SYNTEGRA CONSULTING

Land Formerly Known As British Gas Works, Albert Road, New Barnet, Barnet, EN4 9S

Proof of Evidence (Acoustics)

June 2022

Ref: 19-6526 PoE

TABLE OF CONTENTS

Quality Standards Control

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Revision	*PoE*
Date	21/06/2022
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Checked by	B. Grant
Authorised by	D. Yates MIOA

1. Professional Statement

1.1.1. I am David Yates BSc Hons (Physics with Acoustics with a year in industry) and I am a full member of the Institute of Acoustics (MIOA) with over ten years' experience in acoustic consultancy. I have particular expertise in environmental noise providing acoustic consultancy for residential and mixed use planning applications, plant noise and vibration, construction noise and the design of acoustic, noise and vibration control. I also have experience in providing sound insulation testing and design advice.

1.1.2. I have significant experience of residential planning applications and transportation noise, having advised on numerous developments from small developments to very large developments in locations subject to many different noise sources throughout his entire career.

1.1.3. I am familiar with the application of all relevant standards and guidance documents associated with my work, including but not limited to, BS 8233, WHO Guidelines, ProPG, BS 4142, BS 7445, BS 6472, BS 5228, BS 140 series, BS 16283 series and BS 717 series. I maintain familiarity with best practice and updates to standards and guidance documents through being active in general meetings and a member of committees and working groups with both the Institute of Acoustics (IOA) and Association of Noise Consultants (ANC).

1.1.4. I manage Syntegra Consulting's acoustic department and I am responsible for maintaining Syntegra's ANC membership.

2. Introduction

2.1.1. In this proof of evidence I demonstrate that the proposed development at the **Land Formerly Known As British Gas Works, Albert Road, New Barnet, Barnet, EN4 9S** will not be subject to undue noise impacts and is fully compliant with the relevant legislation and guidance documents. A full assessment has been previously provided as Syntegra Report "Noise Impact Assessment" (reference 19-6526 Rev. E dated 6th August 2021).

2.1.2. The proposed scheme involves the redevelopment of the site to provide 544 residential units (Use Class C3) within 13 buildings ranging from 4 to 8 storeys, with 267.1sqm of retail/commercial space and 112.7sqm of community space (Use Class A1/A2/A3/A4/B1/D1/D2) at ground floor level, new external public realm with communal landscaped amenity areas, alterations and additions to existing highways arrangements plus the removal of an existing elevated footbridge and creation of new pedestrian routes, 334 car parking spaces (including car club and accessible provision) with basement and surface level provision, secure cycle parking, servicing and other associated development.

2.1.3. The proposed development site is located in a mixed residential and commercial area. To the north of the proposed development site is the Albert Road gas works, which is generally quiet apart from a small number of vehicle movements, access to the gas works is along the Spine Road through the proposed development site. To the east of the site is Victoria Park and approximately 30m to the west is the East Coast Main Line railway. On the eastern boundary of the site is a shooting range and meeting hall for the East Barnet Shooting Club, beyond which are residential houses. On the south-western boundary of the site are two public houses: The Railway Bell Public House and Builders Arms Public House and a new residential development (currently under construction). To the south of the site is a mixed residential and retail/commercial area along the A110 East Barnet Road and Victoria Road.

2.1.4. For the avoidance of doubt, the acoustic recommendations in terms of building envelope, glazing and ventilation specifications for the scheme are:

- The façade build-up will be a standard brick and block construction or concrete and steel frame construction to achieve an R_w of approximately 50 dB – 55 dB.
- For those flats directly overlooking Victoria Road/A110 East Barnet Road and the railway line:
  - A double glazing system will be installed to give a minimum Sound Reduction Index (SRI) of 34 dB R_w.
  - MVHR will be installed to allow adequate background ventilation without the requirement to open windows.
  - Purge ventilation (as defined by ADF) would be achieved through open windows.
  - Open windows not acceptable for the mitigation of overheating.
- For flats overlooking Albert Road and the Spine Road:
  - A typical double glazing system will be installed to give a minimum Sound Reduction Index (SRI) of 32 dB R_w.
  - Appropriately specified acoustic trickle vents, with a $D_{n,e,w}$ of at least 38 dB, will be installed to allow adequate background ventilation without the requirement to open windows.
  - Purge ventilation (as defined by ADF) would be achieved through open windows.

- Open windows acceptable for the mitigation of overheating from an acoustic perspective.

- For flats other flats without a direct line of site to major noise sources:
  - A typical double glazing system will be installed to give a minimum Sound Reduction Index (SRI) of 32 dB R_w.
  - Background ventilation could be achieved through open windows from an acoustic perspective.
  - Purge ventilation (as defined by ADF) would be achieved through open windows.
  - Open windows acceptable for the mitigation of overheating from an acoustic perspective.

2.2. Exclusions

2.2.1. Noise from nearby commercial and recreational premises, including the two Public Houses and East Barnet Shooting Club has been assessed in detail within Syntegra Report "Noise Impact Assessment" (reference 19-6526 Rev. E dated 6th August 2021) with no noise impacts expected. These noise sources have also not been raised by the Council or Rule 6 party and therefore has been excluded from this Proof of Evidence. Additionally, vibration has not been raised as a concern and therefore has not been addressed as an issue in this proof of evidence.

3. Legislation and Guidance Documents

3.1.1. The legislative framework surrounding noise assessments, and guidance documents referred to in order to demonstrate compliance with said legislation is set out below.

3.2. National Planning Policy Framework

3.2.1. The National Planning Policy Framework (NPPF) was released in March 2012 and last updated in July 2021. The purpose of the planning system is to contribute to the achievement of sustainable development and to encourage good design. There are three dimensions to sustainable development: economic, social and environmental.

3.2.2. Central to the NPPF, paragraph 10 states: *'At the heart of the National Planning Policy Framework is a **presumption in favour of** [permitting] **sustainable development**'*. This is expanded upon in paragraph 11, where it is stated:

*'…For **decision-taking** this means:*

- *approving development proposals that accord with an up-to-date development plan without delay; or*
- *where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date, granting permission unless:*
  - *the application of policies in this Framework that protect areas or assets of particular importance provides a clear reason for refusing the development proposed; or*
  - *any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole'*

3.2.3. Paragraph 174 states *'Planning policies and decisions should contribute to and enhance the natural and local environment by… preventing new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of… noise pollution…'.*

3.2.4. Paragraph 185 states: *'Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

- *mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life (see Explanatory Note to the Noise Policy Statement for England (DEFRA)).*
- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- *limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.'*

3.3. Noise Policy Statement for England

3.3.1. The Noise Policy Statement for England (NPSE) aims to *'through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*

- *where possible, contribute to the improvement of health and quality of life'.*

3.4. London Plan

3.4.1. The London Plan (published March 2021) contains overarching policy for all developments in the Greater London area.

3.4.2. Policy D14 relates to noise and states:

*"**Policy D14 Noise***

A In order to reduce, manage and mitigate noise to improve health and quality of life, residential and other non-aviation development proposals should manage noise by:

1) avoiding significant adverse noise impacts on health and quality of life

2) reflecting the Agent of Change principle as set out in Policy D13 Agent of Change

3) mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development without placing unreasonable restrictions on existing noise-generating uses

4) improving and enhancing the acoustic environment and promoting appropriate soundscapes (including Quiet Areas and spaces of relative tranquillity)

5) separating new noise-sensitive development from major noise sources (such as road, rail, air transport and some types of industrial use) through the use of distance, screening, layout, orientation, uses and materials – in preference to sole reliance on sound insulation

6) where it is not possible to achieve separation of noise-sensitive development and noise sources without undue impact on other sustainable development objectives, then any potential adverse effects should be controlled and mitigated through applying good acoustic design principles

7) promoting new technologies and improved practices to reduce noise at source, and on the transmission path from source to receiver.

B Boroughs, and others with relevant responsibilities, should identify and nominate new Quiet Areas and protect existing Quiet Areas in line with the procedure in Defra's Noise Action Plan for Agglomerations."

3.5. Local Planning Policy

3.5.1. The site is located within the administrative boundary of the London Borough of Barnet (LBB).

3.5.2. LBC have set standards for "noise quality" within their Supplementary Planning Document on Sustainable Design and Construction (published October 2016). The requirements for reporting in respect of "noise quality" are set out in Table 2.14.3 of that document and are reproduced in **Table 3.1** below.

