX6 Data Sheet



Measured based on JIS B 8616
Mike position as highest noise level in position as below
Distance from front side 1m
Height 1m

Figure 5 – VRF KX6 Data Sheet Sound Pressure Levels Octave Band Data

Appendix III – Site Photos



Figure 6 – Receptor: Hotel premises at the rear of 175-185 Gray's Inn Road

Appendix IV – Plant Noise Calculations

Table 3 – Plant Noise Calculations

Type	Reference / calculation	Frequency (Hz) (dB)								Total dB(A)
		63	125	250	500	1k	2k	4k	8k	
Sound pressure level of FDC680KXE6 at 1metre	Taken from Figure 5 in Appendix II	69.0	75.0	62.0	62.0	59.0	53.0	53.0	47.0	65
Line of sight		Yes (no barrier attenuation)								
Ditance of 1m from plant to 1m from window	13m									
Point source attenuation	$-20 \log \left(\frac{r_2}{r_1} \right)$				-22					
A weighting		-26.2	-16.1	-8.6	-3.2	0	1.2	1.0	-1.1	
Resultant A weighted sound pressure level at receptor (1m from window)		20	37	31	36	37	32	32	24	43

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