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Noise Impact Assessment undertaken by:

Michael D Vine – BSc Hons, MIOA

NOISE IMPACT ASSESSMENT FOR

PETER ERNEST HOMES HOLDINGS LTD

87 REDWIG ROAD

WATERLOOVILLE

HAMPSHIRE

PO8 0LX

SITE ADDRESS

PROPOSED 10 BED COLIVING, 4 X STUDIO FLATS & COMMERCIAL SCHEME

270 LONDON ROAD

WATERLOOVILLE

HAMPSHIRE

ASSESSMENT DATE: 6TH – 10TH & 11TH – 12TH MARCH 2026

REPORT DATE: 8TH APRIL 2026

Acoustic Engineer:

Testing Date: 6th – 10th & 11th – 12th March 2026

Michael Vine



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Customer Name:

Testing Date: 6th – 10th & 11th – 12th March 2026

Report Date: 8th April 2026

Peter Ernest Homes Holdings Ltd
87 Redwig Road
Waterlooville
Hampshire

Site Address:

270 London Road
Waterlooville
Hampshire
PO7 7ER

Acoustic Engineer:

Mr. Michael Vine

Equipment used:

Norsonic Environmental Analyser 140 BS EN IEC 61672-1 2013 Class 1 – Associated frequency analyser to BS EN IEC 61260: 1996 Class 1 – serial 1407126 – calibration due March 2026

Measurement Microphone (Nor 1225) – Serial Number 305215 – calibration due 26th March 2026

Acoustic Calibrator - (Type 1251) – Serial No 31652, Calibration due 31st October 2025

Measurement Procedure:

This additional document is an extension to the noise impact assessment undertaken and submitted in March 2026, and it will concentrate on the commercial noise sources in operation with clear and concise calculations included and determination of the impact of said noise events. Reference must be maintained to the average noise levels measured over the duration of the previous assessment period and the fact that the proposed mitigation will ensure these sources are mitigated accordingly.

Site Address: 270 London Road, Waterlooville, Hampshire

Proposal: Conversion of current commercial building into 4 x studio flats and 10 bedrooms for co-living, with the boxing gym remaining on the ground floor.

An attended and unattended assessment measuring the current acoustic climate over a 92-hour period during one assessment and another 24hour period in one microphone location was undertaken to determine the ambient noise levels at the proposed rear façade of the proposed development site, to the rear of proposed scheme facing the rear courtyard location. The unattended assessment took place between 1100hrs on Friday 6th to 0700hrs on Tuesday 10th March and between 0700hrs on Wednesday 11th to 0700hrs on Thursday 12th March 2026 as this was the period when a commercial waste collection took place. The period for Friday 6th March commenced at 1100hrs for the purpose of the average noise levels but prior to this a delivery took place and was measured for the tile business to the rear of the site and thus is assessed in the commercial section of this report.

Additional measurements were also taken to assess the plant serving Poppins restaurant and Lloyd's bank, which are also included within the commercial section of this report.

This document will relate to commercial noise sources only, with an attempt to offer a clear and concise approach to these noise sources.



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Assessment Criteria:

The National Planning Policy Framework (NPPF) came into effect in March 2012 and was updated in December 2024. It replaced other documents such as PPG24. The NPPF provides several objectives and aims that are directed towards avoiding significant adverse impacts and reducing others on quality of life and health. This document states that:

Paragraph 187 states Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) 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, considering relevant information such as river basin management plans.

Paragraph 198 states - Planning policies and decisions should also ensure that new development is appropriate for its location considering 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:

- a) mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
- b) 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
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes, and nature conservation.

Paragraph 200 - 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.

The Planning Practice Guidance has guidance on noise, dated 22nd July 2019, and has the noise hierarchy table as shown below. Paragraphs 009 & 011 are referenced later in this report.



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

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 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.

The NPSE (Noise Policy Statement for England) states the following aims with respect to noise policy:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of the 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.*



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PROPG: PLANNING & NOISE (2017) NEW RESIDENTIAL DEVELOPMENT [PROPG 2017]

The ProPG Planning & Noise document was published in 2017, its development supported by the Institute of Acoustics, the Association of Noise Consultants, and the Chartered Institute of Environmental Health. The aim of the document is to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England.

ProPG advocates a systematic, proportionate risk-based, 2 stage approach which:

1. Encourages early consideration of noise issues;
2. Facilitates straightforward accelerated decision making for lower risk sites;
3. Assists proper consideration of noise issues where the acoustic environment is challenging.

A summary of the overall ProPG approach is included in Appendix B. The two sequential stages of the overall approach are:

1. Stage 1 – an initial noise risk assessment of the proposed development site; and
2. Stage 2 – a systematic consideration of four key elements.

The four key elements to be undertaken in parallel during Stage 2 are:

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

The approach is underpinned by the preparation and delivery of an “Acoustic Design Statement” [ADS]. The ADS is intended to conclude in the provision of one of the following four recommendations to the decision maker:

1. Planning consent may be granted without any need for noise conditions;
2. Planning consent may be granted subject to the inclusion of suitable noise conditions;
3. Planning consent should be refused on noise grounds in order to avoid significant adverse effects (“avoid”); or
4. Planning consent should be refused on noise grounds in order to prevent unacceptable adverse effects (“prevent”).

The overall ProPG 2017 approach is intended for implementation with projects at an earlier stage than the subject of this report. This report provides a full noise mitigation strategy for the site, rather than an initial recommendation to the decision maker.

ProPG 2017 contains the most up to date guidance available on industry-wide adopted best-practice interpretation of relevant guidance regarding acceptable internal and external noise levels i.e., BS8233:2014 and WHO Guidelines.

WHO GUIDELINES FOR COMMUNITY NOISE (1999)

The guidance in this document recommends design criteria for internal noise levels within residential and commercial buildings. A summary of the recommended guidance is shown in Table 2.1. **Table 2.1 – Excerpt from WHO [dB ref. 20μPa]**

Criterion	Environment	Design range LAeq, T dB
Maintain speech intelligibility, avoid moderate annoyance, daytime & evening	Living Rooms	35
Prevent sleep disturbance, night time	Bedrooms	30

This guidance also states:

For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB LAmax more than 10-15 times a night (Vallet & Vernet 1991)



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For outdoor living areas, it is stated that:

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

BS8233:2014 GUIDANCE ON SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS

The guidance in this document indicates acceptable noise levels for various activities within residential dwellings. A summary of the recommended guidance is shown in the following table as listed in BS8233: 2014

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB LAeq, 16 hour	-
Dining	Dining Room	40 dB LAeq, 16 hour	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq, 16 hour	30 dB LAeq, 8 hour

Pro PG document states the following for $L_{Amax,F}$ noise levels.

