

**Noise Assessment
Report**

**Land off Corporation Road,
Newport**

**Prepared for
Newport City Homes
by**

Stuart Michael Associates Limited



August 2025

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SMA Ref: 6050/NA

Issue Status: 06

DOCUMENT CONTROL			
Project	Land off Corporation Road, Newport, South Wales		
Job No.	6050		
Document Title	Noise Assessment		
File Location	N:\Admin Project\6000 to 6099\6050 - Corporation Road,Newport\Noise Assessment\6050 - Noise Assessment - 06.docx		
Prepared by	Jason Mills	Date	26/05/2023
Reviewed by	Stewart Andrews	Date	29/05/2023
Approved by	Stuart Atkinson	Date	31/05/2023
Document Issue	Description / Changes	Revised by	Date
DRAFT	For internal review and comment	JPM	29/05/2023
01	Amendments to layout (Block A)	JPM	31/05/2023
02	Issue to Client for Comment	JPM	31/05/2023
03	Issued to Client	JPM	02/11/2023
04	Updates to Block A – analysis and report updated accordingly	JPM	08/08/2024
05	Updates to Block A – analysis and report updated accordingly	JPM	05/08/2025
06	References to TAN 11 added	JPM	19/08/2025



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CONTENTS

SECTIONS

	PAGE
1.0 INTRODUCTION	1
2.0 LEGISLATION AND POLICY	4
3.0 EXISTING NOISE PROFILE	11
4.0 NOISE ASSESSMENT	15
5.0 MITIGATION MEASURES	24
6.0 SUMMARY AND CONCLUSIONS	30
7.0 APPENIDICES	32

FIGURES

Figure 1.1	Site and Noise Measurement Location Plan
Figure 3.1	Daytime Noise Levels
Figure 3.2	Night time Noise Levels

TABLES

Table 1.1:	Typical Noise Levels
Table 2.3:	Summary of Internal Noise Criteria: BS 8233 & WHO
Table 3.1:	Equipment used during the field measurements
Table 3.2:	Summary of Recorded Noise Levels at SLM1
Table 4.1:	Predicted façade noise levels at GF level
Table 4.2:	Predicted façade noise levels at FF level
Table 4.3:	Predicted façade noise levels at SF level
Table 4.4:	Predicted façade noise levels at TF level
Table 5.1:	Example Window Systems

APPENDICES

Appendix 1	Site Layout – S05 BLA_MP_RF_03_B
Appendix 2	Noise Profile (SLM 1 Graph)



ACRONYMS AND ABBREVIATIONS

'A' weighted	'A' weighting is applied to the measured sound pressure levels so that these levels correspond more closely to the subjective response - expressed as dB(A)
°C	Degrees Celsius
BRE	Building Research Establishment
BS 5228	British Standard 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise'
BS 8233	British Standard 8233 'Sound insulation and noise reduction for buildings – Code of practice' (2014)
CIRIA	Construction Industry Research and Information Association
CRTN	Calculation of Road Traffic Noise (1988)
dB	Decibel – unit of measurement of sound
EU	European Union
Hertz	Frequency oscillation in cycles per second i.e. 1000 Hertz is a thousand cycles per second
$L_{Aeq,T}$	'A' weighted equivalent continuous noise level over a time period, T
L_{Amax}	'A' weighted maximum noise level
LDP	Local Development Plan
ms^{-1}	Metres per second
NCC	Newport City Council
PPW	Planning Policy Wales
SLM	Sound Level Meter
SMA	Stuart Michael Associates Limited
SRI	Sound Reduction Index
TAN 11	Technical Advice Note 11 "Planning and Noise" 1997
UK	United Kingdom
UKAS	United Kingdom Accreditation Service in reference to sound level meter calibration
WHO	The World Health Organization



1.0 INTRODUCTION

- 1.1 Stuart Michael Associates Limited (SMA), Consulting Engineers, has been engaged by Newport City Homes (the Applicant) to undertake a noise assessment to support a Full Planning Application for a proposed block of residential apartments at land at Corporation Road, Newport, South Wales. Refer to **Appendix 1** for a copy of the Site Layout (S05 BLA_MP_RF_03_B) and **Figure 1.1** for the site location plan.

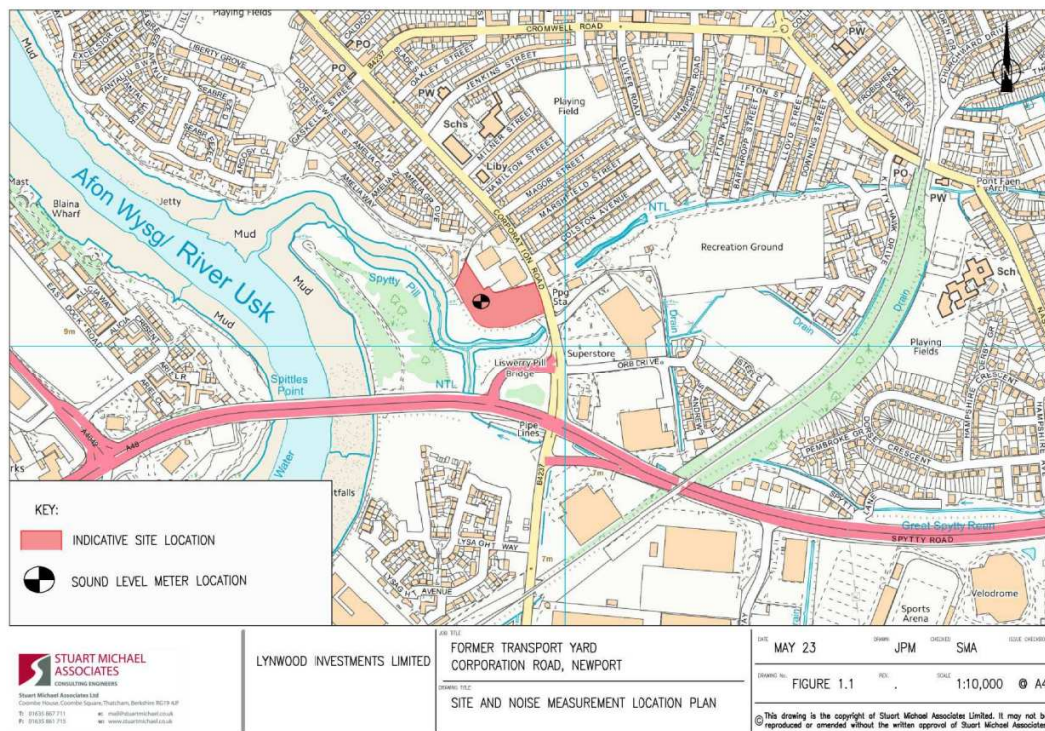


Figure 1.1: Site Location Plan

- 1.2 The proposed development site is located in the area administered by Newport City Council (NCC).

Planning History

- 1.3 Outline planning permission was granted in December 2019 for “mixed use development comprising C2 residential institutions and C3 residential and drive thru coffee shop (A1/A3) along with associated infrastructure and facilities” (Planning Ref. outline 18/0973 and reserved matters 19/1301).
- 1.4 A noise assessment was undertaken by SMA (Oct 2018) and submitted as one of the planning documents for the outline application. The results from the assessment have been used in this noise assessment.



