Blenheim Estates

37- 41 BRIGHTON ROAD, SHOREHAM-BY-SEA

Noise Assessment

002
MAY 2025

PUBLIC

Blenheim Estates

37- 41 BRIGHTON ROAD, SHOREHAM-BY-SEA

Noise Assessment

(REVISION 2) PUBLIC

PROJECT NO. 70118838

OUR REF. NO. 002

DATE: MAY 2025

WSP

WSP House
70 Chancery Lane
London
WC2A 1AF

WSP.com

QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks				
Date	November 2024	25 November 2024	7 May 2025	
Prepared by	Robert Colder	Robert Colder	Robert Colder	
Signature			Colder, Robert (UKRIC002) Digitally signed by Colder, Robert (UKRIC002) DN: cn=Colder, Robert (UKRIC002), ou=Active, email=Robert.Colder@wsp.com Reason: I am the author of this document Date: 2025.05.13 10:59:37 +01'00'	
Checked by	Louise Beamish	Louise Beamish	Louise Beamish	
Signature				
Authorised by	Louise Beamish	Louise Beamish	Louise Beamish	
Signature				
Project number	70118838			
Report number				
File reference	\\uk.wspgroup.com\central data\Projects\70118xxx\70118838 - Kwik-Fit, Brighton Road, Shoreham\03 WIP\Acoustics\08 Reporting			

CONTENTS

1. INTRODUCTION 3

1.1. PROJECT BACKGROUND 3
1.2. EXISTING SITE 3
1.3. NEIGHBOURING CAR WASH FACILITY 4
1.4. PROPOSED DEVELOPMENT 5
1.5. SCOPE OF WORKS 7

2. PLANNING POLICY, BRITISH STANDARDS AND GUIDANCE 8

2.1. LOCAL PLANNING POLICY 8
2.2. LOCAL PLANNING GUIDANCE 8
2.3. NATIONAL PLANNING POLICY 9
2.4. BRITISH STANDARDS AND GUIDANCE 11
2.5. CONSULTATION 19

3. NOISE SURVEY 20

3.1. OVERVIEW 20
3.2. INSTRUMENTATION 21
3.3. WEATHER CONDITIONS 21
3.4. NOISE CLIMATE 22
3.5. RESULTS 22

4. NOISE ASSESSMENT 25

4.1. NOISE MODELLING 25
4.2. INITIAL SITE NOISE RISK ASSESSMENT (PROPG – STAGE 1) 25
4.3. EXISTING INDUSTRIAL/ COMMERCIAL NOISE IMPACT 26
4.4. EXTERNAL AMENITY AREA 29

4.5. FAÇADE ASSESSMENT 31

5. CONCLUSIONS 36

APPENDICES

APPENDIX A

GLOSSARY OF ACOUSTIC TERMS

APPENDIX B

SITE PHOTOGRAPHS

APPENDIX C

SURVEY EQUIPMENT

APPENDIX D

NOISE MODELLING CONTOUR PLOTS

APPENDIX E

LIMITATIONS

1. INTRODUCTION

1.1. PROJECT BACKGROUND

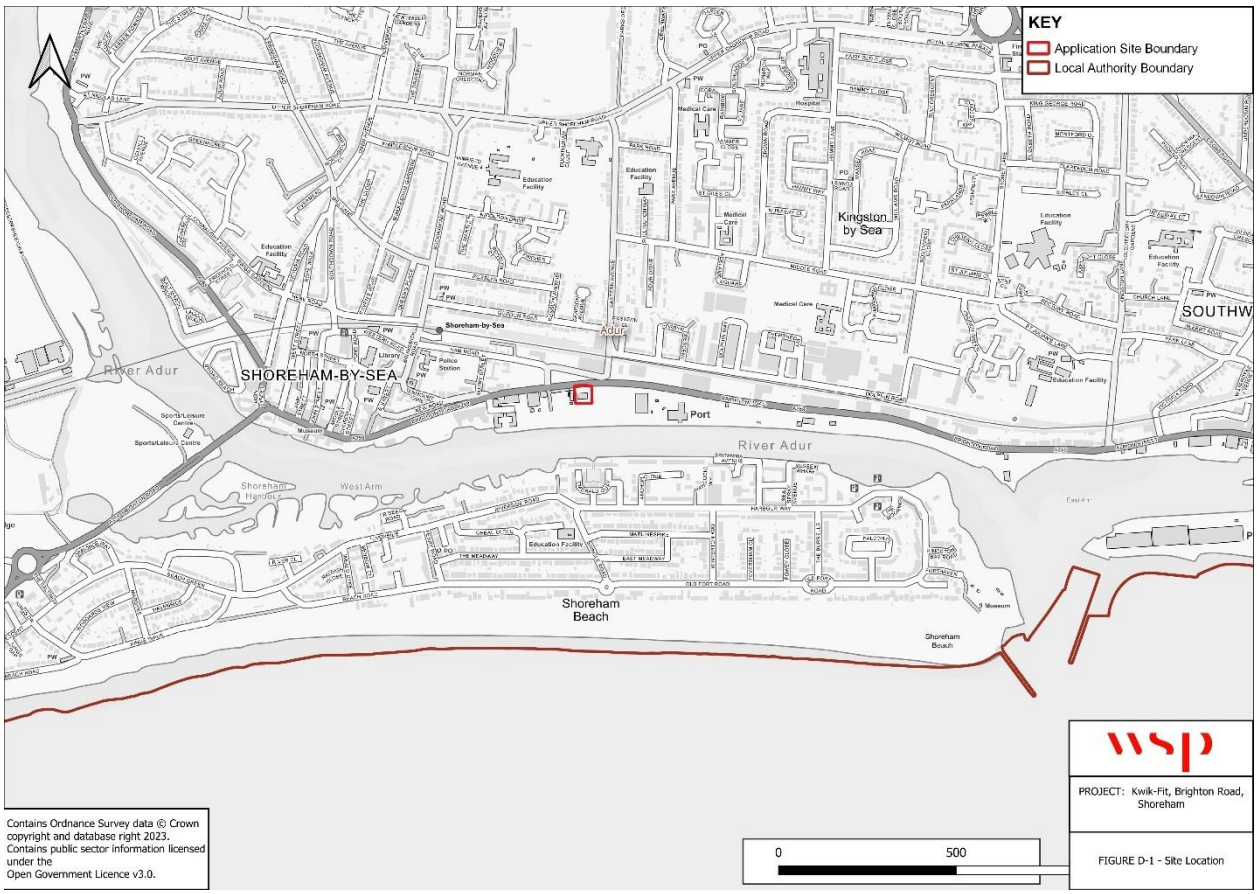
1.1.1. WSP has been commissioned by Blenheim Estates to carry out a noise assessment for the proposed residential development located at A259 Brighton Road, Shoreham-by-Sea (hereafter referred to as 'the Proposed Development' or 'the Application Site'). The assessment is required to accompany an outline planning application.

1.1.2. A glossary of acoustic terminology is presented in **Appendix A**.

1.2. EXISTING SITE

1.2.1. The Application Site is located in Adur District Council (ADC), adjacent to the River Adur. It is bounded by Brighton Road to the north, the newly planned Free Wharf development to the east, commercial spaces to the west (including 'The Whale car wash'), and a development currently under construction to the south with the River Adur beyond. A location plan of the Application Site is shown in **Figure 1.1.**

Figure 1-1 - Location Plan of the Application Site



1.3. NEIGHBOURING CAR WASH FACILITY

1.3.1. The neighbouring car wash, 'The Whale', situated west of the Proposed Development, comprises:

- a tunnel type car wash enclosure with associated mechanical plant within the tunnel; and
- jet wash station at car wash entrance; and
- vacuum cleaning adjacent to the car wash tunnel.

1.3.2. The car wash facility is currently operational from 08:00 to 18:00 Monday to Saturday, and 09:00 to 17:00 on Sundays.

1.3.3. The layout of the car wash facility is shown in **Figure 1-2**.

Figure 1-2: 'The Whale Car Wash'

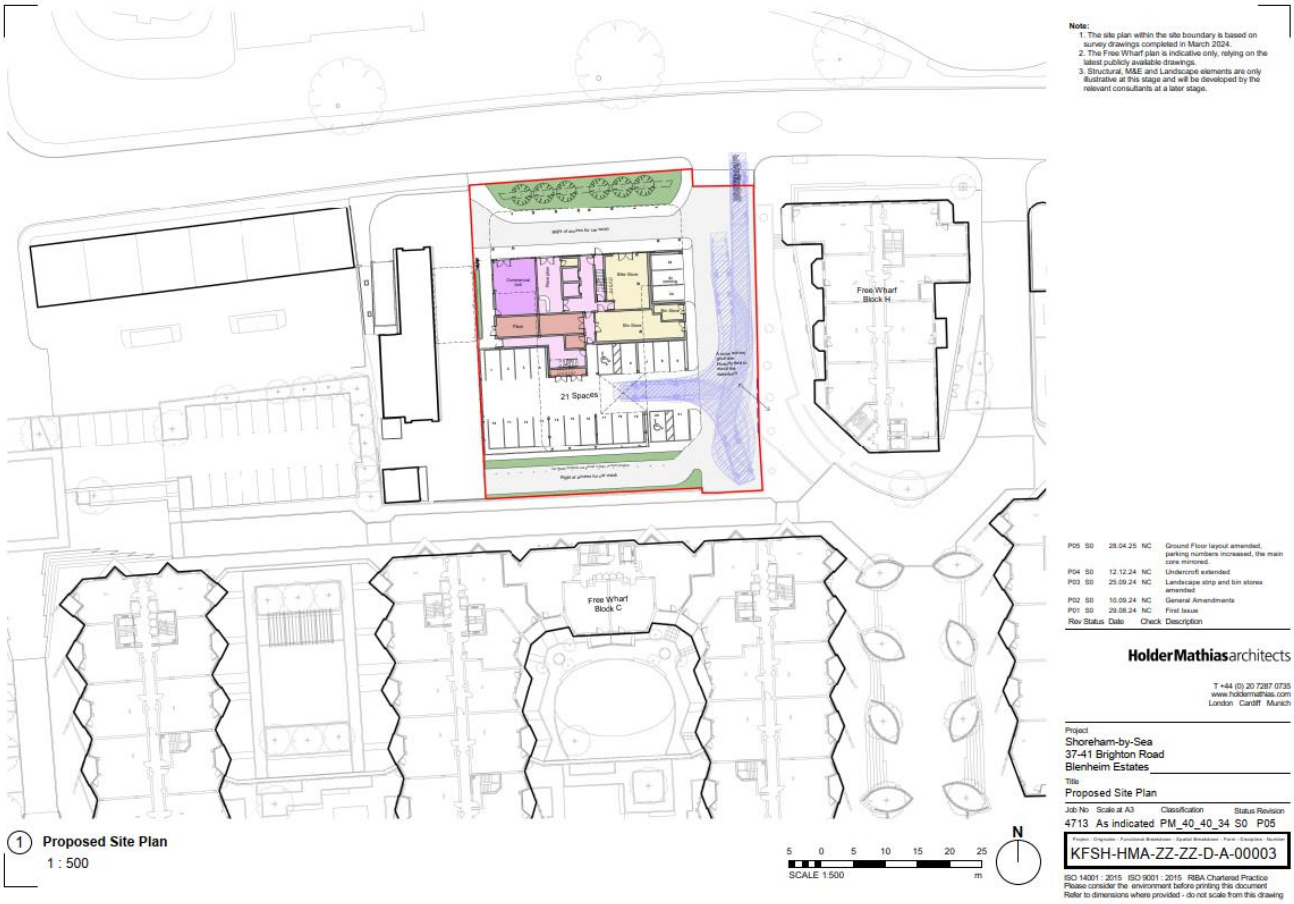
1.3.4. Vehicles enter the car wash via a road located along the eastern and southern site boundaries of the Proposed Development and typically proceed directly to car wash entry or vacuum cleaner stations. During periods of maximum capacity, vehicles may be queuing to enter the car wash at this location with engines typically idling. Vehicles are jet washed then they proceed to the car wash entry, located at the southern end of the car wash tunnel, and drive onto a conveyor which transfers the vehicle through the automatic wash cycle. Process equipment associated with the automatic wash cycle consists of pressure washers, roller brushes, cleaning foam spray applicators and air-dryer equipment. This equipment is located inside the tunnel car wash building. After drying, vehicles exit the car wash at the north end of the car wash tunnel.

