Kimber Acoustics Ltd

Noise Assessment

153 - 157 High Street, Worle

Kimber Acoustics
Noise & Vibration Consultancy

153 - 157 High Street, Worle

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Executive Summary

A noise assessment has been carried out for the permitted development proposals at 153 - 157 High Street, Worle. The noise assessment has been carried out to determine feasibility of mitigation in order to protect the future residents from commercial noise.

Reference to National Planning Policy Framework, national guidance and local planning policy has been made to derive reasonable design targets.

The example building envelope sound insulation improvements outlined within this report would result in compliance with recommendations of national guidance. **With the minimum acoustic requirements shown, all of the bedrooms and living rooms would achieve the internal noise level recommendations of BS 8233: 2014 during the day time and night time. The L_{Afmax} dB noise levels in bedrooms at night time are predicted to be lower than WHO guidance.**

Compliance with BS 8233: 2014 recommendations should be sufficient to satisfy the requirements of Class MA and North Somerset Policy CS3 recommendations for commercial noise intrusion from environmental and adjoining sources.

In our opinion, environmental commercial noise and commercial noise transfer should not constrain granting prior approval.

Introduction

This report has been prepared to provide a planning stage noise assessment for the redevelopment of a site at 153 - 157 High Street, Worle. The proposed permitted development is for the conversion of a first floor commercial use space into 4 residential flats.

A noise survey has been carried out and a summary of the survey methodology and measured levels are presented in this report.

The recommended target internal noise levels within BS 8233: 2014[i] have been used with the calculation methodology to estimate the required sound insulation of the building envelope.

Local planning policy requirements and national guidance for internal noise levels due to external and internal commercial noise sources are discussed within this report.

Site Description

The site is currently occupied by three tenanted retail units and a vacant commercial space, with access and car parking to the rear. The site is bound by High Street to the south, the Lamb Inn car park to the east, and residential properties to the north. To the west the site is bound by residential and commercial use properties.

For the purpose of the noise assessment only, the site boundary is indicated by a red outline in Figure 1 below, taken from OS Location Plan, courtesy of First Fox Architecture.

Figure 1: Site location

Assessment Criteria

This section provides a summary of policy and guidance documents relevant to the noise emission assessment.

The Town and Country Planning Order

The proposed development is understood to benefit from permitted development rights under the Class MA provisions given by The Town and Country Planning Order 2021 . The Order defines Class MA permitted development as:

MA. *Development consisting of a change of use of a building and any land within its curtilage from a use falling within Class E (commercial, business and service) of Schedule 2 to the Use Classes Order to a use falling within Class C3 (dwellinghouses) of Schedule 1 to that Order.*

Class MA is permitted subject to prior approval as to impacts of noise from commercial premises on the intended occupiers of the development.

North Somerset Core Strategy

The North Somerset Core Strategy[ii] does not appear to contain any policies that are specific to the impact of commercial noise on proposed residential uses. However, Policy CS3 Environmental impacts and flood risk includes consideration of noise pollution. Policy CS3 wording is reproduced below. assessment requires that:

Development that, on its own or cumulatively, would result in air, water or other environmental pollution or harm to amenity, health or safety will only be permitted if the potential adverse effects would be mitigated to an acceptable level by other control regimes, or by measures included in the proposals by the imposition of planning conditions or through a planning obligation.

The North Somerset Council website provides guidance that a noise impact assessment is required for all applications for:

- noise sensitive development (such as residential, hospitals or schools) adjacent to major road/transport infrastructure and other significant sources of noise.
- uses of the site that might generate significant amounts of noise, when placed next to existing noise sensitive infrastructure (such as development in use classes B2 and B8, a new music venue next to a residential area, for example)

The Core Strategy document does not appear to reference any Supplementary Policy Guidance documents or numerical noise limits. Suitable guidance for new residential development can be found in BS 8233: 2014, as discussed in the following section.

BS 8233: 2014 Sound Insulation and Noise Reduction for Buildings – Code of Practice

The scope of BS 8233: 2014 includes the provision of recommendations for the control of noise in and around buildings. It suggests appropriate design guide noise limits for different situations, which are primarily intended to guide the design of new or refurbished buildings.

For steady external noise source, it is desirable that the internal ambient noise levels do not exceed the guideline values in Table 2 of BS 8233: 2014. This information has been reproduced below in Table 1 for ease of reference.

Table 1: BS 8233: 2014 internal noise targets for domestic uses

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

It is stated in BS 8233: 2014 that 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 $L_{Amax,F}$ dB, depending on the character and number of events per night. Sporadic noise events could require separate values.

The guideline values in Table 1 above are based on annual averages with normal diurnal fluctuations in external noise levels. A shorter averaging period may be used where external levels are atypical due to local activity. The guideline values are for internal ambient noise levels with an appropriate level of ventilation provided. An estimate of the ventilation provision will be made for the purpose of acoustic assessment. It is assumed that the appropriate level of ventilation required by Part F of the Building Regulations will be determined by a ventilation engineer.

Where a development is considered necessary or desirable, BS 8233: 2014 suggests that if the internal target levels are increased by 5 dB reasonable internal conditions will still be achieved.

The internal target level should include noise from mechanical ventilation systems but exclude other domestic building services plant.

With respect to the night time L_{AFmax} dB noise criterion, the WHO Guidelines for Community Noise Exposure[iii]presents further clarity, stating: 'For good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{AFmax} more than 10-15 times per night'.

Noise Level Measurements

Noise level measurements of the acoustic conditions at the site have been made by part attended and part unattended survey on Thursday 15th February and Friday 16th February 2024. The purpose of the survey was to provide sufficient acoustic information to establish the prevailing environmental noise levels at site. Environmental noise levels were measured at two locations across the site with microphone heights of 2.1 metres above ground and 5.0 metres above ground.

The noise level measurements were undertaken by a consultant certified as competent in environmental noise monitoring and in accordance with the principles of BS 7445: 2003[iv]. The noise measurement instrumentation used conforms to the accuracy requirements of Type 1 as defined by BS EN 61672-1: 2013[v], acoustic calibrator conforming to BS EN 60942: 2018[vi] and an inventory of all equipment used is given in Table 2 below.