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.

The WHO guidance states the following regarding frequency of events: For a good sleep, internal maximum noise levels should not exceed 45dB L_{Amax} more than **10–15 times per night**. Therefore, the calculations used in this assessment are the numbers of events not exceeding 10 times between the hours of 2300-0700hrs – measured in F time-weighting – $L_{Amax,F}$

BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound states that:

1- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.

2- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.

3- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific 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 negligible impact, depending on the context.



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Executive Summary:

Vine Acoustics Ltd were instructed by Peter Ernest Homes Holdings Ltd to undertake a further Noise Impact Assessment (NIA) at the rear elevation of 270 London Road, Waterlooville. A planning application is to be made to convert the existing building into a 10-x bedroom co-living space with 4 x studio flats and the commercial unit (boxing gym) remaining at ground floor level. The microphone location was positioned at the proposed residential façade and installed to determine the impact of the following noise sources on the proposed dwellings:

1. Noise associated with the rear courtyard area, including:
2. Deliveries – 1 x recorded during attendance to site & other further reference made to forklift activity
3. Waste collections – 1 at 0350 – referenced in original NIA & another at 0936 to 0939 on Monday 9th March (not during the night time)
4. Vehicle Movements – various and intermittent during the day time period
5. Neighbouring plant – measured on site and referenced in initial NIA

This document will address the noise sources listed above and has been written to assess the impact of the noise sources on the proposed mixed-use scheme, in particular the bedrooms that will be located on the rear facade at 1st & 2nd floor. The bedrooms will be fitted and ventilated & cooled with singular heating and comfort cooling systems to each bedroom. It is recommended that the rear bedrooms be fitted with an alternative ventilation system such as single room heating and comfort cooling systems to assist with periods when windows are closed. However, to strike a balance between noise, overheating & ventilation it is anticipated that future residents of the scheme should be able to ventilate the bedrooms naturally by opening windows on various elevations throughout the day time and night time period. Both the measured & calculated levels indicate a low to moderate impact on the proposed scheme with lengthy periods whereby the rooms can be naturally ventilated via open windows without leading to an adverse impact.

The detailed calculations and robust mitigation measures proposed by the client (very high level of glazing sound reduction and single room MVHR with comfort cooling) should ensure a suitable acoustic criterion. It is evident that the waste collection during the early hours may lead to a higher level than the total level of mitigation, but when this event is aligned with the $L_{Amax,F}$ statistics (10 times per night) the proposed mitigation measures should ensure sleep disturbance is not apparent.

The waste collection during the morning of the 9th of March will not lead to an adverse impact and additional calculation for this has been included later in this document.

Further to the robust and comprehensive mitigation measures to be applied to the scheme, the client is also seeking to move the collection times to day time rather than 0350hrs, installing the heating and cooling elements to the bedrooms and also acoustic shutters to the rear bedrooms. As stated, the L_{Aeq} levels of this event can be mitigated and the majority of the L_{Amax} levels but there may be a single event that falls outside of the mitigation scope, but context must be applied here (see later in the report) and also reference Note 4 of Figure 2 in the Pro PG, 2017 guide also.

The scheme can be naturally ventilated with open windows for long periods of the day time and night time. The measures to be taken by the client should ensure a satisfactory acoustic climate for the future residents of the proposed scheme.

The immediate area is in a mixed-use location with dwellings & commercial activity located to the front of the scheme and a small courtyard/parking area at the rear.

There are existing residential dwellings located in similar locations to the proposed, above the other commercial units.



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Noise Sources in use:

The following noise sources will be referenced within this document and must be aligned with the main NIA undertaken and in particular with the average noise levels and mitigation measures apparent for the majority of the measurement duration.

1. Waste Collection at 0350hrs.
2. Delivery to Tile Tardis at 1041hrs – large vehicle
3. Forklift activity during the day time.
4. Waste collection at 0936hrs.
5. Loading up of small van at tile Tardis

Event	Duration (total – see calculations for breakdown)	Number of events (per day or per week)
Waste Collection – 0350hrs	<3mins	1 per week
Delivery – Larger vehicle	11mins	1-2
Forklift Activity – external	1-2mins – as measured during a delivery *For the purpose of this assessment, a time period of 20mins has been assumed	2-3 times per week
Waste Collection 0936hrs	<3mins	1 per week
Small van loading	20mins	2-3 per week

Having viewed the CCTV footage and correlating noise levels, van loading activity was not daily nor were the deliveries to Tile Tardis. There was 1 x waste collection only during the night time period and only 1 during the day time.

The forklift was in use, with similar noise levels recorded each time, and reference made to this activity. All further to the detailed analysis in the initial NIA.

Background Noise Levels:

The levels shown below were taken as part of the wider assessment, and in a further attempt to reduce uncertainty the levels were measured for numerous days and nights over a 6-7day period.

Time Period	0330-0345	0345-0400	0400-0415	0415-04300	0800-0900hrs – 1hour	0900-1000 1hour	1000-1100 1hour	L _{A90} 15min Modal Value
Saturday	L _{Aeq} – 35 L _{A90} – 33	L _{Aeq} – 36 L _{A90} – 33	L _{Aeq} – 42 L _{A90} – 34	L _{Aeq} – 39 L _{A90} – 33		L _{Aeq} 1hour – 50 L _{A90} 1hour – 45	L _{Aeq} 1hour – 49 L _{A90} 1hour – 44	L _{A90} – 33
Sunday	L _{Aeq} – 39 L _{A90} – 33	42 34	43 35	40 33		L _{Aeq} 1hour – 52 L _{A90} 1hour – 46	L _{Aeq} 1hour – 48 L _{A90} 1hour – 44	L _{A90} – 33
Monday	L _{Aeq} – 34 L _{A90} – 31	36 32	42 32	40 32	L _{Aeq} 1hour – 51 L _{A90} 1hour – 46	L _{Aeq} 1hour – 61 L _{A90} 1hour – 57	L _{Aeq} 1hour – 51 L _{A90} 1hour – 48	L _{A90} – 32
Tuesday	L _{Aeq} – 32 L _{A90} – 30	41 34	44 34	38 34		L _{Aeq} 1hour – 58 L _{A90} 1hour – 47	L _{Aeq} 1hour – 50 L _{A90} 1hour – 46	L _{A90} – 30
Wednesday						L _{Aeq} 1hour – 58 L _{A90} 1hour – 54	L _{Aeq} 1hour – 57 L _{A90} 1hour – 49	
Thursday							L _{Aeq} 1hour – 54 L _{A90} 1hour – 51	



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The microphone was located:

- 1- At the building façade facing the rear courtyard area. It was 1m from the building façade so a -3dB reduction has been applied to the figures to account for reflection.