1.3.5. On the eastern side of the car wash tunnel are vacuum cleaners (containing a vacuum nozzle and vacuum hose) After washing and / or vacuuming vehicles pass the northern end of the Proposed Development, onto Brighton Road.

1.4. PROPOSED DEVELOPMENT

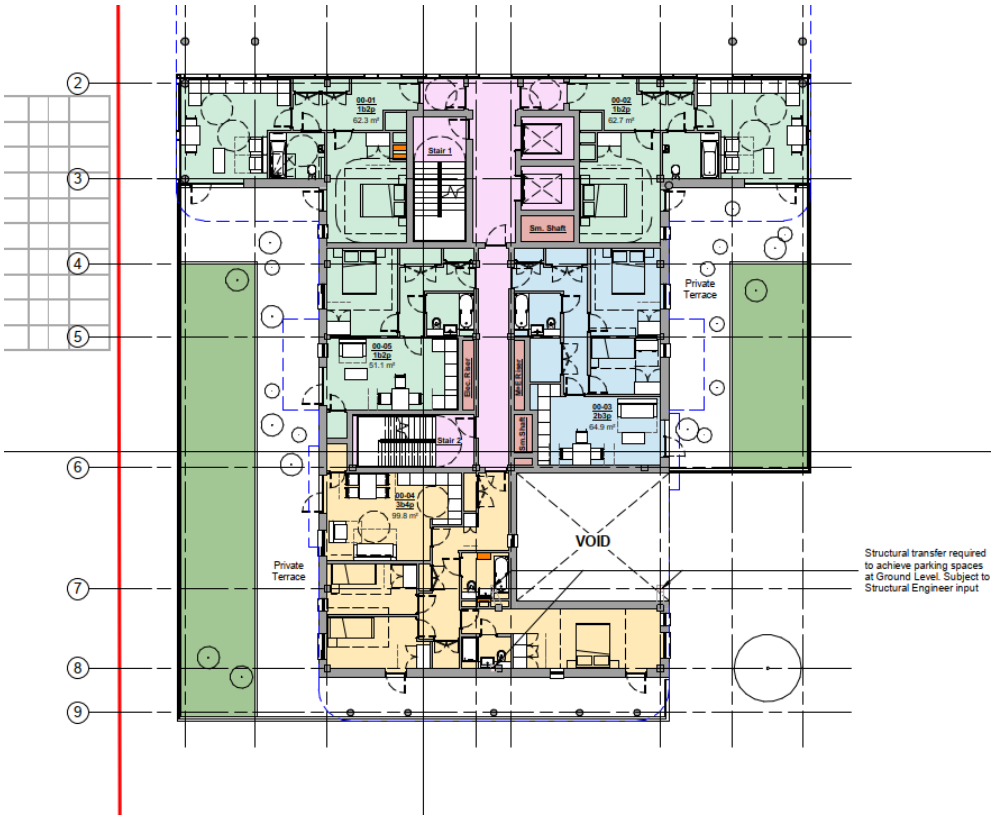
1.4.1. Blenheim Estates Limited seeks Outline Planning Permission to demolish the existing single storey industrial building, currently occupied by Kwik Fit as a tenant, and redevelop the site with a residential block ranging from five to eight stories, containing 49 apartments and a retail unit at ground floor. The development proposal also includes 18 car parking spaces. The site is approximately 8,740 square metres in size and the Proposed Development plan at ground floor level is provided in **Figure 1-3**.

Figure 1-3 - Proposed Site Plan (Ground Floor)



1.4.2. The upper ground floor level and those above are for the residential usage and they extend over the proposed car parking area to the south of the site. The plan is shown in **Figure 1-4.**

Figure 1-4 - Proposed Site Plan (Upper Ground Floor)



1.4.3. This report presents the findings of the baseline noise survey undertaken to establish the existing noise climate across the site. The survey results have been used to assess the suitability of the site for residential use in accordance with relevant criteria. Mitigation measures have been identified with the aim of providing suitable internal and external noise environments for future occupants.

1.4.4. The potential noise impact from the neighbouring car wash facility has been considered through an assessment in accordance with the relevant British Standard.

1.5. SCOPE OF WORKS

1.5.1. The scope of the assessment to support the outline planning application comprises:

- Consultation with the ADC Environmental Health Officer (EHO) to discuss assessment methodologies, the noise monitoring regime and any complaint history for the area;
- Baseline noise monitoring within the site and adjacent to commercial uses adjacent to the site;
- Development of a noise model of the site and environs using Datakustik CadnaA®, a proprietary modelling/mapping software, in accordance with the Calculation of Road Traffic Noise[1] (CRTN);
- An initial site noise risk assessment and constraints appraisal report suitable to inform the proposed residential development and with regard to the commercial uses, BS 41422;
- Outline mitigation measures, where required; and
- A standalone report outlining the results of the assessment.

[1] Department of Transport Welsh Office, HMSO. (1998). Calculation of Road Traffic Noise.

[2] British Standards Institution (2019). British Standard 4142: 2014+A1:2019 Methods for rating and assessing industrial and commercial sound.

2. PLANNING POLICY, BRITISH STANDARDS AND GUIDANCE

2.1. LOCAL PLANNING POLICY

Adur Local Plan 2017

2.1.1. The Adur Local Plan adopted in 2017[3] provides a comprehensive vision and strategy for the future of Adur (outside of the South Downs National Park) until 2032. It guides how new development can address challenges faced and identifies where, when, and how much development will take place within the ADC's administrative area.

2.1.2. The relevant policies from the Adur Local Plan concerning noise considerations are:

- Policy 8: Shoreham Harbour Regeneration Area: "All new development proposals must take into account contaminated land, local noise and air quality impacts and improvements should be sought wherever possible."
- Policy 34: Pollution and Contamination: "Where appropriate, air quality assessments and/or noise assessments will be required in conjunction with development proposals."

2.2. LOCAL PLANNING GUIDANCE

Planning Noise Advice Document

2.2.1. Section 2 of the Planning Noise Advice Document for Sussex[4] provides the basic principles for a noise assessment. Paragraph 2.5.3 states:

"For a new noise sensitive development next to a commercial noise source, where practical, each existing potential noise source would need to be measured separately and details provided of the hours of operation, the LAeq, the tonality, character, impulsivity and/or intermittency of the noise (see BS 4142) and the hours of occurrence. The existing background noise level (LA90) will also have to be measured with and without the commercial noise sources in operation in accordance with BS 4142. This could also apply to extensions/ alterations to existing development. Once appropriately assessed, mitigation may be required in accordance with Good Acoustic Design."

2.2.2. Section 6 of the Planning Noise Advice Document provides guidance for new noise sensitive developments. Paragraph 6.4.2 states:

"Development affected by transportation noise sources shall use the recommended acoustic approach set out in Pro PG: Planning and Noise – Professional Practice Guidance on Planning and Noise- New Residential Development 2017."

[3] ADC (2017). Adur Local Plan 2017 [online]. Available at: https://www.adur-worthing.gov.uk/media/Media,159572,smxx.pdf [Accessed October 2024].

[4] Planning Noise Advice Document: Sussex, November 2023

Paragraph 6.5.2 states:

"Design control measures should aim to meet the recommended standards set out in table 4 of BS 8233:2014 and regular night time noise events such as scheduled aircraft or passing trains which can cause sleep disturbance shall be minimized and assessed as (LAFmax), as recommended in the World Health Organisation's (WHO) Night Noise Guidelines for Europe (2009), unless there are particular reasons why this is not considered appropriate. In such cases, a clear explanation of the reasons should be provided."

2.3. NATIONAL PLANNING POLICY

NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

2.3.1. The NPPF[5] was introduced in March 2012 and last updated in December 2024 and is a key part of the reforms to make the planning system less complex and more accessible, to protect the environment and to promote sustainable growth. The NPPF includes an overarching presumption in favour of sustainable development that should be the basis of every plan and every decision.

2.3.2. The NPPF states that planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely 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 (Paragraph 198) and specifically to:

- *'mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise from giving rise to significant adverse impacts on health and quality of life[72];*
- *identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- *…'*

2.3.3. The footnote (72) to the policy, directs the reader to the Explanatory Note to the Noise Policy Statement for England (NPSE)[6], which sets out more information on how the 'adverse effects' and 'significant adverse effects' referred to in the NPPF should be considered.

2.3.4. The NPPF emphasises that planning policies and decisions should take account of existing businesses and other organisations when locating new noise sensitive development nearby, so that development does not create noise complaint conditions to the detriment of those existing operations. Paragraph 200 states:

'Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.'

[5] Department of Communities and Local Government (December 2024), The National Planning Policy Framework

[6] Department for the Environment Food and Rural Affairs (2010) Noise Policy Statement for England, Defra.

NOISE POLICY STATEMENT FOR ENGLAND (NPSE), 2010

2.3.5. The NPSE seeks to ensure that noise issues are considered at the right time during the development of policy and decision making, and not in isolation. It highlights the underlying principles on noise management already found in existing legislation and guidance.

2.3.6. The NPSE sets out the long-term vision of Government noise policy as follows:

- *"Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development."*

2.3.7. This long-term vision is supported by the following aims:

- *"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."*

2.3.8. To assist in the understanding of the terms 'significant adverse' and 'adverse', the NPSE acknowledges that there are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation (WHO). They are:

- NOEL - No Observed Effect Level - This is the level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise.
- LOAEL - Lowest Observed Adverse Effect Level - This is the level above which adverse effects on health and quality of life can be detected.

2.3.9. The NPSE extends these concepts to that of a SOAEL:

- SOAEL - Significant Observed Adverse Effect Level - This is the level above which significant adverse effects on health and quality of life occur.

2.3.10. However, the NPSE goes on to acknowledge that:

- *"it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."*

2.4. BRITISH STANDARDS AND GUIDANCE

ProPG: PLANNING AND NOISE – NEW RESIDENTIAL DEVELOPMENT

2.4.1. The Professional Practice Guidance on Planning and Noise (ProPG)[7] has been produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England.