Table 2: Inventory of measurement equipment

System	Location	Item	Make & Model	Serial Number	Last Calibration
1	2	Sound Level Meter	Sinus Tango	0001113	02/02/2023
1	2	Preamplifier	Sinus 907144.5	20005	02/02/2023
3	2	Sound Level Meter	NTi XL2	09754	08/02/2023
3	2	Preamplifier	NTi MA220	3424	08/02/2023
3	2	Microphone	NTi MC230	9042	08/02/2023
All	All	Acoustic Calibrator	Larson Davis Cal 200	9535	08/02/2023

The logging sound level meters were set to automatically average 5-minute periods measuring parameters L_{Aeq} dB, L_{Amax} dB, L_{A10} dB and L_{A90} dB. Data was also logged in 10-second periods for the L_{Amax} dB parameter. The Calibrator CAL-200 producing nominal 114 dB at 1000 Hz was used to check the sensitivity of the measurement systems at the start and end of the survey. There was no observed drift in sensitivity.

Metrological conditions were mild with light wind up to 3 m/s. There was light rain during the evening of 15th and morning of 16th February. Temperatures varied between 8 Celsius at night and 11 Celsius in the day. A log of metrological measurements form a nearby weather station is shown in Appendix A.

At Location 1, the microphone was on a first floor window at 5 metres above ground. During the majority of the time the dominant noise source at Location 1 was from road traffic using the High Street. The most significant commercial noise source was a portable generator in the adjacent Lamb Inn car park. Other commercial noise sources, such as movement of customers accessing the ground floor retail units made no significant contribution to ambient noise levels.

A Location 2 the microphone was at 2.1 metres above ground, and 0.3 meters above the hoarding for a skip in the rear car park. There were contributions to the ambient noise climate from road traffic using High Street. The most significant commercial noise source was a portable generator in the adjacent Lamb Inn car park. Other commercial noise sources, such as movement of customer vehicles made a minor contribution to ambient noise levels. The ground floor retail unit has condenser units mounted on the wall, which were operational, but did not perceptibly contribution to the ambient noise climate.

A Google Earth image showing the measurement locations is given below in Figure 2 and photographs of the measurement locations are shown in Appendix B.

Figure 2: Noise measurement locations

A summary of the results is given in Table 3 below. Road traffic on the local network was considered normal with no reported incidents or events.

The L_{Aeq} dB noise levels are logarithmically averaged over the duration shown. The average $L_{A90\ 5min}$ dB noise levels measured are shown for each period. The measured values at Location 1 are shown excluding noise from vehicle movements, but including all other noise (ambient). Noise levels during periods when commercial noise from an adjacent generator is discernible is also shown (commercial only).

Table 3: Summary of noise level measurements

Location	Period	Duration (Hours)	$L_{Aeq,\ T}$ dB	L_{AFmax} dB	L_{A90} dB
1: High Street façade (ambient)	Day	12:15:20	70.5	85.7	63.7
1: High Street façade (ambient)	Night	7:55:20	61.8	85.2	35.6
1: High Street façade (Commercial only)	Day	5:55:10	72.1	85.7	70.1
1: High Street façade (Commercial only)	Night	00:15:00	72.1	85.7	70.1
2: Rear car park (ambient)	Day	16:50:00	53.9	70.2	46.8
2: Rear car park (ambient)	Night	8:00:00	48.9	72.2	35.1

A graph of the 5-minute period measurements at all locations are shown in Appendix C.

Measurements were made in octave bands at both locations, using linear Z weighting filter. The $L_{Zeq\ T}$ dB noise levels logarithmically averaged over the measurement duration stated from 63 Hz to 4 kHz octave bands are shown in Table 4 below.

Table 4: Summary of octave band $L_{Zeq\ T}$ dB noise level measurements

Location	Period	Duration	L_{Zeq} dB						
		[hh:mm:ss]	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
1: High Street façade (ambient)	Day	12:15:20	69.2	68.7	64.8	64.7	66.9	64.1	58.6
1: High Street façade (ambient)	Night	7:55:20	57.7	55.0	55.9	58.6	55.2	49.3	44.9
1: High Street (commercial)	Day	5:55:10	69.1	70.8	66.0	66.0	68.2	66.0	61.0

The L_{zFmax} dB noise level spectrum unlikely to be exceeded more than 10 times per night from 63 Hz to 4 kHz octave bands are shown in Table 5 below. The duration shown in

Table 5: Summary of octave band L_{zFmax} dB noise level measurements

Location	Period	Duration	L_{ZFmax} dB						
		[hh:mm:ss]	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
1: High Street façade	Night	00:15:00	72.9	77.2	70.7	69.7	72.6	70.2	65.8

Predicted External Noise Levels

During the survey period the adjacent temporary catering unit appeared to operate from 15:50 to 23:15 daily. It is understood that the adjacent temporary catering unit is licenced to operate between 16:30 and 23:00. The assessment is based on the observed and measured noise levels. There were no other significant noise sources observed. Commercial noise at the façades of the proposed development has been predicted using software iNoise 2024 to execute the ISO 9613: 1996[vii] calculation methodology and the recommendations of the new quality standard ISO 17534-1: 2015[viii].

The site has been digitised with the existing buildings and height contours. Terrain data has been obtained from Ordnance Survey mapping. The model has also been used to predict free field noise levels across the site and façade noise levels. These predicted values have been used in calculation of the predicted internal noise levels for the most exposed façade locations.

The external environmental noise levels across the site are represented as noise contours on Figure 3. Figure 3 shows the predicted external noise levels at 5 metres above ground, which corresponds with the first floor window height.