Noise Quality Requirements	***Development Scale***
To help consider noise at a site at an early stage an initial noise risk assessment should assess the Noise Risk Category of the site to help provide an indication of the likely suitability of the site for new residential development from a noise perspective	*Minor, Major, or Large scale developments*
A Noise Impact Assessment is required for proposed residential development which is likely to be exposed to significant noise and/or vibration or cause a noise and/or vibration impact. For all noise-sensitive and noise creating developments the council will refer to the standards set out for internal and external noise levels in BS8233 (2014) and to the approach of BS4142:2014.	*Minor, Major, or Large scale developments*
The adverse impacts of noise should be minimised, using measures at source or between source and receptor (including choice and location of plant or method, layout, screening and sound absorption) in preference to sound insulation at the receptor, wherever possible.	*All development*
Any proposed plant and machinery shall be operated so as to ensure that any noise generated is at least 5dB(A) below the background level, as measured from any point 1 m outside the window of any room of a neighbouring residential property. Plant should also be installed to ensure that no perceptible noise or vibration is transmitted through the structure to adjoining premises.	*All development with plant and machinery or activity which potentially has a noise impact*

Table 3.1: London Borough of Barnet's Noise Quality Requirements

3.5.3. The initial noise risk assessment referred to in **Table 3.1** is detailed within the SPD and Syntegra note that this broadly follows the same advice as the ProPG (refer to **Section 3.9** of this report). The ProPG was published after the SPD and is now widely considered to be acceptable across Local Authorities as best practice guidance and Syntegra have therefore primarily utilised that document for their assessment.

3.6. Planning Practice Guidance for Noise

3.6.1. The Planning Practice Guidance for Noise (PPG-Noise) was published in March 2014 and last updated in July 2019. The PPG provides advice on how to determine the noise impact on development and states at Paragraph 3:

'Plan-making and decision making need to take account of the acoustic environment and in doing so consider:

- *whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur; and*
- *whether or not a good standard of amenity can be achieved.*

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation. As noise is a complex technical issue, it may be appropriate to seek experienced specialist assistance when applying this policy.'

3.6.2. The document goes on to provide a definition for the levels of noise exposure at which an effect may occur at Paragraph 4:

*'**Significant observed adverse effect level:** this is the level of noise exposure above which significant adverse effects on health and quality of life occur.*

***Lowest observed adverse effect level:** this is the level of noise exposure above which adverse effects on health and quality of life can be detected.*

***No observed effect level:** this is the level of noise exposure below which no effect at all on health and quality of life can be detected.*

…'

3.6.3. It is important to understand that as the PPG-Noise does not provide any advice with respect to specific noise levels/ limits for different sources of noise, it is appropriate to consider other sources of advice and guidance documents when considering whether new developments would be sensitive to the prevailing acoustic environment.

3.6.4. At Paragraph 5, a noise exposure hierarchy table is provided, which is reproduced as **Table 3.2**.

Response	***Examples of outcomes***	***Increasing effect level***	***Action***
No Observed Effect Level			
Not present	*No Effect*	*No Observed Effect*	*No specific measures required*
No Observed Adverse Effect Level			
Present and not intrusive	*Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life*	*No Observed Adverse Effect*	*No specific measures required*
Lowest Observed Adverse Effect Level			
Present and intrusive	*Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the*	*Observed Adverse Effect*	*Mitigate and reduce to a minimum*

Response	Examples of outcomes	Increasing effect level	Action
	noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.		
Significant Observed Adverse Effect Level			
Present and disruptive	*The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.*	*Significant Observed Adverse Effect*	*Avoid*
Present and very disruptive	*Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory*	*Unacceptable Adverse Effect*	*Prevent*

Table 3.2: Noise Exposure Hierarchy Table

3.6.5. Paragraph 6 introduces factors to consider in respect of noise and introduces the acceptability of relying on closed windows to achieve acceptable internal noise levels, provided that an alternative means of ventilation is provided:

'The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation.

These factors include:

- *the source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day – this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;*
- *for a new noise making source, how the noise from it relates to the existing sound environment;*
- *for non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;*
- *the spectral content of the noise (i.e. whether or not the noise contains particular high or low frequency content) and the general character of the noise (i.e. whether or not the noise contains particular tonal characteristics or other particular features), and;*
- *the local arrangement of buildings, surfaces and green infrastructure, and the extent to which it reflects or absorbs noise.*

More specific factors to consider when relevant include:

- *the cumulative impacts of more than one source of noise;*
- *whether any adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time (and the effect this may have on living conditions). In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations.*
- *…'*

3.6.6. Finally, of relevance to the proposed development, Paragraph 11 presents ways in which noise impacts may be mitigated:

'Noise impacts may be partially offset if residents have access to one or more of:

- *a relatively quiet facade (containing windows to habitable rooms) as part of their dwelling;*
- *a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced if this area is exposed to noise levels that result in significant adverse effects;*
- *a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or*
- *a relatively quiet, protected, external publically accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minute walking distance).'*

3.7. British Standard BS 8233:2014

3.7.1. BS 8233: *Sound Insulation and Noise Reduction for Buildings – Code of Practice* has a number of design criteria and limits for intrusive external noise. The guidelines are designed to achieve reasonable resting/sleeping conditions in bedrooms and good listening conditions in other rooms and the most appropriate to the residential environment are set out in Table 4 of the document and reproduced in **Table 3.3**.

Activity	Location	07:00 – 23:00	23:00 – 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

NOTE 1 The Table provides recommended levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Ground-borne noise is assessed separately and is not included as part of these targets, as human response to ground-borne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

NOTE 2 The levels shown in the Table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the levels recommended in the Table.

NOTE 3 These levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.

NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values.

NOTE 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the facade insulation or the resulting noise level.

If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment.

Activity	Location	07:00 – 23:00	23:00 – 07:00
NOTE 6 Attention is drawn to the requirements of the Building Regulations. **NOTE 7** Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.			

Table 3.3: Indoor Ambient Noise Levels for Dwellings

3.7.2. With respect to external noise levels, BS 8233 states:

'For traditional external areas that are used for amenity space, such as gardens and 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.'

3.8. World Health Organization Guidelines for Community Noise

3.8.1. The World Health Organization (WHO) has developed guidelines designed to minimise the adverse effects of noise. The guidelines relevant to residential noise exposure are detailed in **Table 3.4**. For each specific environment the stated noise levels are the maximum noise levels to avoid the health effect noted.

Specific Environment	Critical health effect(s)	L_{Aeq} dB	Time Base (hours)	L_{Amax} (fast) dB
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
Inside bedrooms	Sleep disturbance, night-time	30	8	45

Specific Environment	Critical health effect(s)	L_{Aeq} dB	Time Base (hours)	L_{Amax} (fast) dB
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

Table 3.4: WHO Community Noise Guideline Values

3.8.2. The WHO guidelines state, with respect to the L_{Amax} threshold, that *'for a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB L_{Amax} more than 10 – 15 times per night (Vallet and Vernet 1991)'.*

3.9. Professional Practice Guidance on Planning & Noise.

3.9.1. The Professional Practice Guidance (ProPG) on Planning and Noise for New Residential Development was published in May 2017 by the Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH). The document has been produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England and provides numerical acoustic standards in line with the objectives of the Government's planning and noise policy. As a collaboration between the ANC, IOA and CIEH the document has been designed to encourage a good acoustic design process and aims to protect people from the harmful effects of noise.

3.9.2. The ProPG notes that it *'does not constitute an official government code of practice and neither replaces nor provides an authoritative interpretation of the law or government policy on which users should take their own advice as appropriate'.*

3.9.3. The ProPG advocates a two-stage approach, first providing an initial noise risk assessment of the proposed development site before undertaking a systematic approach to the noise impact assessment. The results of the initial noise risk assessment are an indication as to how detailed the noise impact assessment will need to be in order to satisfactorily assess all acoustic challenges.

3.9.4. **Stage 1: Initial Site Noise Risk Assessment**

3.9.5. The initial noise risk assessment compares the site noise levels (which can be obtained by measurement or prediction, or a combination of the two, as appropriate) against a risk scale and determines the risk of adverse effects from noise at the site. The purpose of the initial noise risk assessment is to provide an indication of the level of acoustic challenges at the site. In general, the higher the level of risk identified, the greater the level of detail that will be required within the noise impact assessment in order to satisfactorily demonstrate that adverse impacts will be minimised to an acceptable level.

3.9.6. The initial risk assessment and associated notes are provided in Figure 1 of the ProPG and reproduced in **Table 3.5**.