2.4.2. The scope of the ProPG is limited to the consideration of new residential development that will be exposed predominantly to airborne noise from transport sources (including road and aircraft, as is the case for the Site). Although it is also suitable where some industrial or commercial noise contributes to the acoustic environment provided that it is 'not dominant'.

2.4.3. The ProPG aims to complement Government planning and noise policy and guidance, and in particular it strives to:

- *"advocate full consideration of the acoustic environment from the earliest possible stage of the development control process;*
- *encourage the process of good acoustic design in and around new residential developments;*
- *outline what should be taken into account in deciding planning applications for new noise-sensitive developments;*
- *improve understanding of how to determine the extent of potential noise impact and effect; and*
- *assist the delivery of sustainable development."*

2.4.4. The ProPG also states that:

"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."

2.4.5. The guidance discusses in detail how these numbers were derived and provides a rationale for adopting the 10th highest $L_{AFmax,5min}$ maximum event level during the night-time period as the 'typical' level.

[7] CIEH, IOA and ANC (2017), ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise New Residential Development.

2.4.6. The ProPG recommends the following approach for new residential development:

Stage 1 – an initial noise risk assessment of the Proposed Development site.

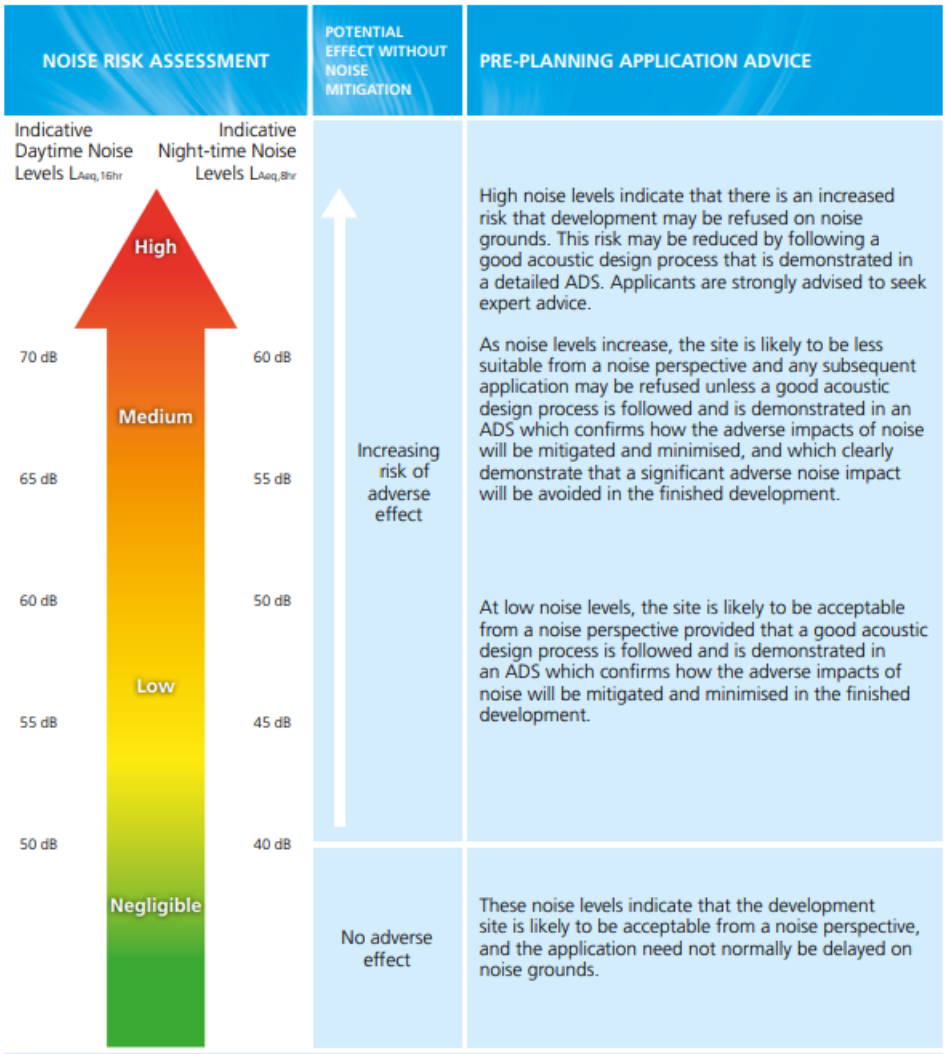


Figure 1 Notes:

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

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

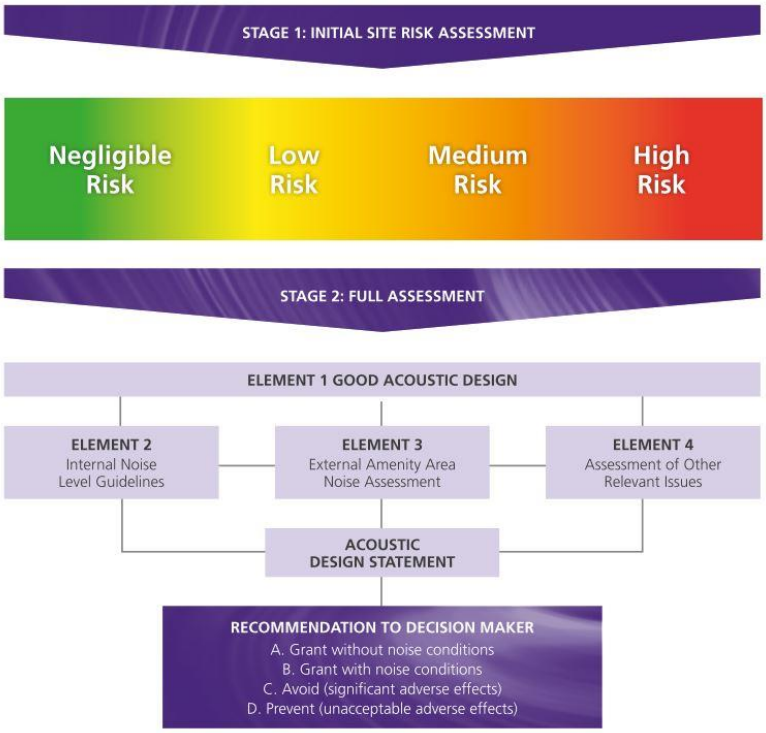
Stage 2 – a systematic consideration of four key elements in parallel:

- Element 1 – demonstrating a "Good Acoustic Design Process";
- Element 2 – observing internal "Noise Level Guidelines";
- Element 3 – undertaking an "External Amenity Area Noise Assessment";
- Element 4 – consideration of "Other Relevant Issues".

2.4.7. This approach is underpinned by the preparation of an Acoustic Design Statement (ADS), which should be more detailed for a high-risk site compared with a low-risk site.

2.4.8. Where it has been considered appropriate, subsequent sections of this noise and vibration assessment have followed the recommended approach outlined in the ProPG as shown in Figure 2-1**.**

Figure 2-1 - Summary of Overall ProPG Approach



2.4.9. ***"In the case of sites exposed to industrial and/or commercial noise:***

2.13 As stated in the Introduction, the scope of this ProPG is restricted to sites that are exposed predominantly to noise from transportation sources. The key concerns regarding new residential development near existing industrial and/or commercial land uses are:

• The future occupants of the new noise sensitive development may be subject to adverse effects of noise, and

• The existing industrial and/or commercial business may become subject to complaints from future occupants of the new noise sensitive development and at risk of having to modify operations and/or incur additional costs.

2.14 In the special case where industrial or commercial noise is present on the site but is "not dominant" (i.e. where the impact would be rated as lower than adverse (subject to context) if a BS4142:2014 assessment was to be carried out), its contribution may be included in the noise level used to establish the degree of risk (and if included, this should be clearly stated).

2.15 Where industrial or commercial noise is present on the site and is considered to be "dominant" (i.e. where the impact would be rated as adverse or greater (subject to context) if a BS4142:2014 assessment was to be carried out), then the risk assessment should not be applied to the industrial or commercial noise component and regard should be had to the guidance in BS4142:2014. The judgement on whether or not to undertake a BS4142 assessment to determine dominance should be proportionate to the level of risk. In low risk cases a subjective judgement of dominance, based on audibility, would normally be sufficient."

BRITISH STANDARD 8233

2.4.10. BS 8233:2014[8] provides recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new buildings, or refurbished buildings undergoing a change of use, rather than to assess the effect of changes in the external noise climate.

The guidance provided includes appropriate internal and external noise level criteria which are applicable to residential buildings exposed to steady external noise sources. It is stated in the British Standard that it is desirable for internal ambient noise levels not to exceed the criteria set out in **Table 2-1**.

Table 2-1 – Summary of Internal Noise Criteria in Habitable Rooms, BS 8233: 2014

Activity	Location	Period 07:00 to 23:00 hours i.e. daytime	Period 23:00 to 07:00 hours i.e. night-time
Resting	Living Room	$L_{Aeq,16hr}$ 35dB	-
Dining	Dining Room	$L_{Aeq,16hr}$ 40dB	-
Sleeping (daytime resting)	Bedroom	$L_{Aeq,16hr}$ 35dB	$L_{Aeq,8hr}$ 30dB

2.4.11. Note 5 to the above table states that:

"If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level. If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment."

2.4.12. This clearly confirms that the acoustic benefit of closed windows can be accounted for when assessing internal noise levels, provided that appropriate ventilation provision is available to the occupant.

[8] British Standards Institute (BSI), (2014). 'BS 8233 – Guidance on sound insulation and noise reduction for buildings. BSI, London.

2.4.13. In addition, Note 7 of the above table states:

"Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5dB and reasonable conditions still achieved".

2.4.14. The criteria in Table 2-1 can therefore, in certain circumstances, be relaxed by 5dB with internal noise conditions remaining 'reasonable'.

2.4.15. Recommendations for design criteria for external areas are also provided, in this regard it is stated:

- *"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 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB $L_{Aeq,T}$ 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".*

WORLD HEATH ORGANISATION

2.4.16. The World Health Organisation (WHO) Guidelines for Community Noise[9], consolidate scientific knowledge on the health effects of community noise and provide guidance to environmental health authorities and professionals trying to protect people from the harmful effects of noise in non-industrial environments. The main sources of community noise are identified as road, rail and air traffic, industries, construction and public work and neighbours.

2.4.17. The effects of noise in residential buildings are, typically, sleep disturbance, speech interference and annoyance. Relevant guideline values and the time base over which the individual guideline values apply are summarised in **Table 2-2**.

Table 2-2 – WHO Guideline Values for Community Noise in Specific Environments

Specific environment	Critical health effects	$L_{Aeq,T}$, dB	Time base, T (hours)*	L_{AFmax}, 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
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

* These periods are usually taken to be 07:00-23:00 hrs (16-hour day) and 23:00-07:00 hrs (8-hour night).

[9] World Health Organisation (1999), WHO Guidelines for Community Noise.

2.4.18. In line with the WHO guidelines and the ProPG, a night-time L_{AFmax} criterion of 45dB has been used in this assessment.

ACOUSTIC, VENTILATION AND OVERHEATING

2.4.19. The Acoustics Ventilation and Overheating – *Residential Design Guide v1.1* (AVOG)[10] was published by the Association of Noise Consultants (ANC) in January 2020. The guide outlines a methodology for the assessment of airborne sound (from predominantly transport related sources) during overheating conditions, and emphasising the co-dependency of acoustics, ventilation and overheating design.