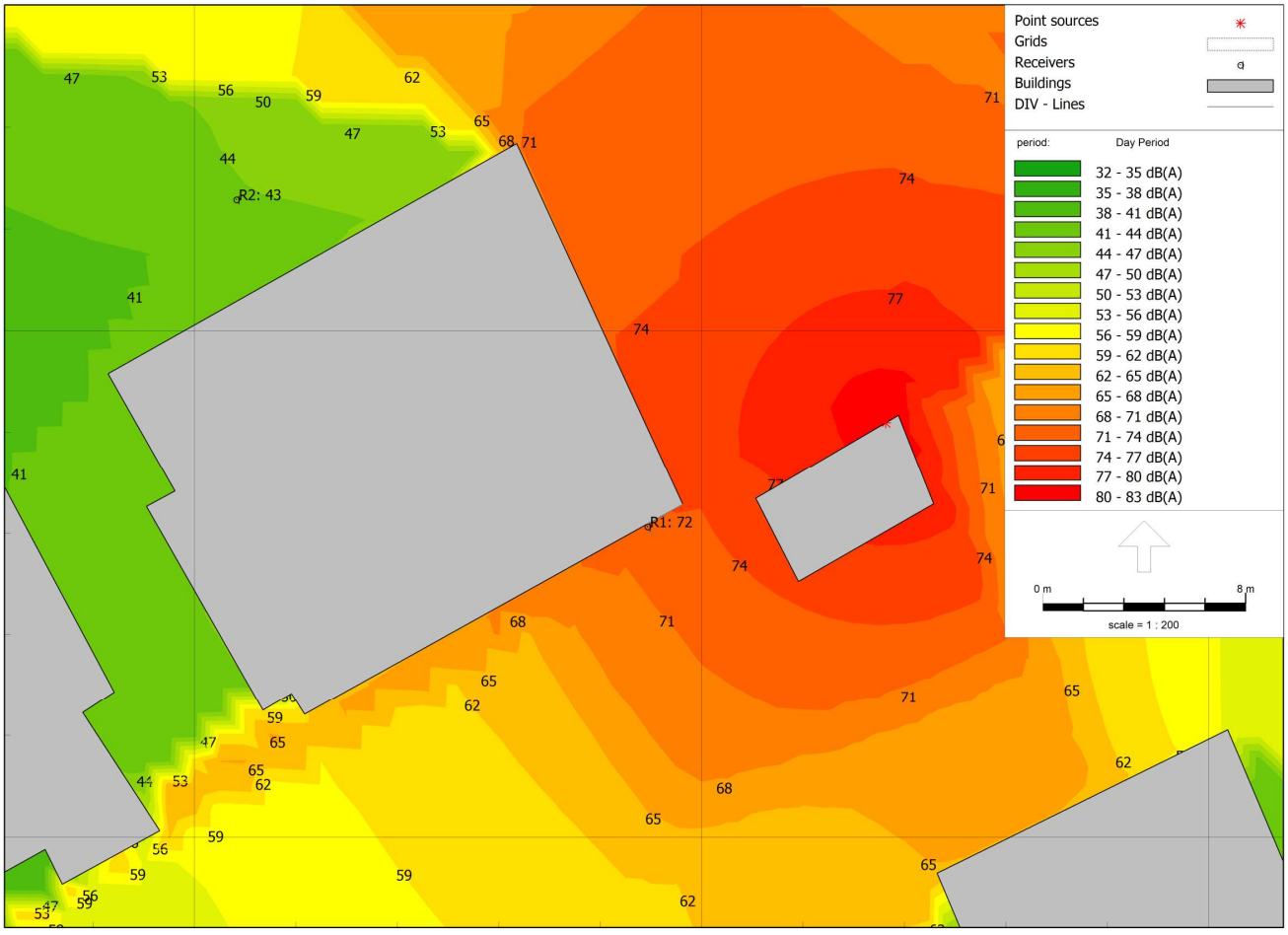


Figure 3: Day time $L_{Aeq\ 16hr}$ dB noise contours at 5 metres above ground

It can be seen in Figure 3 that the most noise exposed facades of the development are likely to be within the L_{eq} 74 dB (A) to 71 dB (A) noise contour, at 5m above ground level.

Predicted façade noise levels

The predicted façade noise levels at the facades are presented in Table 6 below. The predicted noise levels include for façade reflection. The predicted noise levels for the scenarios with the nearby temporary mobile catering unit operational. The mobile catering unit was observed to operate for 15 minutes after 23:00.

Table 6: Summary of predicted façade incident commercial noise levels

Location	Day $L_{Aeq\ 16hr}$ dB	Night $L_{Aeq\ 15min}$ dB	Night L_{Afmax} dB
1	42.1	42.1	56.3
2	42.5	42.5	56.7
3	43.3	43.3	57.5
4	44.1	44.1	58.3
5	45.5	45.5	59.7
6	69.9	69.9	84.1
7	73.4	73.4	87.6
8	71.5	71.5	85.7
9	69.5	69.5	83.7
10	68.0	68.0	82.2
11	66.6	66.6	80.8
12	65.4	65.4	79.6
13	42.3	42.3	56.5
14	41.5	41.5	55.7

The location numbers shown in Table 6 refer to the locations shown in Figure 4 below.

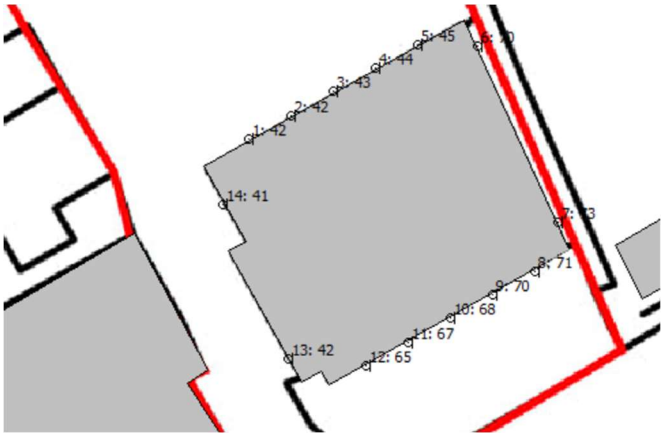


Figure 4: Predicted façade noise levels and sample locations

Assessment of Internal Noise levels

Guidance in BS 8233: 2014 recommends that noise levels from steady broadband sources are not greater than 35 dB $L_{Aeq\ 16hr}$ in living rooms and bedrooms during the daytime and not greater than 30 dB $L_{Aeq\ 8hr}$ dB in bedrooms at night time. Environmental commercial noise at the site is dominated by noise from the adjacent temporary mobile catering unit generator. The character of the noise is broadband, anonymous and relatively continuous during the catering unit's opening hours. For these reasons, the guidance noise limits in BS 8233: 2014 are considered suitable.

In order to calculate a prediction of the internal noise levels, the sound insulation of each of the building envelope elements needs to be considered. At this stage of the development, the proposals for the building envelope have not been finalised. The following examples are intended to demonstrate the sites feasibility for the proposed use without committing the developer.

Open windows for background ventilation

Where an open window is used for ventilation, a level difference from outside to inside of 13 dB (A) is expected when a partially open window is used for background ventilation, as required to achieve Part F^{ix} compliance. For natural ventilation, internal L_{Aeq} dB noise levels during the day time and night time are allowed to be 5 dB (A) higher than the BS 8233: 2014 Table 2 values. However, the L_{Amax} dB noise level limit

for bedrooms at night time should not be relaxed during background ventilation. Predicted internal noise levels with open windows are shown in Table 7, for intrusion environmental commercial noise.