Noise Risk Assessment		Potential Effect Without Noise Mitigation	Pre-Planning Application Advice
Indicative Daytime Noise Levels, $L_{Aeq,16hr}$	Indicative Night-time Noise Levels, $L_{Aeq,8hr}$		
70 dB	60 dB	Increasing risk of adverse effect	High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed Acoustic Design Statement (ADS). Applicants are strongly advised to seek expert advice.
65 dB	55 dB		As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.
60 dB	50 dB		
55 dB	45 dB		At low noise levels, the site is likely be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.
50 dB	40 dB	No adverse effect	These noise levels indicate that the development site is likely to be acceptable from a noise perspective, and the application need not normally be delayed on noise grounds.

Notes:

a. Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.

b. Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is "not dominant".

c. $L_{Aeq,16hr}$ is for daytime 0700 hrs – 2300 hrs, $L_{Aeq,8hr}$ is for night-time 2300 hrs – 0700 hrs.

d. An indication that there may be more than 10 noise events at night (2300 hrs – 0700 hrs) with $L_{Amax,F}$ > 60 dB means that the site should not be regarded as negligible risk.

Table 3.5: Stage 1: Initial Site Risk Assessment

3.9.7. Where sites are exposed to industrial or commercial noise that is considered to be "dominant" then an assessment in line with BS 4142:2014 '*Methods for rating and assessing industrial and commercial sound*' should be carried out.

3.9.8. **Stage 2: Full Assessment**

3.9.9. **Stage 2: Element 1 – Good Acoustic Design Process**

3.9.10. Following a good acoustic design process is an implicit part of achieving good design as required by Government planning and noise policy. It is imperative that acoustic design is considered at an early stage of the development process and the aim should be to avoid "unreasonable" acoustic conditions and prevent "unacceptable" acoustic conditions.

3.9.11. Good acoustic design does not simply mean compliance with the recommended internal and external noise criteria. Instead, an integrated solution should be provided whereby the optimal acoustic outcome is achieved, without design compromises that will adversely affect living conditions and the quality of life of residents or other sustainable design objectives and requirements.

3.9.12. A good acoustic design should consider (in this order):

- *'Maximising the spatial separation of noise sources and receptors.*
- *Investigating the necessity and feasibility of reducing existing noise levels and relocating existing noise sources.*

- *Using topography and existing structures (that are likely to last the expected life of the noise-sensitive scheme) to screen the proposed development site from significant sources of noise.*
- *Incorporating noise barriers as part of the scheme to screen the proposed development site from significant sources of noise.*
- *Using the layout of the scheme to reduce noise propagation across the site.*
- *Using the orientation of buildings to reduce the noise exposure of noise-sensitive rooms.*
- *Using the building envelope to mitigate noise to acceptable levels.'*

3.9.13. **Stage 2: Element 2 – Internal Noise Level Guidelines**

3.9.14. The ProPG contains Figure 2, which is a table with associated notes drawing on the advice contained within BS 8233:2014 '*Guidance on sound insulation and noise reduction for buildings'*, the World Health Organization's Guidelines for Community Noise 1999 (WHO guidelines) and current best practice. This table is reproduced in **Table 3.6**. The target noise levels and notes provided as part of the table are as presented in BS 8233:2014, except of those best practice items added to the ProPG in italic and blue.

Activity	Location	07:00 – 23:00	23:00 – 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$ *45 dB $L_{Amax,F}$ (Note 4)*

NOTE 1 The Table provides recommended *internal L_{Aeq} target* levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Ground-borne noise is assessed separately and is not included as part of these targets, as human response to ground-borne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

NOTE 2 The *internal L_{Aeq} target* levels shown in the Table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the *internal L_{Aeq} target* levels recommended in the Table.

NOTE 3 These *internal L_{Aeq} target* levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.

NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. *In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events.*

NOTE 5 *Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7.*

NOTE 6 Attention is drawn to the requirements of the Building Regulations.

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. *The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as "unreasonable". Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as "unacceptable" by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing "unacceptable" noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form.*

Table 3.6: ProPG Internal Noise Level Guidelines

3.9.15. **Stage 2: Element 3 – External Amenity Area Noise Assessment**

3.9.16. The ProPG considers the advice provided within BS 8233:2014 and the PPG-Noise in respect of external amenity areas, and presents the following advice, which is selected from both documents, in order to carry out a full assessment of noise levels:

i. *'If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.'*

ii. *'The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$.'*

iii. *'These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest*

practicable noise levels in these external amenity spaces.'

iv. *'Whether or not external amenity spaces are an intrinsic part of the overall design, consideration of the need to provide access to a quiet or relatively quiet external amenity space forms part of a good acoustic design process'*

v. *'Where, despite following a good acoustic design process, significant adverse noise impacts remain on any private external amenity space (e.g. garden or balcony) then that impact may be partially off-set if the residents are provided, through the design of the development or the planning process, with access to:*

- *A relatively quiet façade (containing openable windows to habitable rooms) or a relatively quiet externally ventilated space (i.e. an enclosed balcony) as part of their dwelling; and/or*
- *a relatively quiet alternative or additional external amenity space for sole use by a household, (e.g. a garden, roof garden or large open balcony in a different, protected, location); and/or*
- *a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or*
- *a relatively quiet, protected, publically accessible, external amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minute walking distance). The local planning authority could link such provision to the definition and management of Quiet Areas under the Environmental Noise Regulations.'*

3.9.17. **Stage 2: Element 4 – Assessment of Other Relevant Issues**

3.9.18. The final element of Stage 2 is an assessment of '*other relevant issues*' and the ProPG suggests that the following issues are considered before making any final conclusions with respect to noise impacts:

i. *'compliance with relevant national and local policy'*

ii. *'magnitude and extent of compliance with ProPG'*

iii. *'likely occupants of the development'*

iv. *'acoustic design v. unintended adverse consequences'*

v. *'acoustic design v. wider planning objectives'.*

3.9.19. The ProPG notes that *'not all of the issues listed above will arise in every planning application and some may already have been addressed as an inherent part of good acoustic design. In addition, LPAs [Local Planning Authorities] may wish to add other relevant issues depending on local circumstances and priorities.'*

3.10. Acoustics, Ventilation and Overheating Residential Design Guide

3.10.1. The Acoustics, Ventilation and Overheating Residential Design Guide (AVOG) was published in January 2020 by the Association of Noise Consultants (ANC). The document has been produced to provide practitioners with guidance on how to do determine the impact of internal noise levels during both normal (background) ventilation conditions and during overheating conditions. It is recognised that a slightly relaxed set of noise criteria is appropriate during periods of overheating and this is readily accepted by residents of dwellings to counter-balance the discomfort of overheating and exposure to noise through opening windows. The document suggests a balanced approach, protecting against significant impacts of noise exposure whilst

allowing for slightly relaxed criteria. This in practice means that windows can be opened on more occasions to mitigate overheating (when compared to normal background ventilation conditions) without creating an unacceptable significant impact from exposure to noise.

3.11. British Standard BS 7445

3.11.1. BS 7445-1:2003 *Description and measurement of environmental noise – Part 1: Guide to quantities and procedures* defines some of the parameters commonly used in the measurement of environmental noise, in particular the equivalent continuous A-weighted sound pressure level ($L_{Aeq,T}$). The standard also provides advice on appropriate acoustical equipment and calibration.

3.11.2. BS 7445-2:1991 *Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use* provides advice on competent methods for determining the noise environment of an area of land. Section 5.3.1 of the standard provides further advice on the location and number of measurement positions. Of note is the requirement to record the locations on a map and the recommendation to measure the noise level at a height of 3m to 11m in area where construction of buildings is proposed.

3.12. Approved Document F

3.12.1. The Building Regulations Approved Document F (ADF) is concerned with ventilation in dwellings. Three types of ventilation are covered in the document, which are listed below and their interaction with the internal noise level criteria presented in **Tables 3.3**, **3.4** and **3.6** are presented:

- Whole dwelling (background) ventilation – the internal noise level criteria should be achieved with the ventilation system in operation (e.g. window or trickle vent open, or mechanical ventilation system operational).
- Extract ventilation to remove water vapour and indoor air pollutants where they are produced in significant quantities (e.g. kitchens, utility rooms and bathrooms) – internal noise level criteria are only appropriate for habitable rooms (e.g. living rooms and bedroom) so are not normally applicable.
- Purge ventilation to rapidly dilute air pollutants and water vapour when necessary, in habitable rooms – this is normally only for a very short period of time as required and internal noise level criteria are therefore not applicable.

