Transformation of the Ugly Brown Building

Waterman Infrastructure & Environment Ltd

Noise Assessment

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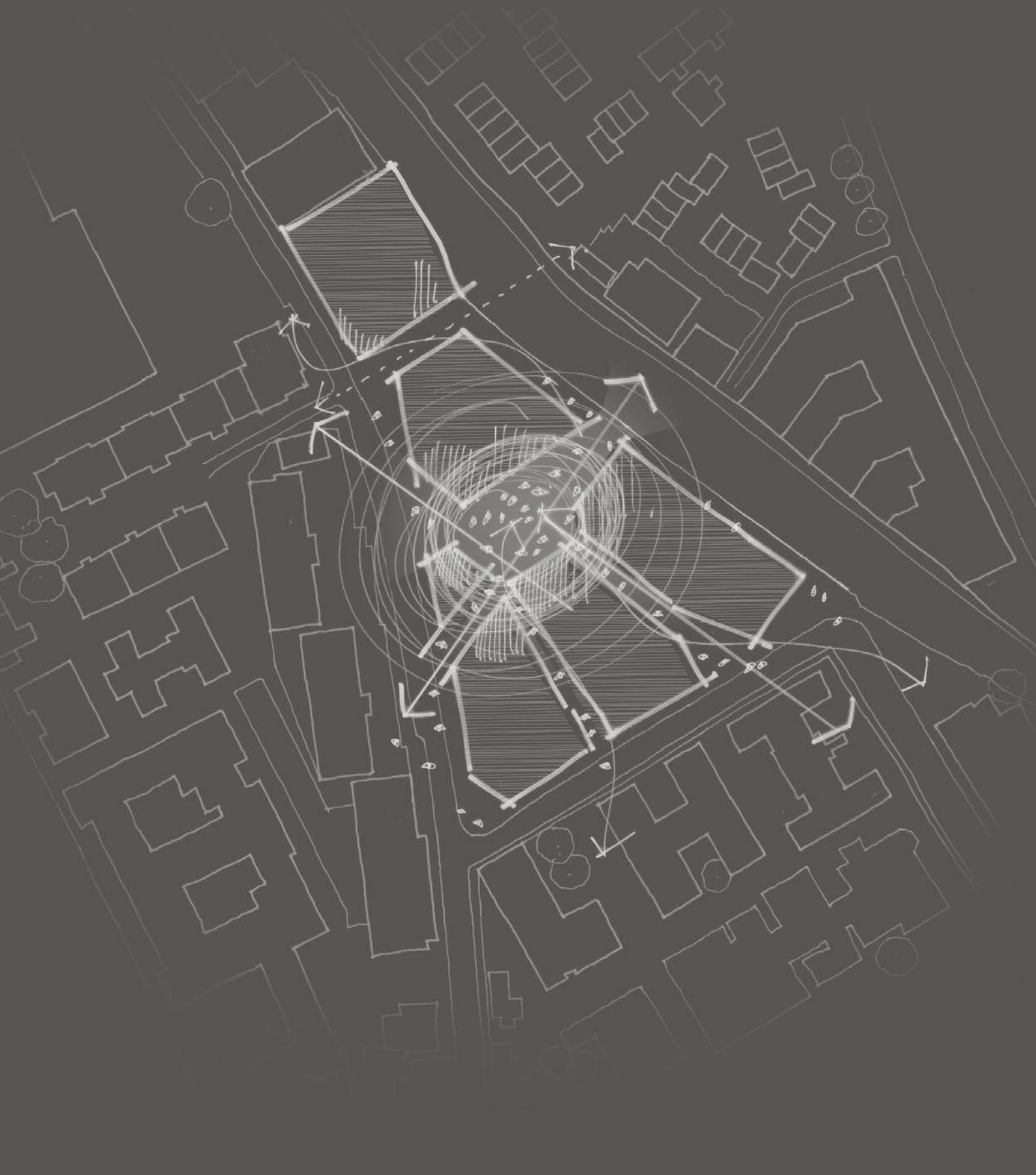

Transformation of the Ugly Brown Building

Noise Assessment Report

Client Name: Reef Estates Limited
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Quality Assurance – Approval Status

This document has been prepared and checked in accordance with Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015 and BS OHSAS 18001:2007)

Issue	Date	Prepared by	Checked by	Approved by
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Comments:

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1. Introduction

1.1 The Brief

This noise assessment has been prepared by Waterman Infrastructure & Environment Ltd (hereafter '*Waterman*') on behalf of Reef Estates Limited (hereafter '*the Applicant*') as part of a noise assessment for the redevelopment of the site known as Transformation of the Ugly Brown Building on St Pancras Way, Camden (hereafter referred to as the '*Site*')

The Applicant is seeking to obtain full planning permission for a scheme covering an area of approximately 1.1412 hectares (ha) and the Site falls within the administrative boundary of the London Borough of Camden (LBC).

The proposals (hereafter referred to as the 'Development') comprise the demolition of the existing building and erection of 6 new buildings ranging in height from 2 storeys to 12 storeys in height above ground and 2 basement levels comprising a mixed use business floorspace (B1), residential (C3), hotel (C1), gym (D2), flexible retail (A1-A4) and storage space (B8) development with associated landscaping work.

This report considers the Site's suitability for the nature of proposed uses through measurement of existing noise affecting the Site, which have been used to carry out the following works:

- Preliminary façade sound insulation assessment to provide early indication of the necessary façade airborne sound insulation required to achieve appropriate internal noise levels (*with reference to BS 8233;2014 and WHO,1999*), whilst protect against noise break out from the retail units;
- Assessment of road traffic noise; and
- The setting of appropriate noise emission limits for new fixed building services plant associated with the Development (*in accordance with the plant noise policy of Camden Council (CC)*).

A glossary of the acoustic terminology used in this report is presented in **Appendix A**.

2. The Site, Site Setting and Proposed Development

2.1 Site Description

The application Site is located at 2-6 St Pancras Way, London, NW1 0TB and is approximately 1.1412 hectares in size. It is 500m to the north west of London Kings Cross and St Pancras International Station. The Site is currently occupied by the Ugly Brown Building which is used for office and data centre use.

The Site is bound by St Pancras Way (the A5202) to the west, a busy thoroughfare which experiences high vehicular flows and to the south by Granary Road. The eastern Site boundary is adjoined by the Regent's Canal.

The surrounding area close to the site is urban and characterised by a mix of uses comprising commercial, retail, office and residential.

2.2 The Noise Climate

The noise climate of the area is dominated by noise from local road traffic along St Pancras Way (A5202) and more distant traffic on the surrounding road network. The main line railway network serving London Kings Cross and St Pancras International stations are situated 130m to the east and train movements are audible around the Site. Distant construction noise is also audible along with human activities in the area and these also influence the noise climate, to some extent.

A Site location plan is provided as **Figure 1**, showing the location of the Site and orientation with respect to other existing developments and the road network for the area.

2.3 Noise Sensitive Premises

Existing properties within the vicinity of the proposed Development are predominantly commercial in nature; however, residential properties have been identified in proximity to the Site. The closest noise sensitive receptors (NSRs) are detailed in **Table 1** and illustrated as **Figure 1**. Consideration of those sensitive receptors introduced as part of the Development is also required.