Table 7: Assessment of predicted internal $L_{Aeq,T}$ dB and L_{Amax} dB noise levels with open windows

Façade	Day $L_{Aeq,\ ff\ 16hr}$ dB	Night $L_{Aeq,\ ff\ 8hr}$ dB	Night $L_{Afmax,\ ff}$ dB	Bedroom Complies with BS 8233: 2014	Living room Complies with BS 8233: 2014
South (High Street)	58.5	58.5	72.7	No	No
North (Car park)	32.5	32.5	46.7	No	Yes

It is not feasible to use an open window for background ventilation and meet the internal noise level guidelines of BS 8233: 2014 due to the day time $L_{Aeq\ 16hr}$ dB criteria and night time L_{Afmax} dB criteria for bedrooms. It may be feasible to use open windows for background ventilation in living rooms with windows on the car park elevation.

An alternative means of background ventilation to an open window is recommended for all dwellings. Trickle ventilator acoustic requirements are suggested on the following pages, to be used with Mechanical Extract Ventilation (MEV) for facades facing the car park. The use of mechanical supply and extract ventilation system is recommended for the facades facing High Street.

Glazing acoustic requirements

The guidance in BS 8233: 2014 allows for a simplistic calculation using A-weighted values, where the resultant internal noise is at least 5 dB (A) lower than the target noise level. As further recommended by the guidance document, a calculation in octave bands has been carried out. Noise levels in octave bands adjusted to the A-weighted predicted values have been input to calculate the minimum required acoustic performance of the building envelope.

The highest glazing acoustic requirement for each elevation has been considered, to demonstrate the sites feasibility for the proposed use. The acoustic requirements are based on the observed commercial activity affecting the site, which includes 15 minutes of commercial activity after 23:00.

Glazing minimum sound reduction values & examples for standard window sizes:

Windows facing High Street

- Bedroom - Double-glazed units - R_w 45 dB - 10mm float glass, 16mm cavity, 8.4mm acoustic laminated glass
- Living room - Double-glazed units - R_w 39 dB - 6mm float glass, 12mm cavity, 9.5mm acoustic laminated glass

Windows facing Car Park

- Bedroom - Double-glazed units - R_w 30 dB - 4mm float glass, 20mm cavity, 4mm float glass
- Living room - Double-glazed units - R_w 30 dB - 4mm float glass, 20mm cavity, 4mm float glass

Background ventilation acoustic requirements

An alternative means of background ventilation to an open window is recommended for all bedrooms and living /kitchen rooms. Where through wall or through window frame trickle ventilator acoustic requirements are suggested, it is based on the Part F minimum equivalent area of 5000mm^2. The use of a mechanical supply and extract ventilation system is recommended for the façade on High Street.

Passive supply ventilator acoustic requirements & examples for facade overlooking the car park:

- Bed Room - Through window frame trickle ventilator – D_{new} 30 dB – DucoTop 60 Medio
- Living Room - Through window frame trickle ventilator – D_{new} 30 dB – DucoTop 60 Medio

A ducted MVHR or MS&E system would not need to be fitted with attenuators for environmental commercial noise intrusion mitigation.

External wall acoustic requirements

External walls are considered to be constructed from two skins of medium density concrete blocks, with external render. The proposals are likely to include an internal plasterboard lining on a lightweight steel frame. The external walls throughout, are likely to meet the sound insulation requirement of R_w 67 dB for the east and south elevations.

For Building Regulation[x] compliance, the design stage should include consideration of noise transmission flanking around party walls and party floors, where there any continuous elements, such as external walls.

Roof and ceiling acoustic requirements

The roof and ceiling system are likely to be constructed from a lightweight system and should be designed to achieve at least R_w 56 dB. This could be achieved with 15mm SoundBloc plasterboard direct fixed to the underside of roof joists and further 2 layers of 15mm SoundBloc plasterboard suspended on resilient bar. Mineral wool is assumed to be at least 25mm in each cavity and at least 270mm overall.

If the secondary ceiling is supported by independent joists rather than the roof joists, this would provide a further enhancement, although it would not be necessary to achieve the minimum acoustic requirements.

Reverberation times

It is assumed that the bedrooms and living rooms would be furnished and the standardised acoustic absorption correction has been applied, based on reverberation times of 0.5 seconds, as required by the calculation methodology.

Internal noise levels

With the above provisions it is expected that environmental commercial noise would be not greater than 33 dB (A) in living rooms and will not be greater than 28 dB (A) in bedrooms. It is expected that L_{Afmax} dB noise levels from commercial sources in bedrooms will not exceed 43 dB (A) at night based on assessment of the 10th highest measured values in 10 second periods.

In our opinion, if the building envelope elements and external wall build up are chosen to meet or exceed the acoustic performance values shown, then the internal noise levels in all rooms should meet the guidelines of BS 8233: 2014.

The mechanical extract ventilation systems are to be selected so that the combined environmental and services noise levels do not exceed the target internal noise levels. The building services noise emission limits to atmosphere combined should be controlled to not cause disturbance to neighbouring uses. Typically, the use of low noise domestic extract and supply fans with termination either through wall or at roof levels should be sufficient.

Assessment of Noise Transfer

This section of the report assesses the impact of commercial noise from the adjoining commercial units on the intended future occupiers of the proposed residential units. Assessment is made of the noise from typical activity associated with the permitted usage class, as this provides a more robust assessment than measurement of relatively quiet existing operations.

Any separation between adjoining flats and other parts of the same building has to comply with Building Regulations. The document Approved Document Part E 2015 (ADE) provides acoustic requirements that satisfy the Requirement's of Part E of Schedule 1 to the Building Regulations 2010 . Requirement E is split into 4 parts, with part 1 requiring that :

Dwelling-houses, flats and rooms for residential purposes shall be designed and constructed in such a way that they provide reasonable resistance to sound from other parts of the same building and from adjoining buildings.

Requirement E1 can be met by building separating walls, floor and stairs that achieve the sound insulation values in Table 0.1a and is reproduced below.