2.4.20. The AVOG includes a number of useful design principals, including:

- Good Acoustic Design must include consideration of appropriate solutions to overheating conditions for new-build residential property.
- Increasing levels of noise outside a proposed residential building will generally demand a greater level of assessment for noise effects during overheating conditions.
- Consideration of noise inside a building during overheating conditions should include consideration for both noise generated outside the building, and by the ventilation solution itself (e.g. mechanical noise).
- It is appropriate to use higher noise limits inside a building during overheating conditions than for normal/typical conditions.

BUILDING REGULATIONS PART O (APPROVED DOCUMENT O)

2.4.21. The updates to Building Regulations Approved Document Part O (ADO)[11] came into effect in June 2022 to address overheating in buildings. Previously, regulation has focused on ensuring dwellings, or other buildings containing rooms for residential purposes, curtail avoidable heat losses in the winter months. Approved Document O addresses the flip side, looking at how we remove excess heat to prevent our dwellings from overheating in warmer months. ADO is the first time that regulation of environmental noise falls under the Building Regulations, rather than Planning legislation. Section 3 of ADO states that it should be ensured that the overheating mitigation strategy is useable and thus if the overheating strategy is to rely on open windows, suitable noise conditions within bedrooms at night should be achieved under such conditions:

"…the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).

Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits:

a. 40 dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am).

b. 55 dB L_{AFmax}, more than 10 times a night (between 11pm and 7am)."

[10] Association of Noise Consultants (2020) Acoustics Ventilation and Overheating: Residential Design Guide, January 2020, Version 1.1

[11] HM Government, Approved Document O: 2021 edition

CALCULATION OF ROAD TRAFFIC NOISE

2.4.22. "Calculation of Road Traffic Noise" (CRTN)[12] describes procedures for traffic noise calculation and is suitable for schemes where road traffic noise may have an impact. This document includes a shortened daytime measurement method for sites dominated by road traffic, which is an alternative to 18-hour monitoring. This method requires L_{A10} noise levels to be measured over three consecutive 1-hour periods between 10:00 and 17:00 hours. By using the $L_{A10,3hours}$ noise level as the arithmetic mean of the measured $L_{A10,1hour}$ values, the $L_{A10,18hours}$ value can then be calculated by subtracting 1dB.

BRITISH STANDARD 4142

2.4.23. BS4142: 2014[13] provides an assessment method for noise arising from commercial noise sources, including external plant, on-site vehicle movements and unloading, at residential receptors. It is a relative assessment approach whereby the predicted commercial sound level (suitably penalised for annoyance character if appropriate) is compared with the prevailing background noise level. A summary of the BS 4142 approach is set out below.

- Establish the specific sound level of the source(s);
- Measure the representative background sound level;
- Correct the specific sound level for on-time and any noise contributions from unrelated sources if necessary;
- Rate the specific sound level to account for distinguishing characteristics;
- Estimate the impact by subtracting the background sound level from the rating level; and
- Consider the initial impact estimation in the context of the noise and its environs.

2.4.24. *Where the sound source is not yet present, the specific sound level is established by calculation. The representative background sound level is established by measurement at the receptor location.*

2.4.25. *The specific sound level is rated using the penalties below:*

- *Tonality up to 6 dB;*
- *Impulsivity up to 9 dB;*
- *Other sound characteristics up to 3 dB; and*
- *Intermittency 3 dB.*

[12] Department of Transport Welsh Office, HMSO. (1998). Calculation of Road Traffic Noise.

[13] British Standards Institution (2019). British Standard 4142: 2014+A1:2019 Methods for rating and assessing industrial and commercial sound

2.4.26. *An initial estimate of the impact of the specific sound is obtained by subtracting the measured background sound level from the rating level as described in section 11 of BS 4142:2014. The results of this comparison are assessed on the basis of the following guidance:*

- *Typically, the greater the difference, the greater the magnitude of the impact;*
- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and*
- *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*

2.4.27. *All pertinent contextual consideration should be taken into account including the following:*

- *The absolute level of the sound;*
- *The character and level of the residual sound compared to the character and level of the specific sound; and*
- *The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.*

2.5. CONSULTATION

2.5.1. **Table 2-3** summarises the consultation process undertaken with the EHO at ADC in preparation of this assessment.

Table 2-3 – Summary of Consultation

Body / organisation	Role/Organisation	Summary of consultation	Summary of outcomes of consultation
ADC	EHO, ADC	The proposed scope and method of assessment was sent to the EHO at ADC via email to on 23 October 2024. A response was received on 25 October 2024.	The EHO approved the overall assessment methodology and had the following comments: • No complaint history for the skate park and is not aware of the skate park being used for events. However, as it is on Council land, any formal events would be controlled by the Council and the hours restricted. • With regards to BS4142, would expect the background levels to be high due to the A259 and the building envelope will be designed to mitigate against this noise environment. There is an Agent of Change matter and the context for BS4142 should be that the rating level does not impact residential use. This will require some calculation from external to internal. If this can be demonstrated then would accept the rating level to be above background. • The suitability of the site should be in line with the guidance contained in 'Planning Noise Advice Document: Sussex, November 2023'. • Queried whether the parking for the development could be moved to the front of the development to provide a greater distance to buffer road noise. This was later clarified by WSP, as the plan shared was at ground floor, which does not contain residential usage to the rear.

3. NOISE SURVEY

3.1. OVERVIEW

3.1.1. Attended noise monitoring was undertaken during the daytime on Tuesday 1 October 2024 to inform the site suitability assessment.

3.1.2. For the purposes of the road traffic noise assessment, daytime monitoring was carried out for three hours at one location between 11:00 and 14:00.

3.1.3. For the purposes of the BS 4142 assessment, monitoring was carried out at three locations, between 11:00 and 14:00, to obtain the noise levels for the neighbouring automated car wash ('The Whale') and jet wash facility.

3.1.4. Baseline noise monitoring was undertaken in line with measurement guidance in BS 7445[14].

3.1.5. The noise monitoring locations are summarised in **Table 3-1.**

Table 3-1: Noise Monitoring Locations

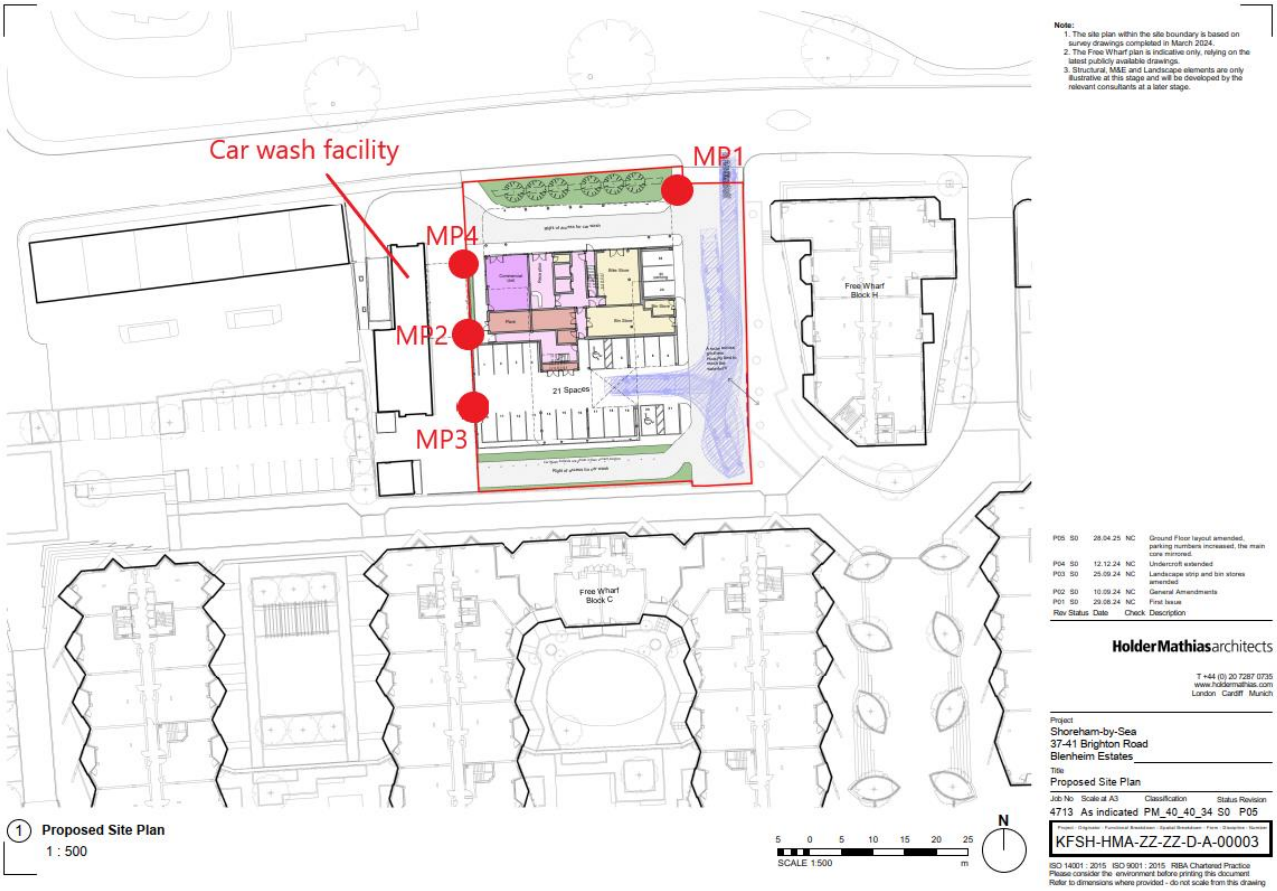
Measurement location	Details	Assessment Methodology
MP1	5m from the kerb of Brighton Road	ProPG/BS8233
MP2	~3m from vacuuming station, on the eastern boundary of the car wash facility, towards the centre.	BS4142
MP3	~5m from jet wash 'station', on the eastern boundary of the car wash facility, towards the south.	BS4142
MP4	~7m from edge of the exit to the car wash facility (closest to Brighton Road). Eastern edge, close to the northern boundary	BS4142

3.1.6. Photographs of the monitoring locations are provided in **Appendix B**.

3.1.7. A plan showing the measurement positions is shown in **Figure 3-1**.

[14] British Standard BS 7445 'Description and Measurement of Environmental Noise', British Standards Institution, 2003.

Figure 3-1 – Noise Monitoring Locations



3.2. INSTRUMENTATION

3.2.1. The sound level meters used were set to measure various parameters, including the $L_{Aeq,T}$ and $L_{A10,T}$ values, logging in contiguous periods of one hour for the road traffic noise assessment and one second for the car wash facility. All noise measurements were taken at between 1.2 and 1.5 metres above ground level, and located at least 3.5 metres from any vertical reflecting surfaces. The calibration level of all equipment was checked before and after the monitoring periods and no changes were noted.