3.13. Approved Document O

3.13.1. The Building Regulations Approved Document O (ADO) is a new Approved Document (coming into force June 2022) concerned with overheating in dwellings. It is listed here as it contains noise criteria, which suggests that when internal noise levels at night would be above a certain level, open windows would not be suitable for mitigating overheating. These levels are:

- 40 dB $L_{Aeq,8hrs}$ (2300 hrs – 0700 hrs)
- 55 dB L_{AFmax} more than 10 times per night (2300 hrs – 0700 hrs).

4. Baseline Noise Levels

4.1.1. Noise level measurements were carried out in three locations in respect of road and railway noise. The measurements at MP1 and MP2 were carried out between 1100 hrs on Thursday 23rd January 2020 and 1000 hrs on Monday 27th January 2020. The measurements at MP4 were carried out between 1300 hrs on Wednesday 4th August 2021 and 1000 hrs on Friday 6th August 2021.

4.1.2. MP1 was located in a free-field location at a height of 4.5m on the corner of Albert Road and Victoria Way, approximately 10m from the junction of Victoria Way and the A110 East Barnet Road. MP1 was also approximately 14m from a plant area of The Railway Bell Public House, located on a first floor flat roof area adjacent to Albert Road. The position was chosen to capture road traffic noise levels at the worst affected part of the site, as well as any plant and activity noise from The Railway Bell Public House. Maximum noise levels at this position could be from a wide range of sources, including road traffic, emergency vehicle sirens, passing trains and potentially pedestrian or patron noise from the nearby Public House.

4.1.3. MP2 was located in a free-field location at a height of 1.5m approximately 5m back from the western boundary of the site (approximately 35m from the closest tracks of the railway line) and approximately 15m from the northern boundary of the site. The position was chosen to capture noise levels from the railway and any activity noise from the Albert Road Gas Works. The position was also chosen to be at a distance from the ongoing construction to the south of the proposed development site. Maximum noise levels at this position are likely to be solely from passing trains, especially at night.

4.1.4. Further noise level measurements were carried out at MP4 in a free-field location at height of approximately 8m (level with the railway line) on top of an extended cherry-picker. MP4 was located approximately 10m back from the western façade of the site for safety reasons and is considered representative of the closest façades of the proposed Blocks E, F1, F2, F3 & G to the railway line at the worst-case height (level with the railway line). This measurement location was utilised specifically to address concerns from stakeholders about railway noise due to the height of measurements at MP2.

4.1.5. The measurement surveys are detailed in the Syntegra Report "Noise Impact Assessment" (reference 19-6526 Rev. E dated 6th August 2021). All measurements were carried out using Class 1 noise measurement equipment and under suitable weather conditions in accordance with BS 7445.

4.1.6. It was identified that the measured noise levels at MP4 were slightly higher than at MP2, which is expected due to the height differential between the two positions. Otherwise, a very similar pattern in diurnal noise levels is presented and the typical night-time noise level from passing trains at the different heights can be clearly identified. It is clear from the data that the two noise measurement locations were recording broadly similar noise levels and there was no

affect from the very thin stand of foliage on the railway embankment, which was present for MP4 and not MP2 due to the different times of year at which the surveys were undertaken.

4.1.7. In general, a very thick and deep stand of foliage, with no gaps even at ground level, would be expected to reduce noise levels by up to 3 dB; a few leaves on trees with significant gaps between them would not be expected to have any material affects on measured noise levels.

4.1.8. A few very high L_{Amax} noise levels (around 100 dB L_{Amax}) have been noted by stakeholders at MP1. This is less than 10 L_{Amax} events over the entire 4 day measurement period and all during the daytime (0700 hrs – 2300 hrs). Two separate L_{Amax} events occurred on separate nights (2300 hrs – 0700 hrs) above 90 dB L_{Amax}. The time history graph for MP2 did not identify any very high L_{Amax} noise levels (above 90 dB) at the same point in time when the high levels occurred at MP1. The same was true of the result from MP4, accordingly it can be safely concluded that the very high L_{Amax} noise levels present in the measurement data for MP1 are not from railway noise but from alternative sources, such as passing pedestrians shouting at the microphone, road traffic such as motorbikes or emergency vehicle sirens, due to the railway line being at a further distance from MP1 compared to MP2 and MP4. It can therefore be safely concluded that MP2 and MP4 provide an accurate reflection of the noise climate along the site boundary with the railway line.

5. Future Noise Levels Across the Site

5.1.1. Noise modelling was carried out with the SoundPLAN Essential 5.1 noise modelling software. Road traffic count information for existing roads, and the proposed future traffic flow on the Spine Road was provided by the scheme transport consultants, Vectos. Calculations of road traffic noise have been carried out within SoundPLAN using the methodologies set out within the Technical Memorandum *'Calculation of Road Traffic Noise'* (CRTN) produced by the Department of Transport in 1988. The relationship between $L_{A10,18hr}$ (as calculated by the CRTN methodologies) and both the $L_{Aeq,16hr}$ and $L_{Aeq,8hr}$ has been defined by TRL and Casella Stanger on behalf of Defra in their report *'Method for converting the UK road traffic noise index $L_{A10,18h}$ to the EU noise indices for road noise mapping'* dated *24th January 2006 and are utilised to calculate the period noise levels.*

5.1.2. Railway noise was entered as a line source in the noise model with propagation calculated in the model according to ISO 9613 -2:1996 *Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation.*

5.1.3. Noise calculations were verified alongside the on-site noise measurements to ensure accuracy. The noise levels calculated by the noise modelling software are for the L_{Aeq} noise metrics only and the 3D noise model takes into account the topography of the site including the height of the railway line and the proposed development.

5.1.4. The L_{Amax} has been predicted using a standard distance correction from the road (using the MP1 measured L_{Amax} noise levels at night) or the railway line (using the MP2 and MP4 measured L_{Amax} noise levels at night) at façades where it has been considered by Syntegra that Victoria Road or the railway line would be the most likely source of L_{Amax} noise levels at night due to proximity and lines of sight. The L_{Amax} noise level calculations have also considered the height of each floor on each façade in the determination of distance from the noise source, except where the predicted L_{Amax} for the worst-case floor was sufficiently low to achieve the internal L_{Amax} noise level requirements with open windows, when the worst-case L_{Amax} was applied to each floor. The calculations assume a point source at the closest point of the road or railway to the receptor points. Additional shielding corrections have been taken for a partial (-5 dB) or full (-10 dB) level of shielding where the façade does not have a direct line of sight, or is significantly obscured from, the most likely source of L_{Amax} noise levels.

5.1.5. For both the L_{Aeq} and L_{Amax} the worst-case floor on each façade of each block was selected as representative for the whole façade, therefore the process utilised is robust.

5.1.6. The procedure is detailed in the Syntegra Report "Noise Impact Assessment" (reference 19-6526 Rev. E dated 6th August 2021) and is in line with normal good acoustic practices.

5.1.7. The chosen noise levels in the Noise Impact Assessment for each façade of each block is reproduced as **Table 5.1** below and predicted noise levels for each façade of each block is provided in **Appendix 2**.

Block	Façade	Floor	Daytime $L_{Aeq,16hr}$ (dB)	Night-time $L_{Aeq,8hr}$ (dB)	Night-time L_{Amax} (dB)
A (8 storey)	North	3rd	52	46	54
	East	7th	47	40	54
	South	2nd	55	48	54
	West	1st	60	52	54
B1, C1 & D1 (7 storey)	North	2nd	55	47	54
	East	6th	41	37	54
	South	2nd	55	47	54
	West	1st	60	53	54
B2, C2 and D2 (7 storey)	North	6th	46	41	52
	East	6th	41	35	52
	South	5th	50	43	52
	West	3rd	45	40	52
E, F1, F2, F3 & G (5 – 7 storey)	North	4th	56	51	76
	East	1st	59	51	61
	South	4th	58	53	76
	West	3rd	58	54	76
Block H (4 storey)	North	3rd	51	44	57
	East	3rd	57	49	68
	South	1st	68	59	78
	West	2nd	58	51	78
Block J (5 storey)	North	1st	55	48	57
	East	1st	57	49	78
	South	1st	68	60	78
	West	4th	63	56	78

Table 5.1: Predicted Noise Levels Utilised in the Assessment

6. Internal Noise Levels

6.1.1. In order to ensure internal noise levels do not exceed the recommended guideline internal noise levels set out in BS 8233:2014, the WHO Guidelines and the ProPG (as detailed in **Sections 3.7** to **3.9**), recommendations for suitable noise mitigation have been presented.