Table 0.1a **Dwelling-houses and flats – performance standards for separating walls, separating floors, and stairs that have a separating function**

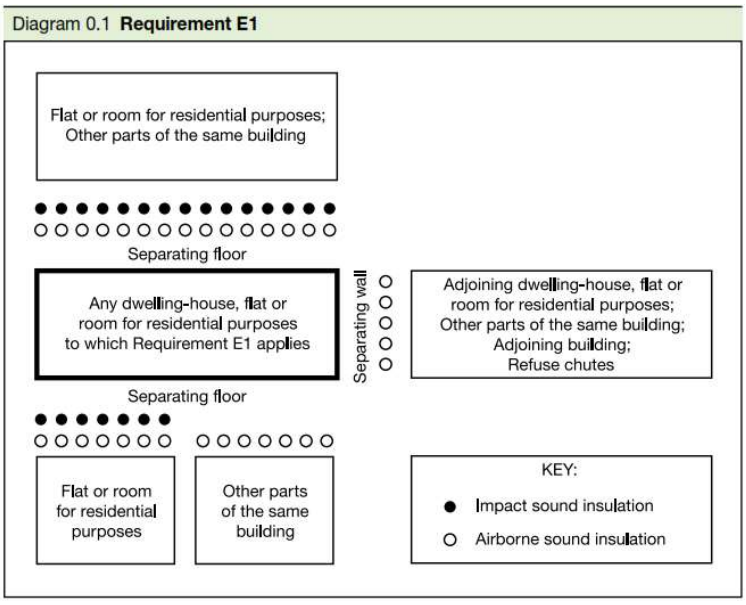
	Airborne sound insulation sound insulation $D_{nT,w} + C_{tr}$ dB (Minimum values)	Impact sound insulation $L'_{nT,w}$ dB (Maximum values)
Purpose built dwelling-houses and flats		
Walls	45	-
Floors and stairs	45	62
Dwelling-houses and flats formed by material change of use		
Walls	43	-
Floors and stairs	43	64

Requirement E1 for airborne and impact sound insulation applies to adjoining dwelling houses, flats, rooms for residential purposed or other parts of the same building. A room with a non-residential use is considered to be 'other parts of the same building' in terms of Requirement E1. Approved Document E does not stipulate the use of those other parts.

Approved Document E sets out Diagram 0.1 to show whether Requirement E1 for airborne or impact borne sound insulation applies to a separation. Diagram 0.1 is reproduced below. It shows that other parts of the same building that are non-residential that are above a residential dwelling-house or flat have to be separated in a way that achieves the airborne and impact performance values of Table 0.1a.

Where a residential dwelling-house or flat is above other parts of the same building, the separation must achieve only the airborne values in Table 0.1a, as shown Diagram 0.1, reproduced below.

Diagram 0.1 **Requirement E1**



For Building Regulation compliance, the sound insulation offered by the partitions separating retail and residential must achieve at least $D_{nTw} + C_{tr}$ 43 dB. Further consideration of the likely retail activity noise levels and background noise levels in the residential unit should provide the level of sound insulation enhancement required.

The noise transfer with each of the ground floor level commercial units has been considered. The source noise level in each commercial unit may vary depending on day to day operations. An estimate of the upper noise levels that could be expected from reasonable activity associated with the current use, presented in Table 8 below. It is assumed that noise in the retail units and estate agents is due to talking, use of keyboards, with scope to play ambient background music.

Table 8: Commercial use noise source levels, dB

Source	Function	63 Hz dB	125 Hz dB	250 Hz dB	500 Hz dB	1000 Hz dB	2000 Hz dB	4000 Hz dB	dB (A)
Retail, voices	$L_{eq,\,T}$ dB	38	39	52	63	78	74	57	78

In the previous report section, the likely background noise levels in the residential units due to intrusive environmental noise was determined. The contributions from mechanical ventilation noise would be controlled so that the combined noise level does not exceed L_{Aeq} 30 dB, as recommended by Part F.

Noise transfer would be limited so that noise transfer from the ground floor retail units is less than the likely background noise levels. The background spectrum has been estimated, as shown in Table 5 below

Table 9: Background noise levels used for assessment of noise transfer, dB

Source	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	dB (A)
Mech. Ventilation	12	17	19	19	19	18	17	24
Environmental noise	41	39	31	23	18	17	9	28
Combined background noise	*41*	*39*	*31*	*24*	*21*	*20*	*18*	*30*

The noise transfer has been calculated for the living rooms and bedrooms, using the shared floor areas for each room. The ground to first floor partition is the same construction throughout and is based on a concrete block and beam system. A sound insulation test was carried on the existing floor separating unit 2 (Estate Agent) from the vacant space above, achieving a result of D_{nTw} + C_{tr} 55 dB, as shown in Appendix D.

The location of each of these spaces is shown in Figure 5, reproduced from drawing 'Proposed Floor Plans and Elevations with Room Sizes and Flat Areas', authored by First Fox Architecture.