3.2.2. Full details of the instrumentation used during the surveys are provided in **Appendix C**, **Table C-1**.

3.3. WEATHER CONDITIONS

3.3.1. Weather conditions throughout the survey period were dry, with a temperature of 14°C, with wind speeds up to 6m/s from the south-east. Whilst it is acknowledged that the wind speed was slightly above the recommended 5m/s in BS7445: 1991, this can be regarded as a worst case assessment due to slightly higher wind noise on the microphone.

3.4. NOISE CLIMATE

3.4.1. At location MP1, the noise climate was dominated by road traffic from the A259 (Brighton Road) to the north of the site. Other sources included construction noise to the south of the site, noise from the Kwik Fit site (horns, banging, wheel guns and revving of engines) and emergency vehicle sirens. However, the other sources are unlikely to have significantly contributed to the measurements of road traffic noise.

3.4.2. At locations MP2 to MP4, adjacent to the car wash facility, noise from the jet wash was noted to be the dominant noise source, when operational. During lulls in car wash noise, other noise sources included road traffic noise from Brighton Road (the A259), construction noise to the south and intermittent noise from works at Kwik Fit.

3.5. RESULTS

3.5.1. For road traffic, a representative $L_{Aeq,16hr}$ value can be obtained by an alternative method of daytime averaging, as detailed in the 'Department for Transport- Welsh Office; Calculation of Road Traffic Noise 1988'. This method involves measuring the L_{A10} of the traffic noise between 10:00 and 17:00 hours in three separate 1-hour periods. From these data an estimate can be made of the 18-hour L_{A10}.

The formula is: $L_{A10}(18hr) = \Sigma\ 3x\ L_{A10(1hr)}/3 - 1dB$

3.5.2. The $L_{A10,18h}$ traffic noise levels determined by CRTN are converted to the standard European Union 16 hour day (07:00-23:00) L_{Aeq} levels using the conversion factors provided by the Transport Research Laboratory (TRL)[15,16]. The 8-hour night has also been derived. The conversion calculations for the $L_{Aeq,16hr}$ and $L_{Aeq,8hr}$ is provided in **Table 3-2.**

Table 3-2 – $L_{A10,18hr}$ Conversion Calculations (Non Motorways)

Time	Conversion
07:00	$L_{day} = 0.95 \times L_{A10,18hr} + 1.44$
19:00	$L_{evening} = 0.97 \times L_{A10,18hr} - 2.87$
23:00	$L_{night} = 0.90 \times L_{A10,18hr} - 3.77$
07:00	$L_{Aeq,16hr} = 10\log_{10}(1/16*((12x(10^{\wedge Lday/10})+4x(10^{\wedge Levening/10}))$

[15] , TRL (2002) Converting the UK traffic noise index LA10,18h to EU Noise Indices for Noise Mapping, TRL Report PR/SE/451/02.

[16] TRL (2006) Method for converting the UK road traffic noise index LA10,18h to EU Noise Indices for road noise mapping, TRL Report st/05/91/AGG04442.

3.5.3. A summary of the noise monitoring results at Location MP1 are provided in **Table 3-3**.

Table 3-3 – Noise Monitoring Results (MP1), 1 October 2024

Time	$L_{A10,1hr}$, dB
11:06-12:06	79
12:06-13:06	79
13:06-14:06	79
Average $L_{A10,3hr}$	**79**
Derived $L_{A10,18hr}$	**78**
Derived $L_{Aeq,16hr}$	**75**

3.5.4. A summary of the measurements at Locations MP2 to MP4, with commentary, are provided in Table 3-4**.**

Table 3-4 – Noise Monitoring Results (MP2 to MP4), 1 October 2024

Location	Time	$L_{Aeq,T}$ dB	L_{AFmax} dB	Commentary	Distance from Source
MP2	11:13-11:28	66	79	Included jet wash at entrance to car wash, car wash operating	~3m from vacuuming station
	11:28-11:43	67	81	Car wash operating, cars vacuumed, car jet washed	
	11:43-11:58	66	83	Tyre gun from KwikFit site, car jet washed, car wash operating	
	11:58-12:13	63	78	Car jet washed, car wash operating, alarm sound, hammering inside KwikFit	
MP3	12:38-12:43	75	83	Car jet washed, car wash operating	~5m from jet wash station
MP4	12:48-12:53	67	95	Car wash operating, loud bang from equipment nearby	~7m from edge of the exit to the car wash facility (closest to Brighton Road).

REPRESENTATIVE BACKGROUND NOISE LEVELS

3.5.5. Due to the open nature of the Site, it was not possible to leave noise monitoring equipment unattended. Therefore, representative background noise levels for use in the BS4142 assessment have been obtained from the noise monitoring data used for the Duke of Wellington (DoW) Public House report, carried out by WSP in September 2023. The DoW is situated approximately 180m west of the Proposed Development The conditions at this site are deemed representative of the Proposed Development, given that noise monitoring was undertaken at a distance of approximately 25m from Brighton Road, which is similar to those at the Proposed Development at its midpoint. The noise measurements were carried out on Saturday 9 September and Sunday 10th September 2023, at a distance of approximately 25m from Brighton Road as shown in Table 3-5.

Table 3-5 – Noise Monitoring Results at the DoW

Location	Time	$L_{Aeq,T}$ dB	$L_{A90,T}$ dB*	$L_{AFmax,5min}$ dB**
DoW 25m from Brighton Road at a height of 6m	15:00-16:00, Saturday 9 September 2024	60	56	-
	09:00-09:45, Sunday 10 September 2024	56	48	-
	00:45-07:00 Sunday 10 September 2024	-	-	66*

*Arithmetic average

**Level exceeded for 90% of the time

4. NOISE ASSESSMENT

4.1. NOISE MODELLING

4.1.1. An environmental noise model was completed using Datakustik CadnaA noise mapping software to assess the noise impact at the Proposed Development site from the surrounding road along with commercial noise.. CadnaA implements a range of noise prediction algorithms, including those based on relevant guidance and standards in the UK. For road traffic noise, the most appropriate calculation methodology is that of CRTN. Commercial noise sources have been calculated using the methodology in ISO 9613-2:2024.[17]

4.1.2. The topography of the site and surrounding area have been determined from 1m resolution Digital Terrain Model (DTM) lidar data, converted to contour lines. Hard ground has been assumed for the noise model.

4.1.3. Road traffic noise levels for Brighton Road have been included within the model, calibrated to the measurements taken at MP1.

4.1.4. Free-field estimated night-time L_{AFmax} levels have been predicted across the Proposed Development based on the measured L_{AFmax} data from the WSP September 2023 survey for the DoW. Night-time L_{AFmax} noise levels have been predicted at a second-floor height of 8 metres as there is no proposed residential usage on the ground floor and there are no bedrooms fronting onto Brighton Road on the first floor. The L_{AFmax} level has been estimated by the noise model based on point source attenuation, allowing for height as well as distance.

4.1.5. Given that the car wash is only operational during the daytime, no assessment has been included for this during the night-time period.

4.2. INITIAL SITE NOISE RISK ASSESSMENT (PROPG – STAGE 1)

4.2.1. The results of the noise modelling are shown on the following figures in **Appendix D**:

- **Figure D.1** – Noise Modelling Results / Initial Noise Risk Assessment – Daytime, $L_{Aeq,16hr}$, and
- **Figure D.2** – Noise Modelling Results / Initial Noise Risk Assessment – Night-Time, $L_{Aeq,8hr}$.

4.2.2. Note, the topography is assumed not to alter significantly, and this includes the Proposed Development.

4.2.3. The daytime indicative noise levels are up to 73dB $L_{Aeq,16hr}$ at the proposed northern façade fronting onto Brighton Road to the north, 58 to 70dB $L_{Aeq,16hr}$ at the eastern facade, 50-57dB $L_{Aeq,16hr}$ at the southern facade and 64 to 70dB $L_{Aeq,16hr}$ at the western façade on the northern section (dominated by road traffic noise) and 59-62dB $L_{Aeq,16hr}$ at the western façade, on the southern section (dominated by the jet wash noise), facing the jet wash area of the car wash facility.

4.2.4. The night-time indicative noise levels are up to 65dB $L_{Aeq,8hr}$ at the proposed northern façade facing Brighton Road to the north, 53-62dB $L_{Aeq,8hr}$ at the eastern facade, up to 50dB $L_{Aeq,8hr}$ at the southern facade and up to 61dB $L_{Aeq,8hr}$ at the western façade (closest to Brighton Road).

[17] *ISO 9613-2:2024 Acoustics — Attenuation of sound during propagation outdoors*

4.2.5. In accordance with ProPG, the figure provided in **Paragraph 2.4.6** of this report shows that the indicative noise levels measured during the day and night provide the following 'pre-planning application advice':

- **'Low' noise risk assessment:**

  For the proposed façade facing the southern boundary the initial noise risk assessment outcome is "low noise risk" where the pre-planning application advice states:

  "At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in the ADS [Acoustic Design Statement*] which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development."*

- ***'Medium' noise risk assessment:***

  For the eastern and western façade of the proposed building the initial noise risk assessment outcome is "medium noise risk" where the pre-planning application advice in ProPG states:

  "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."

- **'High' noise risk assessment:**

  For the northern façade of the proposed building the initial noise risk assessment outcome is "high noise risk" where the pre-planning application advice in ProPG states:

  "High noise levels indicate that there is an increased risk that the 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 ADS. Applicants are strongly advised to seek expert advice."

4.3. EXISTING INDUSTRIAL/ COMMERCIAL NOISE IMPACT

4.3.1. **Figure 3-1** shows the location of the neighbouring car wash facility.

4.3.2. As per ProPG guidance (**Section 2.3.9** of this report) relating to 'Site exposed to industrial and/or commercial noise' the following applies:

"2.15 Where industrial or commercial noise is present on the site and is considered to be "dominant" (i.e. where the impact would be rated as adverse or greater (subject to context) if a BS4142:2014 assessment was to be carried out), then the risk assessment should not be applied to the industrial or commercial noise component and regard should be had to the guidance in BS4142:2014. The judgement on whether or not to undertake a BS4142 assessment to determine dominance should be proportionate to the level of risk. In low-risk cases a subjective judgement of dominance, based on audibility, would normally be sufficient."

4.3.3. Noise from road traffic on Brighton Road was noted to be dominant at locations representative of the proposed northern, eastern and western (northern section) boundaries. However, towards the south, on the western boundary, in close proximity to the jet wash, this was subjectively the dominant noise source, when in operation. Therefore, a BS4142 assessment to determine the likelihood of impact, has been carried out using the results from the CadnaA noise modelling.

4.3.4. The following sources have been included to model noise generated by the car wash facility:

- One car wash tunnel entry.
- One car wash tunnel exit.
- One jet wash (used by workers prior to driving the car onto conveyor for the automated car wash).
- Two vacuum nozzles.

4.3.5. The sound power levels of the plant/equipment are provided in **Table D.1**, **Appendix D**. These are based on a combination of measurements and observations taken at the car wash facility, and WSP library data. Noise from the vacuum stands has been modelled as point sources representing the vacuum nozzles associated with each vacuum stand. It is assumed during periods of maximum capacity, two of the vacuum stands are in use concurrently for 30 minutes per hour. The jet wash is assumed to operate for 45 minutes in a one hour period. Noise from the car wash entry and car wash exit has been modelled as vertical area sources at each end of the building. It has been assumed that the automated car wash is operational for 15 minutes per hour. These conditions are considered to represent a reasonable worse-case assessment.