Table 1: Noise Sensitive Receptors

Receptor Location (Figure 1)	Type of Receptor	Description / Name	Approximate Distance to Site Boundary
NSR A	The Royal Veterinary College	St Pancras Way	26m West
NSR B	Saint Pancras Hospital	Granary Street	18m South
NSR C	Residential	4-28 Reapers Close	35m East

2.4 Proposed Development

Development would comprise the demolition of the existing building and erection of 6 new buildings ranging from 2 storeys to 12 storeys in height above ground and 2 basement levels comprising a mixed business floorspace (B1), residential (C3), hotel (C1), gym (D2), flexible retail (A1-A4) and storage space (B8) development with associated landscaping work. The Development would be divided into three plots, hereafter referred to as Plots A, B and C, which would comprise the following mix of uses:

- Plot A would comprise one building of business floorspace and retail;
- Plot B would comprise one building of business floorspace and hotel; and
- Plot C would comprise three buildings of business floorspace, gym, retail and residential uses (69 units, including affordable homes).

It is currently proposed that the basement would comprise car and cycle parking, refuse areas and plant rooms as well as space for a Gym and Use Class B8 floor space. A total of 808 long stay and approximately 104 short stay cycle parking spaces would be provided.

It is proposed that some of the existing car parking on Site is maintained to serve the retained business floorspace occupied by Ted Baker. This would be provided in the new building in Plot B. It is currently proposed that the Development would provide 32 car parking spaces including 3 for disabled residents.

The surrounding area closer to the site is urban and characterised by a mix of uses comprising commercial, retail, and residential.

In addition, public realm space would be provided across the Site to allow access to the canal-side.

3. Planning Policy and Guidance

3.1 National Planning Policy

3.1.1 National Planning Policy Framework, 2012

The *National Planning Policy Framework*[1] (NPPF) sets out the Government's planning policies for England and how these are expected to be applied. The NPPF must be taken into account in the preparation of Local and Neighbourhood Plans, and is a material consideration in planning decisions.

With regard to noise the NPPF paragraph 109 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 noise pollution."

Paragraph 123 states that:

"*Planning policies and decisions should aim to:*

a) avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;

b) mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;

c) 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

d) identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."

Pollution, including noise, is defined as anything that affects the quality of land, air, water or soils, and which might lead to an adverse impact on human health, the natural environment or general amenity.

Annex 3 of the NPPF states that it replaces Planning Policy Guidance (PPG) 24: *Planning and Noise*[2], but falls short of providing any specific technical guidance for assessing noise levels and amenity.

Web-based guidance on the NPPF was issued with regard to noise[3], although it does not explicitly state acceptable absolute noise levels for safeguarding amenity.

3.2 Local Planning Policy

3.2.1 Camden Local Plan, 2017

LBC has certain legal responsibilities to prepare documents that control and regulate the use of land. This is done with the Camden Local Plan[4] policy sets out detailed planning criteria that LBC use to determine

[1] Communities and Local Government (2012). '*The National Policy Planning Framework'*. HMSO.
[2] DoE (1994). Planning Policy Guidance Note 24: '*Planning and Noise'*. HMSO.
[3] Department for Communities and Local Government (2014). Noise. Available from: http://planningguidance.planningportal.gov.uk/blog/guidance/noise/
[4] London Borough of Camden (2017); '*Camden Local Plan 2017*', London Borough of Camden.

applications for planning permission in the borough in contributing towards delivering the Council's Strategic Objectives. The Camden Local Plan contains Policy A4 – Noise and Vibration.

Policy A4 states that:

"*The Council will seek to ensure that noise and vibration is controlled and managed.*

Development should have regard to Camden's Noise and Vibration Thresholds (Appendix 3). We will not grant planning permission for:

a) development likely to generate unacceptable noise and vibration impacts; or

b) development sensitive to noise in locations which experience high levels of noise, unless appropriate attenuation measures can be provided and will not harm the continued operation of existing uses.

We will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity. We will also seek to minimise the impact on local amenity from deliveries and from the demolition and construction phases of development."

Appendix 3 of the Local Plan presents the threshold values for plant and machinery and states:

"Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion)."

Appendix 3 also states:

"*There are certain smaller pieces of equipment on commercial premises, such as extract ventilation, air conditioning units and condensers, where achievement of the rating levels (ordinarily determined by a BS:4142 assessment) may not afford the necessary protection. In these cases, the Council will generally also require a NR curve specification of NR35 or below, dependant on the room (based upon measured or predicted Leq,5mins noise levels in octave bands) 1 metre from the façade of affected premises, where the noise sensitive premise is located in a quiet background area.*"

A 57dB L_{Amax} value outside a residential bedroom window during the night time period (23:00 to 07:00) is set within Table C in Appendix 3.

For commercial entertainment noise Appendix 3 states:

"*Assessments for noise from entertainment and leisure premises must include consideration to amplified and unamplified music, human voices, footfall and vehicle movements and other general activity. Appropriate metrics must be used to measure and assess the noise impact including LAeq and LAmax metrics and appropriate frequency spectrum. Planning permission will not be granted in instances where it is not possible to achieve suitable and sufficient internal noise levels with reference to the most up to date and appropriate guidance within proposed noise sensitive receptors despite appropriate mitigation proposals due to the totality of noise from existing entertainment venues.*"

Table D within Appendix 3 sets out noise levels applicable to proposed entertainment premises (customer noise).

3.2.2 Camden Planning Guidance 6 - Amenity, 2011

LBC's planning policy also contains a number of other documents, notably Supplementary Planning Documents (SPD), which give detailed guidance on how the Council's planning strategy and policies will be implemented for specific topics, areas or sites. Although they do not form part of the statutory development plan for LBC, and do not therefore have the same weight in decision making, they play an important role in providing additional 'material consideration' in LBC's planning decisions.

Camden Planning Guidance 6: Amenity (CPG 6)[5] is a formal SPD providing guidance on how to control and manage noise, so that growth and development is sustainably managed and harmful effects on the amenity of existing and future occupiers and to nearby properties is avoided.

Chapter 4 '*Noise and Vibration*' of CPG 6 states that LBC's commitments are to:

"*… ensure that noise and vibration is controlled and managed to:*

- *Limit the impact of existing noise and vibration sources on new development; and*
- *Limit noise and vibration emissions from new development.*"

CPG 6 further acknowledges noise and vibration can have an effect on amenity, health and people's quality of life. In this respect, Policy DP28 from LBC's now withdrawn Core Strategy, 2010 (replaced by the Local Plan) is referenced with regard to the control and management of noise and vibration. The document also highlights the key noise sources within LBC (namely road, rail, industrial, plant and mechanical equipment, entertainment uses and building sites), and outlines measures to minimise the effects of these sources of noise on new developments. In respect of controlling noise from development, the measures range from engineering (e.g. reducing the noise emitted at the point of generation), layout (e.g. exploiting distance and screening loss between source and noise sensitive areas) and administrative (e.g. specifying an acceptable noise limit).

CPG 6 goes on to state that detailed acoustic / noise and vibration information in the form of a report will be required for developments that include installation of plant, ventilation or air conditioning equipment that will create significant noise (e.g. new industry, nightclub); noise sensitive development in an area where existing noise sources are present; or will generate a significant volume of traffic.

[5] LBC (2011), Camden Planning Guidance 6 - Amenity. LBC.

4. Noise Assessment Criteria

When selecting appropriate criteria for assessment, consideration has been given to relevant planning policy and regulations concerning the Development (refer to **Section 3** above). Consideration has been given to advice contained within the National Planning Policy Framework (NPPF)[6], the Noise Policy Statement for England (NPSE)[7] and Noise Planning Practice Guidance[8], although direct noise and vibration assessment criteria has not been drawn from these documents.

