
REPORTS 4 PLANNING

NOISE IMPACT ASSESSMENT REPORT

**46B & 47 PIER ROAD AND
LAND OFF CLIFTON ROAD BN17 5LW**

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**46B & 47 PIER ROAD AND LAND OFF CLIFTON ROAD
BN17 5LW.**

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P4504-R1-DRAFT	21/12/2020	M. MAY, BSc (Hons), AMIOA	M. J. Malone, BSc (Hons), AMIOA	N. J. Malone, MIOA
P4504-R1-V1	13/01/2021	M. MAY, BSc (Hons), AMIOA	M. J. Malone, BSc (Hons), AMIOA	N. J. Malone, MIOA

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1 INTRODUCTION

1.1.1 By instruction from Reports 4 Planning ('the client'), NoiseAir was commissioned to undertake a noise impact assessment (NIA) for a proposed development located at 46b & 47 Pier Road and Land Off Clifton Road BN17 5LW, herein referred to as the 'development site'.

1.1.2 This noise report has been prepared to assist with discharge of a condition pertinent to planning application ref: LU/287/17/PL and assesses the results of a noise survey carried out in accordance with current guidance and includes recommendations and mitigation as appropriate.

1.2 Site Description

1.2.1 At the time of writing the development site comprises of existing commercial space and a car servicing garage.

1.2.2 The development site is located within the coastal town of Little Hampton and is situated approximately 20 m east of the River Arun.

1.2.3 The development site is located at the junction of Pier Road and Clifton Road and traffic noise is considered the dominant source of noise at the front and rear of the proposed development site.

1.2.4 **Figure 1** shows an aerial photograph of the development site with respect to the local area and its context.



Figure 1: Site aerial photograph.

1.3 Development Proposals

1.3.1 At the time of writing proposals provided to NoiseAir detail:

1.3.2 *'Demolition of existing buildings, change of use & erection of 1 No. building incorporate office*

(B1) at ground floor & 8 No. dwellings at first and second floor level.'

1.3.3 Proposed Drawings (as provided by the client) are detailed within **Appendix C**.

1.3.4 The nature of occupancy at ground floor is understood to be office space and as such is not considered as a significant noise generating source within this assessment and therefore

standard building regulation requirements are considered appropriate for the separating walls and floors.

- 1.3.5 At the time of writing, no commercial plant units have been proposed to NoiseAir as part of the development. Should units be sourced at a later stage, a BS4142:2014 should be carried out with reference to the background sound levels within **Section 3.3** of this report.

2 ASSESSMENT METHODOLOGY AND SCOPE OF WORKS

2.1 Planning Guidance and Noise

2.1.1 This acoustic report has been prepared in support of a discharge to planning conditions and it is considered that reference should be made to the appropriate planning guidance documentation, specifically:

- National Planning Policy Framework (NPPF), 2019;
- Noise Policy Statement for England (NPSE), 2010;
- Planning Practice Guidance – Noise, 2019;

2.1.2 A summary of the relevant planning documentation and its relevance with respect to noise is provided below.

National Planning Policy Framework [NPPF 2019]

2.1.3 The NPPF was published in March 2012 with the most recent version updated in February 2019. The NPPF sets out the Governments planning policies for England and how these are expected to be applied across a number of areas.

2.1.4 With respect to noise specifically, Section 15, Paragraph 170 of the NPPF 2019 states:

‘Planning policies and decisions should contribute to and enhance the natural and local environment by:

- *preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;’*

2.1.5 The NPPF 2019 continues to state in Paragraph 180:

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

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

Noise Policy Statement for England [NPSE 2010]

2.1.6 The Noise Policy Statement for England (NPSE), published in March 2010, states the long-term vision of Government noise policy is to “*promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development*”.

2.1.7 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;
- Where possible, contribute to the improvement of health and quality of life.

2.1.8 The NPSE also introduces the below categories with respect to ‘adverse impacts’.

‘NOEL – No Observed Effect Level

- *This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.*

LOAEL – Lowest Observed Adverse Effect Level

- *This is the level above which adverse effects on health and quality of life can be detected.*

SOAEL – Significant Observed Adverse Effect Level

- *This is the level above which significant adverse effects on health and quality of life occur’.*

2.1.9 The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided. The second aim refers to the situation where the impact lies somewhere between LOAEL and SOAEL, and it requires that all reasonable steps are taken to mitigate

and minimise the adverse effects of noise. However, the requirement to mitigate and minimise the adverse effects of noise does not mean that such adverse effects cannot occur.

Planning Practice Guidance - Noise [PPG 2019]

- 2.1.10 The National Planning Practice Guidance (PPG) is a web-based resource, launched by the Department for Communities and Local Government (DCLG) in March 2014 to support the NPPF¹.
- 2.1.11 The PPG advises on how planning can manage potential noise impacts in new development. The guidance is regularly reviewed and updated and noise is listed as a specific category, the noise category was most recently updated on 22nd July 2019.
- 2.1.12 The PPG provides further detail about how the effect levels can be recognised. Above the NOEL noise becomes noticeable, however it has no adverse effect as it does not cause any change in behaviour or attitude. Once noise crosses the LOAEL threshold it begins to have an adverse effect and consideration needs to be given to mitigating and minimising those effects, taking account of the economic and social benefits being derived from the activity causing the noise.
- 2.1.13 Increasing noise exposure further might cause the SOAEL threshold to be crossed. If the exposure is above this level the planning process should be used to avoid the effect occurring by use of appropriate mitigation such as by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of the activity causing the noise, but it is undesirable for such exposure to be caused.
- 2.1.14 At the highest extreme the situation should be prevented from occurring regardless of the benefits which might arise.
- 2.1.15 **Table 1** summarises the noise exposure hierarchy outlined within the PPG.

¹ <https://www.gov.uk/guidance/noise--2>

Table 1: National Planning Practice Guidance noise exposure hierarchy			
Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

2.2 Consultation and Scope of Works

- 2.2.1 Details regarding noise survey requirements were provided to NoiseAir via the client and are detailed below:

“It is noted that there are mechanical ventilation systems to food businesses proximal to this proposed building. There is also no detail as whether the proposed new commercial units/other will be fitted with air conditioning. Before the development commences the applicant shall submit an acoustic report to predict noise levels at the facades of the proposed residential units together with any mitigation measures that may be required. This shall demonstrate that noise levels within the residential units will conform to the 'internal ambient noise levels for dwellings' guideline values specified within BS8233:2014, Guidance on Sound Insulation and Noise Reduction for Buildings. Such a report to be representative of the times at which any source of noise would be expected to be operational. Suitable post construction validation testing to be carried out to the satisfaction of the Local Authority Planning Department before occupation of the residential units should a problem be highlighted.”

- 2.2.2 Based on the information provided and the subsequent site visits it is therefore considered that an NIA should be undertaken to assess the potential for adverse impact, primarily from local traffic noise.
- 2.2.3 As previously mentioned within **Section 1.3.4** the nature of commercial occupancy at ground floor is understood to be office space and as such has been discounted as a significant noise generating source within this assessment.

2.3 Assessment Criteria

- 2.3.1 In order to achieve noise levels which are considered to be in alignment with the planning approaches and policies discussed in Section 2.1 it is considered that all efforts are made to ensure that future occupants are unlikely to be exposed to noise levels which might breach the LOEL criteria.
- 2.3.2 It should be noted however that planning guidance does not preclude development where the LOEL is likely to be breached in certain circumstances as long as reasonable efforts are made to mitigate and reduce such an effect.
- 2.3.3 It is therefore considered that the noise assessment and subsequent criteria should be undertaken in accordance with Pro-PG Planning and Noise a summary of which is provided below.

Pro-PG – Planning & Noise [Pro-PG 2018]

- 2.3.4 Pro-PG Planning and Noise provides professional practice guidance in relation to new residential development exposed to noise from transport sources. It provides practitioners with a recommended approach to the management of noise within the planning system in England.
- 2.3.5 The guidance reflects the Government's overarching National Planning Policy Framework, the Noise Policy Statement for England, and Planning Practice Guidance (including PPG-Noise) and draws on other authoritative sources of guidance. It provides advice for Local Planning Authorities and developers, and their professional advisers, on achieving good acoustic design in and around new residential developments.
- 2.3.6 Pro-PG adopts a two-stage approach to assessment:
- **Stage 1** – an initial noise risk assessment of the proposed development site; and,
 - **Stage 2** – a systematic consideration of four key elements.
- 2.3.7 The four key elements to be undertaken in parallel during Stage 2 of the recommended approach are:
- **Element 1** – demonstrating a “Good Acoustic Design Process”;
 - **Element 2** – observing internal “Noise Level Guidelines”;
 - **Element 3** – undertaking an “External Amenity Area Noise Assessment”; and,
 - **Element 4** – consideration of other relevant issues.
- 2.3.8 Internal noise level guidelines are set out in Figure 2 of Pro-PG which have been reproduced in **Table 2**.

Table 2: Summary of internal noise guidelines.			
Activity	Location	0700 – 2300 hours	2300 – 0700 hours
Resting	Living Room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room / area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$ 45 dB L_{AMax}

- 2.3.9 There are multiple notes outlined within Pro-PG with respect to **Table 2** which should be considered in full however the main points for consideration are outlined below:
- The table provides recommended internal $L_{Aeq,T}$ target levels for overall noise in the design of a building. These are the sum total of structure-borne noise and airborne noise sources.

- The internal $L_{Aeq,T}$ target levels shown in the table are based on the existing guidelines issued by the World Health Organisation (WHO) and assume normal diurnal fluctuation in external noise.
- The internal $L_{Aeq,T}$ target levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.
- Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. 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 45dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events.
- Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded.
- Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

2.3.10 The guidelines presented in **Table 2** reflect and extend current practice contained in BS8233:2014.

2.3.11 In terms of external amenity noise assessment, Pro-PG again draws upon guidelines set presented by the WHO and also presented in BS8233:2014.

2.3.12 BS8233:2014 states that "the acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$ ". The standard continues... "These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited."

2.4 Noise Survey

-
- 2.4.1 As part of this assessment, NoiseAir has carried out a primarily unattended noise survey to measure the existing sound levels at the development site.
- 2.4.2 The primary noise sources assessed are:
- Cumulative environmental noise including road traffic and nearby ventilation noise.
- 2.4.3 The above noise sources have been assessed in relation to the below identified receptors:
- Future occupants of the proposed residential apartments to the first and second floor of the development site.
- 2.4.4 It is noted that the noise survey has been undertaken during the global Covid-19 pandemic. As such, to provide a conservative method of assessment, noise emissions attributed to road networks which are likely to be subject to reduced traffic flow have been calculated based on the most recently available vehicle count data (provided prior to the Covid-19) pandemic, extracted from the Department of Transport database.
- 2.4.5 This approach is in accordance with the Association of Noise Consultants (ANC) and the Institute of Acoustics (IOA) Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments document issued on 16th April 2020.

3 ACOUSTIC SURVEY

3.1 Acoustic Survey Details

3.1.1 NoiseAir carried out fixed position noise monitoring between 28th November 2020 to 3rd December 2020 at the development site.

3.1.2 Noise monitoring was undertaken at one monitoring location. The selected monitoring location (ML) is detailed within **Figure 2** and **Table 3** below.



Figure 2: Site layout plan and noise monitoring locations.

Site Location  Measuring Location ML 

Table 3: Summary of Noise Monitoring Locations

Monitor Location Ref.	Location Description	Time Period Monitored		Attended or Unattended Monitoring
		Start	End	
ML	To the rear (north – eastern) end of the development site.	14:45 28/11/20	15:45 03/12/20	Unattended

3.1.3 The monitoring location was selected to be representative of cumulative environmental noise levels at the approximate location of the development site. The monitoring location was selected taking into account multiple aspects such as security and access restrictions at

the time of the survey. Data from the monitoring location, in addition to calculated and library data, will be used for the calibration of the 3D sound model.

- 3.1.4 The noise measurements were made using one Class 1, integrating sound level meter (SLM).
- 3.1.5 The microphone at ML was mounted on a boom out of an opening within the roof structure of the existing vehicle garage and was set approximately 3.5 m above street level. The microphone protruded above the neighbouring building structure at an approximate height of 1.5 m.
- 3.1.6 The acoustic equipment was calibrated to comply with Section 4.2 of BS7445-1:2003² before and after the full noise monitoring duration.
- 3.1.7 Details of the SLM and associated field calibration can be found in **Table 4** below;

Table 4: Summary of SLM used for survey and associated field calibration						
SLM (Serial Number)	Preamp (Serial Number)	Microphone (Serial Number)	Calibrator (Serial Number)	Start Calibration	End Calibration	Drift
NOR140 (1405016)	NOR1209 (14242)	NOR1225 (118503)	B&K4231 (2431761)	-26.2 dB	-26.1 dB	0.1 dB

- 3.1.8 The weather conditions were noted to be as outlined in **Table 5** during the site visits at the start and end of the monitoring periods.

Table 5: Summary of weather conditions noted at the start and end of the monitoring duration.		
	28 th November 2020	3 rd December 2020
Roads (Wet / Dry)	Dry	Dry
Temperature (°C)	9	11
Wind speed (ms ⁻¹)	< 0.5	<0.5
Cloud Cover (Approx. %)	60	80
Humidity (%)	82	81

- 3.1.9 The weather conditions remained approximately consistent over the duration of the noise survey with typical temperature fluctuations over night and daytime hours.

² BS7445-2003 "Description and measurement of environmental noise – Part 1: Guide to quantities and procedures.

3.1.10 A-weighted³ L_{eq} ⁴ and L_{Amax} ⁵ noise levels were measured to comply with the requirements of Pro-PG, WHO and BS8233. A-weighted L_{90} ⁶ were also measured to provide additional information. The measured noise levels are set out in full in Appendix B.

3.1.11 Attending the development site at the start and end of the survey monitoring period provided opportunity for observations and detailed notes to be made of the significant noise sources which contribute to each of the measured levels.

ML --

Road Traffic Noise from Clifton Road: Regular vehicles included motor cars and large goods vehicles (LGVs).

3.2 Measured Sound Levels

3.2.1 The results obtained at the monitoring location during respective daytime and night-time periods are presented in **Table 6**.

Table 6: Average Measured Daytime and Night-time Noise Levels			
Monitoring Location	Time	Measured Noise Level	
		dB $L_{Aeq,16hour}$ / dB $L_{Aeq,8hour}$	dB $L_{A90,1hour}$ / dB $L_{A90,15mins}$
ML	07:00-23:00	41.2 – 58.0	22.0 – 53.9
	23:00-07:00	28.5 – 47.4	20.2 – 42.0

3.2.2 The maximum noise level recorded during the night-time period, is summarised in **Table 7**.

Table 7: Summary of the Maximum Night-time Noise Levels (Figures in dB L_{Amax}).	
Monitoring Location	Measured Maximum Noise Level the night-time period (dB)
ML	72.8

3.2.3 Data is shown in **Figure 3** detailing a level vs. time graph of the recorded L_{Amax} , L_{Aeq} and L_{A90} sound level over 15-minute time periods for ML.

³ An electronic filter in a sound level meter which mimics the human ear's response to sounds at different frequencies under defined conditions.

⁴ Equivalent continuous noise level; the steady sound pressure which contains an equivalent quantity of sound energy as the time-varying sound pressure levels.

⁵ The instantaneous maximum noise level recorded for a measurement period.

⁶ The noise level which is exceeded for 90% of the measurement period.