- 1.5 The applicant is now seeking to change the drive through facility to a block of residential apartments (referred to as Block A for the noise assessment). The other consented land uses will all be brought forward as part of the consented planning application. As such this planning application can be considered a change of use from a drive through to residential apartments.

Site Description

- 1.6 The site was once the location of a Transport Yard and is now currently vacant. Located to the north of the site is the Sinclair Volkswagen car dealership, to the east Corporation Road, and to the south a shared cycle footway and west by Spytty Pill. The A48 is situated south of the site.

Assessment Methodology

- 1.7 For this study a noise assessment has been undertaken to determine the constraints on the development. The constraints are how the existing environment will impact on the development.
- 1.8 Constraints on development regarding noise levels have been assessed using measured and modelled sound levels at the development site. A noise level survey was undertaken for 24 hours within the site. SoundPLAN noise modelling has been used to determine the noise profile throughout the site, which incorporates the topography of the site and surrounding area, existing and proposed buildings and traffic flows for the surrounding road network.
- 1.9 The basic outline methodology employed is detailed below:
- Utilise recorded sound levels to determine the noise profile of the site;
 - Utilise recorded traffic flow data, LiDAR and topographical surveys, and the illustrative masterplan to establish the noise profile of the site using SoundPLAN;
 - Determine the potential constraints of the existing environment for proposed sensitive receptors;
 - Compare the constraints against relevant noise standards and objectives; and
 - Where appropriate recommend mitigation measures.



The Nature, Measurement and Effect of Noise

- 1.10 Noise is often defined as sound that is undesired by the recipient. Whilst it is impossible to measure nuisance caused by noise directly, it is possible to measure the loudness of that noise. 'Loudness' is related to both sound pressure and frequency, both of which can be measured. The human ear is sensitive to a wide range of sound levels. The sound pressure level of the threshold of pain is over a million times that of the quietest audible sound. In order to reduce the relative magnitudes of the numbers involved, a logarithmic scale of decibels (dB) is normally used, based on a reference level of the lowest audible sound.
- 1.11 The response of the human ear is not constant over all frequencies. It is therefore usual to weight the measured frequencies to approximate the human response. The resulting 'A' weighted decibel, dB(A), has been shown to correlate closely to the subjective human response.
- 1.12 When related to changes in noise, a change of ten decibels from say 60 dB(A) to 70 dB(A) would represent a doubling in 'loudness'. Similarly, a decrease in noise from 70 dB(A) to 60 dB(A) would represent a halving in 'loudness'. A change of 3 dB(A) is generally considered to be just perceptible. **Table 1.1** details typical noise levels.

Table 1.1: Typical Noise Levels

Approximate Noise Level (dB(A))	Example
0	Limit of hearing
30	Rural area at night
40	Library
50	Quiet office
60	Normal conversation at 1 m
70	In a car
80	Household vacuum cleaner at 1 m
100	Pneumatic drill at 1 m
120	Threshold of pain



2.0 LEGISLATION AND POLICY

Planning Policy Wales

2.1 The Welsh Government has set out its Planning Policy under Planning Policy Wales (PPW), Edition 12 (February 2024). This document sets out the land use planning policies of the Welsh Government. The PPW guides the Welsh Government's commitment to sustainable development in the planning system.

2.2 The PPW sets out several sustainability objectives for the planning system. These objectives reflect the vision for sustainable development and the outcomes the Welsh Government seeks to deliver across Wales. The objectives are as follows:

- A Prosperous Wales: Promote resource-efficient and climate change resilient settlement patterns that minimise land-take, especially through preference for the re-use of suitable previously developed land and buildings, wherever possible avoiding development on Greenfield sites.
- A Resilient Wales: Contribute to the protection and improvement of the environment. Planning should seek to ensure that development does not produce irreversible harmful effects on the natural environment.
- A Healthier Wales: Contribute to the protection and, where possible, the improvement of people's health and wellbeing as a core component of achieving the well-being goals and responding to climate change.
- A More Equal Wales: Promote access to employment, shopping, education, health, community, leisure and sports facilities and open and green space, maximising opportunities for community development and social welfare.
- A Wales of Cohesive Communities: Locate developments to minimise the demand for travel, especially by private car. Ensure that all local communities have sufficient good quality housing for their needs. Encourage improvements to transport facilities and services which maintain or improve accessibility to services and facilities.



2.3 PPW emphasises the need to minimise travel and increasing accessibility by modes other than the private car. It is also important to note that previously developed (or brownfield land) should, wherever possible, be used in preference to Greenfield sites.

2.4 Section 6, Distinctive and Natural Places, sub section 6.7, Air Quality and Soundscape, Framework for Addressing Air quality and Soundscape, paragraph 6.76 In proposing new development, planning authorities and developers must, therefore:

- address any implication arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas or areas where there are sensitive receptors;
- not create areas of poor air quality or inappropriate soundscape; and
- seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes.

2.5 Good design, for example setting back buildings from roads to avoid canyon effects and using best practice in terms of acoustic design to ensure the appropriate and intended acoustic environment of completed developments should be incorporated at an early consideration in the design and planning process. Other mitigation measures must be capable of being effectively implemented for their intended purpose, and could include those related to:

- traffic management and road safety;
- ensuring progress towards a shift to low or zero emissions means of road transport, such as electrical charging points;
- supporting low or zero emissions public transport;
- providing active travel infrastructure; and
- incorporating green infrastructure, where it can improve air quality by removing air pollution and aiding its dispersal, reduce real or perceived noise levels by absorbing and scattering noise and introducing natural sounds to soften man-made noise, provide areas of relative tranquillity, and reduce exposure by putting a buffer between sources of pollution and receptors.



Local Planning Policy

- 2.6 Every local planning authority in Wales must prepare a Local Development Plan (LDP) for its area. The Newport City Council LDP 2011-2026 provides the local planning policy framework for NCC and was adopted by the Council in January 2015. The LDP became operative on its adoption and supersedes the previous adopted Unitary Development Plan. Noise is mentioned several times in the NCC LDP. It should be noted that NCC are in the process of updating the LDP and at the time of updating this report the new LDP had not been adopted, therefore current Policies are still relevant.

GP6 General Development Principles – Quality of Design

- 2.7 “Good quality design will be sought in all forms of development. The aim is to create a safe, accessible, attractive and convenient environment. In considering development proposals the following fundamental design principles should be addressed: Access, permeability and layout: All development should maintain a high level of pedestrian access, connectivity and be laid out so as to minimise noise pollution.”

GP7 General Development Principles – Environmental Protection and Public Health

- 2.8 “Development will not be permitted which would cause or result in unacceptable harm to health because of land contamination, dust, instability or subsistence, air, heat, noise or light pollution, flooding, water pollution or any other identified risk to environment, local amenity or public health and safety.”