With regard to acoustic design and noise control, the NPPF provides a set of overarching aims, broadly reflecting those already contained in the NPSE. They are directed towards the avoidance of significant adverse impacts and reduction of other adverse impacts on health and quality of life; set within the context of the Government's policy on sustainable development.

4.1 Residential and Hotel Amenity

When considering the amenity of future occupants of the Development, the most relevant and credited guidance covering desirable levels of environmental noise for indoor and outdoor environments is the World Health Organisation (WHO), 1999 '*Guidelines for Community Noise*'[9] and BS 8233:2014 'Guidance on sound insulation and Noise Reduction for Buildings'[10]. These documents set out guideline internal and external noise limits which should be met by all residential and hotel elements of the development to ensure the critical effects of noise on sleep, annoyance and speech interference are guarded against. A summary of the guideline advice relevant to this Development is outlined below.

World Health Organisation, Guidelines for Community Noise, 1999

One of the tenets of the WHO guidelines is the protection of the most vulnerable and sensitive of the population, with the WHO guideline values for community noise set at the level of the lowest adverse health effect at which the effects of environmental noise can be assumed to be negligible. The WHO guidelines can therefore be considered to represent a potentially stringent set of criteria on which to base assessment of environmental noise. This document states that, in dwellings, the critical effects of noise are on sleep, annoyance and speech interference. To avoid sleep disturbance, indoor guideline values for bedrooms are 30dB $L_{Aeq,T}$ for continuous noise and 45dB L_{AFmax} for single sound events. It is identified within the document that 10-15 occurrences per night of the limiting maximum noise level may be considered acceptable. To enable casual conversation indoors during daytime, the sound level of interfering noise should not exceed 35dB $L_{Aeq,T}$.

With regards to outdoor living areas the WHO document states that:

"*To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55 dB$_{LAeq,T}$ on balconies, terraces and in outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor level should not exceed 50 dBL$_{Aeq,T}$. Where it is practical and feasible, the lower outdoor sound level should be considered the maximum desirable sound level for new development.*"

[6] Department for Communities and Local Government (DCLG) (2012); '*The National Planning Policy Framework'*, TSO.
[7] Department for Environment, Food and Rural Affairs (DEFRA) (2010); '*Noise Policy Statement for England*', DEFRA.
[8] DCLG (2014); '*Planning Practice Guidance website*', DCLG. (http://planningguidance.planningportal.gov.uk/)
[9] World Health Organisation (WHO) (1999); '*Guidelines for Community Noise'*, WHO, Geneva.
[10] British Standards Institution (BSI) (2014); British Standard (BS) 8233 '*Sound insulation and noise reduction for buildings*', BSI.

BS 8233, Guidance on Sound Insulation and Noise Reduction for Buildings, 2014

BS 8233:2014 builds on the guidance in the WHO document, providing guidance for the control of noise in and around both new and refurbished buildings applying for change of use to ensure the critical effects of noise on sleep, annoyance and speech interference are guarded against.

The guidelines recommend desirable internal ambient noise criteria for a range of spaces including residential, appropriate to their function. For living rooms, the standard is defined as a limit of 35 dB $L_{Aeq,16hour}$. For bedrooms, the limits are 35 dB $L_{Aeq,16hour}$ and 30 dB $L_{Aeq,8hour}$ during the day and night respectively.

Unlike the previous version, BS 8233:2014 does not provide recommendations in relation to maximum noise levels in residential bedrooms at night from individual noise events such as vehicle pass-by or aircraft movements. Instead, it advises:

"Regular individual noise events…can cause sleep disturbance. A guideline value may be set in terms of SEL (Sound Exposure Level) or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values."

When considering external amenity spaces such as gardens, balconies and terraces, the guidance provided in BS 8233 states:

"For traditional external areas that are used for amenity space, such as gardens or patios it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.

Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space."

Following the above guidance, **Table 3** summarises the advocated internal and external noise level criteria for unoccupied residential and hotel spaces relevant to this Development. Considering the high quality nature of the Development, these internal standards will be adopted for the Development.

Table 2: Summary of Recommended Environmental Noise Levels

Organisation	Typical Situation	Noise Level, dB $L_{Aeq,T}$	
		Day-time	Night-time
BS 8233:2014	Living Room/Hotel Bedroom Daytime	35	-
	Dining Room	40	-
	Bedrooms	35	30
WHO, 1999	Indoor Living Areas	35 (day); 30 & 45[1] (night)	
	Outdoor Amenity Areas	50 (desirable) 55 (upper value)	

Notes: [1] For a reasonable standard in bedrooms at night, the WHO guidelines recommend that individual noise events (measured with F time-weighting) should be limited to/not normally exceed 45 dB L_{AFmax}. The term '*normally*' is typically interpreted as no more than 10-15 times a night.

Table 4 summarises the advocated internal noise level criteria for unoccupied spaces relevant to this Development to which companies operating in the hotels and hospitality industry throughout the United Kingdom align their designs.

Table 3: Summary of Recommended Environmental Noise Levels

Typical Situation	Criterion	Noise Levels, dB $L_{Aeq,T}$	
		Daytime	Night-time
Hotel bedrooms	Reasonable resting/sleeping conditions	35	30 & 45[1] L_{AFmax} (night)
Hotel Dining Room / Bar	Reasonable listing conditions and speech or telephone communications	45 - 50	
Reception / Foyer		45 - 50	
Hotel Office		35 - 40	
A3 Restaurants and Cafes		50 - 55	

Notes: [1] For regular events only, excluding infrequent & irregular sources interpreted as no more than 10-15 times a night

4.2 Building Services Plant Noise

The significance of building services noise impacts depends upon a number of factors including the absolute noise level, the character of the noise, the margin by which the noise exceeds the background sound level, the time and duration at which the sound occurs, whether the sound is temporary, intermittent or permanent, whether the impact is as a result of a new source, or whether it is a change to an existing source and/or the sensitivity of the receptor.

The primary source of guidance in relation to sound from fixed installations, such as mechanical and electrical plant and equipment, is provided in BS 4142:2014 '*Methods for rating and assessing industrial and commercial sound*'[11]. BS 4142:2014 provides an objective method for rating the sound source and also provides a means of determining noise levels from fixed building services plant installations and prevailing background noise levels on, and around, proposed developments. The criteria for assessing the significance of impacts as taken from BS 4142:2014 are presented in **Table 5**. LBC's threshold values for plant and machinery provided in **Table 2** and Appendix 2 of the 2016 submission draft of the Local Plan were also considered in assessing the significance of sound from potential mechanical plant.

[11] BSI (2014); BS:4142 '*Methods for rating and assessing industrial and commercial sound*', BSI.

Table 4 Likelihood of Complaints (BS 4142)

Noise Level Difference dB(A)	Magnitude of Impact
Plant $L_{Ar,Tr}$ = ≤ Background	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
<5	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 a significant adverse impact
+5	Could be an indication of a significant adverse impact, depending on the context
+10	Likely to be an indication of a significant adverse impact, depending on the context

The standard provides an assessment and rating method to assess adverse impacts from a range of noise sources, including fixed building services plant. The measured or predicted noise level from the source in question, the '*specific noise*' level ($L_{Aeq,T}$), immediately outside of the dwellings is compared with the 'background noise' level ($L_{A90,T}$). Where the sound contains certain acoustic features at the assessment location (*e.g. tones, impulses, intermittency etc.*), then a scaled correction is added to the specific noise level to obtain the 'rating noise' level ($L_{Ar,Tr}$). The significance of impact dependent on the context, having consideration to pertinent factors such as the sensitivity of the receptor, the absolute level of sound to the character and level of the residual sound compared to the character and level of the specific sound.