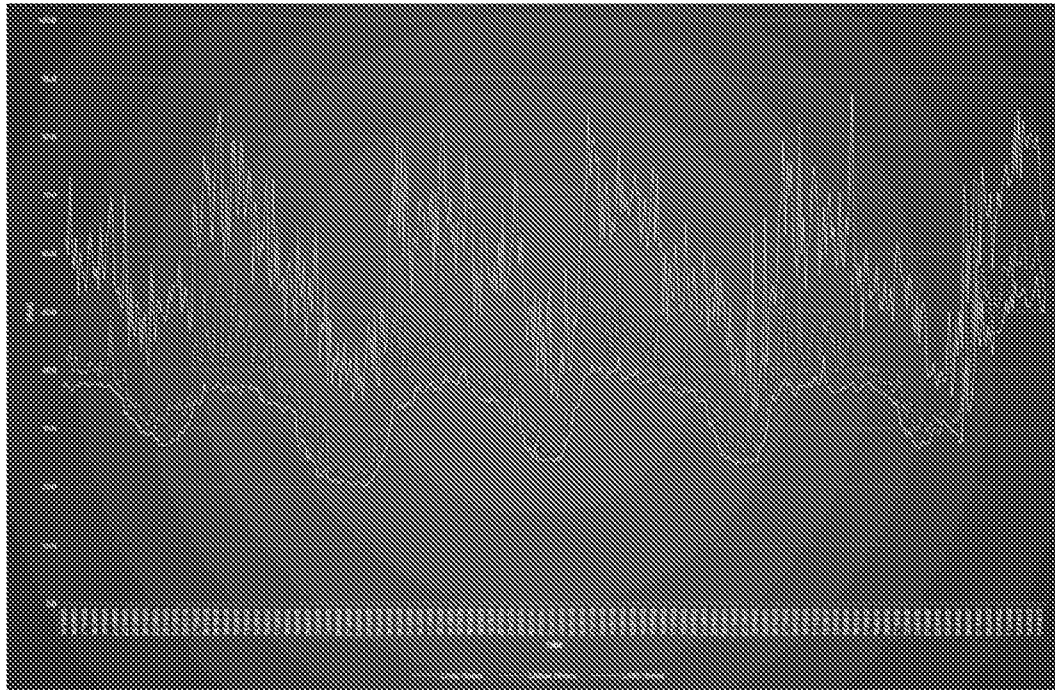


Figure 3: Level vs. time graph showing L_{Amax} , L_{Aeq} and L_{A90} sound levels – ML.

3.3 Background Sound levels

- 3.3.1 A histogram showing the distribution of existing dB $L_{A90, 1hour}$ and dB $L_{A90, 15min}$ sound levels for respective daytime and night-time periods at ML are presented in **Figure 4** and **Figure 5**.

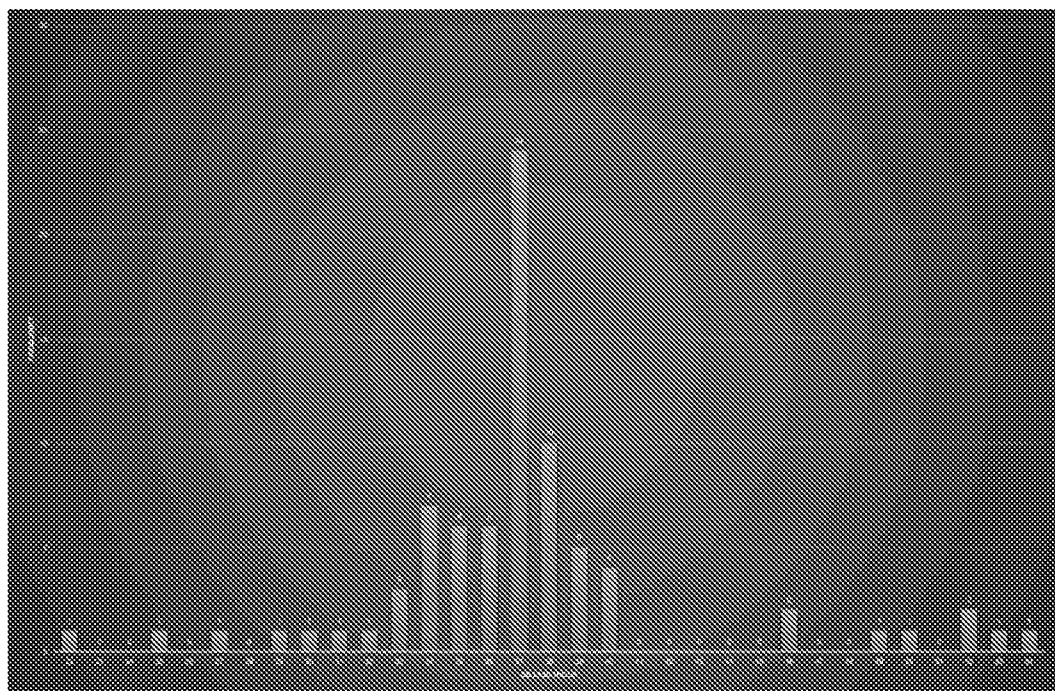


Figure 4: Histogram showing frequency distribution of $L_{A90, 1hour}$ noise readings at ML - Daytime (07:00 – 23:00).

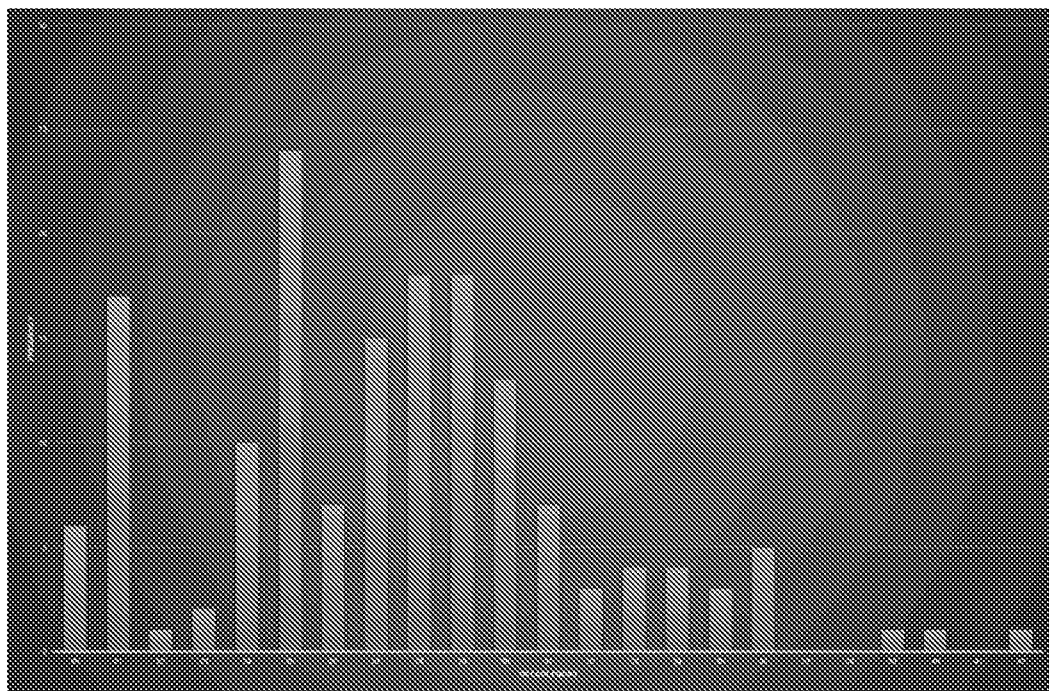


Figure 5: Histogram showing frequency distribution of $L_{A90,15min}$ noise readings at ML – Night-time (23:00 – 07:00).

- 3.3.2 For day-time periods at measuring location ML dB $L_{A90,1hour}$ sound levels of 37 dB are considered representative being the most frequent value recorded across the full measurement duration.
- 3.3.3 For night-time periods at measuring location ML dB $L_{A90,15min}$ sound levels of 25 dB are considered representative being the most frequent value recorded across the full measurement duration.

4 SITE NOISE RISK ASSESSMENT

- 4.1.1 In accordance with Pro-PG 2017, a Site Noise Risk Assessment (SNRA) has been carried out. The SNRA assesses the initial risk of noise to have an adverse impact on a proposed development based on the overall measured levels with no mitigation in place.
- 4.1.2 The results of noise measurements carried out during the daytime and night-time periods are presented in **Table 8**, and have been compared to the information provided on Figure 1 of Pro-PG 2017.

Table 8: Stage 1 Risk Assessment of Noise Levels – Rear North-East Measurement Location					
Monitoring Location	Residential Property Location	Daytime Noise Level (Figures in dB L_{Aeq,T})	Risk of Adverse Effect	Night-time Noise Level (Figures in dB L_{Aeq,T})	Risk of Adverse Effect
ML1	The rear (north – eastern) end of the proposed development site, overlooking Clifton Road.	58	Low	47	Low

- 4.1.3 **Table 8** indicates that during the daytime and night-time periods, proposed receptors of the development are at a '**Low**' risk of adverse effect at the proposed development site based on noise levels obtained at the rear north-east measurement location.
- 4.1.4 ProPG states that:
- '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 an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development'*
- 4.1.5 The Site Noise Risk Assessment shows that local noise mitigation and good acoustic design will be required to ensure that the potential risk of the noise impact is minimised and guideline internal and external noise levels are achieved.
- 4.1.6 In accordance with Pro-PG 2017, a Stage 2 full noise assessment, which includes an acoustic design statement, is required to ensure future residents are protected and good acoustic design has been implemented.

5 NOISE IMPACT ASSESSMENT

5.1.1 The results of the Pro-PG Stage 1: Initial Site Noise Risk Assessment shows that receptors at the proposed development are likely to be at '**Low**' risk of experiencing an adverse noise impact, with no mitigation in place. Therefore, an assessment against the criteria in WHO, BS8233 has been undertaken with reference to the general sound levels at the site.

5.1.2 This section forms the Stage 2 Acoustic Design Statement of Pro-PG:2017.

5.2 3D Sound Model

5.2.1 A 3D sound model has been constructed in SoundPLAN™ to calculate the predicted sound pressure levels at selected potential receiver facades. The model uses the calculation method from ISO 9613-2:1996⁷ to account for the distance between the source and receiver and any screening or reflections provided by the surrounding buildings. The model is based on and calibrated against data collected during the survey (presented in Section 3.2 of this report) as well as noise levels previously recorded by NoiseAir and calculated noise levels derived from sourced data records.

5.2.2 The 3D noise model specifically includes the following noise sources:

- **Traffic noise from local road network** – Pier Road and Clifton Road; and,
- **Ventilation noise** – From nearby commercial premises within the proximal vicinity of the proposed development.

5.2.3 **Table 9** details the noise sources and calibration details adopted within the 3D sound model.

Table 9: Noise Source and Calibration Details – 3D Sound Model		
Noise Source	Source Type	Calibration Description
Traffic Noise	Line source	Clifton Road - Calibrated within the 3D sound model representing sound pressure level recorded at location ML during respective daytime and night-time periods. Pier Road - The Equivalent Sound Pressure Level has been calculated following the Sound Exposure Level formula (Equation 1), based vehicle counts data from the Department of Transport website. $L_{Aeq,T} = L_{AE} + 10 \log N - 10 \log T$ (Equation 1) The data used for calibration of noise emissions from Pier Road was extracted from the 2019 manual vehicle count road traffic statistics (raw count data – major and minor roads),

⁷ ISO9613-2:1996 "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation"

Table 9: Noise Source and Calibration Details – 3D Sound Model		
Noise Source	Source Type	Calibration Description
		taken on 16/05/2019 over a period of 12 hours, available at the Department of Transport website. The data adopted for calculation was for the B2140 which leads into Pier Road and is assumed to accommodate similar vehicle flow patterns. Data obtained during the data count was across a 12-hour daytime period and has been assumed equal for night-time noise exposure for the purpose of calculations and is considered very conservative. To calculate the L_{Aeq} used within calibration of the 3D sound model, the L_{AE} has been calculated based on noise data typical of a large car and is sourced from noise levels previously recorded by NoiseAir at a distance 1 m from the roadside. In Equation 1, N corresponds to the number of vehicles per time unit (T in seconds). Calibration of the 3D sound model is based on 5755 vehicles with a L_{AE} of 83.3 dB, resulting in a representative L_{Aeq} of 74.5 dB. Night-time Maximum noise levels have been calibrated to a level of 83 dB. Spectral frequency content (previously recorded and used within calibration) is provided within Table 10.
Ventilation equipment	Point Source	Spectral frequency content (previously recorded by NoiseAir on-site of a representative extraction system and presented within Table 11), adopted for use within 3D sound modelling to predict levels of potential noise breakout from extraction equipment (visual identified) upon the proposed residential dwellings. Noise Levels have been calibrated to a level of 76.0 dB L_w.

5.2.4 Spectral frequency content adopted for calibration of the 3D sound model is Presented below in **Table 10**.

Table 10: Spectral Frequency Content Adopted for 3D Sound Model – Large Vehicle.						
6.3 Hz	8 Hz	10 Hz	12.5 Hz	16 Hz	20 Hz	25 Hz
53.8	50.3	52.3	55.4	58.7	60.7	56.4
31 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz
55.5	57.5	62.1	61.9	61.6	62.0	61.3
160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz
62.0	60.9	60.4	57.8	59.5	61.1	64.1
800 Hz	1 KHz	1.25 KHz	1.6 KHz	2 KHz	2.5 KHz	3.15 KHz
68.4	69	66.6	63.4	57.5	53.4	50.0
4 KHz	5 KHz	6.3 KHz	8 KHz	10 KHz	12.5 KHz	16 KHz
46.4	43.1	41.0	41.5	37.6	34.1	31.5
20 KHz						
27.1						

Table 11: Spectral Frequency Content Adopted for 3D Sound Model – Extraction Equipment.						
6.3 Hz	8 Hz	10 Hz	12.5 Hz	16 Hz	20 Hz	25 Hz
59.1	61.1	62.5	65.3	64.6	66.8	66.8
31 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz
65.2	61.4	61.5	57.8	60.0	63.1	62.8
160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz
73.2	77.9	82.4	68.1	66.4	65.9	62.1
800 Hz	1 KHz	1.25 KHz	1.6 KHz	2 KHz	2.5 KHz	3.15 KHz
58.1	56.5	54.8	52.3	51.6	50.4	48.0
4 KHz	5 KHz	6.3 KHz	8 KHz	10 KHz	12.5 KHz	16 KHz
46.4	44.2	42.2	39.6	35.2	31.3	26.6
20 KHz						
21.7						

- 5.2.5 A noise contour plot illustrating the propagation of sound from source to receptor during the day ($L_{Aeq,16hour}$), night time ($L_{Aeq,8hour}$) and night time L_{Amax} condition is given in **Figure 6**, **Figure 7** and **Figure 8** respectively.