Weather Conditions:

4.1 The weather was cool & dry during the measurement period; the temperature ranged between 4-9 degrees on Friday 6th, 7-10 on Saturday 7th, 8-9 on Sunday 8th, 8-13 on Monday 9th, 7-11 on Tuesday 10th, 4-12 on Wednesday 11th & 6-11 on Thursday 12th March. There were some high winds during the early hours on Wednesday 11th so these levels have not been used but the levels were started again from 0700hrs on Wednesday the 11th to ensure the waste collection was measured as part of the assessment.

Measurement Duration:

The continuous measurement was taken for a 92-hour period and then an additional 24-hour period at the rear façade. The immediate area was operating at normal levels and thus offers a fair reflection of the noise associated with the immediate area.

Commercial Assessment – $L_{Aeq,T}$ & L_{Amax} Values for delivery noise to proposed dwellings:

The table below shows the background noise levels over the measurement period at the rear facade, particularly in the hours between 0900-1000 and 1000-1100hrs as these are times that a delivery arrived at the tile warehouse (excluding the morning of the delivery). Further levels have also been included, including the modal L_{A90} 15min value during the night time period and the 15min values between the hours of 0330-0430 as this was the time the waste collection took place (excluding the morning of the collection).

The above values indicate that the deliveries for the tile warehouse delivery will be rated against the L_{A90} 1hour value of 44dBA -3 = 41dBA measured on Saturday (as the store is open on a Saturday) but reference must be made to the fact that the levels increase during the week. The waste collection during the early hours will be rated against the lowest L_{A90} 15min value between 0330-0430hrs which is 30dB -3 = 27dB, which is the same as the lowest modal value also. Context must be applied to this event, and this is referenced later in the report. The waste collection during the morning period will be rated against the L_{A90} 1hour between 0800-0900hrs on Monday the 9th which was 46dB -3 = 43dB. Poppins restaurant is open on Sunday so this plant will be referenced against the L_{A90} 1hour value of 44dB -3 = 41dB (Sunday at receptor – plant inaudible at mic location) and the Lloyds plant will be rated against the L_{A90} 1hour value of 44dB -3 = 41dB (Saturday at receptor) – plant inaudible at mic location.

Plant Levels & distance to window:

Plant	Location	L_{Aeq}	Acoustic Feature correction	Screened (level of reduction)	Distance to window	Reduction due to distance	Level at facade	BGN level L_{A90}	Difference	Notes
Poppins – Wall side	Side elevation	61dBA @1m	None	No	13m	-22	39dBA	41dBA 1hour	-2dB – No adverse impact	Indicates no impact at receptor
Poppins – Rooftop	Flat roof	60dBA @3m	None	Yes = -5dB	13m	-13dB distance -5dB for screening	42dBA	41dBA 1hour	1dB – No adverse impact	Indicates no impact at receptor
Lloyd's bank	Flat Roof	66dB @1m	+3dB - noticeable	No	8m (bedroom)	-18dB	51dBA	41dBA 1hour	+10dB – likely impact depending on context	Indicates plant audible but mitigation measures will greatly exceed this level of reduction and ensure internal levels are suitable. There is also another window serving the same bedroom which is screened from plant



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Based on the above calculations (and numerous attended site visits) and whilst the levels produced from the Lloyds plant indicate adverse impact, the noise from all plant should not lead to a change in behaviour for the residents and can easily be mitigated by the proposed measures, orientation, screening, and operating hours of the plant. Furthermore, room 5 has another window facing the internal courtyard area so this will allow natural ventilation for the room without needing to open the window facing the plant. No plant is in operation during the night time period.

No mitigation is possible at the source so all work will be undertaken at the receptor, and these are listed later in this document.

All of Poppins plant was in operation continuously, not noticeable at the proposed residential façade, not tonal or impulsive. Therefore, no further acoustic feature corrections have been applied. If they were then it is clear to see that the prominent level of proposed mitigation will ensure these noise sources will not lead to an adverse impact on the proposed scheme. They are also only in operation during the day time hours as per the hours of operation below:

Premises	Hours of operation
Poppins Restaurant	Monday – 0900-1600hrs Tuesday - 0900-1600hrs Wednesday - 0900-1600hrs Thursday - 0900-1600hrs Friday - 0900-1600hrs Saturday - 0900-1600hrs Sunday - 0900-1600hrs
Lloyds Bank	Monday – 0930-1530hrs Tuesday – 0930-1530hrs Wednesday - Closed Thursday – 0930-1530hrs Friday – 0930-1530hrs Saturday – 0930-1300hrs Sunday – Closed
Tile Tardis	Monday - 0900-1600hrs Tuesday - 0900-1600hrs Wednesday - 0900-1600hrs Thursday - 0900-1600hrs Friday - 0900-1600hrs Saturday - 0900-1500hrs Sunday - Closed

It is clear to see that the neighbouring commercial premises are only open during the day time period and not the night time so they will not lead to any sleep disturbance or disturbance at all during the night time.

Regarding the other noise sources apparent and the site location, please see the note below taken from BS4142: +A1: 2019 – indicating that where an existing site is already occupied by commercial/industrial use, other standards can be applied to the scheme to offer calculation and mitigation. This would seem appropriate in this case, and this offers further insight into the methodology adopted in the initial NIA. Furthermore, it states that noise levels can be taken at the proposed residential façade (as was the case) when monitoring live situations and noise sources.

8.5 Introduction of a new noise-sensitive receptor

Measure the background sound at the intended location of any new noise-sensitive receptor(s) in the absence of any specific sound.