6.1.2. For some façades this necessitates assessing with windows closed, and further advice has been provided in respect of background ventilation systems and purge ventilation (in relation to ADF and ADO of The Building Regulations respectively, which are detailed in **Sections 3.12** and **3.13** respectively) to ensure having closed windows does not have unintended impacts on other aspects of personal comfort. Purge ventilation in relation to ADF is recommended through open windows and therefore windows are not recommended to be sealed.

6.1.3. Predicted internal noise levels for the worst-case floor of each façade of each block are detailed in the Noise Impact Assessment and detailed in **Table 6.1** below. It is noted that a "Sound Insulation of Glazing (dBA) of 15 denotes an open window, assuming 15 dB reduction for a partially open window in line with normal good acoustic practices.

Assessment Location	Period (hrs)	External Noise Levels (dB)	Sound Insulation of Glazing (dBA)	Internal Noise Levels (dB)	Compliance with ProPG Criteria
Block A					
North and South Façades	Daytime $L_{Aeq,16hr}$ (0700 – 2300)	55	32	23	✓
	Night-time $L_{Aeq,8hr}$ (2300 – 0700)	48	32	16	✓
	Night-time L_{AFmax} (2300 – 0700)	54	32	22	✓
East Façade	Daytime $L_{Aeq,16hr}$ (0700 – 2300)	47	15	32	✓
	Night-time $L_{Aeq,8hr}$ (2300 – 0700)	40	15	25	✓
	Night-time L_{AFmax} (2300 – 0700)	54	15	39	✓
West Façade	Daytime $L_{Aeq,16hr}$ (0700 – 2300)	60	32	28	✓
	Night-time $L_{Aeq,8hr}$ (2300 – 0700)	52	32	20	✓
	Night-time L_{AFmax} (2300 – 0700)	54	32	22	✓
Blocks B1, C1 and D1					
North and South Façades	Daytime $L_{Aeq,16hr}$ (0700 – 2300)	55	32	23	✓
	Night-time $L_{Aeq,8hr}$ (2300 – 0700)	47	32	15	✓
	Night-time L_{AFmax} (2300 – 0700)	54	32	22	✓
East Façade	Daytime $L_{Aeq,16hr}$ (0700 – 2300)	41	15	26	✓
	Night-time $L_{Aeq,8hr}$ (2300 – 0700)	37	15	22	✓
	Night-time L_{AFmax} (2300 – 0700)	54	15	39	✓
West Façade	Daytime $L_{Aeq,16hr}$ (0700 – 2300)	60	32	28	✓
	Night-time $L_{Aeq,8hr}$ (2300 – 0700)	53	32	21	✓
	Night-time L_{AFmax} (2300 – 0700)	54	32	22	✓
Blocks B2, C2 and D2					
North, East and West Façades	Daytime $L_{Aeq,16hr}$ (0700 – 2300)	46	15	31	✓
	Night-time $L_{Aeq,8hr}$ (2300 – 0700)	41	15	26	✓
	Night-time L_{AFmax} (2300 – 0700)	52	15	37	✓
South Façade	Daytime $L_{Aeq,16hr}$ (0700 – 2300)	50	15	35	✓
	Night-time $L_{Aeq,8hr}$ (2300 – 0700)	43	15	28	✓
	Night-time L_{AFmax} (2300 – 0700)	52	15	37	✓

Assessment Location	Period (hrs)	External Noise Levels (dB)	Sound Insulation of Glazing (dBA)	Internal Noise Levels (dB)	Compliance with ProPG Criteria
Blocks E, F1, F2, F3 & G					
North, South and West Façade	Daytime $L_{Aeq,16hr}$ (0700 – 2300)	58	34	24	✓
	Night-time $L_{Aeq,8hr}$ (2300 – 0700)	54	34	20	✓
	Night-time L_{AFmax} (2300 – 0700)	76	34	42	✓
East Façade	Daytime $L_{Aeq,16hr}$ (0700 – 2300)	59	32	27	✓
	Night-time $L_{Aeq,8hr}$ (2300 – 0700)	51	32	19	✓
	Night-time L_{AFmax} (2300 – 0700)	61	32	29	✓
Block H					
South Façade	Daytime $L_{Aeq,16hr}$ (0700 – 2300)	68	34	34	✓
	Night-time $L_{Aeq,8hr}$ (2300 – 0700)	59	34	25	✓
	Night-time L_{AFmax} (2300 – 0700)	78	34	44	✓
West Façade	Daytime $L_{Aeq,16hr}$ (0700 – 2300)	58	34	24	✓
	Night-time $L_{Aeq,8hr}$ (2300 – 0700)	51	34	17	✓
	Night-time L_{AFmax} (2300 – 0700)	78	34	44	✓
East Façade	Daytime $L_{Aeq,16hr}$ (0700 – 2300)	57	32	25	✓
	Night-time $L_{Aeq,8hr}$ (2300 – 0700)	49	32	17	✓
	Night-time L_{AFmax} (2300 – 0700)	68	32	36	✓
North Façade	Daytime $L_{Aeq,16hr}$ (0700 – 2300)	51	32	19	✓
	Night-time $L_{Aeq,8hr}$ (2300 – 0700)	44	32	12	✓
	Night-time L_{AFmax} (2300 – 0700)	57	32	25	✓
Block J					
South Façade	Daytime $L_{Aeq,16hr}$ (0700 – 2300)	68	34	34	✓
	Night-time $L_{Aeq,8hr}$ (2300 – 0700)	60	34	26	✓
	Night-time L_{AFmax} (2300 – 0700)	78	34	44	✓
West Façade	Daytime $L_{Aeq,16hr}$ (0700 – 2300)	63	34	29	✓
	Night-time $L_{Aeq,8hr}$ (2300 – 0700)	56	34	22	✓
	Night-time L_{AFmax} (2300 – 0700)	78	34	44	✓
North Façade	Daytime $L_{Aeq,16hr}$ (0700 – 2300)	55	32	23	✓
	Night-time $L_{Aeq,8hr}$ (2300 – 0700)	48	32	16	✓
	Night-time L_{AFmax} (2300 – 0700)	57	32	25	✓
East Façade	Daytime $L_{Aeq,16hr}$ (0700 – 2300)	57	34	23	✓
	Night-time $L_{Aeq,8hr}$ (2300 – 0700)	49	34	15	✓
	Night-time L_{AFmax} (2300 – 0700)	78	34	44	✓

Table 6.1: Internal Noise Levels

6.1.4. Achievement of the internal noise level criteria with closed windows (but not sealed) is entirely in line with government planning guidance as set out in the PPG-Noise (as detailed in **Section 3.5**).

6.1.5. Accordingly, it is demonstrated that in terms of internal noise levels National, London and Local planning policy has been complied with in that significant adverse impacts are avoided and any residual adverse impacts are mitigated and reduced to a minimum.

7. External Noise Levels

7.1.1. The noise levels at each façade have been predicted within the SoundPLAN noise model (detailed in **Section 5**). It is noted that all balconies are also likely to benefit from an amount of shielding from the balustrade, typically between 5 dB and 10 dB, depending on the obstruction to line of sight to the noise sources. The effect will be higher on higher floors. As a worst-case, a -5 dB shielding correction is applied to all floors and it is assumed that if the balconies are being utilised as a typical amenity space, then residents would be sat down. Accordingly, the vast majority of terrace areas and balconies would achieve the higher guideline criterion set out in the ProPG of 55 dB $L_{Aeq,16hr}$, and many are likely to achieve the lower guideline criterion set out in the ProPG (50 dB $L_{Aeq,16hr}$).

7.1.2. The balconies that would not achieve the guideline criteria are those with a line of sight to Victoria Road. This is not uncommon in similar urban and sub-urban environments overlooking busy roads.

7.1.3. It is worth noting that balconies closest to and facing the railway are predicted to achieve the upper guideline criterion.

7.1.4. It was also identified from the noise model that the communal amenity areas are likely to experience daytime noise levels below the upper guideline criterion (55 dB $L_{Aeq,16hr}$) and, in most cases, below the lower guideline criterion (50 dB $L_{Aeq,16hr}$).

7.1.5. Additionally, all residents would have access to a relatively quiet public amenity area, which is Victoria Park.

7.1.6. As such, all residents would have access to relatively quiet communal amenity areas for the use of the development, as well as public amenity areas, in line with the advice set out in the PPG-Noise and the ProPG.