Calculation of Road Traffic Noise 1988 (CRTN)

- 2.9 It is common practice in the UK to assess the impacts of road traffic noise in accordance with the method prescribed in The Department for Transport document ‘Calculation of Road Traffic Noise 1988 (CRTN)’. Paragraph 1 of the introduction states that:

“These procedures are necessary to enable the entitlement under the Noise Insulation Regulations to be determined but they also provide guidance appropriate to the calculation of traffic noise for more general applications e.g. environmental appraisal of road schemes, highway design and land use planning”.



- 2.10 Section II of CRTN outlines the procedures to be followed when calculating the prediction method for future road traffic noise and Section III of CRTN details the procedure and requirements to be met using the measurement method with details of a simplified measurement procedure.
- 2.11 All noise levels are expressed in the terms of the index $L_{10,(T)}$ dB(A) where L_{10} is the noise level exceeded for 10% of the time period (T) expressed in decibels with an A weighting, which broadly agree with the range of human hearing.

Planning Guidance (Wales), Technical Advice Note (Wales) 11, Noise October 1997

- 2.12 Guidance regarding planning policies towards noise is given in Planning Guidance (Wales), Technical Advice Note (Wales) 11, Noise - October 1997 (TAN 11). TAN 11 provides a method which is detailed in section A9 for calculating $L_{Aeq,16hr}$ from the recorded $L_{A10,18hr}$.
- 2.13 Annex A of TAN 11 provides noise exposure categories for dwellings near a source of noise and provides advice upon which the Local Planning Authority should have regard to when considering planning applications. The advice in Annex A is reproduced below:

“When assessing a proposal for residential development near a source of noise, local planning authorities should determine into which of the four noise exposure categories (NEC's) the proposed site falls, taking account of both day and night time noise levels. Local planning authorities should then have regard to the advice in the appropriate NEC presented in **Table 2.1**.

Table 2.1 – Noise Exposure Categories (NEC)

NEC	
A	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level.
B	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection.
C	Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.
D	Planning permission should normally be refused.



- 2.14 The recommended range of noise levels for each Noise Exposure Category for dwellings to noise from road and “mixed sources” is given below in **Table 2.2**.

Table 2.2 – Recommended Noise Exposure Categories for New Dwellings near Existing Noise Sources

NOISE LEVELS CORRESPONDING TO THE NOISE EXPOSURE CATEGORIES FOR NEW DWELLINGS $L_{Aeq,T}$ dB				
NOISE EXPOSURE CATEGORY				
Noise Source	A	B	C	D
Road Traffic				
07.00 - 23.00	<55	55-63	63-72	>72
23.00 - 07.00	<45	45-57	57-66	>66
Mixed Sources				
07.00 - 23.00	<55	55-63	63-72	>72
23.00 - 07.00	<45	45-57	57-66	>66

- 2.15 The values in Table 2.2 refer to noise levels measured on an open site, well away from any existing buildings and 1.2 metres to 1.5 metres above ground level. The arithmetic average of recorded readings should be rounded up.
- 2.16 Levels of noise from road and rail traffic are often specified at one metre from a façade, and these façade levels should be assumed to be 3 dB(A) higher than levels measured away from buildings, unless a more accurate figure is available. For road traffic noise the $L_{Aeq,16h}$ can be calculated using the formula below:
- 2.17 $L_{Aeq,16hr} = L_{A10,18hr} - 2dB$

WHO Guidelines and BS 8233:2014

- 2.18 Guidance on absolute limits for noise inside buildings is provided in BS 8233:2014 “Sound insulation and noise reduction for buildings – Code of practice”. Similar guidance can also be found in the current World Health Organisation (WHO) “Guidelines on Community Noise” and “Night Noise Guidelines for Europe” and the BRE/CIRIA document “Sound control for homes”. A summary of the noise criteria can be seen in **Table 2.3**.



Table 2.3: Summary of Internal Noise Criteria: BS 8233 & WHO

Criterion	Activity	Location	0700 to 2300	2300 to 0700
BS 8233:2014	Resting	Living room	35 dB $L_{Aeq,16hr}$	-
	Dining	Dining room/area	40 dB $L_{Aeq,16hr}$	-
	Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$
WHO Onset of sleep disturbance		Bedroom		30 dB $L_{Aeq,8hr}$

2.19 Individual noise events such as passing trains have the potential to cause sleep disturbance and the WHO recommend a reasonable individual noise event of 45 dB ($L_{Amax,F}$) within the bedrooms during the night. Above this level the onset of sleep disturbance can occur.

2.20 Regarding noise levels in outside amenity areas, Section 7.7.3.2 Design criteria for external noise BS 8233:2014 states that:

"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 recognized 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."

2.21 Guidelines for external noise levels in public and private open space, such as gardens and parks, is available in the WHO guidelines. According to the WHO guidelines, during the daytime ($L_{eq,16hr}$), moderate annoyance may be experienced at noise levels between 50 dB(A) and 55 dB(A) and serious annoyance may be experienced above 55 dB(A).



- 2.22 During the night time ($L_{eq,8hr}$), an interim target (IT) level of 55 dB(A) is recommended (from WHO Night Noise Guidelines for Europe – 2009). The 55 dB(A) is the lowest observed adverse effect level (LOAEL).
- 2.23 However, it should be noted that the WHO Guidelines for Community Noise – 1999 recommend an external night time noise level of 45 dB(A) ($L_{eq,8hr}$) in relation to the reduction in noise level through an open window to achieve an internal noise level in bedrooms of 30 dB.
- 2.24 With regard to the prediction of noise levels from road traffic noise, the $L_{10,18hr}$ can be converted to $L_{Aeq,16hr}$ by subtracting 2 dB from the $L_{A10,18hr}$ (BS 8233 paragraph 6.2.2) $L_{Aeq,16hr} = L_{A10,18hr} - 2 \text{ dB}$.
- 2.25 The night time noise level, $L_{Aeq,8hr}$, can be calculated from $L_{A10,18hr}$ using the conversion formula in the TRL document “*Converting the UK traffic noise index $L_{A10,18hr}$ to EU noise indices for noise mapping*”.



3.0 EXISTING NOISE PROFILE

- 3.1 The existing noise profile of the development site was determined through noise measurement and SoundPLAN noise modelling.

Noise Level Survey

- 3.2 The environmental noise measurement method detailed in British Standard 7445:1991 was used to record the 'A' weighted ambient ($L_{eq,T}$), maximum ($L_{max,T}$), background ($L_{90,T}$) and 10th percentile ($L_{10,T}$) noise levels. For this noise assessment the reference time periods, T, were sixteen hours during the daytime (0700 – 2300) and eight hours during the night time (2300 – 0700).
- 3.3 Noise levels were recorded for 24 hours at one location within the site. The sound level meter (SLM) was positioned at the centre of the site. The location of the measurement position SLM1 is presented on Figure 1.1.
- 3.4 The SLM microphone was mounted at grazing incidence 1.5 metres above ground level on a tripod at the monitoring location. The SLM was calibrated before and after the measurement periods using an acoustic calibrator. The acoustic calibrator was set to 94 dB at a frequency of 1000 Hertz.
- 3.5 The local weather conditions were recorded at the start of the measurements and at regular interval throughout the measurement period. A description of the weather conditions are presented later on in this chapter.