4.3.6. A summary of the results and the BS4142 assessment are provided in **Table 4-1**, with the nearest façade of the Proposed Development to the car wash facility being the western side, towards the rear at first floor level.

Table 4-1 – Initial BS4142 Assessment of Car Wash Facility at the Proposed Development

Description	Saturday Afternoon (15:00-16:00)	Sunday Morning (09:00-10:00)
Specific sound level L_{Aeq}	62dB	62dB
Character correction	+5dB	+5dB
Rating level $L_{Ar,Tr}$	67dB	67dB
Background sound level L_{A90}	56dB	48dB
Excess of rating over background level	+11dB	+19dB
Likelihood of impact	Significant adverse, depending on the context	Significant adverse, depending on the context

4.3.7. The specific noise levels were calculated with an acoustic feature (+3dB for intermittency and +2dB for tonality - just perceptible) to derive the rating level. The prominence of the acoustic feature correction is likely to reduce at the floor height increases. As the jet wash at the adjacent car wash facility is expected to cause a significant adverse impact to the Proposed Development on both a Saturday afternoon and a Sunday morning, the contribution from the plant has been added to the road traffic noise model.

4.3.8. The initial impact estimation in **Table 4-1** cannot be considered in isolation and without due regard to the following sections on context and uncertainty as well as the relevance of other guidance and standards which are discussed later in this section.

CONTEXT

4.3.9. In addition to the initial estimate of noise impact, which is simply based on the excess of the rating level over the background sound level, the following contextual factors have to be considered in terms of their potential to modify the initial estimation of impact:

- Operational period – the car wash operational hours during the daytime are 08:00 to 18:00 Monday to Saturday, and 09:00 to 17:00 on Sundays. The car wash facility will, therefore, not operate into the evening period on weekdays and weekends, when there could be a greater likelihood of adverse impact, due to residents' being more likely to be in their apartment at that time. This would support a downward modification of the initial impact estimation.
- Proposed residential near to a commercial source – in contrast to circumstances where a new noise source is introduced close to existing receptors – at the development site the reasonable expectation of future occupiers will have been informed by their knowledge of the existence of the car wash facility i.e., they will have come to the area with knowledge. This would support a downward modification of the initial impact estimation.
- Level of sound insulation – this is a new build development which will be designed and built with a high level of sound insulation and an external layout specifically designed to minimise noise intrusion from the car wash operations. This would support a downward modification of the initial impact estimation.
- No line of sight – from the fourth floor upwards, a solid balustrade of ~1.2m is likely to provide approximately a 10dB reduction for users of the balcony, assuming this breaks the line of sight.

UNCERTAINTY

4.3.10. The approach carried out at all stages has been adopted with the aim of reducing uncertainty via the implementation of good practice, with reference to BS4142 Annex B 'Consideration of uncertainly and good practice for reducing uncertainty'.

4.3.11. The following key steps have been taken to reduce uncertainty:

- The use of suitable Class 1 sound level meters which comply with the relevant standards and have been calibrated at a UKAS accredited laboratory within the previous year.
- Field calibration of the measurement system on site at the start and end of each monitoring period.

- Predictions have been completed using a reputable noise mapping software package (CadnaA) which implements a validated method of calculation (ISO 9613-2: 2024).

CONCLUSIONS

4.3.12. Overall, it is considered that for the proposed façade in close proximity to the car wash, at first floor level, there is the potential for a significant adverse impacts on future residents', especially on a Sunday morning. The following section considers the use of external amenity areas.

4.4. EXTERNAL AMENITY AREA

4.4.1. This section of the report presents the predicted external amenity area noise levels. The level of protection afforded by the building envelope has been assessed in **Section 4.5** of this report.

4.4.2. For outdoor areas, such as gardens and balconies, ProPG refers to 'BS 8233:2014, (Paragraph 2.4.15 of this report), which states:

"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…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'.

4.4.3. Balconies are proposed on all elevations of the Proposed Development. Predicted noise levels for balconies are up to 18dB above the 55dB $L_{Aeq,T}$ criterion on the northern boundary with Brighton Road, due to road traffic noise. Whilst this is considered a high noise level, there are benefits to accessing outdoor amenity spaces as outlined in BS8233 (provided in paragraph above).

4.4.4. When the car wash facility is in operation during the daytime, those proposed units in close proximity on the western boundary (towards the rear) are predicted to be up to 7dB above the upper guideline value of 55dB $L_{Aeq,T}$. It is recommended that, to allow the car wash to operate fully and without a high threat of complaints, proposed balconies along the western boundary within the southern section on the first to third floor, highlighted in Figure 4-1, are excluded, or replaced with wintergardens. At floors above those shown, the contribution from the jet wash noise is lower and the road traffic noise is higher, which is less likely to result in an adverse comment. Also, from the fourth floor upwards, a solid balustrade of ~1.2m is likely to provide approximately a 10dB reduction for users of the balcony, assuming this breaks the line of sight.

Figure 4-1 - Western Boundary, Balconies Recommended for Exclusion or Replaced with Winter Gardens

4.4.5. Balcony areas in the south-eastern corner and southern edge have predicted noise levels above the criterion by up to 4dB respectively, which are considered acceptable. Outside of the car wash opening hours, balcony areas on the south-western area have predicted noise levels up to 6dB above the criterion

4.4.6. Notwithstanding the exceedance of the BS 8233 guidance noise limits at the majority of plots, the following contextual factors have to be considered in terms of their potential to modify the initial estimation of impact:

- Noise variation – noise levels are typically lower (subject to wind direction) during the evening period when proposed residents would more frequently occupy their balcony. This would support a downward modification of the initial impact estimation.
- Proposed residential near to a road traffic and commercial source – in contrast to circumstances where a new noise source is introduced close to existing receptors – at the Proposed Development the reasonable expectation of future occupiers will have been informed by their knowledge of the existence of the road and commercial premises, i.e. they will have come to the area with knowledge. This would support a downward modification of the initial impact estimation.

- Character of sound – The character and level of the sound has to be considered to establish the degree to which the sound source is likely to be distinguishable. Road traffic is regarded as anonymous noise, with few stand out features, with the exception of horns or emergency vehicle sirens. Therefore, this is applicable to units on the northern, eastern and southern boundaries and for those in close proximity to the car wash when outside of their operating hours.

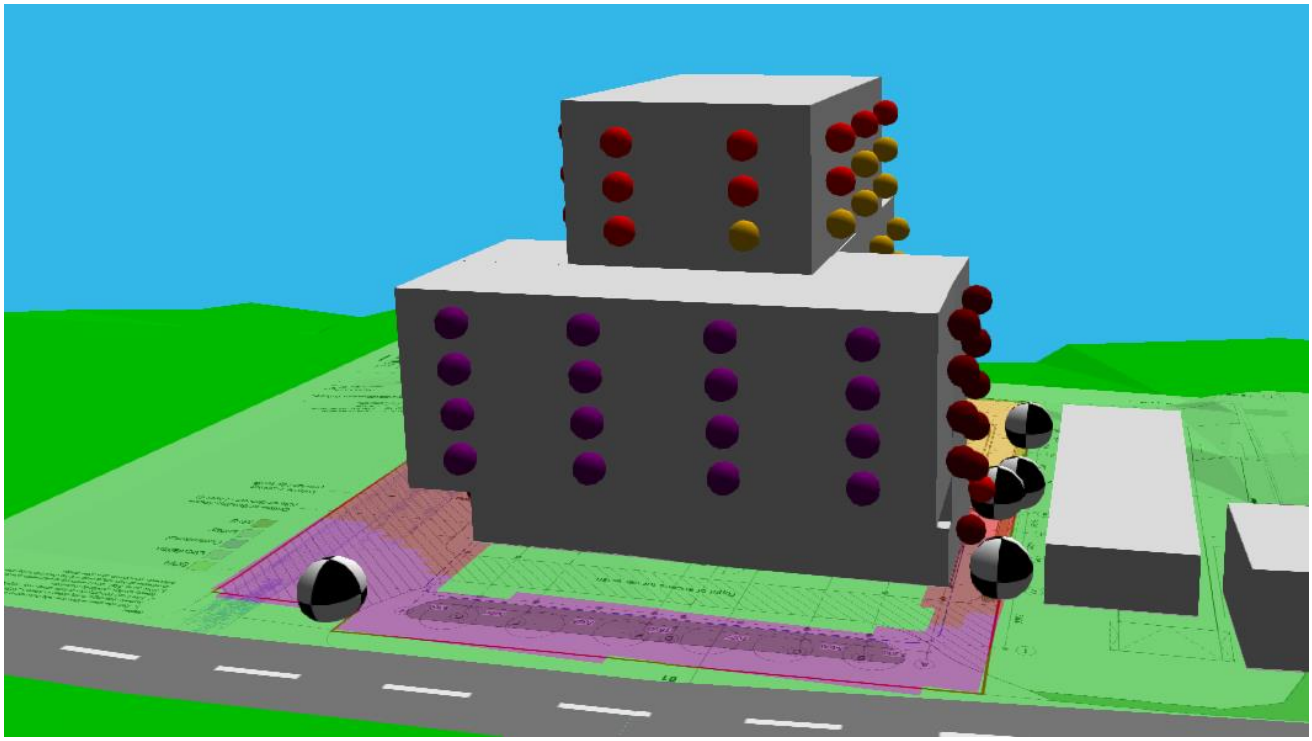
4.5. FAÇADE ASSESSMENT

4.5.1. For this outline application, consideration has been given to the level of protection afforded by the building envelope, to demonstrate that a workable solution exists that would result in the required internal noise levels being achieved. More detailed calculations will be needed at the detailed design stage to determine precise requirements to ensure appropriate internal criteria are achieved.

4.5.2. Given that windows are usually the weakest component acoustically in the overall building envelope, it is appropriate, in the first instance, to consider the sound insulation provided by the glazing elements.

4.5.3. Noise levels have been predicted at all façades with those on the northern façade, closest to Brighton Road, showing the highest noise levels as illustrated in **Figure 4-2**.

Figure 4-2 – 3D Noise Map of the Northern Façade (Daytime)



4.5.4. **Table 4-2** presents the highest predicted free-field $L_{Aeq,T}$ and L_{AFmax} noise levels along the northern and western boundaries, closest to Brighton Road and the car wash respectively.

Table 4-2 – Predicted Noise Levels at the Northern and Western Façades (Free-Field)

Location	Period	Floor	Calculated noise level at façade (free-field) dB(A)
Northern façade	Daytime $L_{Aeq,16hour}$	Second floor	73
	Night-time $L_{Aeq,8hr}$	Second floor	65
	Night-time L_{AFmax}	Second floor	77
Western façade (to the rear, closest to the car wash entrance)	Daytime $L_{Aeq,16hour}$	First floor	62
	Night-time $L_{Aeq,8hr}$	First floor	43
	Night-time L_{AFmax}	First floor	55

Note: car wash not operational during the night-time

4.5.5. The maximum (L_{AFmax}) noise levels on the northern façade, fronting onto Brighton Road, are predicted to be up to 77dB (free-field) fronting Brighton Road. The predicted L_{AFmax} during the night-time are 4dB higher than the daytime L_{Aeq} levels (whilst the applicable criterion is 10dB higher). Therefore, the required mitigation is dictated by the daytime L_{Aeq} noise levels.