7.1.7. Accordingly, it is demonstrated that in terms of external noise levels National, London and Local planning policy has been complied with in that significant adverse impacts are avoided and any residual adverse impacts are mitigated and reduced to a minimum in line with current professional practise guidance.

8. Conclusions and Summary

8.1.1. This proof of evidence has been prepared to demonstrate that the proposed development at the **Land Formerly Known As British Gas Works, Albert Road, New Barnet, Barnet, EN4 9S** will not be subject to undue noise impacts and is fully compliant with the relevant legislation and guidance documents. The full assessment has been previously provided as Syntegra Report "Noise Impact Assessment" (reference 19-6526 Rev. E dated 6th August 2021).

8.1.2. The proposed development site is located in a mixed residential and commercial area. To the north of the proposed development site is the Albert Road gas works, which is generally quiet apart from a small number of vehicle movements, access to the gas works is along the Spine Road through the proposed development site. To the east of the site is Victoria Park and approximately 30m to the west is the East Coast Main Line railway. On the eastern boundary of the site is a shooting range and meeting hall for the East Barnet Shooting Club, beyond which are residential houses. On the south-western boundary of the site are two public houses: The Railway Bell Public House and Builders Arms Public House and a new residential development (currently under construction). To the south of the site is a mixed residential and retail/commercial area along the A110 East Barnet Road and Victoria Road.

8.1.3. This document has described the noise measurement procedures, analysis and noise modelling and demonstrated how this is in line with normal good acoustic practices and relevant legislation and guidance documents.

8.1.4. Finally, this document has described the expected internal and external acoustic environments at the future development and demonstrated how any adverse impacts are controlled and mitigated.

8.1.5. Achievement of the internal and external noise level criteria set out in the ProPG, BS 8233 and the WHO guidelines demonstrates compliance with National and Local Policy.

8.1.6. In respect of National Policy, attention is drawn to the wording of the NPSE, as set out in **Section 3.3** and reproduced below:

'through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life'.*

8.1.7. This language is replicated through the NPPF, London Plan and the London Borough of Barnet noise policy (as detailed in **Sections 3.2** to **3.5**).

8.1.8. Accordingly, it has been demonstrated that National, London and Local planning policy has been complied with in that significant adverse impacts are avoided and any residual adverse impacts are mitigated and reduced to a minimum by compliance with current professional practise guidance.

9. Appendix 1: Glossary of Acoustic Terminology

Term	Description
'A'-Weighting	*This is the main way of adjusting measured sound pressure levels to take into account human hearing, and our uneven frequency response.*
Decibel (dB)	*This is a tenth (deci) of a bel. The decibel can be a measure of the magnitude of sound, changes in sound level and a measure of sound insulation. Decibels are not an absolute unit of measurement but are an expression of ratio between two quantities expressed in logarithmic form.*
$L_{Aeq,T}$	*The equivalent steady sound level in dB containing the same acoustic energy as the actual fluctuating sound level over the given period, T. T may be as short as 1 second when used to describe a single event, or as long as 24 hours when used to describe the noise climate at a specified location.* $L_{Aeq,T}$ *can be measured directly with an integrating sound level meter.*
L_{A10}	*The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 10 per cent of a given time and is the* L_{A10T}*. The* L_{A10} *is used to describe the levels of road traffic noise at a particular location.*
L_{A50}	*The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 50 per cent of a given time and is the* L_{A50T}*.*
L_{A90}	*The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 90 per cent of a given time and is the* L_{A90T}*. The* L_{A90} *is used to describe the background noise levels at a particular location.*
L_{Amax}	*The 'A'-weighted maximum sound pressure level measured over a measurement period.*

10. Appendix 2: Predicted Noise Levels

Receiver name	Building side	Floor	External Noise Level (dB)		
			L_{Aeq} Day	L_{Aeq} Night	L_{Amax} Night
Block A	North	GF	49	43	54
Block A	North	1.Fl	51	45	54
Block A	North	2.Fl	52	45	54
Block A	North	3.Fl	52	46	54
Block A	North	4.Fl	52	46	54
Block A	North	5.Fl	52	46	54
Block A	North	6.Fl	52	46	54
Block A	North	7.Fl	52	46	54
Block A	East	GF	43	36	54
Block A	East	1.Fl	44	38	54
Block A	East	2.Fl	45	38	54
Block A	East	3.Fl	45	39	54
Block A	East	4.Fl	46	39	54
Block A	East	5.Fl	46	39	54
Block A	East	6.Fl	46	39	54
Block A	East	7.Fl	47	40	54
Block A	West	GF	59	52	54
Block A	West	1.Fl	60	52	54
Block A	West	2.Fl	59	52	54
Block A	West	3.Fl	59	52	54
Block A	West	4.Fl	58	52	54
Block A	West	5.Fl	58	51	54
Block A	West	6.Fl	58	51	54
Block A	West	7.Fl	58	52	54
Block A	South	GF	52	45	54
Block A	South	1.Fl	54	47	54
Block A	South	2.Fl	55	48	54
Block A	South	3.Fl	55	48	54
Block A	South	4.Fl	55	48	54
Block A	South	5.Fl	55	48	54
Block A	South	6.Fl	55	48	54
Block A	South	7.Fl	55	48	54

Table 10.1: Block A Predicted Noise Levels

Receiver name	Building side	Floor	External Noise Level (dB)		
			L_{Aeq} Day	L_{Aeq} Night	L_{Amax} Night
Block B1	East	GF	37.8	33.3	54
Block B1	East	1.Fl	38.2	33.6	54
Block B1	East	2.Fl	38.6	33.9	54
Block B1	East	3.Fl	38.9	34.3	54
Block B1	East	4.Fl	39.5	34.7	54
Block B1	East	5.Fl	40.2	35.4	54
Block B1	East	6.Fl	41.4	36.5	54
Block B1	North	GF	52.4	45.3	54
Block B1	North	1.Fl	54.4	47.2	54
Block B1	North	2.Fl	54.6	47.3	54
Block B1	North	3.Fl	54.2	47	54
Block B1	North	4.Fl	53.8	46.7	54
Block B1	North	5.Fl	53.5	46.5	54
Block B1	North	6.Fl	53.2	46.3	54
Block B1	West	GF	59.9	52.4	54
Block B1	West	1.Fl	60.4	52.9	54
Block B1	West	2.Fl	59.8	52.4	54
Block B1	West	3.Fl	59.2	51.9	54
Block B1	West	4.Fl	58.7	51.5	54
Block B1	West	5.Fl	58.2	51.3	54
Block B1	West	6.Fl	57.9	51.1	54
Block B1	South	GF	52.3	45.3	54
Block B1	South	1.Fl	54.3	47.2	54
Block B1	South	2.Fl	54.6	47.4	54
Block B1	South	3.Fl	54.4	47.3	54
Block B1	South	4.Fl	54.1	47.1	54
Block B1	South	5.Fl	53.9	47	54
Block B1	South	6.Fl	53.7	46.9	54

Table 10.2: Block B1 Predicted Noise Levels

Receiver name	Building side	Floor	External Noise Level (dB)		
			L_{Aeq} Day	L_{Aeq} Night	L_{Amax} Night
Block B2	South	GF	45.6	39.9	52
Block B2	South	1.Fl	47.3	41.2	52
Block B2	South	2.Fl	48.1	41.9	52
Block B2	South	3.Fl	48.7	42.4	52
Block B2	South	4.Fl	49.1	42.8	52
Block B2	South	5.Fl	49.5	43.2	52
Block B2	South	6.Fl	49.6	43.4	52
Block B2	East	GF	36	30.2	52
Block B2	East	1.Fl	37.6	31.5	52
Block B2	East	2.Fl	38.4	32.3	52
Block B2	East	3.Fl	39.1	32.8	52
Block B2	East	4.Fl	39.6	33.3	52
Block B2	East	5.Fl	40.2	33.8	52
Block B2	East	6.Fl	41.1	34.7	52
Block B2	West	GF	40.5	34.7	52
Block B2	West	1.Fl	42.2	36.1	52
Block B2	West	2.Fl	43	36.9	52
Block B2	West	3.Fl	43.7	37.5	52
Block B2	West	4.Fl	44.3	38.1	52
Block B2	West	5.Fl	44.9	38.9	52
Block B2	West	6.Fl	45.4	39.6	52
Block B2	North	GF	40.4	34.3	52
Block B2	North	1.Fl	42.5	36.1	52
Block B2	North	2.Fl	43.5	37	52
Block B2	North	3.Fl	44.1	37.6	52
Block B2	North	4.Fl	44.6	38	52
Block B2	North	5.Fl	45.1	38.5	52
Block B2	North	6.Fl	45.4	38.9	52