Based on the environmental noise survey data detailed in the following section (**Section 5**), maximum plant emission levels have been set in controlling fixed building services plant to an acceptable level and are detailed in **Section 6** of this report. Noise limits apply at a position 1m from the façade of the nearest noise sensitive properties and include the total contribution of noise from all plant items associated with the proposed plant scheme that may run during any particular period.

4.3 Road Traffic Noise

Calculation of Road Traffic Noise (CRTN)[12] (*Department of Transport, 1988*) provides a methodology for the calculation of road traffic noise levels, taking into account factors such as distance between the road and receptor, road configuration, ground cover, screening, angle of view, reflection from façades and traffic flow, speed and composition. The noise parameter calculated is the $L_{A10\text{-}18\ hour}$ and is based on the 18 hour Annual Average Weekday Traffic (*18hr-AAWT*).

The Institute of Environmental Management and Assessment's (IEMA) Guidance Notes No.1 'Guidelines for the Environmental Assessment of Road Traffic'[13] recommends assessment of noise where traffic flows will increase by more than 30% (*or the number of Heavy Goods Vehicles (HGVs) will increase by more than 30%*), and where specifically sensitive areas experience traffic flow increases of 10% or more. The guidance indicates that projected changes in traffic of less than 10% create no discernible environmental impacts.

The Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 7, HA 213/08 'Noise and Vibration'[14] accords with IEMA guidance stating in paragraph 3.21 that an increase of 25% or a decrease

[12] Department of Transport/Welsh Office (1988): 'Calculation of Road Traffic Noise', HMSO, London.
[13] Institute of Environmental Management and Assessment (IEMA) (1993): 'Guidance Note No. 1 Guidelines for the Environmental Assessment of Road Traffic', IEMA.
[14] Highways Agency (HA) (2014) Design Manual for Roads and Bridges, Volume 11, Section 3, Part 7 'Traffic Noise and Vibration' HA.

of 20% in traffic volumes (*assuming no change in speed or other factors affecting generation and propagation of noise as in this instance*) is equivalent to an increase in noise level of 1dB (A), which is the minimum change that can be detected by human hearing under controlled or laboratory conditions. Therefore, only changes in traffic volumes of 25% or greater are considered significant.

Existing sensitive receptors are currently exposed to a certain level of road traffic noise. In assessment terms, it is therefore the difference in noise level as a result of the Development that is important.

The IoA / IEMA draft guidelines[15] provide an example of how changes or differences in noise levels may be categorised by significance, but caution that in any assessment the noise level threshold and significance statement should be determined by the assessor, based upon the specific evidence and likely subjective response to the noise. Hence, the scale of significance, as shown in **Table 6** will be used in this assessment.

The criteria were derived by considering how changes in noise levels can be categorised by significance, based on key benchmarks that relate to human perception of sound. For noise which is very similar in all respects except magnitude, a change or difference of 1dB is only just perceptible under controlled or laboratory conditions, whilst a change or difference of 3dB is the minimum perceptible under most normal environmental conditions. A 10dB change in noise corresponding roughly to a doubling or halving in the loudness of a sound.

Table 5: Significance Criteria for Road Traffic Noise Assessment

Significance	Change or Difference in Noise Level, dB(A)
Adverse impact of major significance	> 5
Adverse impact of moderate significance	3.0 to 4.9
Adverse impact of minor significance	1.0 to 2.9
Negligible	-0.9 to +0.9
Beneficial impact of minor significance	-1.0 to -2.9
Beneficial impact of moderate significance	-3.0 to -4.9
Beneficial impact of major significance	> -5

4.4 Noise Breakout from the A3 Premises

The significance of noise impacts associated with the A3 uses depends upon the type of tenant and the nature of noise sources, and will dictate the required sound insulation performance of the primary building fabric to control noise break-out. Particular regard will need to be given to tenants whose use may be unusually noisy or noise sensitive to minimise conflict of use between adjacent occupants and wider off site receptors. This is to ensure that tenanted activities are controlled to an unobtrusive level to safeguard the acoustic acceptability of the Development.

[15] Institute of Acoustics (IOA) / IEMA (2002): Guidelines for Noise Impact Assessment. IOA / IEMA, London.

4.5 Consultation

The Environmental Health Officers (EHO) at CC were consulted in December 2016 regarding the noise issues which need to be considered in the planning application, the appropriate standards, and the scope of the baseline monitoring exercise.

No formal response was received from CC so the appraisal has been carried out based on experience of similar developments in London using robust cautionary assumptions and sound methodology to ensure a well-balanced and considered appraisal was undertaken.

5. Baseline Conditions

5.1 Baseline Noise Monitoring

In support of the planning application for the proposed Development, short-term attended noise monitoring was carried out over a seven-day period from Friday 9th December 2016 to Friday 16th December at three key locations described in **Table 7** and illustrated in **Figure 1**, in order to establish and quantify the existing noise climate at and within the vicinity of the Development.

Table 6: Noise Monitoring Locations

Monitoring Location (Figure 1)	**Description**	**Observations and Predominant Noise Sources**
LT1	Façade measurement at roof level on the south-eastern Site boundary overlooking Granary Street. Microphone located 12m AGL.	Noise climate dominated by vehicle traffic on Granary Street and St Pancras Way (A5202) along with Kings Cross construction works. Contributory noise from human activities, distant road noise, distant railway noise, HVAC services and distant aircraft also influence the noise climate to some extent.
LT2	Façade measurement at roof level on the eastern site boundary overlooking Regents Canal. Microphone located 12m AGL.	Noise climate dominated by Kings Cross construction works along with distant railway and road traffic noise. Contributory noise from human activities, distant aircraft and HVAC services also influence the noise climate to some extent.
LT3	Façade measurement at roof level on western Site boundary overlooking St Pancras Way (A5202). Microphone located 12m AGL.	Noise climate dominated by vehicle traffic on St Pancras Way (A5202) and HVAC services. Contributory noise from human activities and distant aircraft also influence the noise climate to some extent.

Notes: LT (long-term); * Comparative free-field measurement at ground level.

All noise measurements were taken with calibrated precision grade (Class 1) frequency (*one-octave band*) sound level meters in order to provide a detailed description of the prevailing environmental noise characteristics. The sound level meters were set-up to record over consecutive 5-minute periods the L_{eq}, L_{90}, L_{10}, and L_{max} noise indices in the A-weighting network over a 125ms^{-1} fast response time constant interval for the duration of each survey. The indices are described in **Appendix A** of this report, but roughly translated they describe in turn the average, background, road traffic, and maximum noise level.

Full details of the instrumentation used for the noise measurements, including calibration certificates are available on request.

Weather conditions, whilst not actively measured during the survey period, were monitored remotely throughout. Overall, weather conditions were ideal for the measurement of noise, it being fine and dry, with just a light north-westerly to north-easterly wind (<5ms^{-1}) prevailing.

A summary of the measured daytime (07:00 to 19:00), evening (19:00 to 23:00) and night-time (23:00 to 07:00) noise levels are presented in **Table 8**, with full results displayed graphically in time-history format in **Annex B**. A summary of attended short-term daytime measurement results are presented in **Table 9** out of completeness.