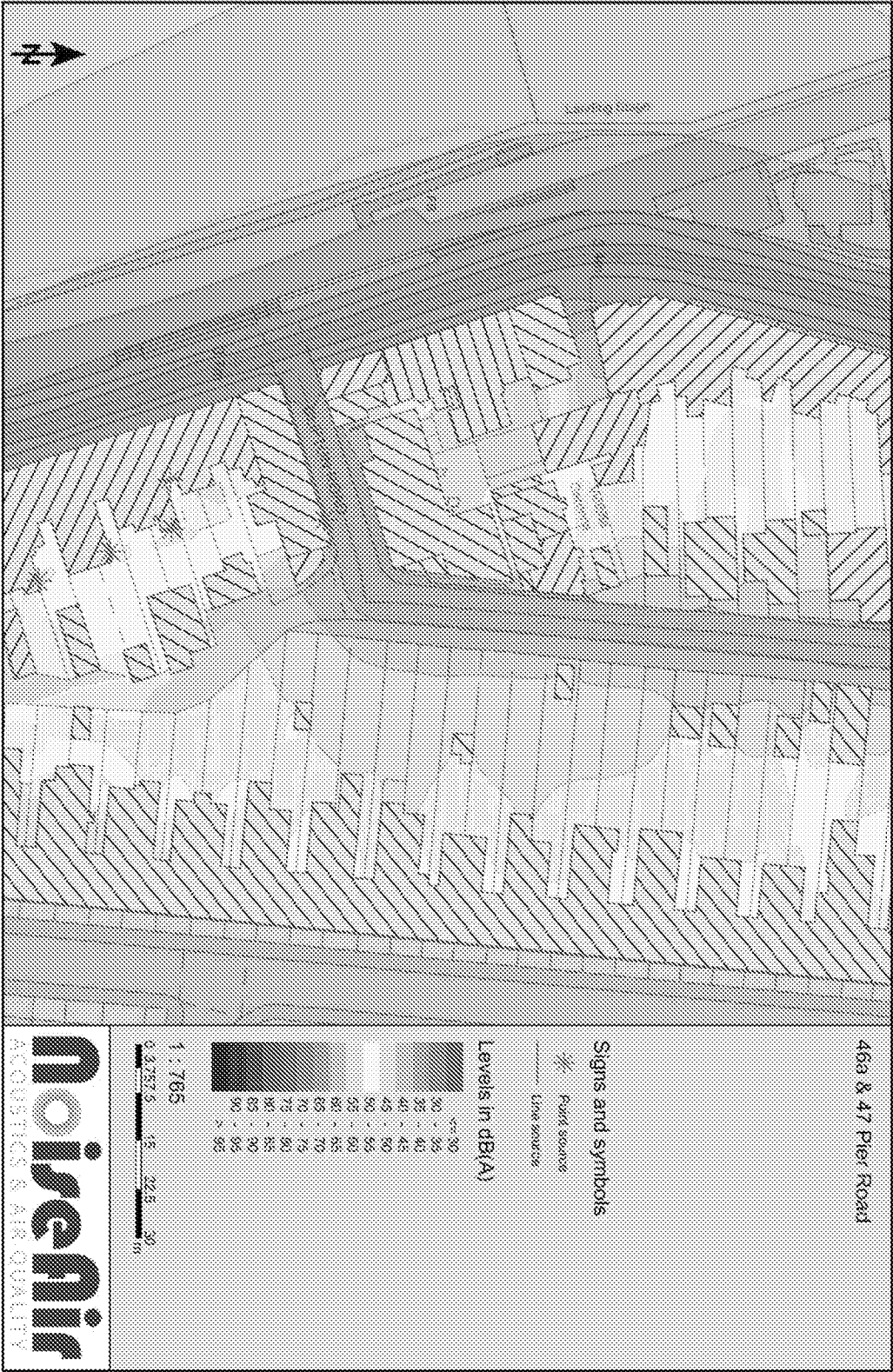


Figure 6: Noise contour plot illustration of the predicted propagation of sound to the proposed development during the daytime – $L_{Aeq,16hour}$

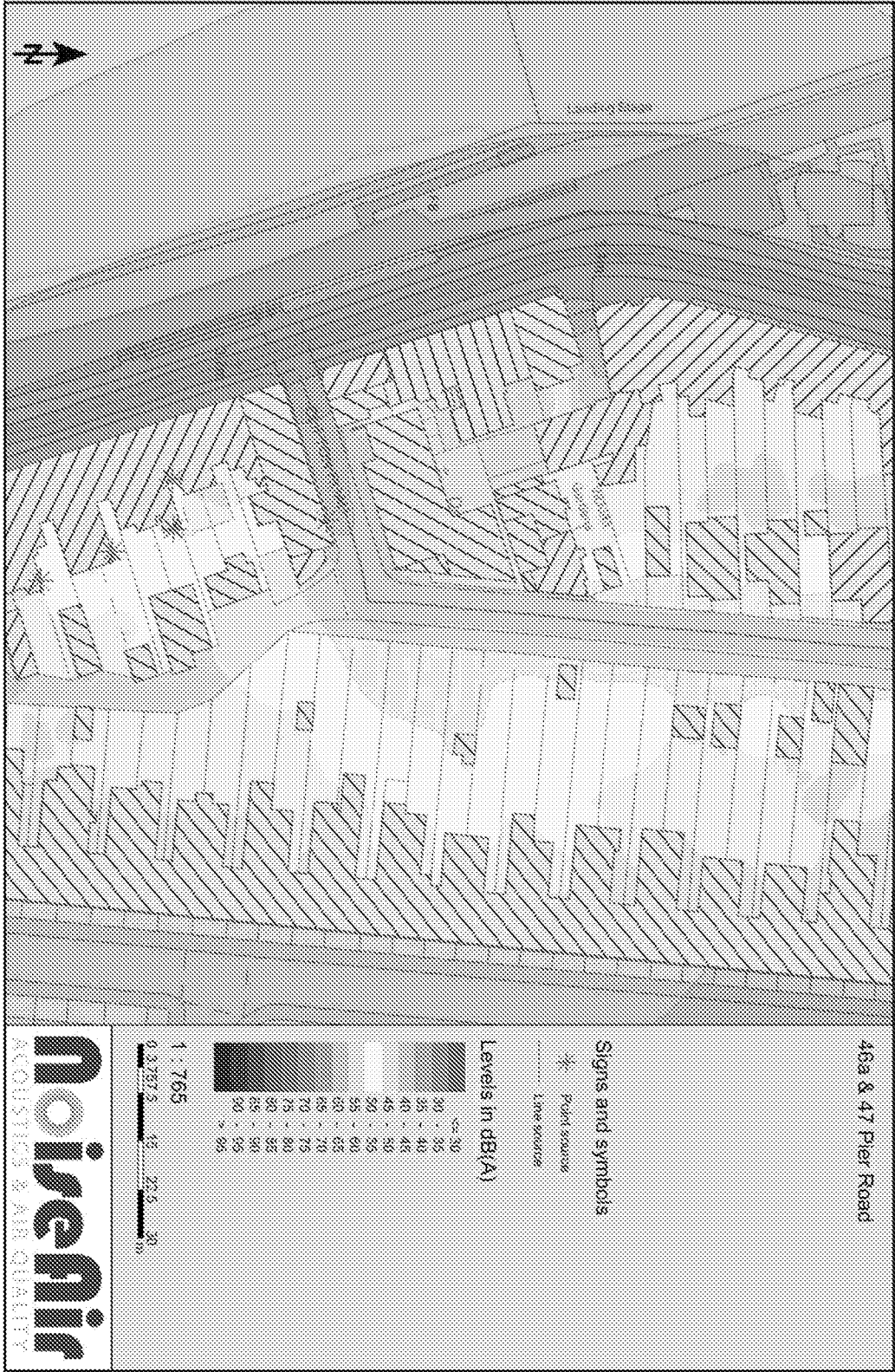


Figure 7: Noise contour plot illustration of the predicted propagation of sound to the proposed development during the night-time –

LAeq,8hour.

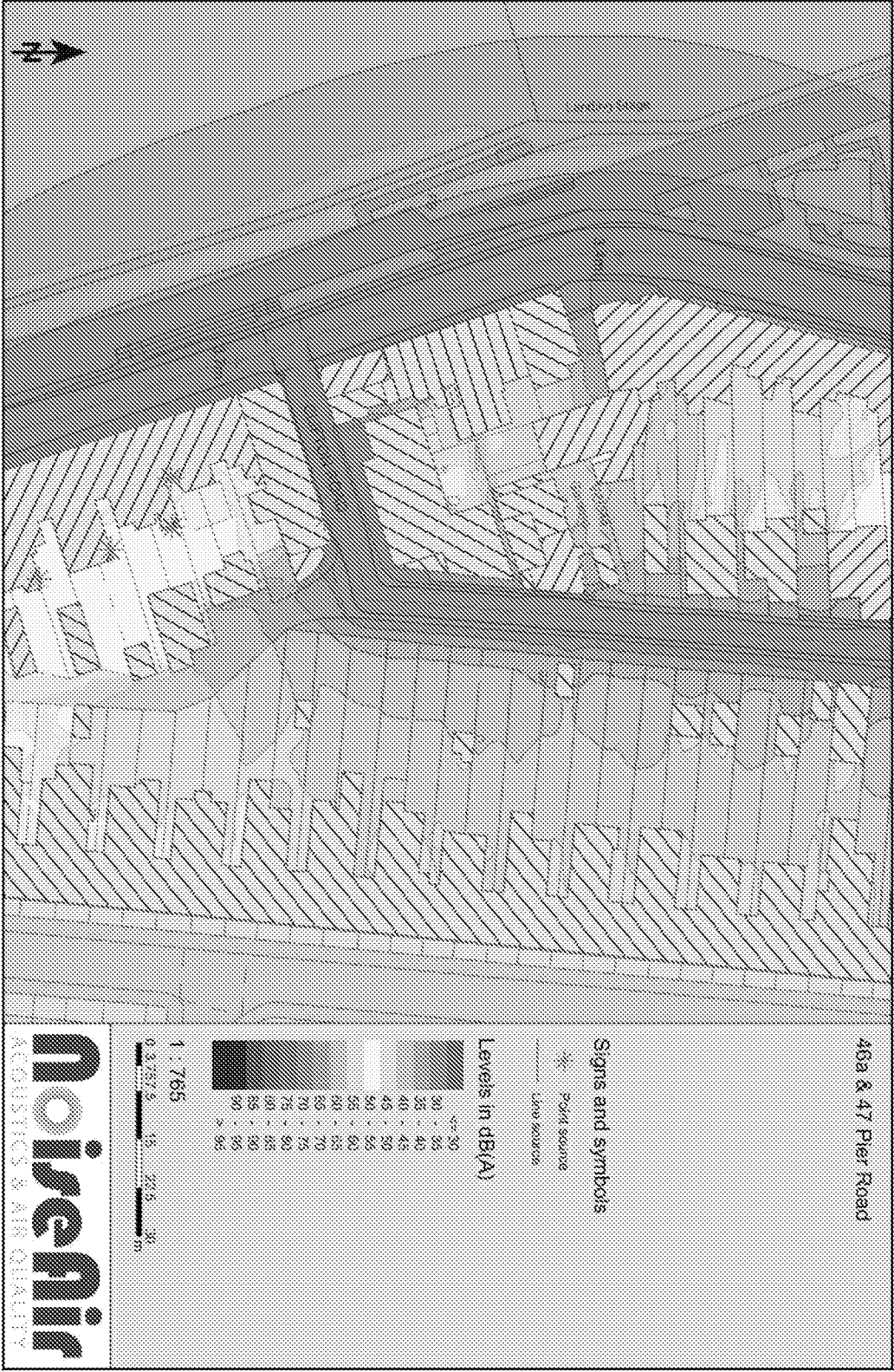


Figure 8 Noise contour plot illustration of the predicted propagation of sound to the proposed development during the night-time – L_{max}.

5.2.6 **Figure 9**, presented below, details receiver location adopted for calculation of facade levels.

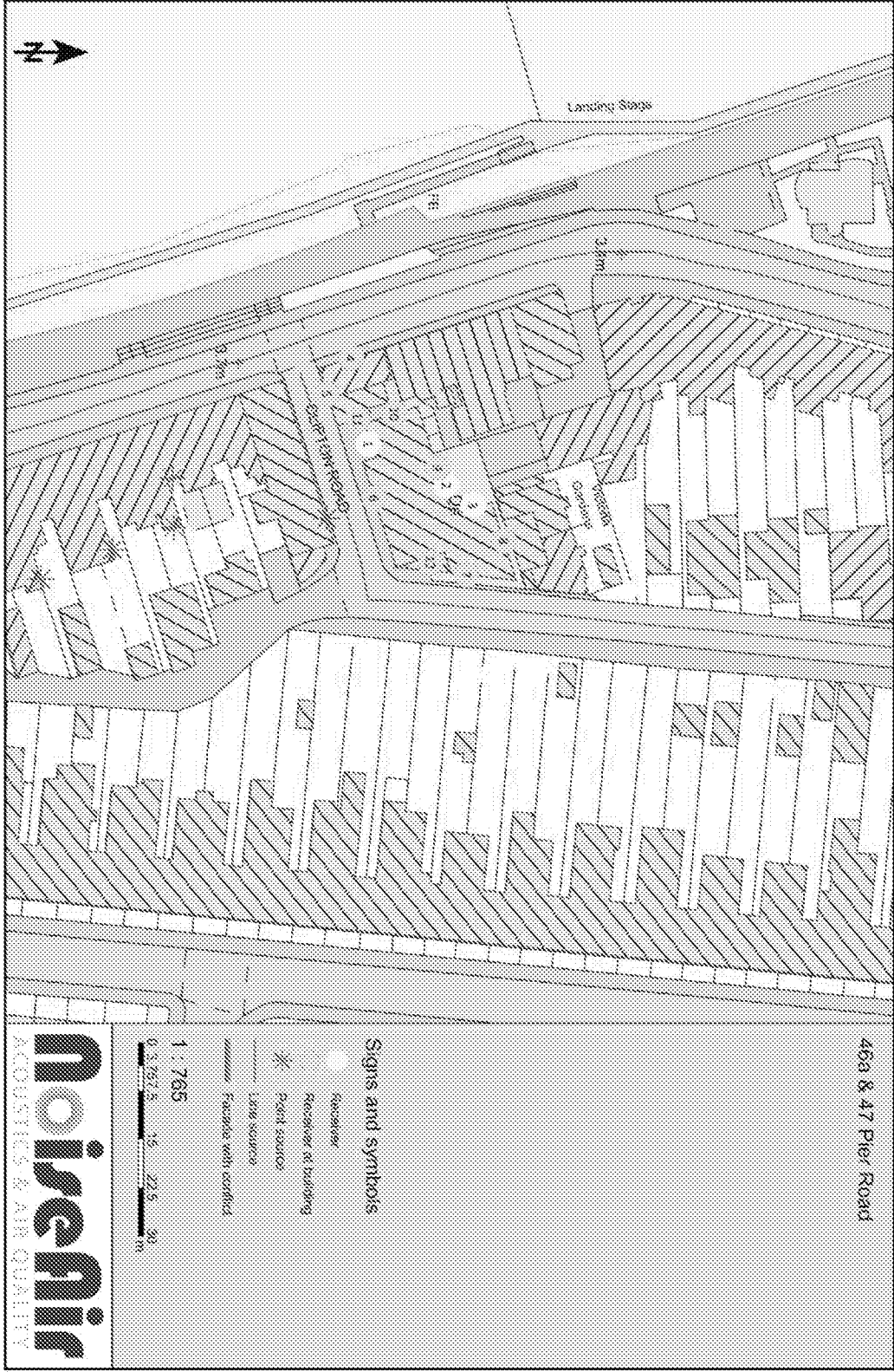


Figure 9: Illustration of the 3D sound model facade noise levels.

5.2.7 **Table 12** below details the worst-case calculated noise levels at each receptor location across all façade floors.

Receptor Number	Façade	dB LAeq,16hour Daytime	dB LAeq,8hour Night-Time	dB LAmax, Night
1	External (Balcony)	67.9	-	-
2	External (Balcony)	50.7	-	-
3	External (Balcony)	50.6	-	-
4	West	74.4	74.4	82.4
5	South	71.2	69.2	80.1
6	South	67.7	61.6	78.0
7	East	67.1	55.6	76.9
8	North	55.9	48.1	71.4
9	North	49.7	48.8	56.7
10	West	57.7	56.3	73.1
11	East	62.0	57.2	76.4
12	External (Terrace)	59.7	-	-

5.3 WHO Assessment of Daytime Noise Levels in Outdoor Living Areas

5.3.1 Analyses of the 3D sound model, specifically the receiver locations placed within the proposed external amenity areas at receptor two and three (calculated at 50.7 and 50.6 dB LAeq respectively), indicate that marginal exceedances of the lower WHO guidance value of 50 dB LAeq for people being moderately annoyed are likely to occur.

5.3.2 Calculations indicate that at receptor 1 and Receptor 12 (calculated at 67.9 and 59.7 dB respectively) noise levels are likely to exceed the upper WHO guidance value of 55 dB LAeq for people being seriously annoyed.

5.4 WHO and BS8233 Assessment of Daytime Noise Levels in Living Rooms and Bedrooms

5.4.1 The predicted noise levels at the façades of the proposed building structures as detailed in **Figure 9** and **Table 12** for the day time period, together with the level of attenuation

required to achieve 35 dB L_{Aeq} in the living room and bedroom areas in accordance with BS8233 (2014) and WHO (1999) are presented in **Table 13** below.