Glazing

4.5.6. BS 8233:2014 identifies two methods for determining the degree of sound insulation required from a building façade to meet a target level internally, based on a known external noise level. With respect to the simple calculation, which has been used for this assessment, BS 8233:2014 (section G.1) states that:

"Strictly, the insulation values used here relate to a pink noise spectrum, and actual values achieved are lower for traffic noise. Furthermore, the method does not take account of the absorption (e.g. furnishings) in the room. However, the Rw values will suffice for a rough calculation, although it is likely to underestimate the level in the room by up to 5 dBA."

4.5.7. **Table 4-3** presents the highest predicted free-field $L_{Aeq,T}$ and L_{AFmax} noise levels along the northern and western boundaries, allowing for a +5dB adjustment for potential under-estimation based on the guidance in BS 8233:2014. Also presented is the sound reduction required from the building façade in order to meet the target internal criteria. For the western boundary, during the daytime, in accordance with the ProPG, the BS4142:2014 character correction has been applied to the target criterion, in order to derive the required sound insulation.

Table 4-3 – Required Sound Reduction for Residential Development

Location	Period	Floor	Calculated noise level at façade (free-field) dB(A) [A]	Adopted noise level at façade (free-field) dB(A) [A+5]	Target criterion, dB(A) [B]	Required sound insulation (R_w) [B-C]
Northern façade	Daytime $L_{Aeq,16hour}$	Second floor	73	78	35	43dB
	Night-time $L_{Aeq,8hr}$	Second floor	65	70	30	40dB
	Night-time $L_{AFMax,8hr}$	Second floor	77	84	45	39dB
Western façade (facing car wash entrance)	Daytime $L_{Aeq,16hour}$	First floor	61	66	30*	36dB
	Night-time $L_{Aeq,8hr}$	First floor	43	48	30	23dB
	Night-time $L_{AFMax,8hr}$	First floor	55	60	45	15dB

*Criterion adjusted by the BS4142 character correction (5dB) – daytime only, car wash not operational at night

4.5.8. For the worst affected façade, where the required sound insulation is up to 43dB R_w, the ingress of noise should be sufficiently controlled using a high specification acoustically rated double-glazed unit, for example Shuco 13/20/9 (44dB R_w+C_{tr}).

4.5.9. This assessment has been undertaken using predicted worst-case noise levels to demonstrate that a workable solution exists which would result in the target values being achieved. Detailed glazing calculations (based on the frequency spectrum of the source, building façade dimensions and internal room dimensions and finishes) will be needed at the detailed design stage to determine precise glazing requirements.

Ventilation Treatment

4.5.10. The noise insulation performance of the specified glazing unit assumes that windows remain closed. Consequently, it is necessary to consider how adequate ventilation would be provided to the most noise exposed building façades. On ventilation, BS 8233:2014 advises that:

"The Building Regulations on ventilation recommend that habitable rooms in dwellings have background ventilation. Trickle ventilators can provide this, and sound attenuating types are available. Where sound insulation requirements preclude opening windows for rapid ventilation and cooling, acoustic ventilation units incorporating fans are available for insertion in external walls; these can provide sound reduction comparable with domestic secondary glazing."

4.5.11. Given the external noise levels predicted to arise at the worst affected façade, mechanical ventilation is likely to be required to enable satisfactory ventilation without the need for opening windows, thereby maintaining the sound reduction performance of the building façade and safeguarding the internal target criteria.

4.5.12. However, at other locations (including along the southern and south-eastern boundaries) it should be possible for background ventilation to be provided through appropriate, acoustically rated passive ventilators.

4.5.13. Therefore, whilst the preference would be to use natural ventilation openings such as trickle vents, air-bricks or other passive ventilation devices, in practice the ventilation strategy for the Proposed Development may involve a combination of passive and mechanical ventilation. Exactly which type of ventilator would be installed where, will depend on the final masterplan design (i.e. the location and orientation of dwellings in general and habitable rooms, such as living rooms and bedrooms, in particular).

4.5.14. Ventilators are available that meet the requirements of the Building Regulations Approved Document F for background ventilation and also provide a sound insulation performance that meets or exceeds that required from the glazing elements. The detailed calculations mentioned herein should also determine the precise ventilation requirements.

4.5.15. The use of opening windows for rapid purge ventilation (i.e. to expel paint fumes or burnt toast odours as per Approved Document F) is acceptable at all façades. This is on the basis that windows will be opened for short periods and may be closed at occupant discretion once odours are purged.

Overheating

4.5.16. The ProPG states that when the target noise criteria can only be practically achieved with closed windows, special care must be taken to ensure dwellings have good standards of acoustics, ventilation and thermal comfort. **Table 4-4** is taken from the AVO guidance for a Level 1[18] assessment of noise from transport noise sources relating to the Overheating Condition. The external free-field noise levels at the majority of the façades are within the high-risk category[19] during the daytime. At these levels, there is an increasing risk of adverse effects, and therefore utilising open windows for overheating mitigation is likely to be considered suitable only if overheating occurs for limited periods.

[18] The AVO guidance recommends a two-level assessment (i.e. a 'Level 1' assessment first, following by a 'Level 2' assessment, if determined necessary from the result of the Level 1 assessment). A Level 1 assessment is considered sufficient for 'low' or 'medium' risk sites.

[19] Overheating risk (from AVOG) is different to the initial site risk (from ProPG)

Table 4-4 – Guidance for Level 1 Assessment of Noise from Transport Sources Relating to Overheating Condition – Adapted from AVO Guide

External Free-Field Noise Level		Risk Category for Level 1 Assessment
$L_{Aeq,16h}$	$L_{Aeq,8h}$	
≤ 52 dB	≤ 47 dB	Low
>52 dB and ≤ 62 dB	>47 dB and ≤ 55 dB	Medium
>62 dB	>55 dB	High

4.5.17. Approved Document O (ADO) only applies to bedrooms during the night-time. An initial assessment has been undertaken to determine the extent of façades, which are able to use 'partially open' windows to mitigate summertime overheating during night time periods, to achieve ADO internal noise criteria. The assessment has been undertaken based on the predicted noise levels at the worst affected northern façade (see **Table 4-3**) and the corresponding predicted internal ambient noise levels with a partially open window. This is based on a partially open window providing 15dB attenuation (as detailed in Annex G of BS8233: 2014). Results of the assessment are shown in **Table 4-5**:

Table 4-5 Approved Document O Initial Noise Level Assessment

	Night-Time Average dB $L_{Aeq,8hr}$	Night-Time $L_{AFmax,5min}$ #
Predicted noise level at the façade	65	77
Predicted internal noise level with partially open window	50	62
Limit met	No*	No**

#Level exceeded for 90% of the time

*40 dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am).

** 55 dB L_{AFmax}, more than 10 times a night (between 11pm and 7am

4.5.18. **Table 4-5** shows that predicted internal noise levels on the northern façade with a partially open window, exceed the ADO requirements, therefore partially open windows cannot be relied upon to mitigate overheating.

4.5.19. During the detailed design phase, when the room dimensions, glazed areas and the external façade construction are confirmed, a more detailed assessment should be undertaken to confirm the exact specification for the glazing units, ventilators and any provision required to control overheating.

5. CONCLUSIONS

5.1.1. WSP has been commissioned by Blenheim Estates Limited to undertake a noise survey and assessment to accompany an outline planning application. The proposals are for a residential development with ground-floor retail usage at 37-41 Brighton Road, Shoreham-by-Sea.

5.1.2. The scope and approach of the assessment has been agreed in consultation with ADC and has given consideration to local and national planning policies and relevant guidance. A baseline noise survey has been undertaken to establish the existing noise levels on the site.

5.1.3. A baseline noise survey has been undertaken to inform the assessment, with the noise climate being dominated by road traffic from Brighton Road to the north. To the west of the site, the operation of the car wash facility was noted to be dominant, when in reasonably close proximity and during lulls in road traffic noise.

5.1.4. A digital noise model of the site, including traffic on Brighton Road and the commercial noise sources from the car wash, has been developed. The model has been calibrated to the measured data at the site. Therefore, the model is considered to be a robust tool for the investigation of noise propagation across the site and has been employed to assess the effects of the proposed site layout, mitigation measures and façade constructions.

5.1.5. It is considered that for the proposed façade in close proximity to the car wash, there is the potential for a significant adverse impacts on future residents', especially on a Sunday morning. To mitigate that, it is recommended that proposed balconies along the western boundary, within the southern section, on the first to third floor are excluded or replaced with wintergardens. At higher floors, the contribution from the jet wash noise is lower and the road traffic noise is higher, which is less likely to result in an adverse comment. Also, from the fourth floor upwards, a solid balustrade of ~1.2m is likely to provide approximately a 10dB reduction for users of the balcony, assuming this breaks the line of sight.

5.1.6. The noise modelling for the proposed residential uses concluded the following:

- Based on the proposed masterplan, the Proposed Development falls in the high risk category fronting onto Brighton Road, medium for eastern and western façades, and low along the southern boundary.
- Daytime and night-time noise levels at the building façades of the predicted magnitudes indicated by the noise modelling, can be suitably mitigated using a combination of the measures outlined in this report.
- Predicted noise levels for balconies are up to 18dB above the 55dB $L_{Aeq,T}$ criterion on the northern boundary with Brighton Road. Whilst this is considered a high noise level, there are benefits to access to outdoor amenity spaces as outlined in the relevant British Standard.

5.1.7. An initial overheating assessment has been undertaken for the worst affected façade, fronting Brighton Road. This shows that predicted internal noise levels with a partially open window, exceed the required internal noise levels. Therefore, partially open windows cannot be relied upon to mitigate overheating.

5.1.8. During the detailed design phase, a more detailed assessment should be undertaken to confirm the exact specification for the glazing units, ventilators and any provision required to control overheating.

5.1.9. The limitations to this report are provided in **Appendix E**.

Appendix A

GLOSSARY OF ACOUSTIC TERMS

APPENDIX A - GLOSSARY

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq}, L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

Table A-1 - Acoustic Glossary

Terminology	Description
A-Weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which considers the increased sensitivity of the human ear at some frequencies
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10} (s_1 / s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20µPa.
Free field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5 m.
Façade	At a distance of 1 m in front of a large sound reflecting object such as a building façade.
$L_{eq, T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady (ambient) sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.