Table 7: Summary of Attended Baseline Noise Monitoring Results (*Façade Measurement*)

Monitoring Location (Figure 1)	Period	Duration	$L_{Aeq,T}$ dB		$L_{A10,T}$ dB		$L_{A90,T}$ dB		$L_{AFmax,5min}$ dB	
			Range	Ave[1]	Range	Ave[2]	Range	Ave[2]	Range	90th Percentile[3]
LT1	Day	12hr	55 - 71	62	55 - 73	64	52 – 68	57	57 – 92	78
	Evening	4hr	55 – 70	60	56 - 68	61	52 – 57	55	61 – 90	74
	Night	8hr	51 - 64	57	53 - 69	58	49 – 57	53	55 – 86	73
LT2	Day	12hr	49 - 71	55	50 - 76	55	47 – 57	51	53 - 84	72
	Evening	4hr	48 - 58	51	49 - 62	52	46 – 56	49	51 - 77	66
	Night	8hr	46 - 57	49	46 - 60	50	44 – 56	47	49 - 81	61
LT3	Day	12hr	61 - 80	68	66 - 78	70	50 – 68	60	72 - 105	85
	Evening	4hr	59 - 77	67	64 - 81	70	50 - 67	56	71 - 100	83
	Night	8hr	50 - 83	65	51 - 84	67	48 - 82	52	61 - 100	81

Notes: [1] Logarithmic average over the daytime survey periods; [2] Arithmetic average over the daytime survey periods; [3] The 90th percentile L_{AFmax} value is presented and considered representative of typical L_{AFmax} levels experienced. All figures rounded to nearest whole decibel.

Table 8: Summary of Short Term Baseline Noise Monitoring Results (*Free-Field Measurement*)

Monitoring Location (Figure 1)	Period	Duration	$L_{Aeq,T}$ dB	$L_{A10,T}$ dB	$L_{A90,T}$ dB	$L_{AFmax,5min}$ dB
			Ave[1]	Ave[2]	Ave[2]	90th Percentile[3]
ST1	Day	20mins	69	73	58	85
ST2	Day	20mins	67	69	59	86
ST3	Day	20mins	67	71	54	85
ST4	Day	20mins	53	55	50	67

Notes: [1] Logarithmic average over the daytime survey periods; [2] Arithmetic average over the daytime survey periods; [3] The 90th percentile L_{AFmax} value is presented and considered representative of typical L_{AFmax} levels experienced. All figures rounded to nearest whole decibel.

6. Assessment of Existing Noise Levels

6.1 Assessment of Existing Noise Levels upon Future Residential & Hotel Use

The degree of external environmental noise intrusion into internal areas depends on the acoustic performance of all elements of the façade, but it is generally determined by the components providing the least airborne sound resistance, in this case the glazing; especially when residents open windows to provide natural background or rapid ventilation.

The glazing performance requirements are dependent on the use type, the percentage of the façade that is glazed, the frequency composition of noise incident on the façade and the ventilation strategy. Preliminary calculations have been undertaken to provide an early indication of the sound insulation performance requirements the glazing in the worst affected façades would be required to provide to achieve the internal criteria set out in **Section 3** of this report (*with windows closed or fixed*) and are presented in **Table 10**. The calculations adopt the detailed methodology set out in BS 8233:2014, and are based on the following assumptions considered to present an accurate if not slightly cautionary scenario:

- To ensure favourable acoustic conditions are provided for, assessment has been based on determined daytime ambient ($L_{Aeq,16hr}$) and night-time ambient ($L_{Aeq,8hr}$) and maximum (L_{AFmax}) values. The 90th percentile measured L_{AFmax} level has been used in the night-time assessment in residential bedrooms and is considered to fairly represent typical L_{AFmax} levels being experienced on the most noise exposed façade of the proposed Development.
- The internal finishes of the room will affect the reverberant component of the overall noise level, with a degree of soft furnishing (*carpet and curtains*) considered in our calculations. All walls and ceilings are assumed to be plastered and painted.
- It has been assumed that the external walls forming a part of the Development achieve an acoustic performance of not less than 50dB R_w.
- The calculated noise levels are based on a 80% glazed area for different user elements of the Development. Should glazed areas change by +/-10% of the façade area then the performance of the proposed glazing units would need to be adjusted accordingly.

Table 9: Minimum Indicative Glazing Performance Specification

Façade	Floor Levels / Room Spaces	Period / Parameter	Target Criterion	Incident Façade Noise Level	Sound Reduction Index (dB) in Octave Band Centre Frequency (Hz)								Minimum Sound Insulation of Glazing	Example Glazing Configuration
					63	125	250	500	1k	2k	4k	8k	dB (R_w+C_{tr})[1]	(*or equal and approved*)
LT1 – Southern Façade	Business Floorspace	Daytime $L_{Aeq,16hr}$	45	61	12	18	22	25	26	25	21	19	≥24	Standard double glazing (e.g. 4/12/4mm) + Acoustic Passive Ventilation
	Residential Bedrooms		35		21	27	32	36	37	36	33	29	≥35	Thick double glazing (e.g. 4:12:6.4 mm Stadip Silence) + mechanically ventilation
		Night-time $L_{Aeq,8hr}$	30	57	20	28	33	37	38	36	33	28	≥36	
		Night-time L_{AFmax}[1]	45	73	25	28	32	36	39	37	33	32		
LT2 – Northern & Eastern Façade	Business Floorspace	Daytime $L_{Aeq,16hr}$	45	54	7	12	16	18	19	18	14	11	≥18	Standard double glazing (e.g. 4/12/4mm) + Acoustic Passive Ventilation
	Residential & Hotel Bedrooms		35		16	21	26	29	30	29	26	21	≥27	
		Night-time $L_{Aeq,8hr}$	30	49	13	21	26	30	30	28	22	12	≥28	
		Night-time L_{AFmax}[1]	45	62	14	17	23	25	26	25	22	19		
LT3 – Western Façade	Business Floorspace	Daytime $L_{Aeq,16hr}$	45	68	12	18	22	26	35	27	33	27	≥26	Standard double glazing (e.g. 4/12/4mm) + Acoustic Passive Ventilation
	Hotel Bedrooms		35		21	27	32	37	46	38	45	37	≥36	Thick double glazing (e.g. 6:12:6.4 mm Stadip

												Silence) + mechanically ventilation
Night-time $L_{Aeq,8hr}$	30	65	20	26	32	39	48	48	46	31	≥39	Thick double glazing (e.g. 6:12:8.4 mm Stadip Silence) + mechanically ventilation
Night-time L_{AFmax}[1]	45	81	27	31	34	40	47	41	49	38		

Notes: [1] The sound insulation performance of the window is for the glazing system as a whole (*including framing, seals, opening lights etc.)* as opposed to the glass panels alone. Preliminary assessment has been based on 80% of the façade area being glazed, with results dependent on but not limited to the final area of glazing.

On the basis of the measured external noise climate and preliminary break-in calculations, providing the glazing system as a whole (*including framing, seals openable lights etc.*) meet or exceed the stipulated performance specified in **Tables 10** on the most noise exposed building façades then sufficient resistance to external environmental noise should be provided to achieve the target internal design criteria levels (*windows closed*). This could be secured though a suitably worded planning condition.