Receptor Number	Façade	Worst Case Noise Level at the Façade of the Property	Worst Case Level of Attenuation Needed to Achieve 35 dB L_{Aeq} in Living Room and Bedroom Areas
4	West	74	39
5	South	71	36
6	South	68	33
7	East	67	32
8	North	56	21
9	North	50	15
10	West	58	23
11	East	62	27

5.5 Assessment of Night-time Noise Levels in Bedrooms

5.5.1 The noise levels calculated from the 3D sound model at the façades of the proposed building structures as detailed in **Figure 9** for the night-time period, together with the level of attenuation required to achieve 30 dB L_{Aeq} and 45 dB $L_{Amax,f}$ in the bedrooms, are summarised in **Table 14**.

Receptor Number	Façade	Worst Case Noise Level at the Façade of the Property (dB L_{Aeq})	Maximum Noise Level at the Façade of the Property (dB $L_{Amax,f}$)	Worst Case Level of Attenuation Needed to Achieve the Noise Guideline Levels in Bedrooms (dB)
4	West	74	82	44
5	South	69	80	39
6	South	62	78	33

Table 14: Level of Attenuation Required to Achieve the Internal Night-time Noise Guideline Levels (Figures in dB(A))

Receptor Number	Façade	Worst Case Noise Level at the Façade of the Property (dB L_{Aeq})	Maximum Noise Level at the Façade of the Property (dB $L_{Amax,f}$)	Worst Case Level of Attenuation Needed to Achieve the Noise Guideline Levels in Bedrooms (dB)
7	East	56	77	32
8	North	48	71	26
9	North	49	57	19
10	West	56	73	28
11	East	57	76	31

6 SOUND INSULATION SCHEME

6.1 Daytime Noise Levels in Outdoor Living Areas

- 6.1.1 The predicted noise levels, as detailed within **Section 5.4** of this report, indicate that resultant noise levels within two of the proposed amenity areas will likely exceed the lower WHO guidance value of 50 dB L_{Aeq} for people being moderately annoyed but remain below the upper guideline value of 55 dB L_{Aeq} for people being seriously annoyed.
- 6.1.2 Additionally, Calculations indicate that noise levels within two of the proposed amenity areas are also likely to exceed the upper WHO guidance value of 55 dB L_{Aeq} for people being seriously annoyed.
- 6.1.3 Given the constraints of the site, mitigation is not thought to be reasonably practicable; consideration could be given to whether the benefits of providing balcony space outweigh the negative aspects of slightly elevated noise levels.

6.2 Building Envelope Requirements – Windows Closed

- 6.2.1 Proposals for the development site at the time of writing outline residential use to the second and third floors. The proposed layout is presented in **Appendix C**.
- 6.2.2 Noise sensitive rooms are proposed to all facades of the property. Therefore, internal noise levels are required to not exceed 35 dB L_{Aeq} during the daytime hours in all rooms and 30 dB L_{Aeq} and 45 dB L_{Amax} during the night-time hours in bedrooms.
- 6.2.3 When assessing sound levels in habitable areas of the proposed development, the sound attenuation provided by the overall building facade should be considered. To mitigate sound levels, the composition of the building facade can be designed to provide the level of attenuation required. Glazing is generally the building element which attenuates noise the least, so the proportion of glazing in a building facade is an important consideration when assessing overall sound attenuation. Additionally, any façade penetrations should also be considered such as for ventilation i.e. trickle ventilation.
- 6.2.4 Based on the design details forwarded, worst case façade attenuation calculations have been undertaken in accordance with BS EN ISO 12354-3:2000. Full details of the calculations undertaken are presented in Appendix D.
- 6.2.5 Calculations show that to achieve a reasonable internal acoustic environment in habitable rooms as specified within BS8233, the building envelope constructions should be selected to meet the sound reduction index (SRI) values presented in **Table 15** and **Table 16**.

6.2.6 Figure 10 displays façade locations against a colour referenced system in-order to identify sound insulation requirements as discussed within this report.

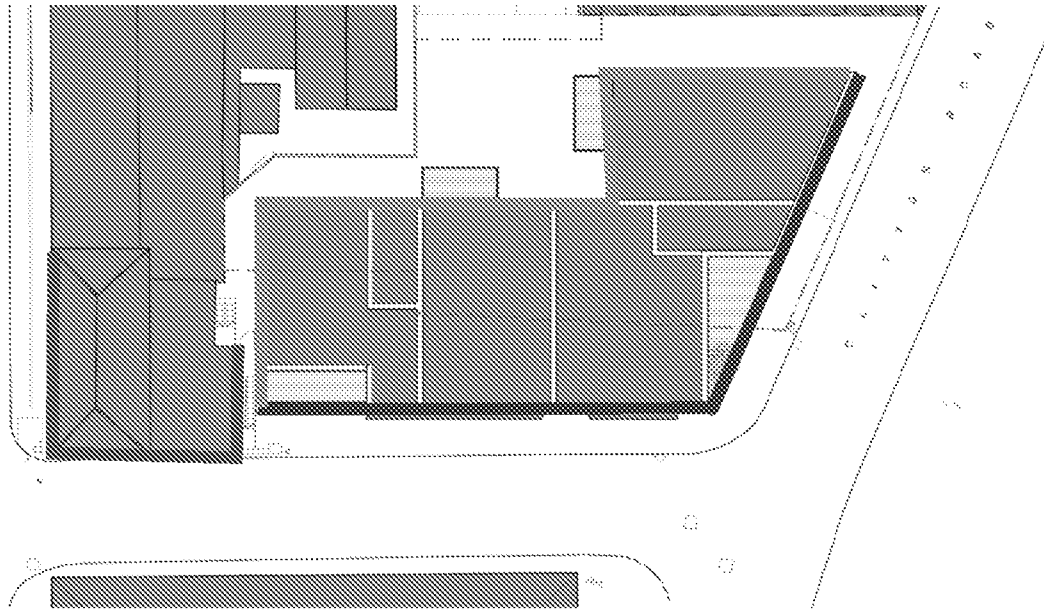


Figure 10: Façade Colour Scheme

6.2.7 A summary of sound insulation requirements to meet internal noise criterion is detailed in **Table 15, Table 16 and Table 17.**

Table 15: Summary of Building Envelope Performance Requirements to Blue Facade – All Rooms.		
Walls	50 R_w+C_{tr}	Typical Example: Concrete / Brick exterior wall with min. 100 mm insulated (60 kg / m ³ rockwool) cavity constructed with timber studwork and resilient bars with min. 10 mm plasterboard lining.
Glazing	41 R_w+C_{tr}	Typical Example: Double glazed unit with pane of 8.8 mm Optiphon – 16 mm argon filled cavity – 12.8 mm Pilkington Optiphon. Other supplier may be used, must achieve minimum 41 R_w+C_{tr} .
Acoustic Ventilator (Wall / Trickle)	50	Typical Example – Greenwood MA3051 Passive Wall Ventilator (or Similar). Other supplier may be used, must achieve minimum 50 $D_{ne,w}+C_{tr}$ when open.
Table 16: Summary of Building Envelope Performance Requirements to Purple Facade – All Rooms.		
Walls	50 R_w+C_{tr}	Typical Example: Concrete / Brick exterior wall with min. 100 mm insulated (60 kg / m ³ rockwool) cavity constructed with timber studwork and resilient bars with min. 10 mm plasterboard lining.
Glazing	38 R_w+C_{tr}	Typical Example: Double glazed unit with pane of 10 mm – 16 mm argon filled cavity – 8.8 mm Pilkington Optiphon. Other supplier may be used, must achieve minimum 38 R_w+C_{tr} .
Acoustic Ventilator (Wall / Trickle)	42 $D_{ne,w}+C_{tr}$	Typical Example – Greenwood MA3051 Passive Wall Ventilator (or Similar). Other supplier may be used, must achieve minimum 42 $D_{ne,w}+C_{tr}$ when open.
Table 17: Summary of Building Envelope Performance Requirements to Orange Facade – All Rooms.		
Walls	50 R_w+C_{tr}	Typical Example: Concrete / Brick exterior wall with min. 100 mm insulated (60 kg / m ³ rockwool) cavity constructed with timber studwork and resilient bars with min. 10 mm plasterboard lining.
Glazing	34 R_w+C_{tr}	Typical Example: Double glazed unit with pane of 8 mm – 16 mm argon filled cavity – 8.8 mm Pilkington Optiphon. Other supplier may be used, must achieve minimum 34 R_w+C_{tr} .
Acoustic Ventilator (Wall / Trickle)	42 $D_{ne,w}+C_{tr}$	Typical Example – Greenwood MA3051 Passive Wall Ventilator (or Similar). Other supplier may be used, must achieve minimum 42 $D_{ne,w}+C_{tr}$ when open.

6.3 Building Envelope Performance – Windows Open

- 6.3.1 The sound performance requirements for bedrooms, living and dining rooms at the development during the daytime and night-time in rooms with windows closed are summarised in Section 6.1.
- 6.3.2 However, with windows open, the attenuation provided by the façade will be approximately 10-15 dB(A). This would potentially allow the recommended internal noise limit to be exceeded some rooms at the development.
- 6.3.3 Facades where rooms are likely to achieve acceptable internal noise levels with windows partially open are presented in **Table 18**.

Table 18: Summary of Facades where rooms are likely to achieve acceptable internal noise levels with windows partially open providing min 15 dB attenuation.					
Receptor Number	Façade	Room Type	Day / Night	Yes / No	Excess (dB)
4	West	Living Room / Bedroom	Day	No	+24
		Bedroom	Night	No	+29
5	South	Living Room / Bedroom	Day	No	+21
		Bedroom	Night	No	+24
6	South	Living Room / Bedroom	Day	No	+18
		Bedroom	Night	No	+18
7	East	Living Room / Bedroom	Day	No	+17
		Bedroom	Night	No	+17
8	North	Living Room / Bedroom	Day	No	+6
		Bedroom	Night	No	+11
9	North	Living Room / Bedroom	Day	Yes	0
		Bedroom	Night	No	+4
10	West	Living Room / Bedroom	Day	No	+8
		Bedroom	Night	No	+13
11	East	Living Room / Bedroom	Day	No	+12
		Bedroom	Night	No	+16

- 6.3.4 **Table 18** also shows the level of likely exceedance of internal noise levels allowing for up to 15 dB(A) attenuation across a partially open window. It is considered that in many

circumstances, such as urban / sub-urban developments, an exceedance of up to 5 dB(A) in accordance with BS8233:2014 is likely to be acceptable to future residents and therefore is unlikely to breach the LOEL criteria discussed in Section 2 of this report.

- 6.3.5 Where exceedances are likely to be greater than +5 dB, on occasions this may be acceptable to a resident, but when quiet conditions are required, the resident should be able to close the windows whilst maintaining adequate ventilation. Some form of acoustic ventilation would therefore need to be installed in the apartments located at the site, ventilation is to be designed by others.

6.4 Acoustic Ventilation Requirements

- 6.4.1 It is recommended that the acoustic ventilation proposed at the site should, as a minimum, comply with Building Regulations 2000 Approved Document F1 Means of Ventilation and British Standard BS5925 1991: "Code of Practice for Ventilation Principles and Designing for Natural Ventilation". Acoustic ventilation is only recommended for noise sensitive rooms, which are bedrooms and living/dining rooms.
- 6.4.2 Where a passive ventilation system is incorporated into the design, ventilators should be acoustically treated for habitable rooms to all facades. Ventilation openings to these rooms should match or exceed the minimum values set out in **Table 15**, **Table 16** and **Table 17**
- 6.4.3 The implementation of the recommended glazing together with appropriate acoustic ventilation would ensure that the required internal daytime and night-time noise limits are achieved.
- 6.4.4 It should be further noted that the glazing and ventilation configurations within this report are for guidance only. Similar products to those used in NoiseAir calculations may achieve a similar level of sound reduction however this should be verified by the manufacturer.
- 6.4.5 As detailed in Section 6.2 it is likely that noise levels in noise sensitive rooms within some of the proposed dwellings will likely rely on the windows being in the closed position and therefore appropriate ventilation design should be completed.
- 6.4.6 Basic acoustic requirements for any passive ventilation which may be installed are outlined in Section 6.1 however it should be noted that ventilation requirements for future occupants of the proposed development are outside the scope of this report.

If it is considered preferable to install an active ventilation system, any mechanical ventilation adopted for the noise sensitive rooms should have a cumulative habitable room noise output which complies with NR25 leq noise rating curve.

7 CONCLUSIONS

7.1.1 NoiseAir has carried out a noise impact assessment with respect to the proposed development to be located at 46a and 47 Pier Road and Land Off Clifton Road BN17 5LW.

7.1.1 Proposals for the development site detail:

'Demolition of existing buildings, change of use & erection of 1 No. building incorporate office (B1) at ground floor & 8 No. dwellings at first and second floor level.'

7.1.2 The nature of occupancy at ground floor is understood to be office space and as such is not considered as a significant noise generating source within this assessment and therefore standard building regulation requirements are considered appropriate for the separating walls and floors.

7.1.3 At the time of writing, no commercial plant units have been proposed to NoiseAir as part of the development. Should units be sourced at a later stage, BS4142:2014 should be carried out with reference to the background sound levels within **Section 3.3** of this report.

7.1.4 The primary noise sources assessed are:

- Cumulative environmental noise including road traffic and nearby ventilation noise.

7.1.5 The above noise sources have been assessed in relation to the below identified receptors:

- Future occupants of the proposed residential apartments to the first and second floor of the development site.

7.1.6 The results of the noise survey and initial site noise risk assessment show that areas of the development have a '**Low**' Risk of adverse effect in accordance with Pro-PG without mitigation.

7.1.7 Calculation results presented within **Table 12** and **Table 18** indicate that internal noise levels will likely exceed desired noise criteria when relying upon 10-15 dB via partially open windows.

7.1.8 On occasions, this may be acceptable to a resident, but when quiet conditions are required, the resident should be able to close the windows whilst maintaining adequate ventilation. Some form of acoustic ventilation would therefore need to be installed in the dwellings.

7.1.9 Calculations demonstrate establishing a reasonable internal acoustic environment in habitable rooms as specified within BS8233 is achievable and a sound insulation scheme should be

selected to meet the sound reduction index (SRI) presented in **Table 15** , **Table 16** and **Table 17** of this report as a minimum.

APPENDIX A - REPORT LIMITATIONS

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This Report is presented to Reports 4 Planning and may not be used or relied on by any other person or by the client in relation to any other matters not covered specifically by the scope of this report.