Equipment Used

- 3.6 The equipment used during the field measurements on site are listed in **Table 3.1**. The SLM and acoustic calibrator have been calibrated at an UKAS accredited centre (certificates available on request).

Table 3.1: Equipment used during the field measurements

Equipment	Type	Serial Number
Sound Level Meter	Brüel and Kjær Type 2250 Light	3004648
Microphone	Brüel and Kjær Type 4950	2913913
Calibrator	Brüel and Kjær Type 4321	2388830
Anemometer/thermometer	Kestrel 2000	449331
Tripod	Mirander – 1.5 metre	



Results from the Noise Monitoring

Noise Levels

- 3.7 The SLM was setup at 1200 on Wednesday 1st August 2018. The survey ended 24 hours later (i.e. 1200 on Thursday 2nd August 2018). Presented in **Table 3.2** is a summary of the results from the measurements. It should be noted that there was extraneous noise from hedge cutters for the first hour of the survey, so this has not been included in the results of the survey. Refer to **Appendix 2** for an illustration of the noise levels on a graph.

Table 3.2: Summary of Recorded Noise Levels at SLM1 (August 2018)

Measurement Location	Time	Ambient Noise Level ($L_{Aeq,T}$)	Maximum Noise Level ($L_{Amax,T}$)	10 th Percentile Noise Level ($L_{A10,T}$)	Background Noise Level ($L_{A90,T}$)
SLM1	1300 - 2300	51.6	75.7	53.8	45.3
	2300 - 0700	46.5	67.0	50.1	38.4
	0700 - 1200	49.5	77.7	52.3	39.4

Weather Conditions

- 3.8 The weather conditions were recorded at regular intervals throughout the noise measurement survey. The conditions were suitable for the noise survey. On Wednesday 1st August 2018 the air temperature was 25°C, and the wind speed was approximately 2 ms⁻¹ (average). On Tuesday 2nd August, the air temperature was 24°C and the wind speed was 3 ms⁻¹. Throughout the surveys, the wind was south-westerly and there was between 20% and 100% cloud cover. There was light rain towards the end of the survey.

Conclusions

- 3.9 Although the noise survey was undertaken in 2018, there has been no changes to the locality (new development or changes to road layout/priorities) that would cause a material change to the survey results. Therefore, the results from the 2018 noise survey are still relevant and have been used for this assessment.

Noise Modelling

- 3.1 To determine the noise profile of the development site, noise levels across the site have been calculated using SoundPLAN. The proposed site layout, road



traffic flows and LiDAR data have been used to predict the noise levels and produce noise contour plots for the development site. The noise levels are adjusted from $L_{A10,18hr}$ to $L_{Aeq,16hr}$ and $L_{Aeq,8hr}$ using the conversion formula detailed in the TRL document “*Converting the UK traffic noise index $L_{A10,18hr}$ to EU noise indices for noise mapping*”.

- 3.2 The noise contour plots for the development area are provided in **Figure 3.1** (daytime 0700 – 2300) and **Figure 3.2** (night time 2300 – 0700).