NOTE Where a new noise-sensitive receptor is introduced and there is extant industrial and/or commercial sound, it should be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. In such circumstances other guidance and criteria in addition to or alternative to this standard can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation.



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The above note offers insight into the detailed approach of the initial NIA, and the variety in which the existing noise was assessed. Due to the complexity of the approach and detailed calculations, this document will give further insight into the noise sources in operation, and the level of mitigation to be provided by the client.

Mitigation Measures to be installed:

The table below shows that the client is prepared to install extensive, robust, and comprehensive measures to offer an extremely prominent level of mitigation for the rear rooms. Further to the sound reduction measures to be installed, the bedrooms will be fitted with mechanical ventilation & comfort cooling, this will allow a suitable level of ventilation and also ensure that overheating will not be an issue when the windows are closed.

Item	Specification	Assumed sound reduction	Notes
Glazing	High-performance double-glazing system with additional secondary glazing profile installed to the bedroom side	>47dB	The client is exploring the exact details and speaking with glazing manufacturers to install the highest level of reduction possible within reason and budget. Such a level of performance is extremely high in such cases and will exceed the majority of dwellings in the vicinity
Façade Detail	<ol style="list-style-type: none"> 1. External cladding system 2. 140mm timber frame detail 3. Resilient bars fixed to the internal face of the timber frame. 4. Rw³ mineral wool placed in between the studs. 5. 2 x 15mm acoustic plasterboard fixed to resilient bars. 	>47dB	This system comprises of a standard timber frame detail with the additional sound performance of acoustic plasterboard, insulation, and resilient bars. All of these will greatly increase performance of the system and therefore reduce impact further
Ventilation & Comfort cooling system	Exact specification unknown as the client is discussing options with the overheating assessor but the system will offer comfort cooling for the bedrooms		This system will allow the bedrooms to be ventilated and cooled without having to open windows. Natural ventilation can be offered via open windows if the resident's desire (secondary glazing offers a higher level of reduction when open than a standard window) but the cooling system, will ensure the bedrooms are cooled without open windows
Acoustic Stutters	As previously stated, the final specification is unknown as the client is exploring this option further		The final specification is not known as the client is speaking with the manufacturer and discussing viable options and installation details.

The above table offers an insight in the lengths the client will take to ensure the highest level of mitigation possible for the scheme, this coupled with the generally low average noise levels produced during the week (measured not assumed) indicates that a suitable overall acoustic environment can be achieved for 95% of the week, and that all noise sources, with the exception of one event can be adequately mitigated.



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Tile Tardis Delivery:

The delivery took place at 1041hrs on Friday 6th March using a mid-sized van (this van was a high sided van that opens on both sides – a typical delivery van for the company). Most other activity was small sized vans loading up, which will easily be mitigated against as part of the mitigation strategy. The whole delivery took no longer than 11mins, with 6minutes activity taking place up the alley way and the other 5mins taking place on Stakes Hill Road.

The reason for part of the delivery taking place on the road is that there is not enough space to unload both sides of the van in the courtyard area, therefore part of the delivery takes place at the rear of the store, then when the other side needs to be unloaded the van has to move so that the forklift can remove the goods from the other side. A picture of the lorry used is shown below. It can be seen that this is the largest type of lorry that will fit up the alleyway to the rear of the site – so typical for the delivery to the tile warehouse. All other activity at the rear is much smaller vans accessing the rear part of the development.



So, it can be seen that it is not a small van, but a mid-sized high sided delivery vehicle. The vehicle reversed up to the rear door of the warehouse so one side could be unloaded, but then due to restricted access it moved to the road side so the forklift could unload the other side, this is standard practice for such events.

Due to the deliveries only being operational for a brief period of time, an acoustic time correction equation is applied to the values. Time correction equation:

- $-10\log(\text{duration of event/duration of reference period})$ in seconds

Tile Tardis Delivery:

Event Noise Level						
Arrival		Unloading/Forklift		Departure		L _{Amax,F} 1min values (dB)
Duration (mins)	L _{Aeq,T} (dB)	Duration (mins)	L _{Aeq,T} (dB)	Duration (mins)	L _{Aeq,T} (dB)	
1	82	5	66	1	80	
						93, 82, 87, 86, 83, 80, 104, 74, 75, 69

**All of the above values do not include the facade correction – see calculations*

9.3 The L_{Amax,F} values have been included to highlight that the level of 104dB was a one off and not representative of the noise apparent at the façade. The next highest L_{Amax,F} level over the entire period was 93dBA – which is still not representative of the whole period but can be referenced. The L_{Amax,F} is not assessed during this delivery as it takes place during the day time period and not the night time, but the levels are referenced later.



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Activity	Resultant Noise Level
Arrival	
Baseline Level	$L_{Aeq1min} = 82$
Façade correction = -3	$L_{Aeq1min} = 79$
Screening Loss	None
Convert to 1hour = $10 \log^{60/3600} = -18$	$L_{Aeq 1hour} = 61$

Activity	Resultant Noise Level
Unloading & Forklift	
Baseline Level	$L_{Aeq5min} = 66$
Façade correction = -3	$L_{Aeq5min} = 63$
Screening Loss	None
Convert to 1hour = $10 \log^{300/3600} = -11$	$L_{Aeq 1hour} = 52$

Activity	Resultant Noise Level
Departure	
Baseline Level	$L_{Aeq1min} = 80$
Façade Correction = -3	$L_{Aeq1min} = 77$
Screening Loss	None
Convert to 1hour = $10 \log^{60/3600} = -18$	$L_{Aeq 1hour} = 59$

Overall Delivery Process	
$10\log(10^{6.1} + 10^{5.2} + 10^{5.9})$	$L_{Aeq,T} = 63\text{dBA}$
Acoustic Feature Corrections	+3dB Intermittent +3dB distinctive +6dB – clearly perceptible impulsivity
Total Rating Level	75dBA
$L_{Aeq 1hour}$ 1000-1100hrs - Saturday	46dBA – incl façade correction
$L_{A90 1hour}$ 1000-1100hrs - Saturday	41dBA – incl façade correction
Difference – L_{Aeq}	+29dB
Difference – L_{A90}	+34dB – externally results in significant adverse impact, but must be taken in context

External Level	Level of Mitigation	Calculated internal level	Notes
75dBA	>47dB	28dBA	The mitigation measures proposed will ensure a suitable internal noise level based on delivery to the tile warehouse. The bedrooms will be served with a cooling system to ensure windows do not need to be opened if necessary

Activity	Resultant Noise Level
$L_{Amax,F}$	
Baseline Level	$L_{Amax} = 93$
Façade correction = -3	$L_{Amax} = 90$
Recommended internal level	45dBA
Difference	45dBA
Notes	Delivery only taking place during the day time so it will not lead to sleep disturbance

9.4 The above deliveries have been compared to the $L_{A90 1hour}$ value at 1000-1100hrs on a Saturday as the tile warehouse is open on a Saturday, but it is anticipated that the deliveries will only take place Monday to Friday. L_{Amax} criteria only applies to the night time period, but these figures have been included for transparency.