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APPENDIX B – METER READINGS

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ML

Start Date	Start Time	Duration	LAeq	LAFMax	LA90
dd/mm/yyyy	hh:mm:ss	hh:mm:ss	dB	dB	dB
28/11/2020	14:45:00	00:15:00	43.0	62.9	37.2
28/11/2020	15:00:00	00:15:00	42.5	62.8	37.7
28/11/2020	15:15:00	00:15:00	41.5	59.6	37.2
28/11/2020	15:30:00	00:15:00	44.4	73.2	36.6
28/11/2020	15:45:00	00:15:00	40.9	61.4	36.4
28/11/2020	16:00:00	00:15:00	39.6	57.3	37.0
28/11/2020	16:15:00	00:15:00	42.8	62.9	37.5
28/11/2020	16:30:00	00:15:00	40.1	52.6	37.2
28/11/2020	16:45:00	00:15:00	39.6	60.3	37.7
28/11/2020	17:00:00	00:15:00	39.4	57.7	37.6
28/11/2020	17:15:00	00:15:00	39.8	55.5	37.9
28/11/2020	17:30:00	00:15:00	39.3	53.7	37.5
28/11/2020	17:45:00	00:15:00	40.5	59.7	37.3
28/11/2020	18:00:00	00:15:00	41.4	63.7	37.5
28/11/2020	18:15:00	00:15:00	40.7	60.1	37.6
28/11/2020	18:30:00	00:15:00	39.5	55.8	37.6
28/11/2020	18:45:00	00:15:00	40.3	57.3	37.6
28/11/2020	19:00:00	00:15:00	38.8	53.8	37.4
28/11/2020	19:15:00	00:15:00	41.9	65.1	37.7
28/11/2020	19:30:00	00:15:00	39.1	57.8	37.2
28/11/2020	19:45:00	00:15:00	39.5	55.6	37.0
28/11/2020	20:00:00	00:15:00	40.3	62.6	37.1
28/11/2020	20:15:00	00:15:00	42.4	64.0	37.5
28/11/2020	20:30:00	00:15:00	49.4	69.8	37.4
28/11/2020	20:45:00	00:15:00	41.9	66.8	36.6
28/11/2020	21:00:00	00:15:00	38.3	54.8	36.4
28/11/2020	21:15:00	00:15:00	37.5	52.9	35.9
28/11/2020	21:30:00	00:15:00	38.1	54.1	36.0
28/11/2020	21:45:00	00:15:00	36.8	51.1	35.1
28/11/2020	22:00:00	00:15:00	37.0	50.6	35.5
28/11/2020	22:15:00	00:15:00	40.3	69.8	32.3
28/11/2020	22:30:00	00:15:00	35.8	54.9	32.9
28/11/2020	22:45:00	00:15:00	33.6	44.1	31.8
28/11/2020	23:00:00	00:15:00	35.3	54.6	31.6
28/11/2020	23:15:00	00:15:00	34.1	46.9	31.7
28/11/2020	23:30:00	00:15:00	33.5	45.7	31.3
28/11/2020	23:45:00	00:15:00	34.5	51.7	30.4
29/11/2020	00:00:00	00:15:00	34.5	50.3	30.5
29/11/2020	00:15:00	00:15:00	31.4	43.3	29.3
29/11/2020	00:30:00	00:15:00	32.0	48.8	29.5
29/11/2020	00:45:00	00:15:00	31.6	49.5	29.0
29/11/2020	01:00:00	00:15:00	30.6	41.9	28.7
29/11/2020	01:15:00	00:15:00	30.9	40.8	28.9
29/11/2020	01:30:00	00:15:00	32.5	58.3	29.4
29/11/2020	01:45:00	00:15:00	33.1	51.6	29.2
29/11/2020	02:00:00	00:15:00	30.0	45.2	28.0
29/11/2020	02:15:00	00:15:00	31.9	51.5	28.3
29/11/2020	02:30:00	00:15:00	31.2	52.1	27.0

P4504-R1-V1
13th January 2021

Start Date	Start Time	Duration	LAeq	LAFMax	LA90
dd/mm/yyyy	hh:mm:ss	hh:mm:ss	dB	dB	dB
29/11/2020	02:45:00	00:15:00	31.4	49.8	27.4
29/11/2020	03:00:00	00:15:00	31.8	49.6	27.0
29/11/2020	03:15:00	00:15:00	31.1	48.3	27.1
29/11/2020	03:30:00	00:15:00	32.5	50.0	27.5
29/11/2020	03:45:00	00:15:00	34.9	54.0	27.9
29/11/2020	04:00:00	00:15:00	33.0	51.8	27.6
29/11/2020	04:15:00	00:15:00	33.7	54.6	28.4
29/11/2020	04:30:00	00:15:00	34.2	54.4	28.0
29/11/2020	04:45:00	00:15:00	33.1	54.1	27.9
29/11/2020	05:00:00	00:15:00	35.2	59.3	29.5
29/11/2020	05:15:00	00:15:00	33.7	49.7	29.4
29/11/2020	05:30:00	00:15:00	32.3	51.8	29.2
29/11/2020	05:45:00	00:15:00	32.9	54.1	30.4
29/11/2020	06:00:00	00:15:00	35.4	50.7	30.6
29/11/2020	06:15:00	00:15:00	33.2	46.4	31.1
29/11/2020	06:30:00	00:15:00	34.9	49.2	32.5
29/11/2020	06:45:00	00:15:00	43.5	68.4	34.1
29/11/2020	07:00:00	00:15:00	45.9	67.8	35.0
29/11/2020	07:15:00	00:15:00	42.0	60.7	34.4
29/11/2020	07:30:00	00:15:00	41.6	61.6	34.1
29/11/2020	07:45:00	00:15:00	41.6	67.4	34.7
29/11/2020	08:00:00	00:15:00	52.8	76.6	37.5
29/11/2020	08:15:00	00:15:00	45.2	72.1	36.4
29/11/2020	08:30:00	00:15:00	46.8	75.1	36.3
29/11/2020	08:45:00	00:15:00	43.1	68.7	36.6
29/11/2020	09:00:00	00:15:00	41.6	62.3	37.0
29/11/2020	09:15:00	00:15:00	43.7	69.3	36.8
29/11/2020	09:30:00	00:15:00	53.6	80.7	37.2
29/11/2020	09:45:00	00:15:00	54.3	81.6	37.8
29/11/2020	10:00:00	00:15:00	56.4	84.3	37.4
29/11/2020	10:15:00	00:15:00	41.5	64.5	36.6
29/11/2020	10:30:00	00:15:00	39.7	58.8	36.3
29/11/2020	10:45:00	00:15:00	43.3	71.0	36.8
29/11/2020	11:00:00	00:15:00	42.0	59.5	37.4
29/11/2020	11:15:00	00:15:00	46.8	69.1	36.6
29/11/2020	11:30:00	00:15:00	50.0	79.1	36.4
29/11/2020	11:45:00	00:15:00	55.7	79.2	37.4
29/11/2020	12:00:00	00:15:00	46.2	68.0	36.5
29/11/2020	12:15:00	00:15:00	45.2	66.2	36.8
29/11/2020	12:30:00	00:15:00	50.2	79.4	35.7
29/11/2020	12:45:00	00:15:00	49.3	77.8	37.7
29/11/2020	13:00:00	00:15:00	43.7	65.8	37.1
29/11/2020	13:15:00	00:15:00	45.7	68.8	37.1
29/11/2020	13:30:00	00:15:00	47.3	74.3	36.5
29/11/2020	13:45:00	00:15:00	48.6	72.2	37.5
29/11/2020	14:00:00	00:15:00	40.7	55.1	36.7
29/11/2020	14:15:00	00:15:00	45.2	68.7	36.8
29/11/2020	14:30:00	00:15:00	41.4	66.9	37.0
29/11/2020	14:45:00	00:15:00	40.2	58.2	36.5
29/11/2020	15:00:00	00:15:00	40.6	61.7	35.2

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Start Date	Start Time	Duration	LAeq	LAFMax	LA90
dd/mm/yyyy	hh:mm:ss	hh:mm:ss	dB	dB	dB
29/11/2020	15:15:00	00:15:00	42.6	60.8	35.0
29/11/2020	15:30:00	00:15:00	41.6	69.9	34.6
29/11/2020	15:45:00	00:15:00	44.7	73.2	34.5
29/11/2020	16:00:00	00:15:00	37.7	56.0	34.2
29/11/2020	16:15:00	00:15:00	38.3	54.3	34.4
29/11/2020	16:30:00	00:15:00	45.2	72.6	34.5
29/11/2020	16:45:00	00:15:00	39.4	55.3	34.3
29/11/2020	17:00:00	00:15:00	42.1	64.5	34.4
29/11/2020	17:15:00	00:15:00	35.6	53.5	33.7
29/11/2020	17:30:00	00:15:00	38.0	54.4	33.3
29/11/2020	17:45:00	00:15:00	36.2	55.7	32.8
29/11/2020	18:00:00	00:15:00	34.9	47.5	33.3
29/11/2020	18:15:00	00:15:00	37.6	57.1	33.8
29/11/2020	18:30:00	00:15:00	36.2	58.6	33.6
29/11/2020	18:45:00	00:15:00	36.2	54.0	33.4
29/11/2020	19:00:00	00:15:00	35.0	52.0	32.8
29/11/2020	19:15:00	00:15:00	34.6	47.9	33.1
29/11/2020	19:30:00	00:15:00	38.5	64.9	27.5
29/11/2020	19:45:00	00:15:00	34.7	56.0	26.8
29/11/2020	20:00:00	00:15:00	30.5	52.6	28.2
29/11/2020	20:15:00	00:15:00	33.4	59.0	27.8
29/11/2020	20:30:00	00:15:00	30.1	44.7	26.9
29/11/2020	20:45:00	00:15:00	29.2	50.0	24.3
29/11/2020	21:00:00	00:15:00	31.6	55.7	25.4
29/11/2020	21:15:00	00:15:00	31.5	50.0	24.9
29/11/2020	21:30:00	00:15:00	33.4	56.8	24.5
29/11/2020	21:45:00	00:15:00	36.0	65.1	23.6
29/11/2020	22:00:00	00:15:00	28.8	53.1	21.6
29/11/2020	22:15:00	00:15:00	24.2	41.6	21.9
29/11/2020	22:30:00	00:15:00	25.6	48.0	21.8
29/11/2020	22:45:00	00:15:00	29.2	46.8	22.7
29/11/2020	23:00:00	00:15:00	32.3	56.1	22.9
29/11/2020	23:15:00	00:15:00	22.9	37.8	21.2
29/11/2020	23:30:00	00:15:00	23.4	48.5	21.3
29/11/2020	23:45:00	00:15:00	22.3	37.7	20.7
30/11/2020	00:00:00	00:15:00	23.3	42.2	21.3
30/11/2020	00:15:00	00:15:00	23.9	39.6	21.1
30/11/2020	00:30:00	00:15:00	23.0	44.6	20.6
30/11/2020	00:45:00	00:15:00	22.6	36.9	20.8
30/11/2020	01:00:00	00:15:00	22.7	40.5	21.2
30/11/2020	01:15:00	00:15:00	23.0	44.7	21.0
30/11/2020	01:30:00	00:15:00	22.4	38.0	20.9
30/11/2020	01:45:00	00:15:00	21.8	39.7	20.4
30/11/2020	02:00:00	00:15:00	22.0	41.9	20.5
30/11/2020	02:15:00	00:15:00	22.0	34.8	20.3
30/11/2020	02:30:00	00:15:00	21.7	36.6	20.3
30/11/2020	02:45:00	00:15:00	24.4	44.0	20.7
30/11/2020	03:00:00	00:15:00	22.2	36.5	20.9
30/11/2020	03:15:00	00:15:00	23.1	38.9	20.6
30/11/2020	03:30:00	00:15:00	22.0	34.9	20.3

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Start Date	Start Time	Duration	LAeq	LAFMax	LA90
dd/mm/yyyy	hh:mm:ss	hh:mm:ss	dB	dB	dB
30/11/2020	03:45:00	00:15:00	22.5	40.1	20.3
30/11/2020	04:00:00	00:15:00	22.1	43.2	20.2
30/11/2020	04:15:00	00:15:00	26.3	47.9	20.7
30/11/2020	04:30:00	00:15:00	23.8	44.6	21.1
30/11/2020	04:45:00	00:15:00	23.2	40.2	21.1
30/11/2020	05:00:00	00:15:00	29.1	50.2	22.3
30/11/2020	05:15:00	00:15:00	24.4	38.5	22.5
30/11/2020	05:30:00	00:15:00	25.8	37.2	24.0
30/11/2020	05:45:00	00:15:00	29.3	50.1	24.5
30/11/2020	06:00:00	00:15:00	29.2	49.8	24.9
30/11/2020	06:15:00	00:15:00	29.2	42.9	26.1
30/11/2020	06:30:00	00:15:00	29.9	45.2	26.8
30/11/2020	06:45:00	00:15:00	40.5	66.5	29.2
30/11/2020	07:00:00	00:15:00	41.0	64.9	30.6
30/11/2020	07:15:00	00:15:00	49.5	73.0	34.0
30/11/2020	07:30:00	00:15:00	44.6	64.1	34.9
30/11/2020	07:45:00	00:15:00	52.2	80.1	34.6
30/11/2020	08:00:00	00:15:00	43.6	62.6	33.4
30/11/2020	08:15:00	00:15:00	51.8	78.1	34.2
30/11/2020	08:30:00	00:15:00	38.5	59.5	33.3
30/11/2020	08:45:00	00:15:00	49.0	77.2	33.9
30/11/2020	09:00:00	00:15:00	44.7	69.8	34.4
30/11/2020	09:15:00	00:15:00	39.3	60.4	34.6
30/11/2020	09:30:00	00:15:00	37.6	53.1	33.9
30/11/2020	09:45:00	00:15:00	38.8	62.7	33.9
30/11/2020	10:00:00	00:15:00	41.1	61.6	37.4
30/11/2020	10:15:00	00:15:00	42.0	60.9	36.3
30/11/2020	10:30:00	00:15:00	44.1	68.9	37.3
30/11/2020	10:45:00	00:15:00	45.6	68.6	36.3
30/11/2020	11:00:00	00:15:00	47.6	68.0	36.1
30/11/2020	11:15:00	00:15:00	43.0	63.5	36.4
30/11/2020	11:30:00	00:15:00	42.1	62.6	37.5
30/11/2020	11:45:00	00:15:00	46.5	68.1	37.4
30/11/2020	12:00:00	00:15:00	46.5	70.6	38.0
30/11/2020	12:15:00	00:15:00	39.6	55.8	36.4
30/11/2020	12:30:00	00:15:00	44.8	70.5	37.0
30/11/2020	12:45:00	00:15:00	41.0	61.5	36.7
30/11/2020	13:00:00	00:15:00	50.1	75.7	36.4
30/11/2020	13:15:00	00:15:00	61.0	80.8	37.8
30/11/2020	13:30:00	00:15:00	51.6	79.8	37.8
30/11/2020	13:45:00	00:15:00	46.5	67.8	39.4
30/11/2020	14:00:00	00:15:00	43.6	65.1	38.2
30/11/2020	14:15:00	00:15:00	45.7	69.6	38.1
30/11/2020	14:30:00	00:15:00	42.3	61.6	37.9
30/11/2020	14:45:00	00:15:00	44.5	65.1	38.1
30/11/2020	15:00:00	00:15:00	40.1	56.4	37.8
30/11/2020	15:15:00	00:15:00	41.6	65.4	37.6
30/11/2020	15:30:00	00:15:00	46.7	66.8	39.5
30/11/2020	15:45:00	00:15:00	45.0	65.8	39.4
30/11/2020	16:00:00	00:15:00	46.8	59.3	40.7

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Start Date	Start Time	Duration	LAeq	LAFMax	LA90
dd/mm/yyyy	hh:mm:ss	hh:mm:ss	dB	dB	dB
30/11/2020	16:15:00	00:15:00	52.2	77.0	38.4
30/11/2020	16:30:00	00:15:00	49.0	71.3	37.5
30/11/2020	16:45:00	00:15:00	43.5	68.1	37.3
30/11/2020	17:00:00	00:15:00	46.3	68.4	37.0
30/11/2020	17:15:00	00:15:00	37.9	47.1	36.1
30/11/2020	17:30:00	00:15:00	38.1	57.0	35.7
30/11/2020	17:45:00	00:15:00	39.3	55.4	35.3
30/11/2020	18:00:00	00:15:00	37.2	49.4	35.1
30/11/2020	18:15:00	00:15:00	38.9	64.4	34.8
30/11/2020	18:30:00	00:15:00	41.0	64.5	35.0
30/11/2020	18:45:00	00:15:00	39.0	60.7	34.6
30/11/2020	19:00:00	00:15:00	37.1	56.6	34.5
30/11/2020	19:15:00	00:15:00	37.3	55.3	34.7
30/11/2020	19:30:00	00:15:00	38.8	53.5	35.6
30/11/2020	19:45:00	00:15:00	39.6	58.4	35.3
30/11/2020	20:00:00	00:15:00	37.4	53.3	34.6
30/11/2020	20:15:00	00:15:00	36.8	61.7	33.9
30/11/2020	20:30:00	00:15:00	36.5	53.3	33.0
30/11/2020	20:45:00	00:15:00	44.7	69.1	32.9
30/11/2020	21:00:00	00:15:00	36.0	52.3	32.0
30/11/2020	21:15:00	00:15:00	35.9	55.5	31.7
30/11/2020	21:30:00	00:15:00	38.5	56.6	32.0
30/11/2020	21:45:00	00:15:00	35.9	61.0	30.8
30/11/2020	22:00:00	00:15:00	36.1	61.6	30.6
30/11/2020	22:15:00	00:15:00	44.8	73.8	34.9
30/11/2020	22:30:00	00:15:00	43.6	71.9	35.2
30/11/2020	22:45:00	00:15:00	38.7	58.1	33.2
30/11/2020	23:00:00	00:15:00	38.6	63.0	29.1
30/11/2020	23:15:00	00:15:00	34.6	56.4	29.5
30/11/2020	23:30:00	00:15:00	31.2	51.0	27.1
30/11/2020	23:45:00	00:15:00	29.0	45.1	26.3
01/12/2020	00:00:00	00:15:00	29.3	50.7	26.6
01/12/2020	00:15:00	00:15:00	32.2	51.1	25.8
01/12/2020	00:30:00	00:15:00	28.0	42.4	24.9
01/12/2020	00:45:00	00:15:00	31.2	53.3	27.2
01/12/2020	01:00:00	00:15:00	26.8	39.9	24.8
01/12/2020	01:15:00	00:15:00	30.2	52.3	24.7
01/12/2020	01:30:00	00:15:00	26.1	40.9	24.6
01/12/2020	01:45:00	00:15:00	26.2	47.7	24.6
01/12/2020	02:00:00	00:15:00	25.8	38.7	24.6
01/12/2020	02:15:00	00:15:00	26.1	50.4	24.6
01/12/2020	02:30:00	00:15:00	26.8	53.9	24.9
01/12/2020	02:45:00	00:15:00	26.4	35.0	24.9
01/12/2020	03:00:00	00:15:00	25.7	39.2	24.6
01/12/2020	03:15:00	00:15:00	25.9	36.4	24.4
01/12/2020	03:30:00	00:15:00	26.5	35.2	25.1
01/12/2020	03:45:00	00:15:00	26.0	38.5	24.5
01/12/2020	04:00:00	00:15:00	27.1	43.9	25.2
01/12/2020	04:15:00	00:15:00	27.5	39.3	26.0
01/12/2020	04:30:00	00:15:00	33.6	57.3	27.6