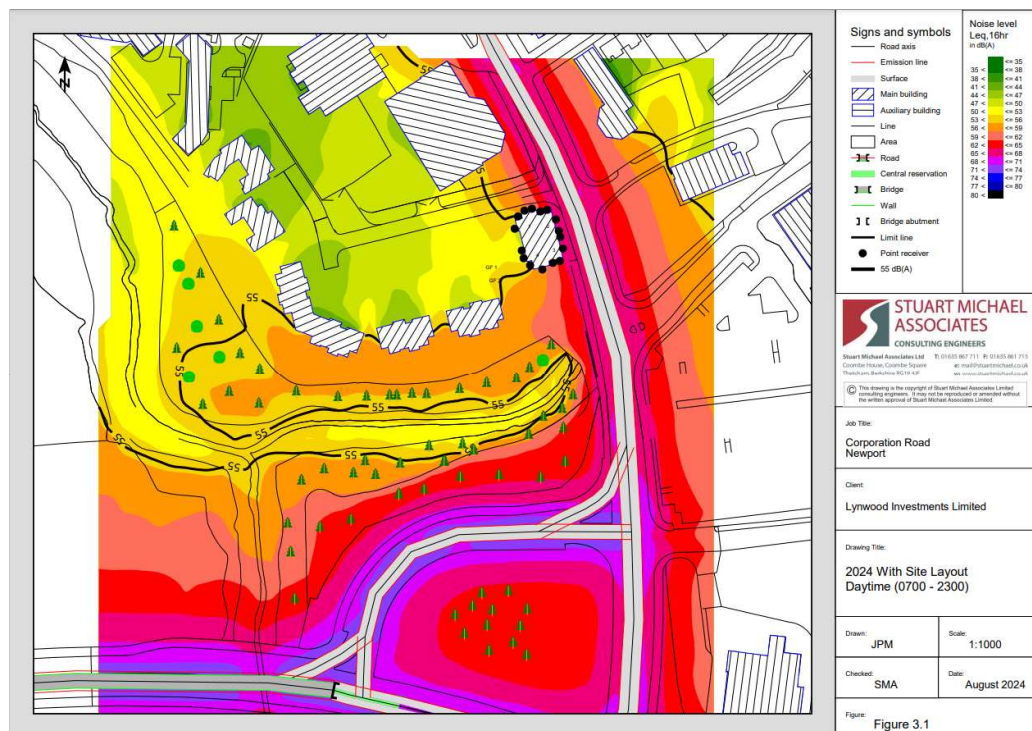


Figure 3.1: Daytime (0700 – 2300) Noise Profile

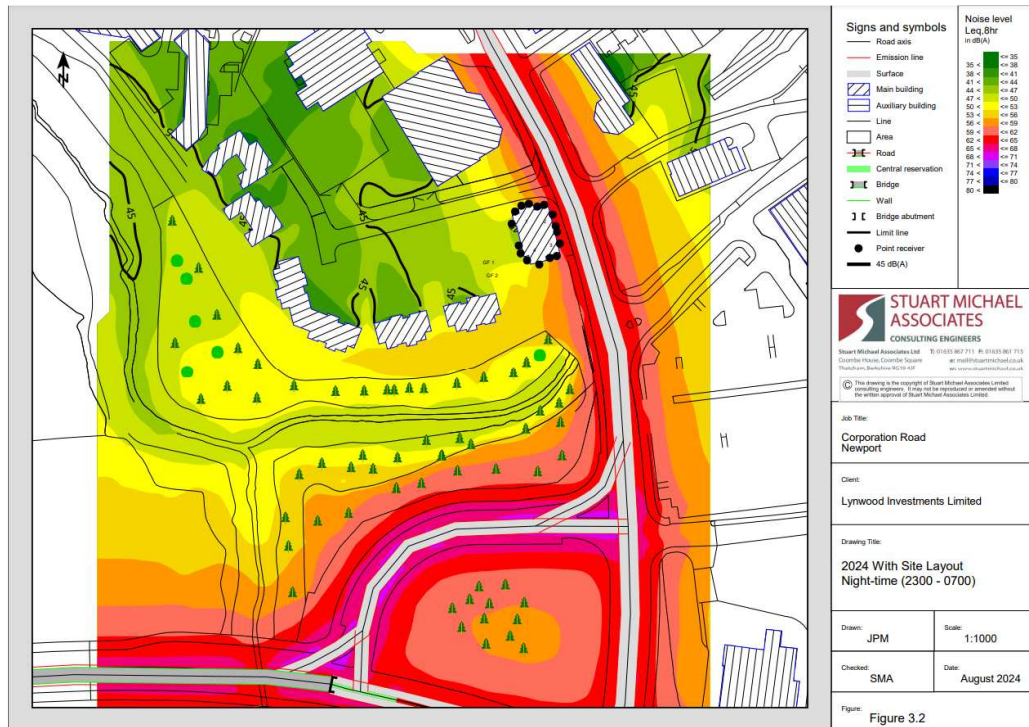


Figure 3.2: Night Time (2300 – 0700) Noise Profile

- 3.3 During the daytime, Block A is located in an area of land which is in NEC B (55 to 63 dB) i.e. above 55 dB $L_{Aeq,16hr}$ due to road traffic noise from Corporation Road.
- 3.4 During the night time, it can be seen that Block A is located in an area of land which is in NEC C (57 to 66 dB) i.e. above 45 dB $L_{Aeq,8hr}$ due to road traffic noise from Corporation Road.

Constraints

- 3.5 Using the results of the monitoring and SoundPLAN noise modelling, the future noise levels across the site are assessed against the WHO and BS 8233 for internal noise levels and local noise policy.



4.0 NOISE ASSESSMENT

- 4.1 From Table 3.2, Figure 3.1, and Figure 3.2, it can be seen that noise levels are above 55 dB during the daytime (0700 – 2300) and above 45 dB during the night time (2300 – 0700) within the site.
- 4.2 From the above analysis it can be seen that the proposed Development Site fall within NEC B during the daytime and NEC B/C during the night time.
- 4.3 NEC B of TAN 11 states that: *“Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise.”*
- 4.4 NEC C of TAN 11 states that: *“Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.”*
- 4.5 The maximum individual noise level recorded during the night was 67 dB ($L_{MAX,F}$). Appendix 2 illustrates that 60 dB was not regularly exceeded throughout the night (i.e. below 10 times during the night).

Block A façade noise levels

- 4.6 For this assessment, façade noise levels have been calculated 1m from the windows of habitable rooms on all floors using the modelling software SoundPLAN which utilises the methods detailed in CRTN. The apartments have been numbered by floor level e.g. GF 1, FF 1, SF 2 etc for the noise assessment only.
- 4.7 The position of the receptors is presented on Figure 4.1 (Ground Floor) and Figure 4.2 (First Floor to Third Floor).
- 4.8 The results from the modelling are presented in Table 4.1 (Ground Floor), Table 4.2 (First Floor), Table 4.3 (Second Floor) and Table 4.4 (Third Floor).

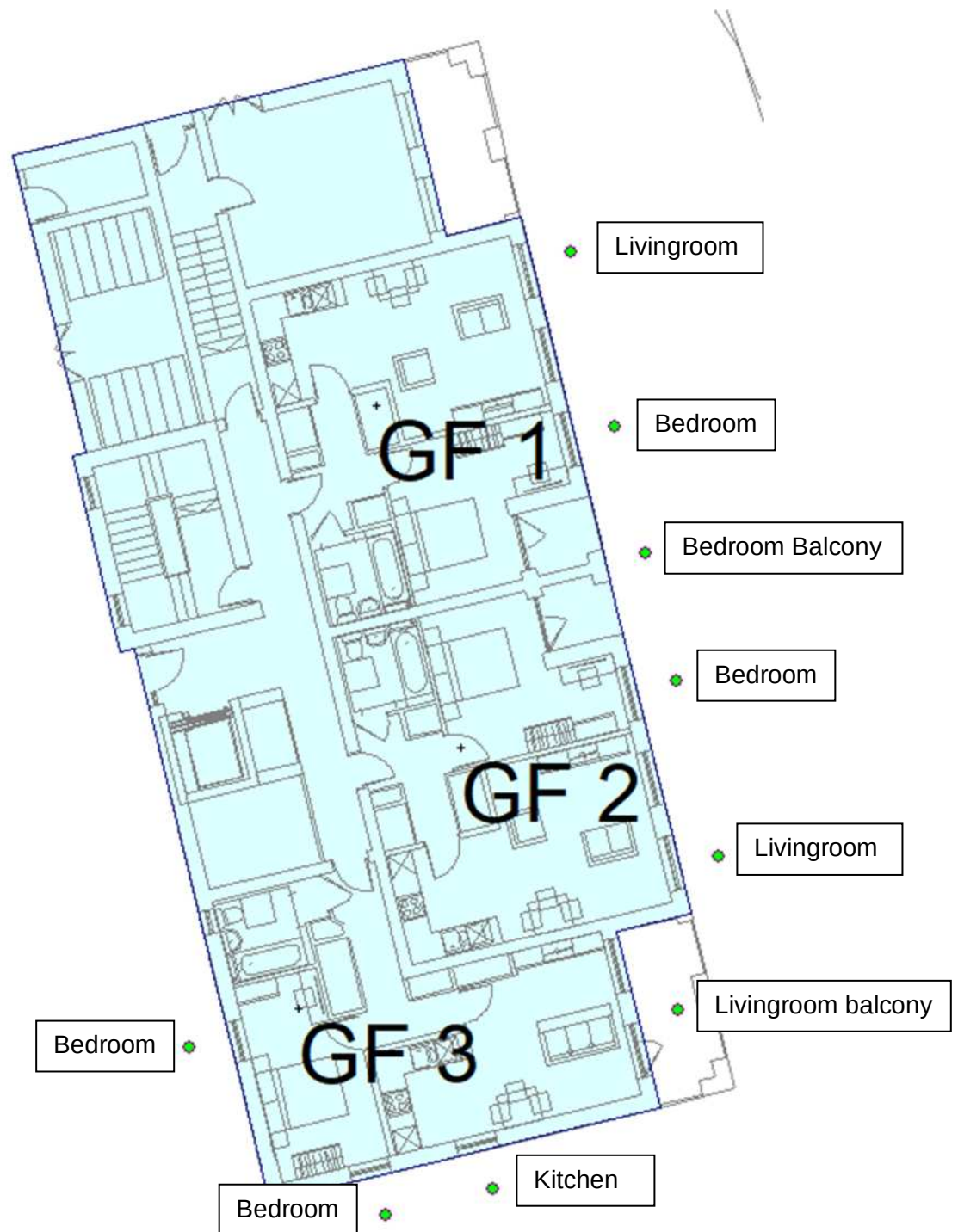


Figure 4.1: Ground Floor Receptor Locations

4.9 Presented in **Table 4.1** are the predicted ground floor (GF) façade noise levels at Block A.



Table 4.1: Predicted façade noise levels at GF level

Receptor Location		Façade Direction	Floor Level	'Future' Situation	
Apartment Number (noise assessment reference only)	Room Type			Daytime L _{eq,16hr} dB(A)	Night Time L _{eq,8hr} dB(A)
GF 1	bedroom	N	Ground Floor	60	56
	bedroom	W		52	48
	livingroom balcony	E		65	61
	kitchen/dining	N		61	57
GF 2	livingroom	E		66	63
	bedroom balcony	E		66	62
	bedroom	E		66	62
GF 3	livingroom	E		65	62
	bedroom	E		66	62
	bedroom balcony	E		66	62

4.10 With reference to Table 4.1, the highest façade noise levels (66 dB daytime and 63 dB night time) are predicted to be on the eastern façade which overlooks Corporation Road.