During the detailed design phase of the project, a complete assessment will be undertaken and used to identify the detailed zoning of window types and attendant acoustic performance specifications in one octave band detail to ensure appropriate control of the frequency content of sound incident upon all the different façades of the Development.

6.2 Ventilation

The sound insulation performance of the glazing system assumes that windows are fixed and or remain closed. Should windows be partially opened for ventilation (*assuming 10-15dB typical noise attenuation*) then the internal design criteria levels within the different room spaces (**Tables 3 & 4**) would not be met.

The Building Regulations on ventilation (*Approved Document F; ADF*)[16] require that habitable rooms have background ventilation by natural or mechanical means. As such, an alternative source of passive (*e.g. trickle vent*) or mechanical ventilation will need to be made available that meets the minimum requirements for background ventilation in habitable rooms as set out in ADF. It is important to ensure that the alternative source of ventilation does not compromise the overall performance of the façade system or the internal ambient noise level criteria to be met within habitable room spaces.

At this stage, it is understood the ventilation strategy for the building would be an active solution comprising a whole building mechanical ventilation system. This would allow windows to remain closed for much of the time, safeguarding internal target criteria levels, with occupants and tenants free to open windows for purge ventilation and summer cooling as required at their own discretion accepting the related increase in noise.

[16] Department for Communities and Local Government (DCLG) (2010); '*The Building Regulations Approved Document F – Means of Ventilation*', HM Government.

7. Noise Impact Assessment

7.1 Road Traffic Noise Assessment

The likely change in road traffic noise resulting from operational traffic associated with the Development was determined in accordance with CRTN; the results of which are presented in **Table 11**. The 2025 baseline scenario 'without Development' includes traffic increases due to natural traffic growth and a cumulative scheme. Therefore, the scenario 'with Development' is intended to identify the likely impacts solely as a result of the Development.

Table 10: Differences in the Road Traffic Basic Noise Level (BNL), dB LA10,18hr

Road Link	Difference in dB $L_{A10,18hr}$ BNL (Base + Development) - (Base)		
	2025 - Without Development (Base)	2025 - With Development (Base + Development)	Change
Pancras Road, south of junction with Crowndale Road	69.4	69.7	0.3
Granary Street, east of junction with St Pancras Way	62.9	63.0	0.1
St Pancras Way, north of site	62.5	62.7	0.1
Camden Road, west of St Pancras Way	71.6	71.9	0.3
Camden Road, west of Murray Street	71.0	71.2	0.2

For all road links assessed in **Table 11**, the difference in operational road traffic noise (considering the 2025 baseline situation both 'with' and 'without' Development) is no greater than +0.5 dB. According to the criteria (see **Table 6**) the difference in noise levels are negligible, with Development alone would not cause any discernible impacts.

7.2 Building Services Plant Noise Limiting Criteria

Any items of fixed plant associated with the operation of the proposed Development would have the potential to generate noise. At this stage in the design of the Development, specific details of the type, number and configuration of building services plant are not developed. Consequently, suitable limits to which plant should adhere have been set.

Based on the results of the baseline noise survey (**Table 8, Section 5**), suitable noise limits to which fixed building services plant should adhere have been set and are presented in **Table 12**.

Table 11: Plant Noise Limits at Nearest Noise Sensitive Premises

Location	Period	Measured Minimum $L_{A90,15min}$	Plant Noise Emission Limit [1] ($L_{Ar,15min}$)
NSR A	Daytime	47	37
	Evening	46	36
	Night-time	44	35[1]
NSR B	Daytime	52	42
	Evening	52	42
	Night-time	49	39
NSR C	Daytime	50	40
	Evening	50	40
	Night-time	48	38

Notes: [1] A limiting plant noise limit of 35 $dBL_{Aeq,T}$ is set where the prevailing background noise levels minus 10 dB(A) are below this value. Such a limiting criterion falls below credited absolute health-based guideline values to prevent harmful effects of noise (*e.g. on rest/sleep with windows open*), whilst ensuring standard abatement measures remain physically and economical viable.

The plant noise limits apply to the total contribution of noise from all new plant items associated with the proposed Development that may run during any particular period and are to be met 1m from the nearest habitable window of existing potentially sensitive receptors that may be affected by the proposed Development, together with future sensitive receptors forming a part of the Development.

Based on the above noise emission limits for new building plant being achieved (*and potentially being controlled by a standard planning condition*), noise generated from new building services plant would have a negligible impact on surrounding existing and future sensitive receptors.

8. Break-Out Noise Associated with A3 Premises

Class A3

In order to not prejudice public areas outside of the proposed Development, it is recommended that break-out noise is controlled to below NR 40 (~48dBA) 3.0m from the façade, which will ensure that noise levels at the nearest noise sensitive receptors fall to an unobtrusive (*unnoticeable*) level as not to materially affect or inconvenience user's amenity, thereby ensuring the acoustic acceptability of the Development.

At this stage in the design of the Development, the future tenant and restaurant type is not known. However, a representative sample internal ambient noise level of 75 dB $L_{Aeq,T}$ and maximum noise level of 93 dB L_{AFmax} taken within a busy themed restaurant with incidental background music and raised voice to represent a '*severe case'* scenario have been used in the appraisal. This allows break-out noise levels associated with the operation of the restaurants to be identified and controlled to a sufficient level as to ensure negligible disturbance to nearby residents. For the Development this can be achieved where the façade system provides a performance equal to or greater than that presented in **Table 13.**

Table 12: Minimum Façade Specification

Octave Band Centre Frequency (Hz)								
63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**$R_w + C_{tr}$**	**Example Glazing Configuration** (or equal and approved)
Minimum Sound Reduction Index, dB								
29	29	29	38	43	49	56	36	10/12/8.8 mm Stadip Silence

For guidance only, the glazing configuration outlined in **Table 13**, which would typically be expected to be suitable in achieving the minimum SRI requirements. It should be noted, however, that this construction is for guidance/costing purposes only, and does not constitute a recommended construction.

9. Conclusions

This noise assessment has been prepared by Waterman Infrastructure & Environment Ltd on behalf of Reef Estates as part of a noise assessment for the redevelopment of the Ugly Brown Building in Camden. The following points outline the assessment findings of this report:

- A comprehensive noise assessment has been undertaken across the Site in order to assess the amenity of the proposed redevelopment for future occupants and to determine the potential impacts of the proposed Development upon nearby existing and proposed sensitive receptors.
- To facilitate this assessment, short-term attended noise monitoring was carried out at ground level on Friday 09 December 2016 at four key locations to establish and quantify the existing noise climate around the Site.
- Noise monitoring results confirm the east and south Site boundary to be exposed to high noise levels commensurate to its urban location adjoining the busy St Pancras Road (A5202). In contrast the levels on the western Site boundary adjoining the Regent Canal are around 12 dB lower.
- Based upon measured environmental noise levels ($L_{Aeq,T}$ and L_{AFmax}) affecting the Site, preliminary façade sound insulation calculations have been undertaken to determine the sound insulation performance requirements the glazing in the worst affected façades would be required to provide in controlling the ingress of noise to meet recommended internal design criteria noise levels (BS 8233;2014 and WHO,1999).
- This study has shown that to achieve the internal noise level design criteria within hotel spaces on the most noise exposed façade (western façade) it will be necessary to provide thick doubled glazed units (*e.g.* 6:12:6.4 and *6:12:6.8 mm Stadip Silence*) providing in the region of 36 to 39 dB R_w+C_{tr} sound insulation. This is in combination with a mechanical ventilation system proposed as part of the design of the Development and could be secured though a suitably worded planning condition. During the detailed design phase of the project, a more detailed assessment will be undertaken.
- No significant change in noise level is predicted due to the increase in traffic flows associated with the completed Development.
- With regards to building services plant, suitable plant noise emission limits have been specified in accordance with BS4142; 2014 and LBC plant noise policy to which all fixed plant will need to be designed (*collectively*) to achieve. Providing careful attention is paid to plant selection, installation and noise attenuation and that the design aim is achieved then there can be high confidence that noise from the operation of plant associated with the proposed Development will have negligible impact upon the existing noise climate and amenity of nearby sensitive receptors or future occupants of the Development.