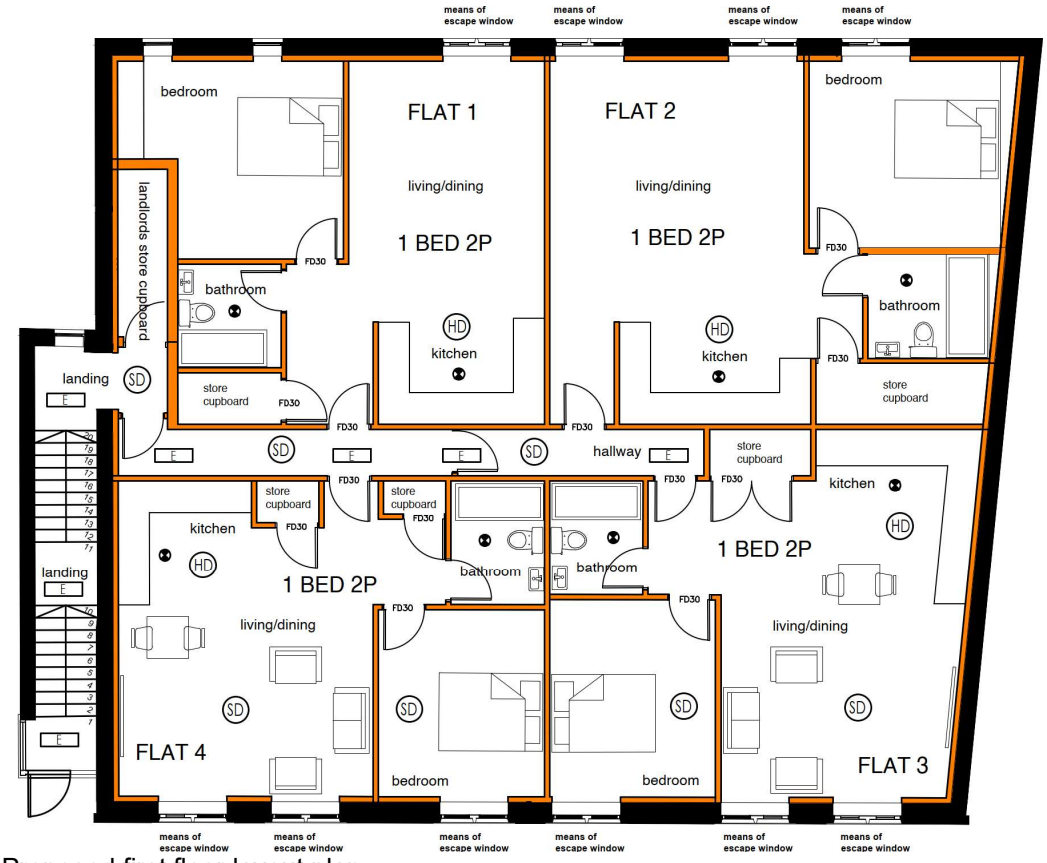


Figure 5: Proposed first floor layout plan

The separating floor between the ground and first will be a solid masonry construction, based on the existing concrete system. The proposed build up is listed below and is intended as an example to demonstrate feasibility of the site for residential development.

Floor finishes
22mm t&g chipboard
75mm x 48mm timber joist with 25mm mineral wool insulation
22mm JCW Acoustic Level Pod Cradle
10mmm JCW Acoustic pad
70mm sand & cement screed
30mm EPS insulation
100mm concrete beam and block
400mm ceiling void with suspended ceiling system
20mm mineral fibre ceiling tiles

Estimated sound reduction (Insul V9) $R_w + C_{tr}$ 67 dB
Estimated in situ sound reduction $D_{nTw} + C_{tr}$ 59 dB

The in situ sound insulation between the first floor and second floor is predicted to exceed the minimum airborne sound insulation requirements of Part E by 16 dB. Further details of the JCW acoustic cradle and batten system are provided in Appendix E. Any party wall partitions should be built off the structural concrete slab, not the flooring deck. After prior approval has been granted, the design stage work should consider sound insulation of wall partitions on the first floor and flanking sound transmission, as well as all other aspects of required for Part E compliance.

The predicted noise transfer levels are shown in Table 10 below, including through the floor partition and flanking pathways.

Table 10: Background noise levels used for assessment of noise transfer, dB

Space	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	dB (A)
Bedroom	20.7	-1.4	-6.8	-7.8	6.6	2.1	-15.2	8.5
Living room	17.4	-2.2	-7.5	-8.4	6.1	1.8	-15.4	8.0

It is unlikely that the internal adjacency would cause an adverse impact due to noise transfer, as the predicted intrusive noise levels are 21 dB (A) lower than the expect internal ambient noise levels.

In our opinion, this is sufficient information to grant prior approval in respect of commercial noise transfer.

It is worth noting that the proposals would also provide an impact sound reduction improvement of 28 dB over the existing floor system, although no impact sound insulation is required for Class MA prior approval or Part E compliance.

Conclusion

This report has presented the findings of assessments of likely intrusive environmental commercial noise levels and commercial noise transfer levels, for the proposed development at 153 - 157 High Street, Worle. The noise assessments have been carried out on behalf of Fremar properties Ltd.

The results of a noise survey carried out by Kimber Acoustics on Thursday 15th February and Friday 16th February 2024 have been used to establish the prevailing noise levels across the site. The measured noise levels have been used to digitise a model of the site.

The predicted external noise levels have been used with the design targets of BS 8233: 2014 to estimate the required external wall, glazing and ventilator acoustic performance requirements. With the minimum acoustic requirements shown, all the bedrooms and living rooms would achieve the internal noise level recommendations of BS 8233: 2014 during the day time and night time. The L_{Afmax} dB noise levels in bedrooms at night time are predicted to be lower than WHO guidance.

Compliance with BS 8233: 2014 recommendations should be sufficient to satisfy the requirements of prior approval for Class MA permitted development by way of compliance with North Somerset Policy CS3 for environmental noise intrusion.

In our opinion, environmental commercial noise intrusion should not be a constraint to the granting of prior approval.

An assessment of likely commercial noise transfer has been carried out. The assessment has considered the impact of noise transfer from the existing ground floor commercial use on the proposed first floor residential use. The airborne sound insulation of the proposed floor partition is likely to exceed Part E requirements by 16 dB. T**he predicted commercial noise transfer levels are 21 dB (A) lower than the expect internal ambient noise levels, it is therefore unlikely that the internal adjacency would cause an adverse impact**.

The information presented in this report should be sufficient to satisfy the requirements of prior approval for Class MA permitted development for commercial noise transfer to the future residential use. **In our opinion, commercial noise transfer should not be a constraint to the granting of prior approval.**

Appendix A: Weather History

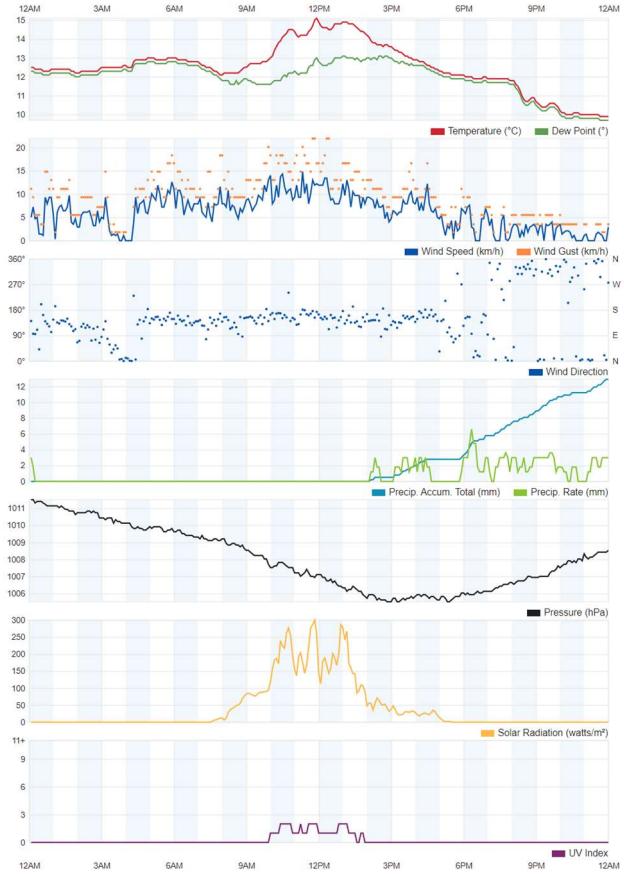
Watson 8686 - IWESTO65[xi]