Table 10.3: Block B2 Predicted Noise Levels

Receiver name	Building side	Floor	External Noise Level (dB)		
			L_{Aeq} Day	L_{Aeq} Night	L_{Amax} Night
Block C1	East	GF	34.7	29.8	54
Block C1	East	1.Fl	35.2	30.2	54
Block C1	East	2.Fl	35.6	30.6	54
Block C1	East	3.Fl	36	31	54
Block C1	East	4.Fl	36.7	31.6	54
Block C1	East	5.Fl	38.1	33	54
Block C1	East	6.Fl	39.7	34.6	54
Block C1	South	GF	51.7	44.7	54
Block C1	South	1.Fl	53.7	46.5	54
Block C1	South	2.Fl	53.9	46.7	54
Block C1	South	3.Fl	53.5	46.4	54
Block C1	South	4.Fl	53.2	46.1	54
Block C1	South	5.Fl	52.8	45.9	54
Block C1	South	6.Fl	52.6	45.9	54
Block C1	West	GF	59.3	51.8	54
Block C1	West	1.Fl	60	52.4	54
Block C1	West	2.Fl	59.5	52	54
Block C1	West	3.Fl	58.9	51.5	54
Block C1	West	4.Fl	58.4	51.1	54
Block C1	West	5.Fl	58	50.9	54
Block C1	West	6.Fl	57.6	50.6	54
Block C1	North	GF	51.9	45.3	54
Block C1	North	1.Fl	54	47.1	54
Block C1	North	2.Fl	54.2	47.3	54
Block C1	North	3.Fl	53.9	47.2	54
Block C1	North	4.Fl	53.6	47	54
Block C1	North	5.Fl	53.4	46.9	54
Block C1	North	6.Fl	53.2	46.9	54

Table 10.4: Block C1 Predicted Noise Levels

Receiver name	Building side	Floor	External Noise Level (dB)		
			L_{Aeq} Day	L_{Aeq} Night	L_{Amax} Night
Block C2	East	GF	34.2	28.7	52
Block C2	East	1.Fl	35.6	29.8	52
Block C2	East	2.Fl	36.4	30.5	52
Block C2	East	3.Fl	37	31	52
Block C2	East	4.Fl	37.6	31.5	52
Block C2	East	5.Fl	38.1	32	52
Block C2	East	6.Fl	39.1	32.9	52
Block C2	South	GF	40.3	34.3	52
Block C2	South	1.Fl	42.3	36	52
Block C2	South	2.Fl	43.3	36.9	52
Block C2	South	3.Fl	43.9	37.5	52
Block C2	South	4.Fl	44.5	38	52
Block C2	South	5.Fl	45	38.5	52
Block C2	South	6.Fl	45.2	38.9	52
Block C2	West	GF	37.4	31.8	52
Block C2	West	1.Fl	38.9	33.1	52
Block C2	West	2.Fl	39.8	33.9	52
Block C2	West	3.Fl	40.4	34.5	52
Block C2	West	4.Fl	41	35.1	52
Block C2	West	5.Fl	42	36.3	52
Block C2	West	6.Fl	42.8	37.3	52
Block C2	North	GF	42.6	37.5	52
Block C2	North	1.Fl	44	38.6	52
Block C2	North	2.Fl	44.7	39.2	52
Block C2	North	3.Fl	45.3	39.7	52
Block C2	North	4.Fl	45.7	40.1	52
Block C2	North	5.Fl	46.1	40.6	52
Block C2	North	6.Fl	46.4	40.9	52

Table 10.5 Block C2 Predicted Noise Levels

Receiver name	Building side	Floor	External Noise Level (dB)		
			L_{Aeq} Day	L_{Aeq} Night	L_{Amax} Night
Block D1	East	GF	34.8	30.2	54
Block D1	East	1.Fl	35.3	30.6	54
Block D1	East	2.Fl	35.7	31	54
Block D1	East	3.Fl	36.1	31.3	54
Block D1	East	4.Fl	36.7	31.8	54
Block D1	East	5.Fl	37.6	32.7	54
Block D1	East	6.Fl	38.9	33.9	54
Block D1	South	GF	52.3	45.7	54
Block D1	South	1.Fl	54.2	47.3	54
Block D1	South	2.Fl	54.4	47.6	54
Block D1	South	3.Fl	54.2	47.4	54
Block D1	South	4.Fl	53.9	47.3	54
Block D1	South	5.Fl	53.7	47.4	54
Block D1	South	6.Fl	53.6	47.4	54
Block D1	West	GF	59.1	51.6	54
Block D1	West	1.Fl	60.3	52.7	54
Block D1	West	2.Fl	59.5	51.9	54
Block D1	West	3.Fl	58.7	51.2	54
Block D1	West	4.Fl	58	50.6	54
Block D1	West	5.Fl	57.4	50.1	54
Block D1	West	6.Fl	56.9	49.7	54
Block D1	North	GF	47.4	40.5	54
Block D1	North	1.Fl	49.3	42.2	54
Block D1	North	2.Fl	49.1	42	54
Block D1	North	3.Fl	48.4	41.4	54
Block D1	North	4.Fl	47.8	40.8	54
Block D1	North	5.Fl	47.1	40.2	54
Block D1	North	6.Fl	46.6	39.7	54

Table 10.6 Block D1 Predicted Noise Levels

Receiver name	Building side	Floor	External Noise Level (dB)		
			L_{Aeq} Day	L_{Aeq} Night	L_{Amax} Night
Block D2	East	GF	32.7	27.3	52
Block D2	East	1.Fl	34.1	28.4	52
Block D2	East	2.Fl	34.8	29	52
Block D2	East	3.Fl	35.4	29.5	52
Block D2	East	4.Fl	35.9	30	52
Block D2	East	5.Fl	36.5	30.5	52
Block D2	East	6.Fl	37.5	31.4	52
Block D2	South	GF	42.5	37.1	52
Block D2	South	1.Fl	44.1	38.4	52
Block D2	South	2.Fl	44.9	39.1	52
Block D2	South	3.Fl	45.5	39.7	52
Block D2	South	4.Fl	46	40.2	52
Block D2	South	5.Fl	46.4	40.6	52
Block D2	South	6.Fl	46.6	40.9	52
Block D2	West	GF	36.8	32.1	52
Block D2	West	1.Fl	37.6	32.7	52
Block D2	West	2.Fl	38.2	33.2	52
Block D2	West	3.Fl	38.7	33.7	52
Block D2	West	4.Fl	39.2	34.2	52
Block D2	West	5.Fl	39.9	34.9	52
Block D2	West	6.Fl	40.7	35.8	52
Block D2	North	GF	38.1	33.1	52
Block D2	North	1.Fl	39.5	34.2	52
Block D2	North	2.Fl	40.3	34.8	52
Block D2	North	3.Fl	40.8	35.3	52
Block D2	North	4.Fl	41.3	35.7	52
Block D2	North	5.Fl	41.6	36.1	52
Block D2	North	6.Fl	42	36.5	52

Table 10.7 Block D2 Predicted Noise Levels

Receiver name	Building side	Floor	External Noise Level (dB)		
			L_{Aeq} Day	L_{Aeq} Night	L_{Amax} Night
Block E	East	GF	57.8	50.3	61
Block E	East	1.Fl	58.6	51	61
Block E	East	2.Fl	58.2	50.6	53
Block E	East	3.Fl	57.6	50.1	50
Block E	East	4.Fl	57.1	49.6	50
Block E	East	5.Fl	56.5	49.2	48
Block E	East	6.Fl	56.1	48.8	46
Block E	South	GF	52.8	47.5	71
Block E	South	1.Fl	54.4	48.8	71
Block E	South	2.Fl	55.2	49.6	71
Block E	South	3.Fl	55.5	50	76
Block E	South	4.Fl	55.7	50.5	76
Block E	South	5.Fl	55.8	50.7	76
Block E	South	6.Fl	55.7	50.6	76
Block E	West	GF	52.6	48.5	71
Block E	West	1.Fl	53.6	49.6	71
Block E	West	2.Fl	54.6	50.6	71
Block E	West	3.Fl	55.6	51.5	76
Block E	West	4.Fl	56	52	76
Block E	West	5.Fl	56.2	52.1	76
Block E	West	6.Fl	56.2	52.1	76
Block E	North	GF	47.2	43.2	71
Block E	North	1.Fl	48.2	44.2	71
Block E	North	2.Fl	49.2	45.2	71
Block E	North	3.Fl	50.2	46.2	76
Block E	North	4.Fl	51	47	76
Block E	North	5.Fl	51.1	47	76
Block E	North	6.Fl	51	47	76