$L_{max, T}$	A noise level index defined as the maximum noise level during the period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90, T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. L_{90} can be considered to be the "average minimum" noise level and is often used to describe the background noise.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of 20µPa ($20x10^{-6}$ Pascals) on a decibel scale.
Weighted Sound Reduction Index (R_w)	Single number quantity that characterises the airborne sound insulation of a material or building element over a range of frequencies, based on laboratory measurements.
C_{tr}	C_{tr} uses spectrum No2 from ISO 717-1 and the “tr” in the term stands for “traffic” because the sound pressure spectrum replicates road traffic noise

Appendix B

SITE PHOTOGRAPHS

Figure B-1 – Location MP1 Viewed North-East

Figure B-2 – Location MP2 Viewed North

Figure B-3 – Location MP3 Viewed West

Figure B-4 – Location MP4 Viewed West

Appendix C

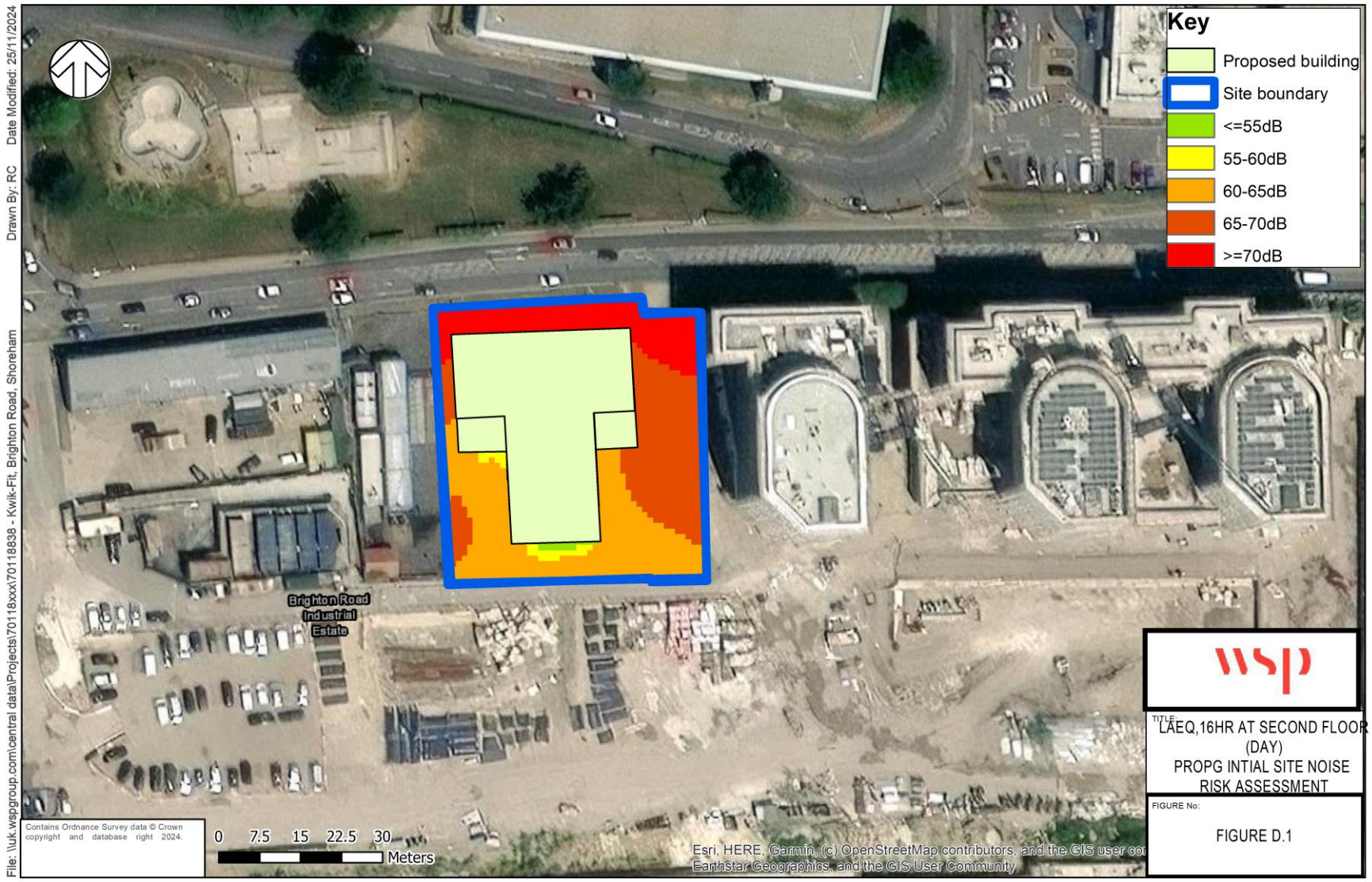
SURVEY EQUIPMENT

Table C-1 – Equipment and Calibration Details

Location	Equipment Item	Make / Model	Serial Number
MP1	Sound Level Meter	Rion NL-52	00231665
	Pre-amplifier	NH-25	21609
	Microphone	UC-59	13789
	Calibrator	NC-75	35292147
MP2 to MP4	Sound Level Meter	Rion NL-52	00164379
	Pre-amplifier	NH-25	54511
	Microphone	UC-59	08754
	Calibrator	NC-75	35292147
NB: All measurement equipment was calibrated by a UKAS accredited laboratory no more than two years prior to the environmental noise survey, with the exception of the calibrators, which were calibrated no more than one year prior to the survey.			

Appendix D

NOISE MODELLING CONTOUR PLOTS


Key
Proposed building
Site boundary
<=55dB
55-60dB
60-65dB
65-70dB
>=70dB
Brighton Road Industrial Estate
0 7.5 15 22.5 30
Meters
Contains Ordnance Survey data © Crown copyright and database right 2024.
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user co
Earthstar Geographics, and the GIS User Community
TITLE
LAEQ,16HR AT SECOND FLOOR (DAY)
PROPG INTIAL SITE NOISE RISK ASSESSMENT
FIGURE No:
FIGURE D.1
Date Modified: 25/11/2024
Drawn By: RC
File: \\uk.wspgroup.com\central data\Projects\70118xxx\70118838 - Kwik-Fit, Brighton Road, Shoreham

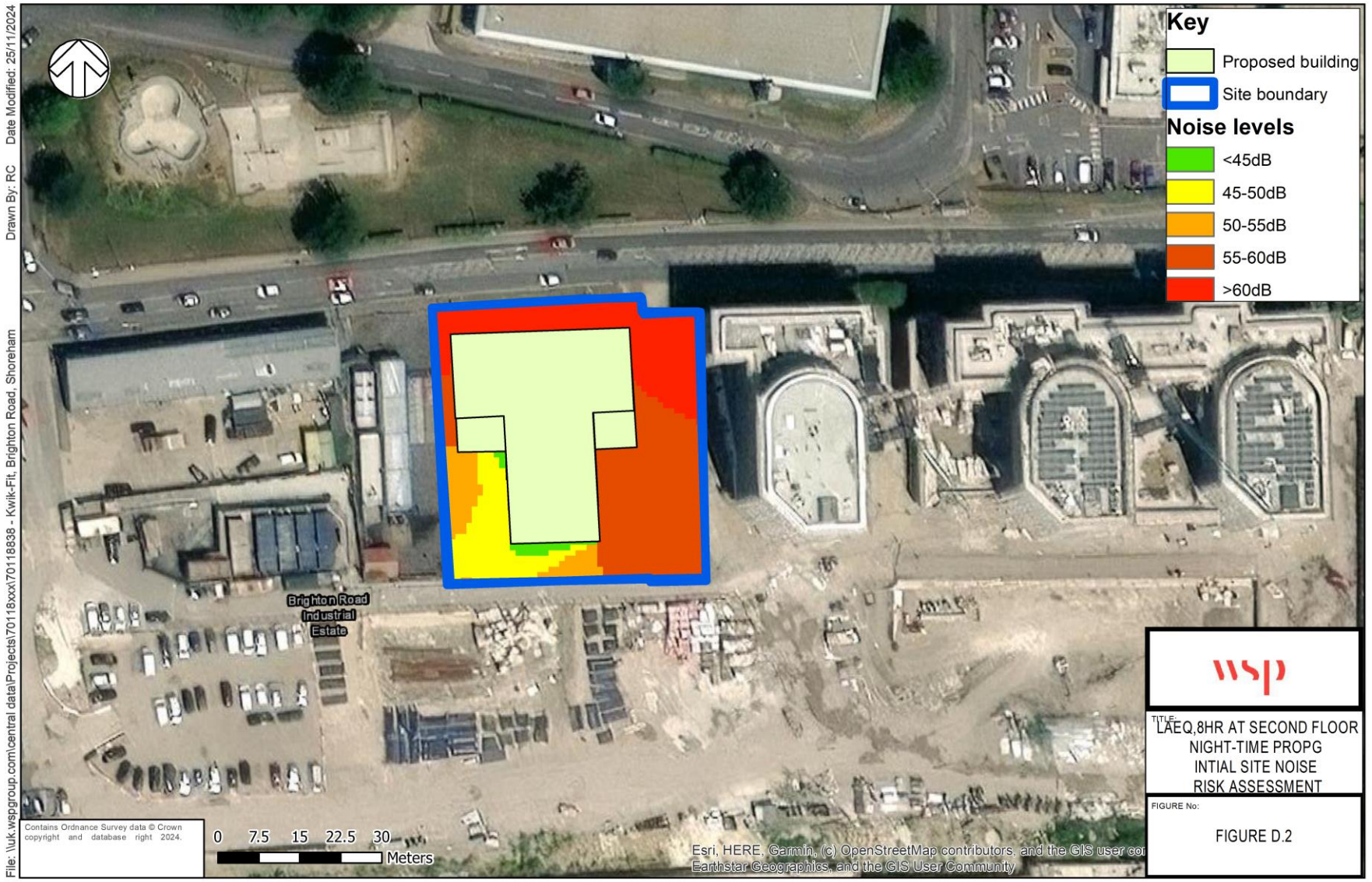

Key
Proposed building
Site boundary
Noise levels
<45dB
45-50dB
50-55dB
55-60dB
>60dB
Brighton Road Industrial Estate
Contains Ordnance Survey data © Crown copyright and database right 2024.
0 7.5 15 22.5 30
Meters
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user co
Earthstar Geographics, and the GIS User Community
TITLE:
LAEQ,8HR AT SECOND FLOOR NIGHT-TIME PROPG INTIAL SITE NOISE RISK ASSESSMENT
FIGURE No:
FIGURE D.2
Drawn By: RC
Date Modified: 25/11/2024
File: \\uk.wspgroup.com\central data\Projects\70118xxx\70118838 - Kwik-Fit, Brighton Road, Shoreham

Table D-1 – Source Sound Power Levels for Car Wash Facility dB

Noise Source	No. of items	Sound Power Level L_w, dB	Source Height, m	On-time (%) in One Hour
Car wash entry	1	93	0 to 3	25
Car wash exit	1	93	0 to 3	25
Vacuum nozzle	2	91	1	50
Jet wash	1	94	1	75

Appendix E

LIMITATIONS

This report has been prepared for the titled project or named part thereof and should not be used in whole or part and relied upon for any other project without the written authorisation of WSP UK Limited. WSP UK Limited accepts no responsibility or liability for the consequences of this document if it is used for a purpose other than that for which it was commissioned. Persons wishing to use or rely upon this report for other purposes must seek written authority to do so from the owner of this report and/ or WSP UK Limited and agree to indemnify WSP UK Limited for any and all loss or damage resulting therefrom. WSP UK Limited accepts no responsibility or liability for this document to any other party other than the person by whom it was commissioned.

The findings and opinions expressed are relevant to the dates of the site works and should not be relied upon to represent conditions at substantially later dates. Opinions included therein are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions, or recommendations WSP UK Limited reserve the right to review the information, reassess any new potential concerns and modify our opinions accordingly.

WSP House
70 Chancery Lane
London
WC2A 1AF

wsp.com