February 15, 2024

	High	Low	Average
Temperature	15.1 °C	9.9 °C	12.5 °C
Dew Point	13.1 °C	9.7 °C	11.9 °C
Humidity	99 %	85 %	97 %
Precipitation	12.90 mm	–	–

	High	Low	Average
Wind Speed	14.8 km/h	0.0 km/h	3.0 km/h
Wind Gust	21.9 km/h	–	7.1 km/h
Wind Direction	–	–	SE
Pressure	1,011.51 hPa	1,005.22 hPa	–

Graph | Table

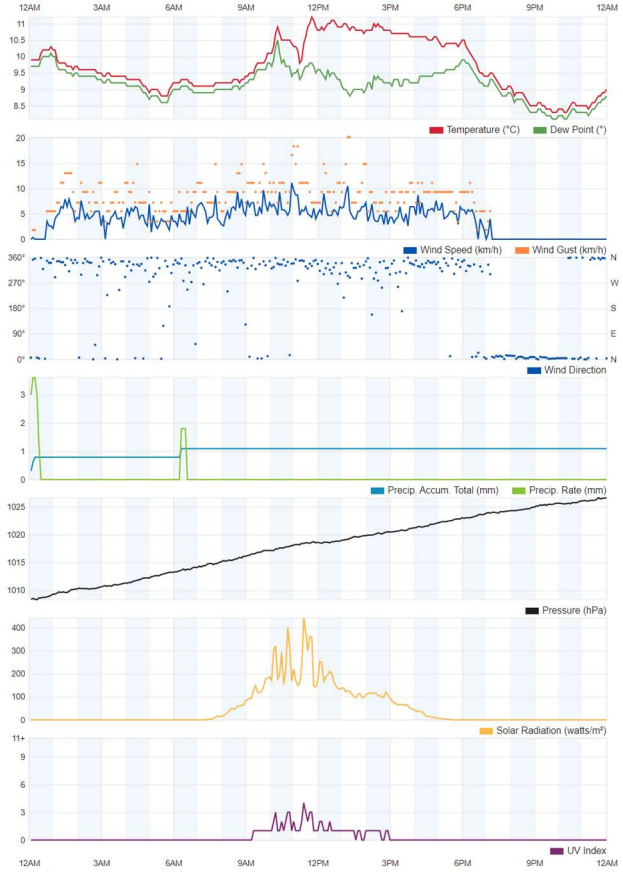


February 16, 2024

	High	Low	Average
Temperature	11.2 °C	8.2 °C	9.7 °C
Dew Point	10.5 °C	8.0 °C	9.1 °C
Humidity	99 %	87 %	97 %
Precipitation	1.09 mm	–	–

	High	Low	Average
Wind Speed	11.1 km/h	0.0 km/h	1.4 km/h
Wind Gust	20.1 km/h	–	4.9 km/h
Wind Direction	–	–	NNW
Pressure	1,026.62 hPa	1,008.03 hPa	–