Table 10.8: Block E Predicted Noise Levels

Receiver name	Building side	Floor	External Noise Level (dB)		
			L_{Aeq} Day	L_{Aeq} Night	L_{Amax} Night
Block F1	East	GF	57.4	50	71
Block F1	East	1.Fl	58.9	51.4	71
Block F1	East	2.Fl	58.7	51.2	63
Block F1	East	3.Fl	58.3	50.8	60
Block F1	East	4.Fl	57.9	50.4	60
Block F1	North	GF	52.5	47.4	71
Block F1	North	1.Fl	54.1	48.7	71
Block F1	North	2.Fl	54.9	49.5	71
Block F1	North	3.Fl	55.3	50.1	76
Block F1	North	4.Fl	55.6	50.5	76
Block F1	West	GF	53.3	49.2	71
Block F1	West	1.Fl	54.3	50.3	71
Block F1	West	2.Fl	55.4	51.3	71
Block F1	West	3.Fl	56.3	52.2	76
Block F1	West	4.Fl	56.7	52.6	76

Table 10.9: Block F1 Predicted Noise Levels

Receiver name	**Building side**	**Floor**	**External Noise Level (dB)**		
			L_{Aeq} Day	**L_{Aeq} Night**	**L_{Amax} Night**
Block F2	East	GF	57.1	49.7	71
Block F2	East	1.Fl	58.7	51.2	71
Block F2	East	2.Fl	58.6	51.1	63
Block F2	East	3.Fl	58.2	50.7	60
Block F2	East	4.Fl	57.8	50.4	60
Block F2	East	5.Fl	57.4	50.1	60
Block F2	South	GF	53.6	48.1	71
Block F2	South	1.Fl	55.3	49.5	71
Block F2	South	2.Fl	55.9	50.2	71
Block F2	South	3.Fl	56.1	50.6	76
Block F2	South	4.Fl	56.3	51	76
Block F2	South	5.Fl	56.3	51	76
Block F2	West	GF	53.4	49.3	71
Block F2	West	1.Fl	54.5	50.4	71
Block F2	West	2.Fl	55.5	51.4	71
Block F2	West	3.Fl	56.4	52.4	76
Block F2	West	4.Fl	56.8	52.7	76
Block F2	West	5.Fl	57	52.9	76

Table 10.10: Block F2 Predicted Noise Levels

Receiver name	Building side	Floor	External Noise Level (dB)		
			L_{Aeq} Day	L_{Aeq} Night	L_{Amax} Night
Block F3	East	GF	58.1	50.6	71
Block F3	East	1.Fl	58.9	51.3	71
Block F3	East	2.Fl	58.6	51	63
Block F3	East	3.Fl	58.2	50.7	60
Block F3	East	4.Fl	57.7	50.3	60
Block F3	East	5.Fl	57.3	49.9	60
Block F3	South	GF	53.7	48.4	71
Block F3	South	1.Fl	55.4	49.8	71
Block F3	South	2.Fl	56.1	50.5	71
Block F3	South	3.Fl	56.4	51.1	76
Block F3	South	4.Fl	56.6	51.4	76
Block F3	South	5.Fl	56.7	51.5	76
Block F3	West	GF	54.5	50.4	71
Block F3	West	1.Fl	55.9	51.7	71
Block F3	West	2.Fl	57.1	52.9	71
Block F3	West	3.Fl	57.8	53.6	76
Block F3	West	4.Fl	58	53.8	76
Block F3	West	5.Fl	58.1	53.9	76
Block F3	North	GF	53	47.8	71
Block F3	North	1.Fl	54.6	49.1	71
Block F3	North	2.Fl	55.3	49.8	71
Block F3	North	3.Fl	55.7	50.4	76
Block F3	North	4.Fl	55.9	50.7	76
Block F3	North	5.Fl	55.9	50.8	76

Table 10.11: Block F3 Predicted Noise Levels

Receiver name	Building side	Floor	External Noise Level (dB)		
			L_{Aeq} Day	L_{Aeq} Night	L_{Amax} Night
Block G	East	GF	56.2	48.9	71
Block G	East	1.Fl	57.6	50.2	71
Block G	East	2.Fl	57.5	50.1	71
Block G	East	3.Fl	57.3	49.9	76
Block G	East	4.Fl	57	49.7	76
Block G	South	GF	51.1	45.7	61
Block G	South	1.Fl	55.7	49.8	61
Block G	South	2.Fl	57	51.2	53
Block G	South	3.Fl	57.9	52.3	50
Block G	South	4.Fl	58.2	52.6	50
Block G	West	GF	55.1	50.9	71
Block G	West	1.Fl	57.4	52.9	71
Block G	West	2.Fl	58.7	54.3	71
Block G	West	3.Fl	59.1	54.6	76
Block G	West	4.Fl	59.2	54.7	76
Block G	North	GF	53.1	48.3	71
Block G	North	1.Fl	54.7	49.6	71
Block G	North	2.Fl	55.6	50.5	71
Block G	North	3.Fl	56.1	51.2	76
Block G	North	4.Fl	56.2	51.4	76

Table 10.12: Block G Predicted Noise Levels

Receiver name	Building side	Floor	External Noise Level (dB)		
			L_{Aeq} Day	L_{Aeq} Night	L_{Amax} Night
Block H	North	GF	48.3	41.7	57
Block H	North	1.Fl	50	43.2	57
Block H	North	2.Fl	50.4	43.6	57
Block H	North	3.Fl	50.7	43.9	57
Block H	North	GF	39	33.7	57
Block H	North	1.Fl	40.5	35.1	57
Block H	North	2.Fl	42.4	36.7	57
Block H	North	3.Fl	45.5	39.3	57
Block H	West	GF	56.3	48.8	78
Block H	West	1.Fl	57.8	50.2	78
Block H	West	2.Fl	58.3	50.7	78
Block H	West	3.Fl	58.4	50.8	78
Block H	South	GF	67	58.9	78
Block H	South	1.Fl	67.6	59.4	78
Block H	South	2.Fl	66.9	58.8	78
Block H	South	3.Fl	66.1	58	78
Block H	East	GF	53.1	45.8	68
Block H	East	1.Fl	55.4	47.9	68
Block H	East	2.Fl	56.4	48.8	68
Block H	East	3.Fl	56.8	49.2	68

Table 10.13: Block H Predicted Noise Levels

Receiver name	Building side	Floor	External Noise Level (dB)		
			L_{Aeq} Day	L_{Aeq} Night	L_{Amax} Night
Block J	West	GF	61.1	53.4	78
Block J	West	1.Fl	62	54.3	78
Block J	West	2.Fl	62.1	54.6	78
Block J	West	3.Fl	62.6	55.1	78
Block J	West	4.Fl	63.1	55.7	78
Block J	West	GF	56.3	49.3	67
Block J	West	1.Fl	57.8	51.1	67
Block J	West	2.Fl	58.2	51.6	67
Block J	West	3.Fl	58.5	52.1	67
Block J	West	4.Fl	58.8	52.5	67
Block J	West	GF	49.2	43.4	57
Block J	West	1.Fl	52.2	46.7	57
Block J	West	2.Fl	53.1	47.5	57
Block J	West	3.Fl	54.3	48.8	57
Block J	West	4.Fl	55.3	49.7	57
Block J	South	GF	67.2	59.1	78
Block J	South	1.Fl	67.8	59.6	78
Block J	South	2.Fl	67.3	59.2	78
Block J	South	3.Fl	66.9	58.8	78
Block J	South	4.Fl	66.5	58.4	78
Block J	East	GF	55.4	48	78
Block J	East	1.Fl	56.7	49.2	78
Block J	East	2.Fl	57	49.4	78
Block J	East	3.Fl	57.1	49.5	78
Block J	East	4.Fl	57	49.4	78
Block J	North	GF	53	46.1	57
Block J	North	1.Fl	54.9	47.8	57
Block J	North	2.Fl	55.1	48.1	57
Block J	North	3.Fl	55	48.1	57
Block J	North	4.Fl	54.9	48.1	57

Table 10.14: Block J Predicted Noise Levels