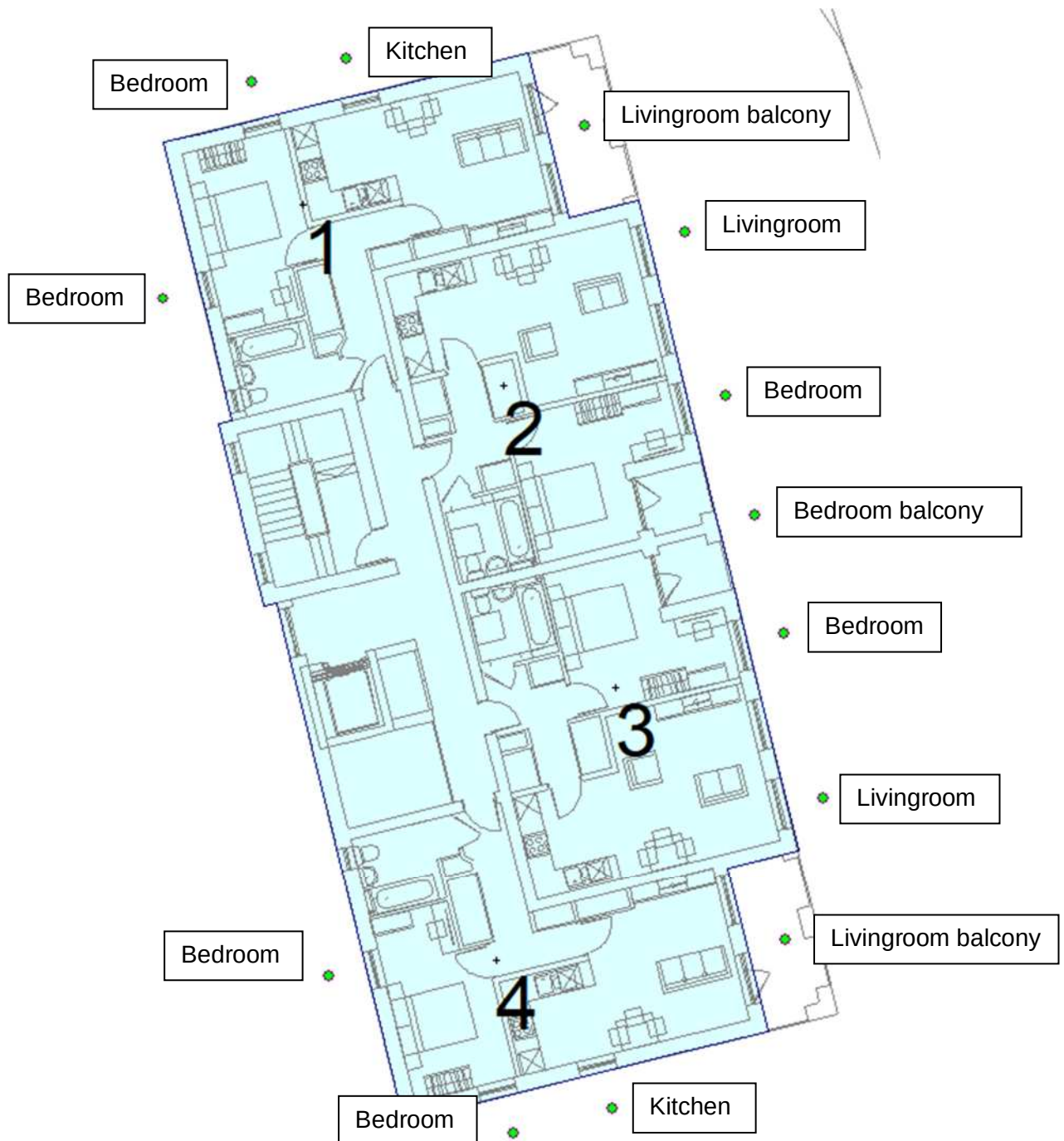


Figure 4.2: First Floor to Third Floor Receptor Locations

4.11 Presented in **Table 4.2** are the predicted first floor (FF) façade noise levels at Block A.



Table 4.2: Predicted façade noise levels at FF level

Receptor Location		Façade Direction	Floor Level	'Future' Situation	
Apartment Number (noise assessment reference only)	Room Type			Daytime L _{eq,16hr} dB(A)	Night Time L _{eq,8hr} dB(A)
FF 1	bedroom	N	First Floor	62	58
	bedroom	W		55	51
	livingroom balcony	E		67	63
	kitchen/dining	N		63	60
FF 2	livingroom	E		68	64
	bedroom balcony	E		67	64
	bedroom	E		67	64
FF 3	livingroom	E		67	63
	bedroom	E		67	63
	bedroom balcony	E		67	64
FF 4	bedroom	S		62	59
	kitchen/dining	S		63	59
	livingroom balcony	E		66	62
	bedroom	W		57	53

4.12 With reference to Table 4.2, the highest façade noise levels (67 dB during the daytime and 64 dB during the night time) are predicted to be on the eastern façade which overlooks Corporation Road. On the western façade, noise levels are predicted to be decidedly lower (55 to 57 dB during the daytime and 51 to 53 dB during the night time).



4.13 Presented in Table 4.3 are the predicted second floor (SF) façade noise levels at Block A.

Table 4.3: Predicted façade noise levels at SF level

Receptor Location		Façade Direction	Floor Level	'Future' Situation	
Apartment Number (noise assessment reference only)	Room Type			Daytime L _{eq,16hr} dB(A)	Night Time L _{eq,8hr} dB(A)
FF 1	bedroom	N	Second Floor	62	59
	bedroom	W		56	52
	livingroom balcony	E		66	62
	kitchen/dining	N		63	59
FF 2	livingroom	E		67	63
	bedroom balcony	E		67	63
	bedroom	E		67	63
FF 3	livingroom	E		67	63
	bedroom	E		67	63
	bedroom balcony	E		67	63
FF 4	bedroom	S		63	60
	kitchen/dining	S		64	60
	livingroom balcony	E		66	62
	bedroom	W		59	55

4.14 With reference to Table 4.3, the highest façade noise levels (67 dB during the daytime and 63 dB during the night time) are predicted to be on the eastern façade which overlooks Corporation Road. On the western façade, noise levels are predicted to be decidedly lower (56 to 59 dB during the daytime and 52 to 55 dB during the night time).