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Start Date	Start Time	Duration	LAeq	LAFMax	LA90
dd/mm/yyyy	hh:mm:ss	hh:mm:ss	dB	dB	dB
01/12/2020	04:45:00	00:15:00	31.4	48.1	28.2
01/12/2020	05:00:00	00:15:00	30.4	39.9	28.7
01/12/2020	05:15:00	00:15:00	31.9	40.8	30.0
01/12/2020	05:30:00	00:15:00	36.4	49.4	33.2
01/12/2020	05:45:00	00:15:00	35.6	47.5	33.5
01/12/2020	06:00:00	00:15:00	36.0	53.3	33.7
01/12/2020	06:15:00	00:15:00	38.2	60.2	34.8
01/12/2020	06:30:00	00:15:00	43.4	63.1	36.4
01/12/2020	06:45:00	00:15:00	48.1	69.0	38.9
01/12/2020	07:00:00	00:15:00	50.2	71.1	39.2
01/12/2020	07:15:00	00:15:00	58.8	83.8	39.4
01/12/2020	07:30:00	00:15:00	49.3	73.2	39.3
01/12/2020	07:45:00	00:15:00	57.3	78.6	41.1
01/12/2020	08:00:00	00:15:00	50.9	79.8	40.0
01/12/2020	08:15:00	00:15:00	50.3	75.6	39.7
01/12/2020	08:30:00	00:15:00	51.3	76.3	39.6
01/12/2020	08:45:00	00:15:00	46.0	61.2	40.6
01/12/2020	09:00:00	00:15:00	45.9	70.5	39.4
01/12/2020	09:15:00	00:15:00	43.0	62.7	38.8
01/12/2020	09:30:00	00:15:00	47.3	72.2	38.6
01/12/2020	09:45:00	00:15:00	51.1	69.2	39.7
01/12/2020	10:00:00	00:15:00	42.3	61.6	39.5
01/12/2020	10:15:00	00:15:00	47.2	65.7	39.7
01/12/2020	10:30:00	00:15:00	52.0	63.7	39.9
01/12/2020	10:45:00	00:15:00	45.4	69.9	39.6
01/12/2020	11:00:00	00:15:00	57.5	77.8	42.2
01/12/2020	11:15:00	00:15:00	49.7	66.6	39.5
01/12/2020	11:30:00	00:15:00	50.2	72.5	38.2
01/12/2020	11:45:00	00:15:00	45.5	67.3	38.6
01/12/2020	12:00:00	00:15:00	43.9	69.1	38.4
01/12/2020	12:15:00	00:15:00	46.4	66.4	39.4
01/12/2020	12:30:00	00:15:00	47.2	68.7	39.4
01/12/2020	12:45:00	00:15:00	48.3	70.4	38.9
01/12/2020	13:00:00	00:15:00	50.4	73.5	39.4
01/12/2020	13:15:00	00:15:00	49.7	70.2	40.3
01/12/2020	13:30:00	00:15:00	43.8	70.4	37.7
01/12/2020	13:45:00	00:15:00	43.0	61.3	37.7
01/12/2020	14:00:00	00:15:00	44.4	65.3	37.6
01/12/2020	14:15:00	00:15:00	43.3	69.1	38.0
01/12/2020	14:30:00	00:15:00	41.1	60.7	37.9
01/12/2020	14:45:00	00:15:00	43.5	63.4	38.3
01/12/2020	15:00:00	00:15:00	46.5	70.6	38.1
01/12/2020	15:15:00	00:15:00	49.6	74.8	37.9
01/12/2020	15:30:00	00:15:00	41.4	62.1	38.4
01/12/2020	15:45:00	00:15:00	46.9	73.6	38.4
01/12/2020	16:00:00	00:15:00	40.8	60.9	37.6
01/12/2020	16:15:00	00:15:00	40.9	62.1	36.9
01/12/2020	16:30:00	00:15:00	39.1	49.4	37.4
01/12/2020	16:45:00	00:15:00	40.3	60.0	37.1
01/12/2020	17:00:00	00:15:00	38.1	48.3	36.9

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13th January 2021

Start Date dd/mm/yyyy	Start Time hh:mm:ss	Duration hh:mm:ss	LAeq dB	LAFMax dB	LA90 dB
01/12/2020	17:15:00	00:15:00	39.6	58.4	36.3
01/12/2020	17:30:00	00:15:00	38.8	53.8	37.0
01/12/2020	17:45:00	00:15:00	38.0	52.1	36.8
01/12/2020	18:00:00	00:15:00	39.0	61.6	36.2
01/12/2020	18:15:00	00:15:00	38.7	56.9	36.2
01/12/2020	18:30:00	00:15:00	36.9	51.4	35.7
01/12/2020	18:45:00	00:15:00	36.7	49.9	35.5
01/12/2020	19:00:00	00:15:00	38.4	50.5	36.3
01/12/2020	19:15:00	00:15:00	45.0	65.2	37.2
01/12/2020	19:30:00	00:15:00	39.6	56.0	36.0
01/12/2020	19:45:00	00:15:00	38.3	51.9	36.6
01/12/2020	20:00:00	00:15:00	37.9	50.7	36.4
01/12/2020	20:15:00	00:15:00	38.7	57.4	36.5
01/12/2020	20:30:00	00:15:00	37.6	54.0	35.7
01/12/2020	20:45:00	00:15:00	36.1	48.6	34.6
01/12/2020	21:00:00	00:15:00	36.1	48.2	34.7
01/12/2020	21:15:00	00:15:00	36.2	50.1	34.6
01/12/2020	21:30:00	00:15:00	37.7	60.3	34.9
01/12/2020	21:45:00	00:15:00	36.4	56.2	34.5
01/12/2020	22:00:00	00:15:00	34.9	46.7	31.7
01/12/2020	22:15:00	00:15:00	36.1	53.6	30.2
01/12/2020	22:30:00	00:15:00	33.6	54.3	31.1
01/12/2020	22:45:00	00:15:00	32.6	48.8	29.7
01/12/2020	23:00:00	00:15:00	33.5	57.4	28.8
01/12/2020	23:15:00	00:15:00	30.1	47.3	27.5
01/12/2020	23:30:00	00:15:00	35.0	56.5	26.5
01/12/2020	23:45:00	00:15:00	30.0	51.4	25.3
02/12/2020	00:00:00	00:15:00	28.7	51.8	25.6
02/12/2020	00:15:00	00:15:00	26.6	44.9	24.7
02/12/2020	00:30:00	00:15:00	27.5	43.3	25.2
02/12/2020	00:45:00	00:15:00	32.4	51.5	24.6
02/12/2020	01:00:00	00:15:00	26.9	39.7	24.5
02/12/2020	01:15:00	00:15:00	27.4	39.3	24.3
02/12/2020	01:30:00	00:15:00	26.4	43.7	23.9
02/12/2020	01:45:00	00:15:00	27.7	43.2	24.5
02/12/2020	02:00:00	00:15:00	26.7	35.9	24.2
02/12/2020	02:15:00	00:15:00	27.4	35.3	24.0
02/12/2020	02:30:00	00:15:00	26.0	36.4	23.9
02/12/2020	02:45:00	00:15:00	28.0	39.8	24.9
02/12/2020	03:00:00	00:15:00	33.0	52.8	24.3
02/12/2020	03:15:00	00:15:00	26.5	36.2	24.1
02/12/2020	03:30:00	00:15:00	36.6	64.4	24.7
02/12/2020	03:45:00	00:15:00	26.7	34.2	24.6
02/12/2020	04:00:00	00:15:00	26.2	33.1	24.1
02/12/2020	04:15:00	00:15:00	28.4	36.9	25.9
02/12/2020	04:30:00	00:15:00	30.1	41.0	27.3
02/12/2020	04:45:00	00:15:00	29.8	41.5	26.9
02/12/2020	05:00:00	00:15:00	42.8	66.1	28.3
02/12/2020	05:15:00	00:15:00	32.2	41.0	29.9
02/12/2020	05:30:00	00:15:00	35.4	50.5	32.2

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Start Date	Start Time	Duration	LAeq	LAFMax	LA90
dd/mm/yyyy	hh:mm:ss	hh:mm:ss	dB	dB	dB
02/12/2020	05:45:00	00:15:00	36.4	53.0	34.1
02/12/2020	06:00:00	00:15:00	40.4	54.6	35.7
02/12/2020	06:15:00	00:15:00	35.8	51.4	34.7
02/12/2020	06:30:00	00:15:00	37.7	55.5	35.6
02/12/2020	06:45:00	00:15:00	46.3	66.8	36.1
02/12/2020	07:00:00	00:15:00	50.9	68.2	37.2
02/12/2020	07:15:00	00:15:00	53.8	79.3	37.4
02/12/2020	07:30:00	00:15:00	43.1	63.2	38.7
02/12/2020	07:45:00	00:15:00	50.7	75.8	37.2
02/12/2020	08:00:00	00:15:00	48.5	70.1	38.0
02/12/2020	08:15:00	00:15:00	46.1	75.2	37.5
02/12/2020	08:30:00	00:15:00	42.6	61.0	36.2
02/12/2020	08:45:00	00:15:00	40.8	60.4	35.5
02/12/2020	09:00:00	00:15:00	41.5	55.7	36.5
02/12/2020	09:15:00	00:15:00	54.6	82.1	37.5
02/12/2020	09:30:00	00:15:00	42.8	59.9	37.3
02/12/2020	09:45:00	00:15:00	41.9	66.2	37.4
02/12/2020	10:00:00	00:15:00	39.4	53.9	37.1
02/12/2020	10:15:00	00:15:00	40.3	61.9	37.0
02/12/2020	10:30:00	00:15:00	45.1	61.7	37.9
02/12/2020	10:45:00	00:15:00	44.1	70.5	37.0
02/12/2020	11:00:00	00:15:00	48.9	74.6	38.5
02/12/2020	11:15:00	00:15:00	48.1	72.5	38.8
02/12/2020	11:30:00	00:15:00	46.6	67.6	37.5
02/12/2020	11:45:00	00:15:00	41.7	56.2	37.7
02/12/2020	12:00:00	00:15:00	44.1	61.3	39.0
02/12/2020	12:15:00	00:15:00	48.1	67.8	42.3
02/12/2020	12:30:00	00:15:00	45.7	59.3	37.9
02/12/2020	12:45:00	00:15:00	49.1	67.5	37.5
02/12/2020	13:00:00	00:15:00	48.2	70.3	37.0
02/12/2020	13:15:00	00:15:00	45.1	62.6	36.1
02/12/2020	13:30:00	00:15:00	45.8	64.5	36.2
02/12/2020	13:45:00	00:15:00	39.3	57.5	36.2
02/12/2020	14:00:00	00:15:00	40.3	59.6	36.3
02/12/2020	14:15:00	00:15:00	45.7	70.3	36.2
02/12/2020	14:30:00	00:15:00	40.5	58.8	36.8
02/12/2020	14:45:00	00:15:00	41.2	57.6	37.3
02/12/2020	15:00:00	00:15:00	44.7	66.1	36.7
02/12/2020	15:15:00	00:15:00	43.5	62.8	37.2
02/12/2020	15:30:00	00:15:00	46.8	77.7	37.5
02/12/2020	15:45:00	00:15:00	55.8	87.2	37.9
02/12/2020	16:00:00	00:15:00	40.7	57.8	37.1
02/12/2020	16:15:00	00:15:00	39.0	58.2	36.4
02/12/2020	16:30:00	00:15:00	38.6	54.3	36.6
02/12/2020	16:45:00	00:15:00	39.8	57.8	36.6
02/12/2020	17:00:00	00:15:00	38.9	47.2	37.3
02/12/2020	17:15:00	00:15:00	39.9	57.7	37.3
02/12/2020	17:30:00	00:15:00	41.2	60.9	37.6
02/12/2020	17:45:00	00:15:00	41.7	55.9	37.8
02/12/2020	18:00:00	00:15:00	39.6	52.2	37.8