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Waste Collection – 0350hrs:

Event Noise Level

Arrival & drop of waste		Waste compression		Departure		
Duration (mins)	L _{Aeq,T} (dB)	Duration (mins)	L _{Aeq,T} (dB)	Duration (mins)	L _{Aeq,T} (dB)	L _{Amax,F} (dB)
1	83	0.5	76	1	66	104, 88, 77

**All of the above values do not include the facade correction – see calculations*

Activity	Resultant Noise Level
Arrival & waste drop	
Baseline Level	L _{Aeq1min} = 83
Facade correction = -3	L _{Aeq1min} = 80
Screening Loss	None
Convert to 15min = $10 \log^{60/900} = -12$	L _{Aeq 1hour} = 68

Activity	Resultant Noise Level
Waste Compression	
Baseline Level	L _{Aeq0.5min} = 76
Facade correction = -3	L _{Aeq0.5min} = 73
Screening Loss	None
Convert to 15min = $10 \log^{30/900} = -15$	L _{Aeq 1hour} = 58

Activity	Resultant Noise Level
Departure	
Baseline Level	L _{Aeq1min} = 66
Facade correction = -3	L _{Aeq1min} = 63
Screening Loss	None
Convert to 15min = $10 \log^{60/900} = -12$	L _{Aeq 1hour} = 51

Overall Delivery Process	
$10\log(10^{6.8} + 10^{6.1} + 10^{5.1})$	L _{Aeq,T} = 69dBA
Acoustic Feature Corrections	+3dB Intermittent +3dB distinctive +9dB – highly perceptible impulsivity
Total Rating Level	84dBA
L _{Aeq 15mins} 0330-0430hrs	29dBA – incl facade correction
L _{A90 15mins} 0330-0430hrs	27dBA – incl facade correction
Difference – L _{Aeq}	55dB
Difference – L _{A90}	+57dB – externally indicates significant adverse impact, but must be taken into context

External Level	Level of Mitigation	Calculated internal level	Notes
84dBA	>47dB	37dBA	The mitigation measures proposed will ensure an internal noise level of 37dBA on the waste collection during the early hours. Whilst this level is still low it is above the criteria for night time and it may lead to significant adverse impact depending on the context (given later in this report)

Activity	Resultant Noise Level
L_{Amax,F}	
Highest Baseline Level	L _{Amax} = 104
Facade correction = -3	L _{Amax} = 101
Recommended internal level	45dBA
Difference	+56dBA – as above regarding impact
Notes	As part of the average assessment and the L _{Amax} levels exceeded 10 times per night, the calculated levels of reduction were 20dBA – so whilst this single event falls outside of the mitigation context must be applied

This table equates to an internal L_{Amax,F} of 54dB, which is above the recommended criteria any may fall above SOAEL, but context must be applied – see context section.



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Waste Collection – 0936hrs:

Event Noise Level

Arrival & drop of waste		Waste compression		Departure		
Duration (mins)	L _{Aeq,T} (dB)	Duration (mins)	L _{Aeq,T} (dB)	Duration (mins)	L _{Aeq,T} (dB)	L _{Amax,F} (dB)
1	70	1	76	1	72	76, 81, 78

**All of the above values do not include the facade correction – see calculations*

Activity	Resultant Noise Level
Arrival & waste drop	
Baseline Level	L _{Aeq1min} = 70
Facade correction = -3	L _{Aeq1min} = 67
Screening Loss	None
Convert to 1hour = $10 \log^{60/3600} = -18$	L _{Aeq 1hour} = 49

Activity	Resultant Noise Level
Waste Compression	
Baseline Level	L _{Aeq1min} = 76
Facade correction = -3	L _{Aeq1min} = 73
Screening Loss	None
Convert to 1hour = $10 \log^{30/3600} = -18$	L _{Aeq 1hour} = 55

Activity	Resultant Noise Level
Departure	
Baseline Level	L _{Aeq1min} = 72
Facade correction = -3	L _{Aeq1min} = 69
Screening Loss	None
Convert to 1hour = $10 \log^{60/3600} = -18$	L _{Aeq 1hour} = 51

Overall Delivery Process	
$10\log(10^{4.9} + 10^{5.5} + 10^{5.1})$	L _{Aeq,T} = 57dBA
Acoustic Feature Corrections	+3dB Intermittent +3dB distinctive +9dB – highly perceptible impulsivity
Total Rating Level	72dBA
L _{Aeq 1hour} 0800-0900hrs	48dBA – incl facade correction
L _{A90 1hour} 0800-0900hrs	43dBA – incl facade correction
Difference – L _{Aeq}	24dB
Difference – L _{A90}	29dB – externally indicates significant adverse impact, but must be taken into context

External Level	Level of Mitigation	Calculated internal level	Notes
72dBA	>47dB	25dBA	The mitigation measures proposed will ensure an internal noise level of 25dBA on the waste collection during the day time. This is an extremely low internal level and will not lead to an adverse impact inside the bedrooms.

Activity	Resultant Noise Level
L_{Amax,F}	
Highest Baseline Level	L _{Amax} = 81
Facade correction = -3	L _{Amax} = 78
Recommended internal level	45dBA
Difference	+33dBA – as above regarding impact
Notes	This level can be mitigated using the proposed mitigation systems to be installed and therefore it will not lead to an adverse impact – L _{Amax,F} not apparent during this waste collection time (day time) but has been included for thoroughness

This table equates to an internal L_{Amax,F} of 31dB, which will not lead to a change in behaviour.