4.15 Presented in Table 4.4 are the predicted third floor (TF) façade noise levels at Block A.

Table 4.4: Predicted façade noise levels at TF level

Receptor Location		Façade Direction	Floor Level	'Future' Situation	
Apartment Number (noise assessment reference only)	Room Type			Daytime L _{eq,16hr} dB(A)	Night Time L _{eq,8hr} dB(A)
TF 1	bedroom	N	Third Floor	62	58
	bedroom	W		58	54
	dining	E		66	62
	kitchen	N		62	58
	livingroom	E		66	62
TF 2	dining	E		65	61
	bedroom	E		65	61
	bedroom	E		65	61
TF 3	bedroom	S		63	59
	kitchen	S		63	60
	dining	E		66	62
	bedroom	W		60	56
	livingroom	E		65	62

4.16 With reference to Table 4.4, the highest façade noise levels (66 dB during the daytime and 62 dB during the night time) are predicted to be on the eastern façade which overlooks Corporation Road. On the western façade, noise levels are predicted to be decidedly lower (58 to 60 dB during the daytime and 54 to 56 dB during the night time).



- 4.17 As noise levels are predicted to be above 55 dB $L_{Aeq,16hrs}$ during the daytime, and above 45 dB $L_{Aeq,8hrs}$ during the night-time, a commensurate level of mitigation will be required to achieve internal noise levels that comply with local policy, British Standards and WHO guidelines.
- 4.18 Noise can enter a building, whether commercial or residential, through windows, ventilators, walls, roof and doors. In most cases, however, windows provide the main path for noise and it is important they be insulated properly. Section 8.4.7 of BS 8233 (2014) “Windows” Table 10, details the noise reduction of a thermal insulating window (6 – 12 – 6) as of the order of 33 dB(A) for a closed window (alternate window configurations are available) and 10 dB(A) to 15 dB(A) for a partially open window.
- 4.19 As detailed in Table 2.1 of this report, BS 8233 (2014) suggests that internal daytime ($L_{eq,16hr}$) noise levels of 40 dB(A) and 35 dB(A) are design targets for dining rooms, and living rooms and bedrooms respectively. During the night time ($L_{eq,8hr}$), internal noise levels in bedrooms should be 30 dB(A) and noise due to individual events ($L_{max,i}$) should not regularly exceed the 45 dB(A) threshold. To achieve an internal noise level of 30 dB(A) with an open window, façade noise levels must be no greater than 45 dB(A) ($45 - 15 = 30$ dB(A)).
- 4.20 Section 5.4.4 of BS 8233 (2014) “Obstructing the sound” gives examples of how sound can be enclosed or obstructed by a solid barrier such as a fence between the noise source and receiver. It should be noted that attenuation levels of around 10 dB are common; however, the benefits from ground absorption may be reduced.
- 4.21 The Buildings Research Establishment (BRE) and Construction Industry Research and Information Association (CIRIA) publication ‘Sound Control for Homes’ 1993 presents practical advice on the control within dwellings of noise from outside sources and noise transmitted within and between dwellings. Part B: Scheme Design – Planning to control external noise, gives advice on the potential noise reduction from low-rise dwellings acting as a barrier block between the noise source and noise sensitive areas.
- 4.22 The first paragraph on page 24 of BRE and CIRIA publication Sound Control for Homes states that ‘On an estate of low rise dwellings, those closest to a noise source can give some protection to the remainder of the site’. The order of reduction in noise levels behind these buildings can be in the order of 10 dB for



the whole site, where the gaps between the dwellings not exceeding 30% of the site frontage.

- 4.23 Table 13 of the BRE and CIRIA publication Sound Control for Homes gives guidance on the 'design background noise levels arising from external sources' and suggests that an internal noise level of <50 dB for less sensitive areas such as the kitchen, bathroom utility room, WC and internal and communal circulation areas is acceptable.
- 4.24 The World Health Organization Guidelines for Community Noise report covers, amongst other things, recommended internal and external noise levels for residential dwellings. From "Table 6.1: Guideline values for community noise in specific environments", it can be seen that for outdoor living areas a guideline for serious and moderate annoyance for both daytime and evenings is 55 dB(A) and 50 dB(A) respectively.



5.0 MITIGATION MEASURES

Introduction

- 5.1 To consider the effects of the proposals once constructed it is necessary to assess the constraints on the Development. The constraints deal with the effect of the existing environment on the Development.

Constraints on development

- 5.2 During the daytime, free field noise levels across the whole of the development site are above 55 dB(A) and place the Site in NEC B.
- 5.3 During the night time, the majority of the Site falls into NEC B with the eastern area in NEC C.
- 5.4 Areas of the proposed development fall within NEC B of TAN 11, which states that: *"noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise"*.
- 5.5 During the night time, the eastern area falls into NEC C of TAN 11 states that: *"Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise."*
- 5.6 To reduce noise levels to below the internal and external noise levels presented in the WHO guidelines, BS 8233:2014 and local planning policy a commensurate level of mitigation is required.
- 5.7 Internal noise levels of any habitable room during the night time period should not exceed 30 dB to comply with BS 8233, TAN 11 and WHO guidelines. During the daytime, internal noise levels in living rooms/bedrooms and dining areas should not exceed 35 dB and 40 dB respectively to also comply with BS 8233, TAN 11 and WHO guidelines. There are predicted to be façades with levels above 50 dB during the daytime and 45 dB during the night time.
- 5.8 There are many ways for sound to enter a building. The routes are through the roof, the doors and the main route is through the windows. If the roof is built to current Building Regulations and of sufficient mass, it will provide an adequate barrier to the passage of sound. For example, a flat timber joist roof, asphalt on



boarding, 12 mm plasterboard ceiling with thermal insulation has a weighted sound reduction of approximately 45 dB. Doors with adequate mass and minimal gaps between the door and door frame can provide sound reduction of approximately 35 dB when fitted to manufacturers' specification.

- 5.9 With regard to windows, thermal double glazed units should be fitted in accordance with Building Regulations as a minimum standard. Units are normally of the configuration 6 – 12 – 6 (glass, air gap and glass) with a weighted sound reduction (R_w) of approximately 33 dB. Presented in **Table 5.1** are sound reduction values for window systems utilising various air gap and window thickness.