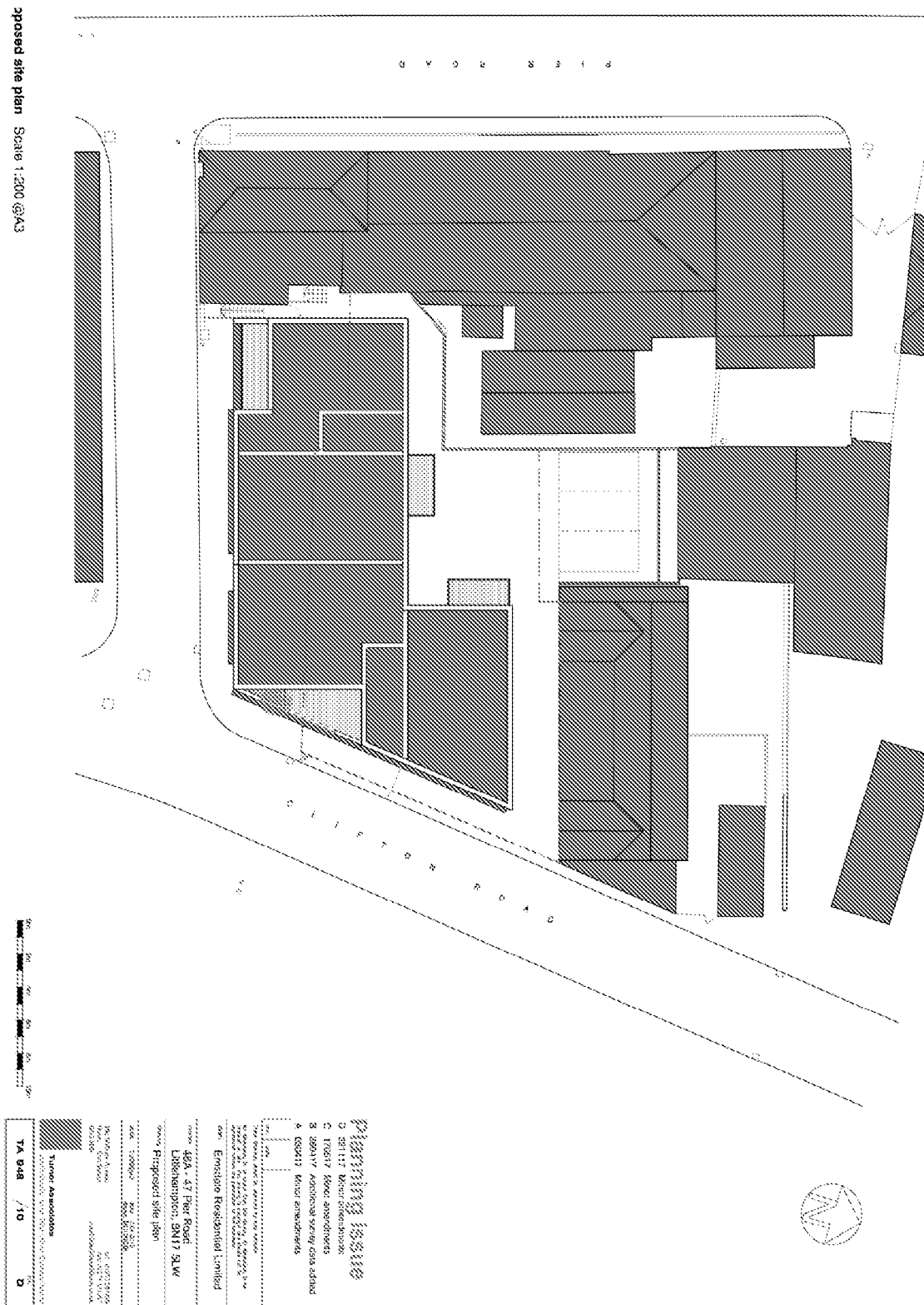
P4504-R1-V1
13th January 2021

Start Date	Start Time	Duration	LAeq	LAFMax	LA90
dd/mm/yyyy	hh:mm:ss	hh:mm:ss	dB	dB	dB
02/12/2020	18:15:00	00:15:00	40.0	53.3	37.0
02/12/2020	18:30:00	00:15:00	38.6	53.4	36.6
02/12/2020	18:45:00	00:15:00	40.0	58.2	36.6
02/12/2020	19:00:00	00:15:00	39.4	53.6	36.7
02/12/2020	19:15:00	00:15:00	37.7	50.5	36.2
02/12/2020	19:30:00	00:15:00	37.5	50.4	35.9
02/12/2020	19:45:00	00:15:00	38.2	55.3	35.9
02/12/2020	20:00:00	00:15:00	36.9	50.8	35.2
02/12/2020	20:15:00	00:15:00	37.1	50.5	35.2
02/12/2020	20:30:00	00:15:00	37.9	54.1	35.1
02/12/2020	20:45:00	00:15:00	35.8	48.5	34.3
02/12/2020	21:00:00	00:15:00	37.7	57.0	34.0
02/12/2020	21:15:00	00:15:00	36.6	61.9	34.7
02/12/2020	21:30:00	00:15:00	39.5	60.8	32.5
02/12/2020	21:45:00	00:15:00	37.5	56.5	30.8
02/12/2020	22:00:00	00:15:00	33.1	55.7	29.7
02/12/2020	22:15:00	00:15:00	34.3	54.5	29.9
02/12/2020	22:30:00	00:15:00	31.7	50.4	28.5
02/12/2020	22:45:00	00:15:00	34.0	56.4	29.6
02/12/2020	23:00:00	00:15:00	34.6	55.2	29.0
02/12/2020	23:15:00	00:15:00	30.7	48.4	27.9
02/12/2020	23:30:00	00:15:00	29.5	45.8	27.1
02/12/2020	23:45:00	00:15:00	29.8	53.5	26.4
03/12/2020	00:00:00	00:15:00	30.5	44.7	26.7
03/12/2020	00:15:00	00:15:00	31.7	50.6	27.5
03/12/2020	00:30:00	00:15:00	30.6	51.5	27.8
03/12/2020	00:45:00	00:15:00	30.7	50.1	27.4
03/12/2020	01:00:00	00:15:00	29.3	38.4	27.4
03/12/2020	01:15:00	00:15:00	30.4	39.4	27.6
03/12/2020	01:30:00	00:15:00	30.6	38.9	28.8
03/12/2020	01:45:00	00:15:00	32.5	41.3	30.0
03/12/2020	02:00:00	00:15:00	31.9	38.6	29.5
03/12/2020	02:15:00	00:15:00	31.3	36.7	29.3
03/12/2020	02:30:00	00:15:00	30.9	39.4	28.9
03/12/2020	02:45:00	00:15:00	33.0	39.6	30.6
03/12/2020	03:00:00	00:15:00	33.2	38.1	31.3
03/12/2020	03:15:00	00:15:00	32.2	38.2	30.8
03/12/2020	03:30:00	00:15:00	31.7	44.9	30.3
03/12/2020	03:45:00	00:15:00	32.5	49.8	30.2
03/12/2020	04:00:00	00:15:00	31.3	35.4	29.5
03/12/2020	04:15:00	00:15:00	31.1	38.3	29.5
03/12/2020	04:30:00	00:15:00	32.4	48.3	29.2
03/12/2020	04:45:00	00:15:00	30.9	42.3	28.8
03/12/2020	05:00:00	00:15:00	33.1	50.2	27.6
03/12/2020	05:15:00	00:15:00	32.8	44.0	28.0
03/12/2020	05:30:00	00:15:00	55.9	71.5	35.9
03/12/2020	05:45:00	00:15:00	56.5	67.8	42.0
03/12/2020	06:00:00	00:15:00	36.7	51.6	33.1
03/12/2020	06:15:00	00:15:00	41.6	61.3	33.1
03/12/2020	06:30:00	00:15:00	47.3	63.2	35.2

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13th January 2021

Start Date	Start Time	Duration	LAeq	LAFMax	LA90
dd/mm/yyyy	hh:mm:ss	hh:mm:ss	dB	dB	dB
03/12/2020	06:45:00	00:15:00	59.2	72.8	40.1
03/12/2020	07:00:00	00:15:00	63.4	72.7	58.8
03/12/2020	07:15:00	00:15:00	57.1	72.3	45.5
03/12/2020	07:30:00	00:15:00	48.8	58.2	44.2
03/12/2020	07:45:00	00:15:00	57.3	74.7	51.7
03/12/2020	08:00:00	00:15:00	56.1	70.8	45.3
03/12/2020	08:15:00	00:15:00	51.9	66.8	44.3
03/12/2020	08:30:00	00:15:00	53.6	66.2	47.5
03/12/2020	08:45:00	00:15:00	51.5	70.4	46.1
03/12/2020	09:00:00	00:15:00	46.2	57.4	42.6
03/12/2020	09:15:00	00:15:00	52.5	64.5	46.8
03/12/2020	09:30:00	00:15:00	50.8	67.0	46.3
03/12/2020	09:45:00	00:15:00	51.0	70.5	46.6
03/12/2020	10:00:00	00:15:00	52.0	67.7	46.4
03/12/2020	10:15:00	00:15:00	57.8	72.5	48.1
03/12/2020	10:30:00	00:15:00	57.5	73.2	49.4
03/12/2020	10:45:00	00:15:00	57.4	75.1	51.9
03/12/2020	11:00:00	00:15:00	56.2	71.3	49.7
03/12/2020	11:15:00	00:15:00	59.6	72.3	52.7
03/12/2020	11:30:00	00:15:00	54.4	73.5	50.4
03/12/2020	11:45:00	00:15:00	62.1	83.5	55.1
03/12/2020	12:00:00	00:15:00	57.7	73.3	52.7
03/12/2020	12:15:00	00:15:00	58.7	84.5	52.6
03/12/2020	12:30:00	00:15:00	57.9	72.8	52.7
03/12/2020	12:45:00	00:15:00	61.1	82.6	54.1
03/12/2020	13:00:00	00:15:00	61.6	79.9	53.3
03/12/2020	13:15:00	00:15:00	56.6	78.1	50.7
03/12/2020	13:30:00	00:15:00	56.7	80.5	50.9
03/12/2020	13:45:00	00:15:00	57.2	80.6	51.7
03/12/2020	14:00:00	00:15:00	57.7	78.4	52.4
03/12/2020	14:15:00	00:15:00	59.8	78.1	54.2
03/12/2020	14:30:00	00:15:00	63.7	80.2	56.2
03/12/2020	14:45:00	00:15:00	58.5	77.1	52.7
03/12/2020	15:00:00	00:15:00	58.1	67.4	50.1
03/12/2020	15:15:00	00:15:00	53.6	65.8	49.7
03/12/2020	15:30:00	00:15:00	57.2	67.3	53.3

APPENDIX C – CLIENT PROPOSAL DRAWINGS



P4504-R1-V1
13th January 2021

Proposed first floor plan Scale 1:100 @A3



TUNER ASSOCIATES

1A 8-9 / 12 D

PROJECT
45A - 47 Park Road
Liphroberton, SN17 5LW
drawing
Proposed first floor plan

DATE
11/01/2021
BY
A. J. J. J. J.

SCALE
1:100 @A3

PROJECT NO.
P4504-R1-V1

PLANNING ISSUE

A. 1981/17 ARCHITECTURAL WORKS, 45A-47 PARK ROAD, LIPHROBERTON, SN17 5LW

B. 1981/17 ARCHITECTURAL WORKS, 45A-47 PARK ROAD, LIPHROBERTON, SN17 5LW

C. 1981/17 ARCHITECTURAL WORKS, 45A-47 PARK ROAD, LIPHROBERTON, SN17 5LW

D. 1981/17 ARCHITECTURAL WORKS, 45A-47 PARK ROAD, LIPHROBERTON, SN17 5LW

E. 1981/17 ARCHITECTURAL WORKS, 45A-47 PARK ROAD, LIPHROBERTON, SN17 5LW

EMERGENCY PREPAREDNESS PLAN

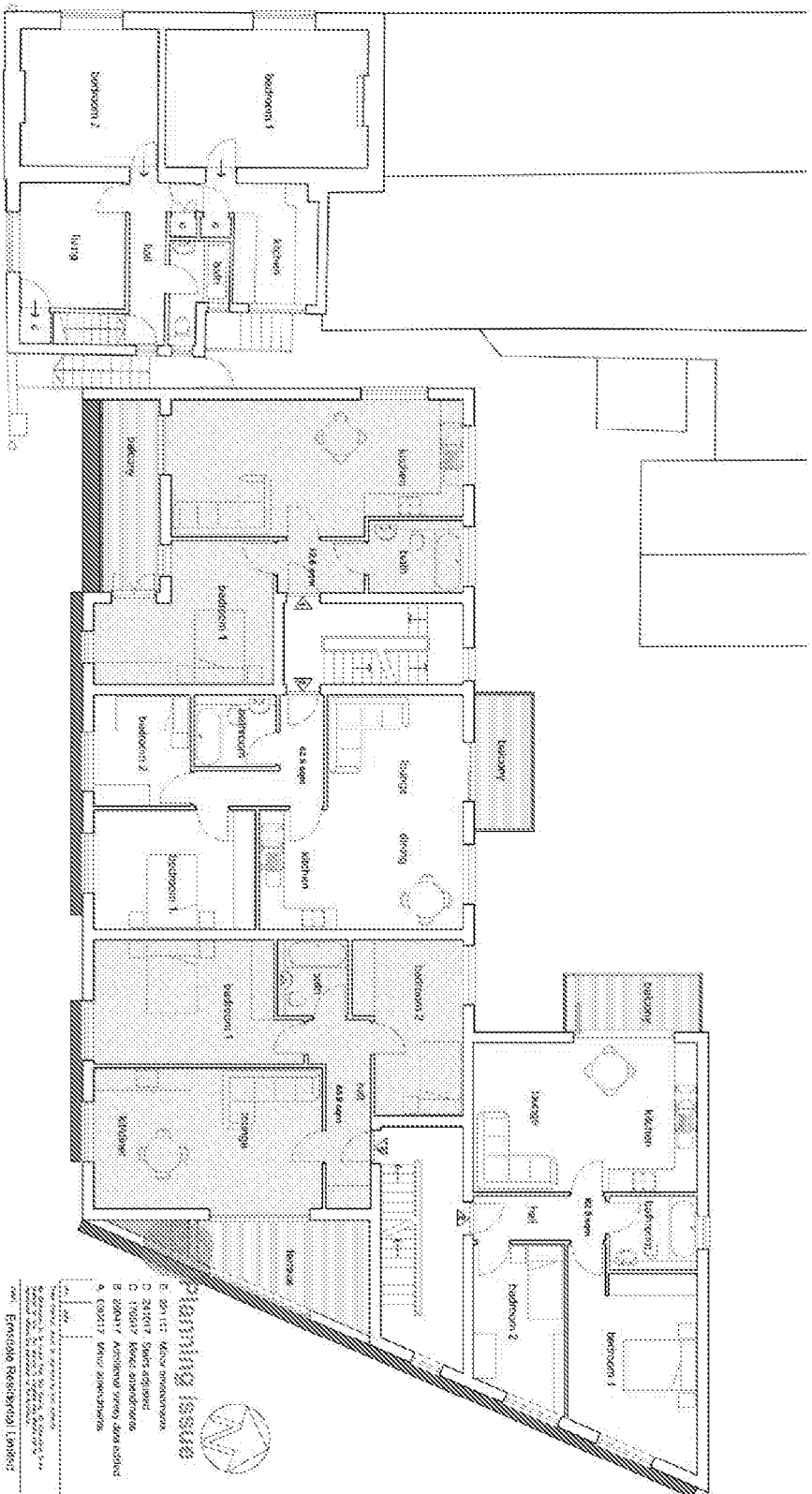
1. 1981/17 ARCHITECTURAL WORKS, 45A-47 PARK ROAD, LIPHROBERTON, SN17 5LW

2. 1981/17 ARCHITECTURAL WORKS, 45A-47 PARK ROAD, LIPHROBERTON, SN17 5LW

3. 1981/17 ARCHITECTURAL WORKS, 45A-47 PARK ROAD, LIPHROBERTON, SN17 5LW

4. 1981/17 ARCHITECTURAL WORKS, 45A-47 PARK ROAD, LIPHROBERTON, SN17 5LW

5. 1981/17 ARCHITECTURAL WORKS, 45A-47 PARK ROAD, LIPHROBERTON, SN17 5LW



APPENDIX D – BS12354-3:2000 CALCULATIONS

46a & 47 Pier Road
BA Outside1.baf - Interior level calculations

Living Rooms - Blue / 46b 47 Pier Road and Land Off Clifton Road / 46a 47 Pier Road and Land Off Clifton Road

Room type:	Living Rooms	Room geometry:	3.40 m x 2.80 m = 9.52 m ²
L2,nfi valid:	35.0 dB	L2,nfi existent / improved:	30.3 / 30.3 dB

facade 1

facade geometry:	3.40 m x 2.70 m = 9.18 m ²
L2,nfi existent / improved:	30.3 / 30.3 dB

Assessment level Day:	74.0 dB(A)
Correction for facade structure by EN 12354-3	0.0 dB
Correction by user:	0.0 dB
Exterior level:	74.0 dB

ser. No.	Component existent	Count	Area [m ²]	R _w [dB]	Da,e [dB]	Component improved	Count	Area [m ²]	R _w [dB]	Da,e [dB]	fan
1	Wall	1	6.67	50	-	Wall	1	6.67	50	-	-
2	Window	1	2.50	41	-	Window	1	2.50	41	-	-
3	Ventilator	1	0.01	-	50	Ventilator	1	0.01	-	50	-

46a & 47 Pier Road BA Outside1.baf - Interior level calculations

Bedroom Max - Blue / 46b 47 Pier Road and Land Off Clifton Road / 46a 47 Pier Road and Land Off Clifton Road

Room type:	Bedrooms Max	Room geometry:	3.70 m x 3.70 m = 13.69 m ²
U _g ,nT valid:	45.0 dB	U _g ,nT existent / improved:	36.5 / 36.3 dB
Facade 1			
		Facade geometry:	3.70 m x 2.70 m = 9.99 m ²
		U _g ,nT existent / improved:	36.5 / 36.3 dB