Based on assessment findings, it is considered that noise levels can be satisfactorily controlled to within recommended acoustic design standards so that a high quality acoustic environment is provided to all future occupants and that impacts associated with the operation of the completed Development can be controlled to a level of negligible significance for existing receptors.

FIGURES

waterman

- Site Boundary
- LT Long Term Noise Monitoring Location
- ST Short Term Noise Monitoring Location

Noise Sensitive Receptor

- A The Royal Veterinary College
- B Saint Pancras Hospital
- C Residential

N

Project Details	WIE11701-100: Ugly Brown Buildings, London
Figure Title	Figure 1: Noise Monitoring and Noise Sensitive Receptor Locations
Figure Ref	WIE11701-100_GR_NM_1C
Date	August 2017
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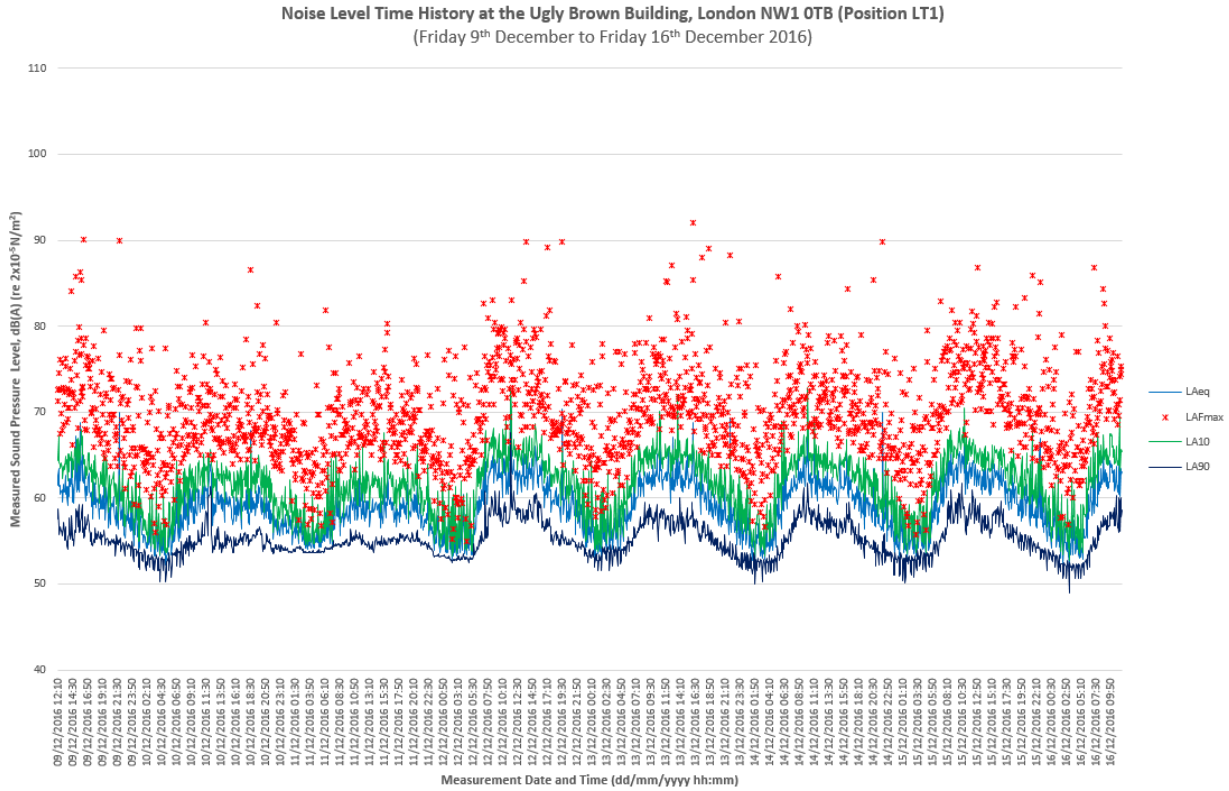
APPENDICES