Table 5.1: Example Window Systems

Material	Configuration glass/air gap/glass (mm)	Total Thickness (mm)	Sound Reduction (dB)
Sealed Unit	4/12/4	24	27
Sealed Unit	6/12/6	28	33
Sealed Unit	4/12/12	28	36
Sealed Unit	6/12/10	28	37
Laminated glass	6/12/11	29	40
Laminated glass	10/12/16	38	42
Laminated glass	13/12/13	38	45
Sealed Unit	6/20/12	38	41

- 5.10 It should be noted that the sound reduction values do not consider the adjusted factor for road traffic noise (C , C_{tr}). Usually, 1 to 2 dB is subtracted for highway road traffic > 80 kph (C) and between 3 and 6 dB for urban road traffic (C_{tr})* depending on window configuration.
- 5.11 The highest façade noise levels are predicted to be 68 dB during the daytime in the eastern façade and to achieve an internal noise level of 35 dB in the living rooms and to provide resting conditions in bedrooms a sound reduction from outside to inside of 33 dB is required.
- 5.12 During the night time, the highest façade noise level is predicted to be 65 dB in the eastern façade and to achieve an internal noise level of 30 dB in bedrooms a sound reduction from outside to inside of 35 dB is required.
- 5.13 With reference to Table 5.1, a window of configuration 6/12/6 provides a sound reduction of 33 dB (30 dB C_{tr}) which would not achieve the internal noise level of 30 dB in bedrooms and 35 dB in living rooms.
- 5.14 Therefore, a higher standard of window is required. We would recommend using a window with a minimum sound reduction of 40 dB (37 dB C_{tr}).
- 5.15 On the northern and southern façades, we would recommend using a window with a sound reduction of 37 dB (34 dB C_{tr}).

* BS EN ISO 717-1:1997, Acoustics – Rating of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation, Annex A, Table A.1 – Relevant spectrum adaptation term for different types of noise source



- 5.16 On the western façade, we would recommend using the higher standard of window, as with the north and south façades, due to the overlooking the parking area.
- 5.17 With the appropriate combination of wall and window, internal noise levels will meet BS 8233, TAN 11 and WHO guidelines on all the façade on all the floors of the proposed development with the windows closed.
- 5.18 If any of the windows or doors is open in the façade, the sound reduction for the façade containing the window or door will be reduced to between 10 and 15 dB depending on the angle of window opening. The effect of having the window or door open is a reduction in transmission loss through the façade and results in a higher internal noise level within the room.
- 5.19 Façades with a noise level of greater than 45 dB during the night time and 50 dB during the daytime and a window or door open will not meet the BS 8233, TAN 11 or WHO guidelines for internal noise levels in bedrooms and sitting rooms.
- 5.20 Where façade noise levels are above 45 dB (night time) or 50 dB (daytime), another method of ventilating the rooms will have to be provided without opening the windows or doors.
- 5.21 Acoustically attenuated background/trickle vents are available with sound reduction properties equal to and greater than levels provided by windows and doors. For example, window mounted and wall mounted trickle vents are available with a sound reduction of approximately 42 dB and 38 dB respectively. Window trickle vents can be mounted in the window frame or above or below the window and provide adequate cross ventilation within the room or hallway.
- 5.22 Windows can be opened for purge ventilation or at the occupants' choice.
- 5.23 To minimise the disturbance by noise of future residential occupiers of the flats and its effect on neighbouring residents, residential accommodation must be designed and constructed or converted to achieve the insulation requirements set out in Building Regulations Approved Document E.
- 5.24 If the roof is built to current Building Regulations, it will provide an adequate barrier to the passage of sound. With regard to windows, thermal double glazed units should be fitted in accordance with Building Regulations as a minimum standard.



- 5.25 The walls and floors between the apartment bedrooms and the adjacent public areas will require adequate sound reduction to ensure daytime resting (35 dB $L_{Aeq,T}$) and night time sleeping (30 dB $L_{Aeq,8hr}$) conditions are met.

Outside Amenity Area

- 5.26 Regarding mitigation to noise levels in outside amenity areas, the construction of the proposed buildings, boundary treatments such as dwarf brick walls and garden fences will help reduce noise levels in these areas. Refer to Appendix 1 for the site layout.

Impacts – Construction

- 5.27 Best practicable means will be used to minimise construction noise through the implementation of the recommendations set out in BS 5228. In particular, the following noise mitigation measures would be implemented:
- Proper use of plant with respect to minimising noise emissions and regular maintenance will be required. All vehicles and mechanical plant will be fitted with effective exhaust silencers and will be maintained in good efficient order;
 - The use of inherently quiet plant where appropriate – all major compressors and generators will be 'sound reduced' models fitted with properly lined and sealed acoustic covers, which will be kept closed whenever the machines are in use, and all ancillary pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers;
 - Machines in intermittent use will be shut down in the intervening periods between work or throttled down to a minimum;
 - All ancillary plant such as generators and pumps will be positioned so as to cause minimum noise disturbance, and where necessary, acoustic enclosures will be provided;
 - Where practicable the use of noisy plant will be limited to core daytime periods;
 - Channels of communication will be established between the contractor/developer, Local Authority and residents;
 - A site representative will be appointed responsible for matters relating to noise;



- Typical levels of noise will be monitored during critical periods and at sensitive locations;
- A 2m high solid site hoarding along the site boundaries will be erected where practical and feasible;
- Localised noise barriers will be erected as necessary around items such as generators or heavy duty compressors;
- Construction compounds will be laid out so as to minimise noise impacts to neighbouring noise sensitive receptors, by locating noisy operations well away from receptors and using on-site structures and materials to screen noise where practicable and necessary.



6.0 SUMMARY AND CONCLUSIONS

- 6.1 Stuart Michael Associates Limited (SMA) has been engaged by Newport City Homes to undertake a noise assessment for the proposed re-development of the former Transport Yard, Corporation Road for a residential development with associated infrastructure and facilities. The assessment has considered the potential noise constraints on development.
- 6.2 Noise measurements were undertaken within the site for a period of 24 hours. The noise survey was undertaken to determine the existing noise profile at the site. Resultant noise levels within the development site have been assessed against TAN 11, WHO guidelines, BS 8233 and local planning policy.
- 6.3 From the results of the noise level surveys and SoundPLAN noise modelling, it was determined that noise levels would be above 55 dB during the daytime (NEC B), and above 45 dB during the night-time (NEC B and NEC C towards Corporation Road). Maximum noise levels were also recorded within the development site. The maximum noise level recorded during the night was 67 dB ($L_{MAX,F}$), although the 60 dB threshold was not regularly exceeded over this period.
- 6.4 Where façade noise levels are above 50 dB during the daytime and 45 dB during the night time, mitigation measures are proposed to ensure internal noise levels meet BS 8233:2014, TAN 11, WHO guidelines and local planning policy.
- 6.5 At all floors on the eastern façade, we recommend using a window with a minimum sound reduction of 40 dB (37 dB C_{tr}).
- 6.6 At all floors on the northern and southern façades, we recommend using a window with a minimum sound reduction of 37 dB (34 dB C_{tr}).
- 6.7 On the western façade, we recommend using the same configuration of window as the northern and southern façades due to the proximity of the parking area.
- 6.8 Noise from some construction activities will be audible at the nearest sensitive receptor locations, but if Best Practical Means (BPM) is implemented then noise impacts can be minimised. It should be noted that construction impacts are temporary and people are generally more tolerant of higher noise levels if they know they are only going to be of a temporary duration. Furthermore, the



permitted hours of undertaking construction activities can be secured as a Planning Condition.

- 6.9 Based on the results of the noise assessment, it is concluded that with appropriate mitigation, noise levels will be acceptable for future residents of the proposed development at Corporation Road, Newport. The predicted internal and external noise levels fall within acceptable levels and therefore accord with national guidance and local policy.



Appendix 2 Noise Profile (SLM 1 Graph)