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Forklift Movements:

During the attended visits and viewing of the CCTV, the forklift activity is generally in use for no more than 5mins as part of the delivery to the store. For the purposes of the calculations below and to assume worst case scenario it has a time period of 20mins.

The deliveries only take place during the day time when the warehouse is open, and the background noise will reflect that. The measured $L_{A90\ 1\text{hour}}$ at 1000-1100hrs on Saturday was 41dB including the façade correction. Also, for the avoidance of doubt a +4dB acoustic feature correction for tonality will be included in the calculations.

<i>Results</i>		<i>Commentary</i>
Ambient Sound Level	Sound Pressure Level = 67dBA @façade	Measured at façade
Residual Sound Level	46dBA	Measured at receptor – L_{Aeq} during day time hours
Specific Sound Level	67dB	
Acoustic Feature Correction	+3dB – Noticeable +4dB – Tonality +3dB - Intermittency	
Reductions due to distance Time Correction reduction	None – measured at façade -5dB	$L_2 - L_1 - 20\log(r_2/r_1)$ $10\log(1200/3600)$
Rating Level	72dBA	Combined Value
Background Sound level	41dBA	Measured on site
Excess of rating over background	$(41-72) = +31\text{dB}$	
Assessment indicates adverse impact at receptor – if no mitigation measures implemented		Mitigation measures will be applied to the proposed dwellings – offering 47dB sound reduction

It can be seen that whilst the forklift activity is audible at the façade, the compressive mitigation strategy will ensure a suitable internal criterion for the future residents.



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Van Loading:

During the attended visits and viewing of the CCTV, the customer van loading took 20mins from arrival to departure, including the loading up of materials to the van. For the purposes of this report, the same BGN levels have been used as this event may occur on a Saturday morning, but more likely to take place Monday to Friday. The deliveries only take place during the day time when the warehouse is open, and the background noise will reflect that. The measured $L_{A90\ 1\text{hour}}$ at 1000-1100hrs on Saturday was 41dB including the façade correction.

It can be seen that whilst the forklift activity is audible at the façade, the compressive mitigation strategy will ensure a suitable internal criterion for the future residents.

Event Noise Level

Arrival		Loading		Departure	
Duration (mins)	$L_{Aeq,T}$ (dB)	Duration (mins)	$L_{Aeq,T}$ (dB)	Duration (mins)	$L_{Aeq,T}$ (dB)
1	61	18	54	1	60

**All of the above values do not include the façade correction – see calculations*

Activity	Resultant Noise Level
Arrival & waste drop	
Baseline Level	$L_{Aeq1min} = 61$
Façade correction = -3	$L_{Aeq1min} = 58$
Screening Loss	None
Convert to 1hour = $10 \log^{60/3600} = -18$	$L_{Aeq\ 1\text{hour}} = 40$

Activity	Resultant Noise Level
Loading	
Baseline Level	$L_{Aeq1min} = 54$
Façade correction = -3	$L_{Aeq1min} = 51$
Screening Loss	None
Convert to 1hour = $10 \log^{1080/3600} = -5$	$L_{Aeq\ 1\text{hour}} = 46$

Activity	Resultant Noise Level
Departure	
Baseline Level	$L_{Aeq1min} = 60$
Façade correction = -3	$L_{Aeq1min} = 57$
Screening Loss	None
Convert to 1hour = $10 \log^{60/3600} = -18$	$L_{Aeq\ 1\text{hour}} = 39$

Overall Delivery Process	
$10\log(10^4 + 10^{4.6} + 10^{3.9})$	$L_{Aeq,T} = 48\text{dBA}$
Acoustic Feature Corrections	+3dB Intermittent
	+3dB distinctive
+3dB – just perceptible impulsivity	
Total Rating Level	57dBA
$L_{Aeq\ 1\text{hour}}\ 1000-1100\text{hrs}$	46dBA – incl façade correction
$L_{A90\ 1\text{hour}}\ 1000-1100\text{hrs}$	41dBA – incl façade correction
Difference – L_{Aeq}	+9dB
Difference – L_{A90}	+16dB – externally indicates significant adverse impact, but must be taken into context

External Level	Level of Mitigation	Calculated internal level	Notes
57dBA	>47dB	10dBA	The mitigation measures proposed will ensure an internal noise level of 10dBA on the van loading activity during the day time. This is an exceptionally low internal level and will not lead to an adverse impact inside the bedrooms.



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It can be seen that the early morning waste collection is the only event that may fall outside of the mitigation strategy and fall above the SOAEL level for the scheme, but context and further explanation must be applied to this event. The context for the scheme is shown below, with further reference once again made to the following notes taken from various sources & documents. Whilst other events are audible at the façade it is clear to see that the mitigation strategy will ensure these are adequality reduced to offer suitable internal acoustic criterion.

NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 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 (see Appendix A).

8.5 Introduction of a new noise-sensitive receptor

Measure the background sound at the intended location of any new noise-sensitive receptor(s) in the absence of any specific sound.

NOTE Where a new noise-sensitive receptor is introduced and there is extant industrial and/or commercial sound, it should be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. In such circumstances other guidance and criteria in addition to or alternative to this standard can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation.

Vehicles accessing the rear courtyard:

It is argued that not all vehicle movements are deemed commercial activity, but the following calculations have been undertaken, nonetheless. There are van and car movements to the rear of the development, and these were measured at the receptor. The vans parked outside the tile warehouse and loaded up their vehicles and left. These noise sources will be rated against the criteria set out in BS8233: 2014 as shown below:

L_{Aeq} level at receptor	Distance propagation (2m to 5m)	Level at façade	Reduction Required
57-62dBA	None – measured at receptor	57-62dBA	22-27dBA – Day Time 27-32dBA – night time
L_{Amax} level at receptor			
67-78dBA	None – measured at receptor	67-78dBA	22-33dBA

**Please note that the vehicle movements took place during the day time period and therefore the night time calculation (and $L_{Amax,F}$) is not applicable but have been included for completeness.*

The above table indicates that vehicle movements for the rear office buildings will also be mitigated accordingly due to the measures proposed by the client.