Assessment level Day:	82.0 dB(A)
Correction for facade structure by EN 12354-3	0.0 dB
Correction by user:	0.0 dB
Exterior level:	82.0 dB

ser. No.	Component existent	Count	Area [m ²]	R _w [dB]	Dn,e [dB]	Component improved	Count	Area [m ²]	R _w [dB]	Dn,e [dB]	Fan
1	Wall	1	7.48	50	-	Wall	1	8.08	50	-	-
2	Window	1	2.50	41	-	Window	1	1.90	41	-	-
3	Ventilator	1	0.01	-	50	Ventilator	1	0.01	-	50	-

46a & 47 Pier Road
BA Outside1.baf - Interior level calculations

Bedroom Blue / 46b 47 Pier Road and Land Off Clifton Road / 46a 47 Pier Road and Land Off Clifton Road

Room type:	Bedrooms	Room geometry:	3.70 m x 3.70 m = 13.69 m ²
L2,nT valid:	30.0 dB	L2,nT existent / improved:	28.8 / 28.8 dB
Facade 1			
		Facade geometry:	3.70 m x 2.70 m = 9.99 m ²
		L2,nT existent / improved:	28.8 / 28.8 dB
Assessment level Day:			74.0 dB(A)
Correction for facade structure by EN 12354-3			0.0 dB
Correction by user:			0.0 dB
Exterior level:			74.0 dB

seq. No.	Component existent	Count	Area [m ²]	R _w [dB]	Dr,e [dB]	Component improved	Count	Area [m ²]	R _w [dB]	Dr,e [dB]	Fan
1	Wall	1	7.48	50	-	= Wall	1	7.48	50	-	-
2	Window	1	2.50	41	-	= Window	1	2.50	41	-	-
3	Ventilator	1	0.01	-	50	= Ventilator	1	0.01	-	50	-

46a & 47 Pier Road
BA Outside1.baf - Interior level calculations

Living Room - Purple / 46b 47 Pier Road and Land Off Clifton Road / 46a 47 Pier Road and Land Off

Room type:	Living Rooms	Room geometry:	3.70 m x 7.80 m = 28.86 m ²
L2,nT valid:	35.0 dB	L2,nT existent / improved:	30.0 / 30.0 dB
Facade 1			
		Facade geometry:	3.70 m x 2.70 m = 9.99 m ²
		L2,nT existent / improved:	30.0 / 30.0 dB
Assessment level Day:			71.0 dB(A)
Correction for facade structure by EN 12354-3			0.0 dB
Correction by user:			0.0 dB
Exterior level:			71.0 dB

ser.	Component existent	Count	Area [m ²]	R' _w [dB]	De,e [dB]	Component improved	Count	Area [m ²]	R' _w [dB]	De,e [dB]	Fan
1	Wall	1	7.48	50	-	Wall	1	7.48	50	-	-
2	Window	1	2.50	34	-	Window	1	2.50	34	-	-
3	Ventilator	1	0.01	-	40	Ventilator	1	0.01	-	40	-

46a & 47 Pier Road
BA Outside1.baf - Interior level calculations

Bedroom Max - Purple / 46b 47 Pier Road and Land Off Clifton Road / 46a 47 Pier Road and Land Off

Room type:	Bedrooms Max	Room geometry:	3.20 m x 4.30 m = 13.76 m ²
L2,nT valid:	85.0 dB	L2,nT existent / improved:	39.4 / 39.4 dB
facade 1			
		Facade geometry:	3.20 m x 2.70 m = 8.64 m ²
		L2,nT existent / improved:	39.4 / 39.4 dB
Assessment level Day:			85.0 dB(A)
Correction for facade structure by EN 12354-3			0.0 dB
Correction by user:			0.0 dB
Exterior level:			85.0 dB

ser. No.	Component existent	Count	Area [m ²]	R' _w [dB]	De,e [dB]	Component improved	Count	Area [m ²]	R' _w [dB]	De,e [dB]	Fan
1	Wall	1	6.13	50	-	Wall	1	6.13	50	-	-
2	Window	1	2.50	38	-	Window	1	2.50	38	-	-
3	Ventilator	1	0.02	-	42	Ventilator	1	0.02	-	42	-

46a & 47 Pier Road
BA Outside1.baf - Interior level calculations

Bedroom - Purple / 46b 47 Pier Road and Land Off Clifton Road / 46a 47 Pier Road and Land Off Clifton Road

Room type:	Bedrooms	Room geometry:	3.20 m x 4.30 m = 13.76 m ²
L _{2,nT} valid:	30.0 dB	L _{2,nT} existent / improved:	28.6 / 28.4 dB

facade 1

Facade geometry:	3.20 m x 2.70 m = 8.64 m ²
L _{2,nT} existent / improved:	28.6 / 28.4 dB

Assessment level Day:	65.0 dB(A)
Correction for facade structure by EN 12354-3	0.0 dB
Correction by user:	0.0 dB
Exterior level:	65.0 dB

ser. No.	Component existent	Count	Area [m ²]	R' _w [dB]	De,e [dB]	Component improved	Count	Area [m ²]	R' _w [dB]	De,e [dB]	Fan
1	Wall	1	6.12	50	-	Wall	1	6.12	50	-	-
2	Window	1	2.50	38	-	Window	1	2.50	38	-	-
3	Ventilator	1	0.02	-	42	Ventilator	1	0.02	-	42	-

46a & 47 Pier Road
BA Outside1.baf - Interior level calculations

Living Room - Orange / 46b 47 Pier Road and Land Off Clifton Road / 46a 47 Pier Road and Land Off

Room type:	Living Rooms	Room geometry:	3.60 m x 3.60 m = 12.96 m ²
L2,nT valid:	35.0 dB	L2,nT existent / improved:	29.9 / 29.9 dB
facade 1			
		Facade geometry:	6.30 m x 2.70 m = 17.01 m ²
		L2,nTi existent / improved:	29.9 / 29.9 dB
Assessment level Day:			58.0 dB(A)
Correction for facade structure by EN 12354-3			0.0 dB
Correction by user:			0.0 dB
Exterior level:			58.0 dB

ser.	Component existent	Count	Area [m ²]	R' _w [dB]	Da,e [dB]	Component improved	Count	Area [m ²]	R' _w [dB]	Da,e [dB]	Fan
1	Wall	1	12.00	50	-	Wall	1	12.00	50	-	-
2	Window	1	5.00	34	-	Window	1	5.00	34	-	-
3	Ventilator	1	0.01	-	28	Ventilator	1	0.01	-	28	-

46a & 47 Pier Road
BA Outside1.baf - Interior level calculations

Bedroom Max - Orange / 46b 47 Pier Road and Land Off Clifton Road / 46a 47 Pier Road and Land Off Clifton Road

Room type:	Bedrooms Max	Room geometry:	5.40 m x 3.50 m = 18.90 m ²
L _{2,nT} value:	45.0 dB	L _{2,nT} existent / improved:	39.4 / 39.4 dB

Facade 1

Facade geometry:	5.40 m x 2.70 m = 14.58 m ²
L _{2,nT} existent / improved:	39.4 / 39.4 dB

Assessment level Day:	73.0 dB(A)
Correction for facade structure by EN 12354-3	0.0 dB
Correction by user:	0.0 dB
Exterior level:	73.0 dB

ser. No.	Component existent	Count	Area [m ²]	R' _w [dB]	Dn,e [dB]	Component improved	Count	Area [m ²]	R' _w [dB]	Dn,e [dB]	Fan
1	Wall	1	12.07	50	-	Wall	1	12.07	50	-	-
2	Window	1	2.50	34	-	Window	1	2.50	34	-	-
3	Ventilator	1	0.01	-	32	Ventilator	1	0.01	-	32	-

46a & 47 Pier Road
BA Outside1.baf - Interior level calculations

Bedroom - Orange / 46b 47 Pier Road and Land Off Clifton Road / 46a 47 Pier Road and Land Off Clifton Road

Room type:	Bedrooms	Room geometry:	5.40 m x 3.50 m = 18.90 m ²
L2,nT valid:	50.0 dB	L2,nT existent / improved:	22.4 / 53.7 dB
facade 1			
		Facade geometry:	5.40 m x 2.70 m = 14.58 m ²
		L2,nTi existent / improved:	22.4 / 53.7 dB
Assessment level Day:			56.0 dB(A)
Correction for facade structure by EN 12354-3			0.0 dB
Correction by user:			0.0 dB
Exterior level:			56.0 dB

ser. No.	Component existent	Count	Area [m ²]	R'w [dB]	Da,e [dB]	Component improved	Count	Area [m ²]	R'w [dB]	Da,e [dB]	Fan
1	Wall	1	11.07	50	-	κ Wall	1	11.07	50	-	-
2	Window	1	2.50	34	-	κ Window	1	2.50	34	-	-
3	Ventilators	1	0.01	-	32	κ Ventilators	1	0.01	-	-	-

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APPENDIX E - GLOSSARY

A-weighted sound pressure, p_a	Value of overall sound pressure, measured in pascals (Pa), after the electrical signal derived from a microphone has been passed through an A-weighting network. <i>NOTE: The A-weighting network modifies the electrical response of a sound level meter with frequency in approximately the same way as the sensitivity of the human hearing system.</i>
A-weighted sound pressure level, L_{pA}	Quantity of A-weighted sound pressure in decibels (dBA).
Acoustic environment	Sound from all sound sources as modified by the environment [BS ISO 12913-1:2013].
Ambient sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. <i>NOTE: The ambient sound comprises the residual sound and the specific sound when present.</i>
Ambient sound level, $L_a = L_{Aeq,T}$ (BS4142:2014)	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T <i>NOTE: The ambient sound level is a measure of the residual sound and the specific sound when present.</i>
Background sound	Underlying level of sound over a period, T, which might in part be an indication of relative quietness at a given location.
Background sound level, $L_{A90,T}$ (BS4142:2014)	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.
Break-in	Noise transmission into a structure from outside.
Break-out	Noise transmission from inside a structure to the outside.
Cross-talk	Noise transmission between one room and another room or space via a duct or other path.
C_{tr}	Correction term applied against the sound insulation single-number values (R_w , D_w , and $D_{nT,w}$) to provide a weighting against low frequency performance. <i>NOTE: The reference values used within the C_{tr} calculation are based on urban traffic noise.</i>
Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$	Value of the A-weighted sound pressure level in decibels (dB) of a continuous, steady sound that, within a specified time interval, T, has the same mean-squared sound pressure as the sound under consideration that varies with time.
Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$ (BS4142:2014)	Value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T = t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time.
Equivalent sound absorption area of a room, A	Hypothetical area of a totally absorbing surface without diffraction effects, expressed in square metres (m ²), which, if it were the only absorbing element in the room, would give the same reverberation time as the room under consideration
Facade level	Sound pressure level 1 m in front of the façade. <i>NOTE: Facade level measurements of L_{pA} are typically 1 dB to 2 dB higher than corresponding free-field measurements because of the reflection from the facade.</i>
Free-field level	Sound pressure level away from reflecting surfaces. <i>NOTE: Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e. not 3.5 m from the reflecting surface in the direction of the source). Estimates of noise from aircraft overhead usually include a correction of 2 dB to allow for reflections from the ground.</i>

Impact sound pressure level, L_i	Average sound pressure level in a specific frequency band in a room below a floor when it is excited by a standard tapping machine or equivalent.
Indoor ambient noise	Noise in a given situation at a given time, usually composed of noise from many sources, inside and outside the building, but excluding noise from activities of the occupants. <i>NOTE: The location(s) within the room at which the ambient indoor noise is to be measured or calculated ought to be considered.</i>
Measurement time interval, T_m (BS4142:2014)	Total time over which measurements are taken. <i>NOTE: This may consist of the sum of a number of non-contiguous, short-term measurement time intervals.</i>
Noise criteria	Numerical indices used to define design goals in a given space.
Noise rating, NR	Graphical method for rating a noise by comparing the noise spectrum with a family of noise rating curves.
Normalised impact sound pressure level, L_n	Impact sound pressure level normalized for a standard absorption area in the receiving room. <i>NOTE: Normalised impact sound pressure level is usually used to characterize the insulation of a floor in a laboratory against impact sound in a stated frequency band.</i>
Octave band	Band of frequencies in which the upper limit of the band is twice the frequency of the lower limit.
Percentile level, $L_{A(N),T}$	A-weighted sound pressure level obtained using time-weighting "F", which is exceeded for $N\%$ of a specified time interval.
Reference time interval, T_r (BS4142:2014)	Specified interval over which the specific sound level is determined. <i>NOTE: This is 1 h during the day from 07:00 h to 23:00 h and a shorter period of 15 min at night from 23:00 h to 07:00 h.</i>
Residual sound (BS4142:2014)	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
Residual sound level, $L_r = L_{Aeq,T}$ (BS4142:2014)	Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T .
Rating level, $L_{A,r,T}$	Equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise. <i>NOTE: This is used in BS 7445 and BS 4142 for rating industrial noise, where the noise is the specific noise from the source under investigation.</i>
Reverberation time, T	Time that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped.
Sound exposure level, L_{AE}	Level of a sound, of 1 s duration, that has the same sound energy as the actual noise event considered.
Sound level difference, D	Difference between the sound pressure level in the source room and the sound pressure level in the receiving room.
Sound pressure, p	Root-mean-square value of the variation in air pressure, measured in pascals (Pa) above and below atmospheric pressure, caused by the sound.
Sound pressure level, L_p	Quantity of sound pressure, in decibels (dB).
Sound reduction index, R	Laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.

Specific sound level, $L_s = L_{Aeq,T_r}$ (BS4142:2014)	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r .
Specific sound source (BS4142:2014)	Sound source being assessed.
Standardised impact sound pressure level, L'_{nT}	Impact sound pressure level normalized to a reverberation time in the receiving room of 0.5 s.
Standardised level difference, D_{nT}	Difference in sound level between a pair of rooms, in a stated frequency band, normalized to a reference reverberation time of 0.5 s for dwellings.
Groundborne noise	Audible noise caused by the vibration of elements of a structure, for which the vibration propagation path from the source is partially or wholly through the ground. <i>NOTE Common sources of ground-borne noise include railways and heavy construction work on adjacent construction sites.</i>
Structure-borne noise	Audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements. <i>NOTE Common sources of structure-borne noise include building services plant, manufacturing machinery and construction or demolition of the structure.</i>
Third octave band	Band of frequencies in which the upper limit of the band is 2% times the frequency of the lower limit.
Weighted level difference, D_w	Single-number quantity that characterizes airborne sound insulation between rooms, but which is not adjusted to reference conditions. <i>NOTE Weighted level difference is used to characterize the insulation between rooms in a building as they are. Values cannot normally be compared with measurements made under other conditions (see BS EN ISO 717-1).</i>
Weighted normalised impact sound pressure level, $L'_{n,w}$	Single-number quantity used to characterize the impact sound insulation of floors over a range of frequencies.
Weighted sound reduction index, R_w	Single-number quantity which characterizes the airborne sound insulating properties of a material or
Weighted standardised impact sound pressure level $L'_{nT,w}$	Single-number quantity used to characterize the impact sound insulation of floors over a range of frequencies.
Weighted standardised level difference, $D_{nT,w}$	Single-number quantity that characterizes the airborne sound insulation between rooms.

Symbols

D_w	Weighted level difference (dB)
D_{nT}	Standardized level difference (dB)
$D_{nT,w}$	Weighted standardized level difference (dB)
L_{Amax}	Maximum noise level (dB)
$L_{A,T}$	Rating level (dB)
L_n	Normalised impact sound pressure level (dB)
L'_{nT}	Standardised impact sound pressure level (dB)
$L'_{nT,w}$	Weighted standardised impact sound pressure level (dB)
$L'_{n,w}$	Weighted normalised impact sound pressure level (dB)
L_p	Sound pressure level (dB)
L_{pA}	A-weighted sound pressure level (dB)
$L_{AN,T}$	Percentile level (dB)
L_{AE}	Sound exposure level (dB)
$L_{Aeq,T}$	Equivalent continuous A-weighted sound pressure level (dB)
p	Sound pressure (Pa)
p_A	A-weighted sound pressure (dB)
$p_{A(t)}$	Instantaneous A-weighted sound pressure (Pa)

R	Sound reduction index (dB)
R_w	Weighted sound reduction index (dB)
T	Time interval (also used for reverberation time) (s)
t_0	Reference time interval (s)

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