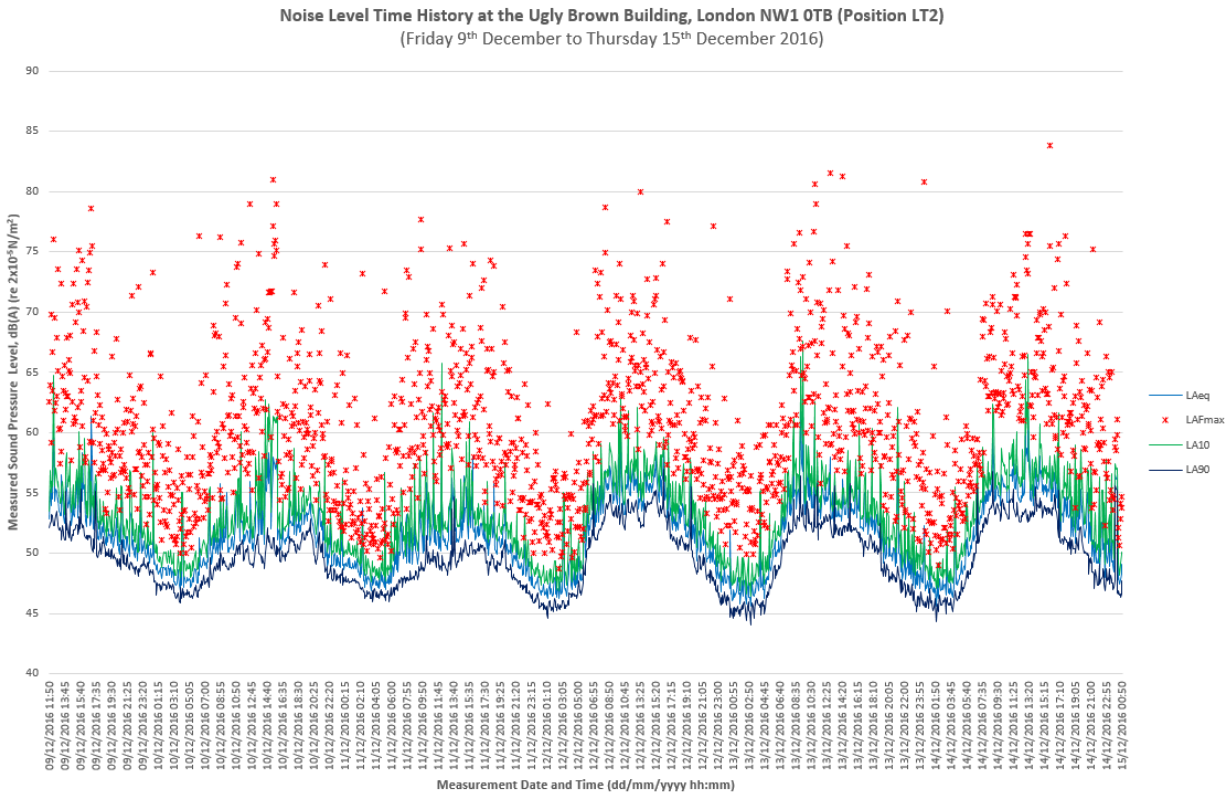
Appendix A Acoustic Terminology

Ambient sound	The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far.
Assessment period	The period in a day over which assessments are made.
A-weighting	A frequency weighting applied to measured or predicted sounds levels in order to compensate for the non-linearity of human hearing.
Background noise	Background noise is the term used to describe the noise measured in the absence of the noise under investigation. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L_{90} noise level (see below).
Broadband	Containing the full range of frequencies.
Decibel [dB]	The level of noise is measured objectively using a Sound Level Meter. This instrument has been specifically developed to mimic the operation of the human ear. The human ear responds to minute pressure variations in the air. These pressure variations can be likened to the ripples on the surface of water but of course cannot be seen. The pressure variations in the air cause the eardrum to vibrate and this is heard as sound in the brain. The stronger the pressure variations, the louder the sound is heard. The range of pressure variations associated with everyday living may span over a range of a million to one. On the top range may be the sound of a jet engine and on the bottom of the range may be the sound of a pin dropping. Instead of expressing pressure in units ranging from a million to one, it is found convenient to condense this range to a scale 0 to 120 and give it the units of decibels. The following are examples of the decibel readings of every day sounds; Four engine jet aircraft at 100m — 120 dB Riveting of steel plate at 10m — 105 dB Pneumatic drill at 10m — 90 dB Circular wood saw at 10m — 80 dB Heavy road traffic at 10m — 75 dB Telephone bell at 10m — 65 dB Male speech, average at 10m — 50 dB Whisper at 10m — 25 dB Threshold of hearing, 1,000 Hz — 0 dB
Free Field	Free field noise levels are measured or predicted such that there is no contribution made up of reflections from sound reflecting objects (e.g. buildings),usually taken to mean at least 3.5m away.
dB(A): A-weighted decibels	The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the 'A' filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise.
Façade Noise Level	A noise level measured or predicted at the façade of a building, typically at a distance of 1m, containing a contribution made up of reflections from the façade itself (+3 dB).
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.

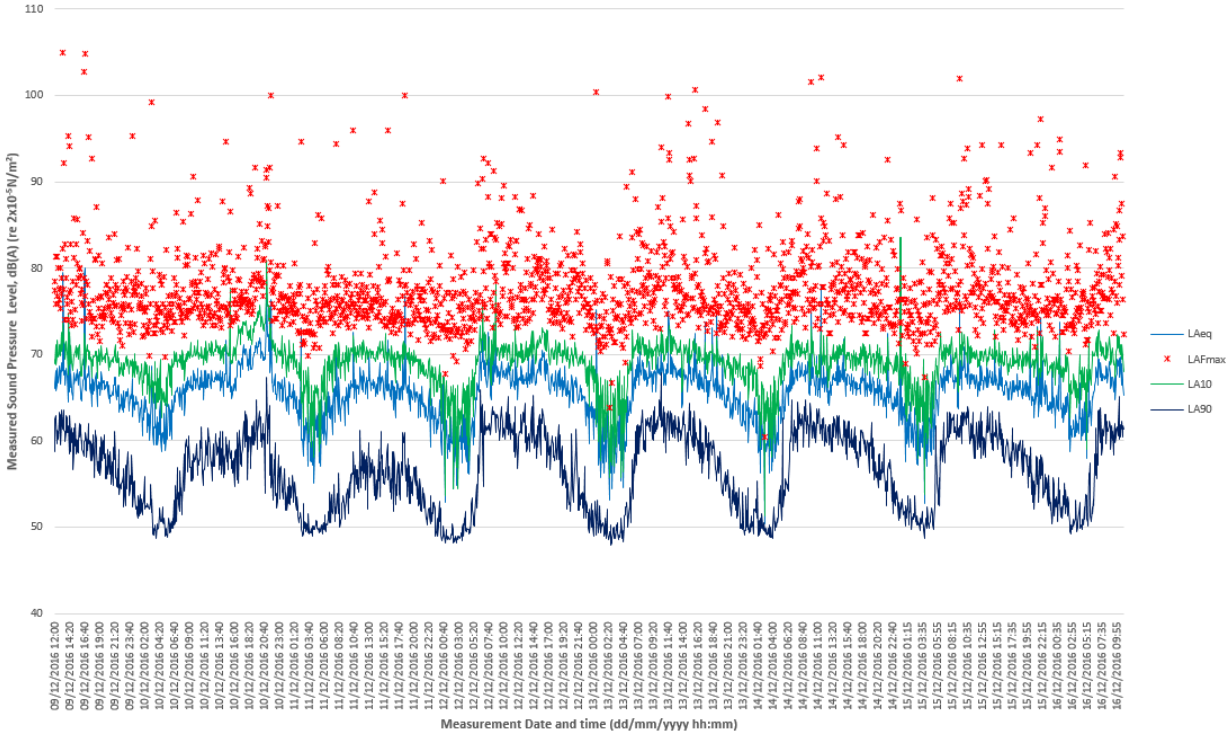
L_{eq}	A noise level index called the equivalent continuous noise level over a specified period of time, T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured. The L_{10} can be considered to be the "average maximum" noise level and is generally used to describe road traffic noise.
L_{90}	The level of noise exceeded for 90% of the measurement time interval, T. The L_{90} can be considered to be the "average minimum" noise level and is often used to describe the background noise.
L_{max}	The maximum noise level over a specified period of time, T, and unless described otherwise, it is measured using the 'fast' sound level meter response. The L_{AFmax} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{Aeq} noise level but will still affect the noise environment.
Rating Noise Level ($L_{Ar,Tr}$)	The equivalent continuous A-weighted sound pressure level during a specified time interval, plus specified adjustments for tonal character and impulsiveness of sound.
Loudness	A rise of 10 dB in sound level corresponds approximately to a doubling of subjective loudness. That is, a sound of 85 dB is twice as loud as a sound of 75 dB which is twice as loud as a sound of 65 dB and so on. That is, the sound of 85 dB is 400% times the loudness of a sound of 65 dB.
Noise	Sound which a listener does not wish to hear.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Specific Noise Level	The monitored/calculated noise level as a result of a noise source excluding the impacts of any extraneous noise sources.
Vibration Dose Value (VDV)	A cumulative measurement of the vibration level received over an 8-hour or 16-hour period.
Weighted Sound Reduction Index (R_w)	The weighted sound reduction index (R_W) is a single figure number rating used to describe the sound reduction of a material or building element. The R_W is calculated from the measured values in each one-third-octave band. A laboratory measurement and so may be used to compare building elements. As with all single figure indices the specified acoustic performance is not always achieved when applied to real noise exposure. Consequently, the R_w cannot be used directly to estimate the noise level in the room. However, where noise from road traffic, low speed railway traffic and/or aircraft traffic at large distances exists, the spectrum adaptation term, C_{tr}, can be added to the R_w to take account of the low frequency spectrum of the noise and provide a more accurate indication of the sound reduction of the building element (e.g. window) (in dB).

Appendix B Noise Level Time History Graphs





Noise Level Time History at the Ugly Brown Building, London NW1 0TB (Position LT3)
(Friday 9th December to Friday 16th December 2016)



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