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Context:

The following is the context that must be applied to the scheme, in order to offer a fair representation of the noise exposure at the proposed façade:

1. The scheme will be fitted with comprehensive mitigation measures that will ensure a suitable acoustic internal environment and will also have comfort cooling systems installed. This will allow the rooms to be cooled during periods whereby the windows are closed. The proposed measures are above & beyond any similar scheme in the vicinity of the site and offer an extremely high level of sound reduction.
2. There is a single event that will fall outside of the mitigation strategy, but this only occurs once a week, and lasts no more than 3 minutes. It is an activity that happens nationwide and happens for both residential dwellings & commercial businesses. The measures installed will reduce the impact greatly, but the final level may still lead to SOAEL being achieved for a short period of time. This will not lead to regular sleep disturbance based on the frequency of events and the proposed measures to be installed. Further to the above it is hoped that the time of the delivery can be moved to during the day time to further reduce the impact.
3. The average values measured for the assessment period indicate a generally low impact of the noise sources apparent at the rear elevation. Whilst this part of the assessment does not fall under the commercial assessment criteria, reference is made to the notes on the previous page stating that a variety of standards can be used to assess the impact of the noise sources in operation and the overall impact on the proposed scheme. The conclusion of this report indicates that the rooms can be naturally ventilated for periods of the day time and night time with open windows, which will not lead to a change in behaviour.
4. All other calculated commercial activities taking place can be adequately mitigated via the mitigation strategy, leading to suitable internal criterion for the future occupiers. This has been shown in the initial NIA and this document also. All other sources also take place during the day time only so they will not lead to sleep disturbance.
5. The client has an extensive track record of implemented extremely good schemes to the area and beyond, they are extremely conscientious and always wish to implement measures that are above and beyond what is required.



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Uncertainty:

The initial assessment actually has looked to remove as much uncertainty from the measured levels as possible and has adopted many measures listed in BS4142: 2014 + A1: 2019 to do so. These measures include:

1. Duration of assessment & BGN levels – The assessment was undertaken over an extensive period of time to ensure all noise events could be measured, and also to establish a clearer picture of the background noise levels apparent at the site during all times of the week and weekend periods.
2. Microphone location – The microphone was positioned at the proposed residential façade to allow for direct measurements and not rely on calculations for distance propagation and other effects. These levels allowed for a clear and robust approach over several days.
3. The time intervals – The time intervals used were 1min, this is incredibly low and thus ensures an accurate and effective measurement process. The levels were then calculated into 15min and 1hour values for the purposes of BS4142: 2014 + A1: 2019 calculations & methodology. All acoustic feature corrections were then applied as required by the assessment criteria.
4. Direct measurements – The assessment relies on actual measurement data taken at the proposed façade rather than calculations to determine the level at the façade. The rear elevation is only accessed via one entry and thus there is not a multitude of noise sources in operation at the same time, this allowed for the single noise sources to be measured in isolation. Due to the tight location of the warehouse doors in relation to the delivery truck, free field measurements would not be possible – this is the reason why the truck had to move onto the road for the other half of the delivery so that the forklift truck could access both sides. This is customary practice for these deliveries.
5. All equipment used is UKAS calibrated and calibrated before and after the assessment.
6. Regular checks and attended visits were made to the site during the assessment duration.
7. A CCTV camera was installed for the purpose of the assessment to ensure that the noise sources could be identified along with the duration of each event.

It is accepted that the trucks may vary and that they may produce slightly different noise levels, but it can be seen that the early morning waste collection is very much worst case due to the increase in noise levels associated with this lorry compared to the collection during the morning period (this event can be mitigated accordingly as part of the mitigation strategy).

The above are clear examples of the ways in which the levels of uncertainty were reduced as part of the assessment, all in accordance with the literature in the British Standard. The fact remains that the rear elevation of the site is not exposed to regular events that will lead to adverse impact. The mitigation strategy in place offers a very high level of reduction and should ensure compliance of all events except for one. The average data and measurements further corroborate these statements, and the noise levels can be mitigated at the rear elevation for the whole week period apart from a single event.

Conclusion:

The mitigation strategy offers suitable compliance for all noise events with the exception of a single event, once per week. However, due to the comprehensive measures to be installed and the very low frequency of the event, the calculated internal levels still may not lead to sleep disturbance for the residents. The measures include comfort cooling ensuring the bedrooms can be cooled without having to open windows. It is accepted that this event may lead to the SOAEL level being exceeded but the context listed above should ensure this is not the case.

Due to the complexity of the site and the requests of the LPA, a detailed and robust assessment has taken place with a high level of context applied, as should be the case when assessing a variety of sources using a variety of assessment methods. The calculations include acoustic feature corrections and time periods that may actually inflate the commercial noise apparent, but this has been done to ensure that compliance can be achieved.



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Noise sources & levels of reduction:

The table below shows the simplified calculated levels at the façade, and the calculated internal levels after mitigation measures have been installed:

Noise Source	Calculated level at façade (external)	Mitigation sound reduction	Calculated internal levels	Notes
Tile Tardis Delivery	75dBA	47dB	28dBA	Internal criteria achieved and suitable levels ensured. Day time event so no sleep disturbance – mitigation measures adequately mitigate this event
Waste collection 0936hrs	72dBA	47dB	25dBA	Internal criteria achieved and suitable levels ensured. Day time event so no sleep disturbance – mitigation measures adequately mitigate this event
Forklift truck movements (WCS)	72dBA	47dB	25dBA	Internal criteria achieved and suitable levels ensured. Day time event so no sleep disturbance – mitigation measures adequately mitigate this event
Van loading	57dBA	47dBA	10dB	Internal criteria achieved and suitable levels ensured. Day time event so no sleep disturbance – mitigation measures adequately mitigate this event
Waste collection – 0350hrs	84dBA	47dB	37dB	Falls outside of the mitigation strategy, but inle event and still an acceptable internal value for a very short period of time. Frequency of events is very low and therefore will not lead to regular sleep disturbance. This event is an event that occurs for every household & business nationwide and is essential
	101dB – $L_{Amax,F}$	47dB	54dB	

*WCS – Worst case scenario



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SITE PLAN



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Table B-5 Examples of passive ventilation solutions providing enhanced sound insulation

Design option	Description and references	Approximate Level Difference (external free field level – internal reverberant level)	Improvement relative to a window providing a similar amount of ventilation
Standard opening windows	Window(s) open sufficiently to provide a ventilation free-area equivalent to 2% of the floor area. ^[42]	13 dB	0 dB
Open windows with sound attenuating balconies	Window(s) as above. Balconies may have a solid balustrade or be enclosed to a further degree (maintaining an open area for ventilation). Absorption may be provided to the balcony soffit or potentially to other surfaces. ^[49, 50, 51]	17 – 23 dB	4 – 10 dB
Attenuated or plenum windows	Dual windows (spaced by around 200mm) with staggered openings and absorptive linings to the cavity reveals. Various other configurations also possible in principle. ^[52, 53]	17 – 24 dB	4 – 11 dB
Attenuated vents/louvres	Ventilation openings with integral means of attenuating sound. Typically this may be acoustic louvres or acoustically lined ducts/plena. ^[54, 55]	17 – 29 dB	4 – 16 dB
Attenuated windows or vents/louvres with sound attenuating balconies	Combined use of balconies to provide screening and acoustically attenuated windows or vents. Refer to above for description of each element.	21 – 39 dB	8 – 26 dB



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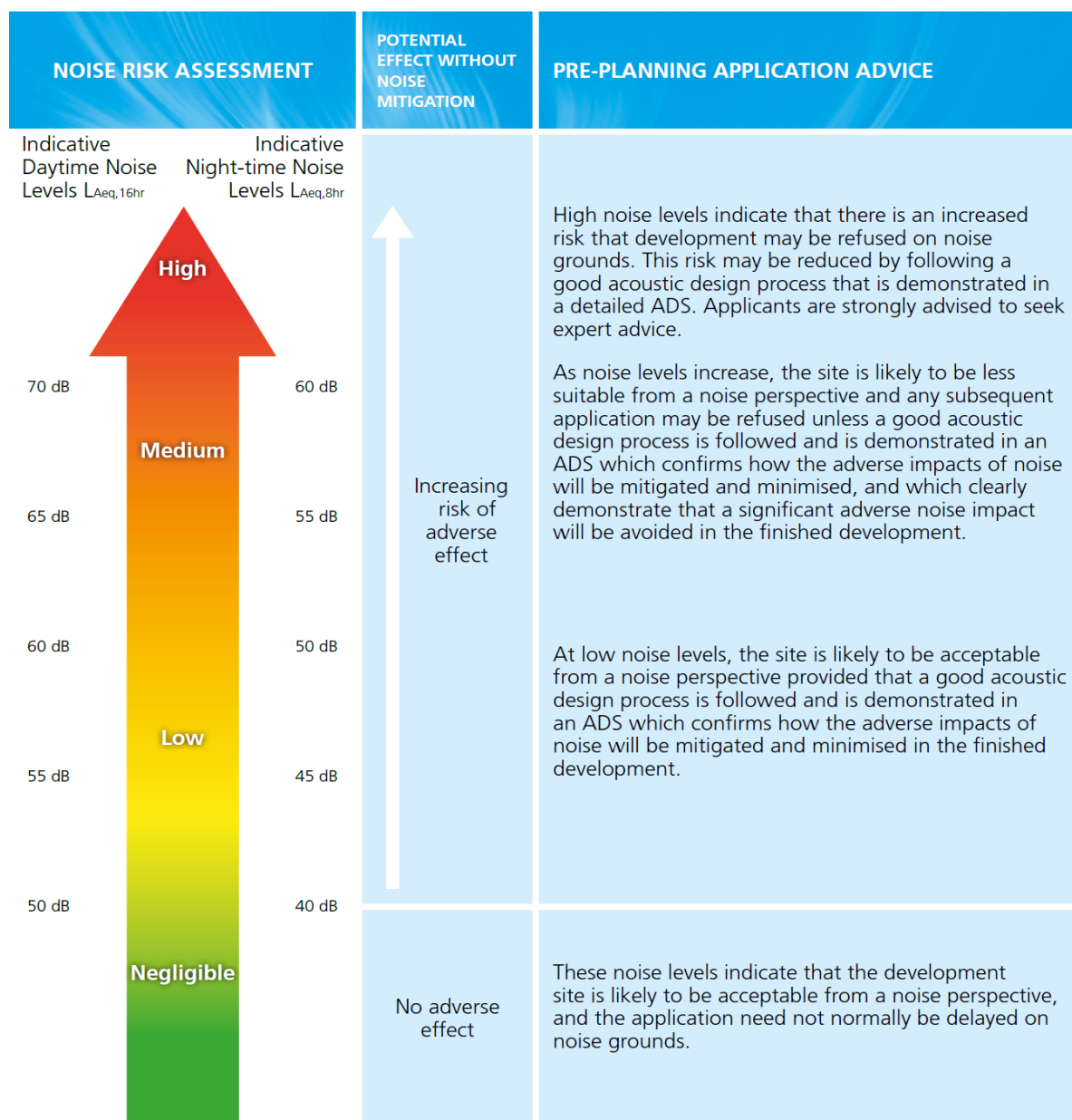


Figure 1 Notes:

- Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.
- 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".
- $L_{Aeq,16hr}$ is for daytime 0700 – 2300, $L_{Aeq,8hr}$ is for night-time 2300 – 0700.
- 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.

Figure 1. Stage 1– Initial Site Noise Risk Assessment



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APPENDIX

Continuous equivalent noise level, LAeq — The steady noise level (usually in dBA) which, over the period of time under consideration, contains the same amount of sound energy as the time varying noise.

LAm_{ax} - The maximum value that the A-weighted sound pressure level reaches during a measurement period.

dB (A) — The A-weighted sound pressure level.

Decibel (dB) A unit used for many acoustic qualities to indicate the level of sound with respect to a reference level.

A-weighting — A frequency weighting that relates to the response of the human ear.

Background noise level — Prevailing noise level in a specified environment measured in the absence of the noise being studied.

Habitable Room – A room used for sleeping or recreation/relaxation

D_{ne,w} Weighted element normalised level difference – A single-number quantity which characterises the airborne sound insulation of a small building elements.

EPU – Environmental Protection Unit

R_w Weighted sound reduction index – A single-number quantity which characterises the airborne sound insulation of a material or building element measured in the laboratory.

LA₁₀ – The A-weighted noise level exceeded for 10% of the measurement duration.

LA₉₀ - The A-weighted noise level exceeded for 90% of the measurement duration.

British Standards & associated documents:

Code of Practice: BS8233: 2014 - Sound Insulation and noise reduction for buildings.

World Health Organization (WHO) - Guidelines for Community Noise.

Pro PG – Planning & Noise, Residential Development – 2017