Graph | Table



Appendix B: Photographs of Measurement Locations

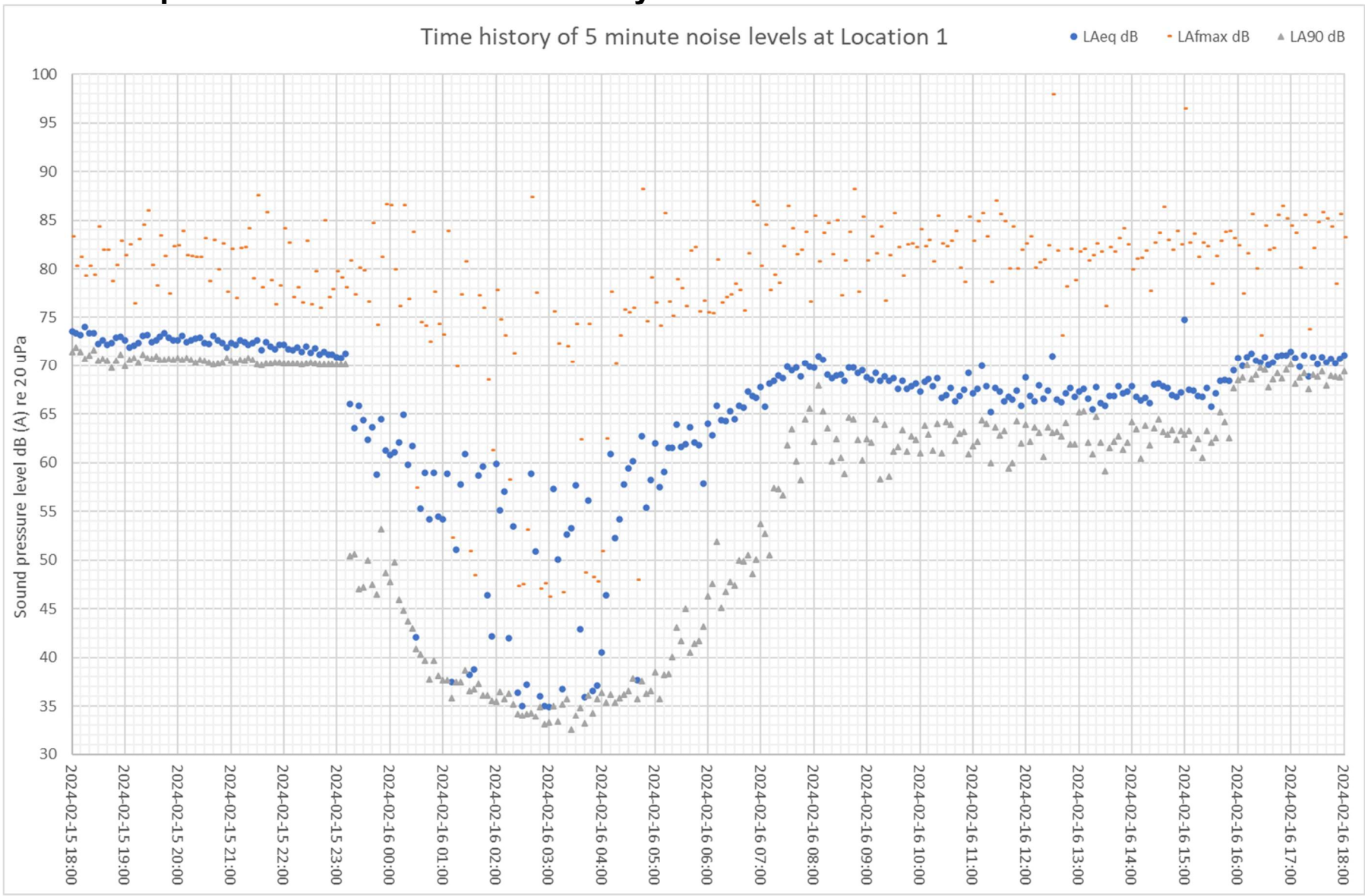
Looking north east towards Location 1

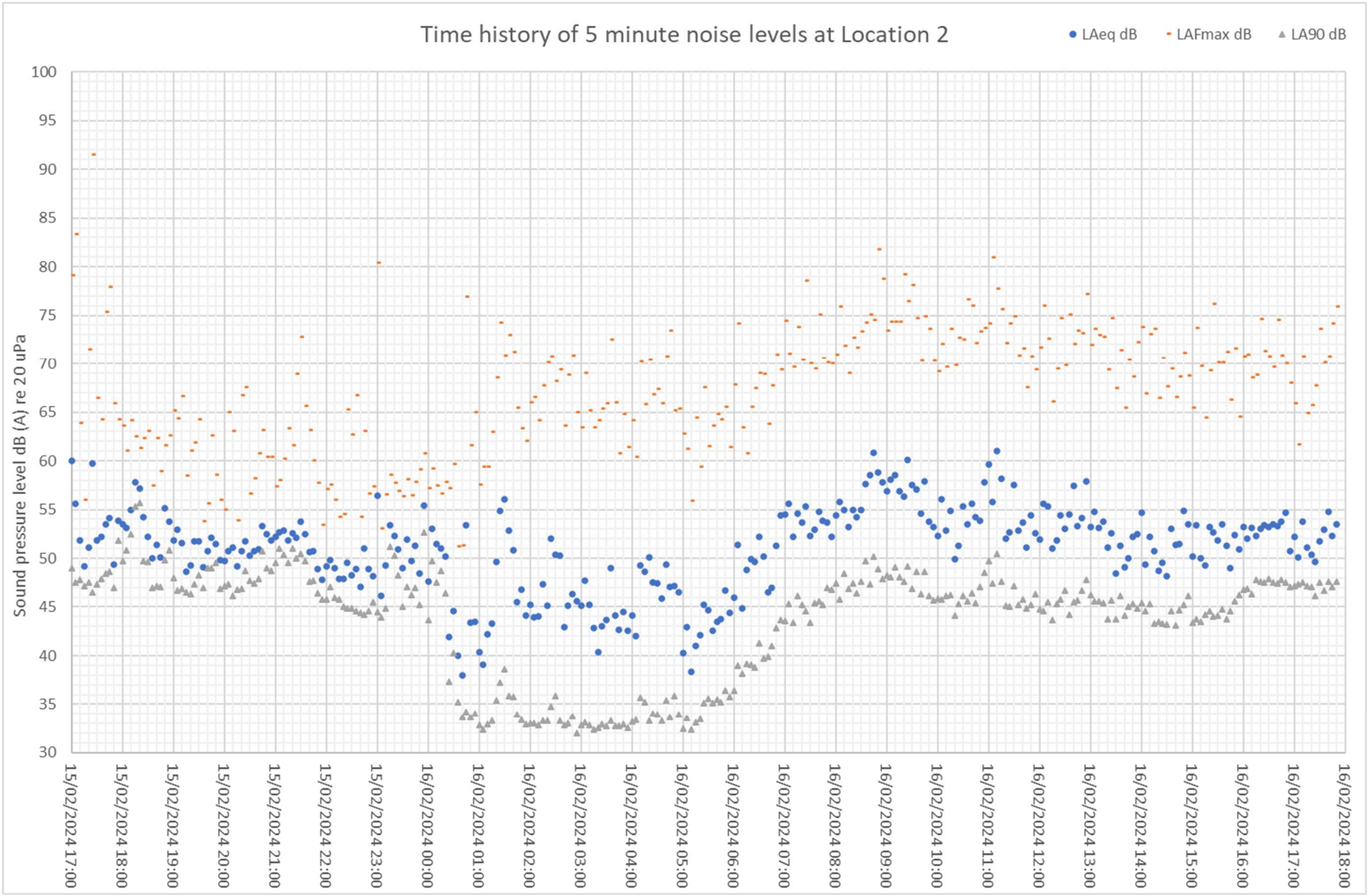
Looking north west towards Location 1

Looking south east towards Location 2

Looking east towards Location 2

Appendix C: Graphs of Noise Level Time History




Time history of 5 minute noise levels at Location 2
LAeq dB
LAFmax dB
LA90 dB
Sound pressure level dB (A) re 20 uPa
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
15/02/2024 17:00
15/02/2024 18:00
15/02/2024 19:00
15/02/2024 20:00
15/02/2024 21:00
15/02/2024 22:00
15/02/2024 23:00
16/02/2024 00:00
16/02/2024 01:00
16/02/2024 02:00
16/02/2024 03:00
16/02/2024 04:00
16/02/2024 05:00
16/02/2024 06:00
16/02/2024 07:00
16/02/2024 08:00
16/02/2024 09:00
16/02/2024 10:00
16/02/2024 11:00
16/02/2024 12:00
16/02/2024 13:00
16/02/2024 14:00
16/02/2024 15:00
16/02/2024 16:00
16/02/2024 17:00
16/02/2024 18:00

Time history of 10 second noise levels at Location 1

Noise from the movement of vehicles on High Street is considered to be non-commercial noise. The most significant noise source was observed to be a portable generator serving the adjacent temporary catering trailer, which operates from 15:50 to 23:15 during the survey period and is highlighted in red marker on the graph.

Appendix D: Graph of sound insulation test results

Client : Martin Britton Site : 153 - 157 High St

Form: 100mm Block & Beam, 35mm EPS, 65mm screed, suspended mineral fibre tile

Date : 15-Feb-24 Engineer : Robert Kimber

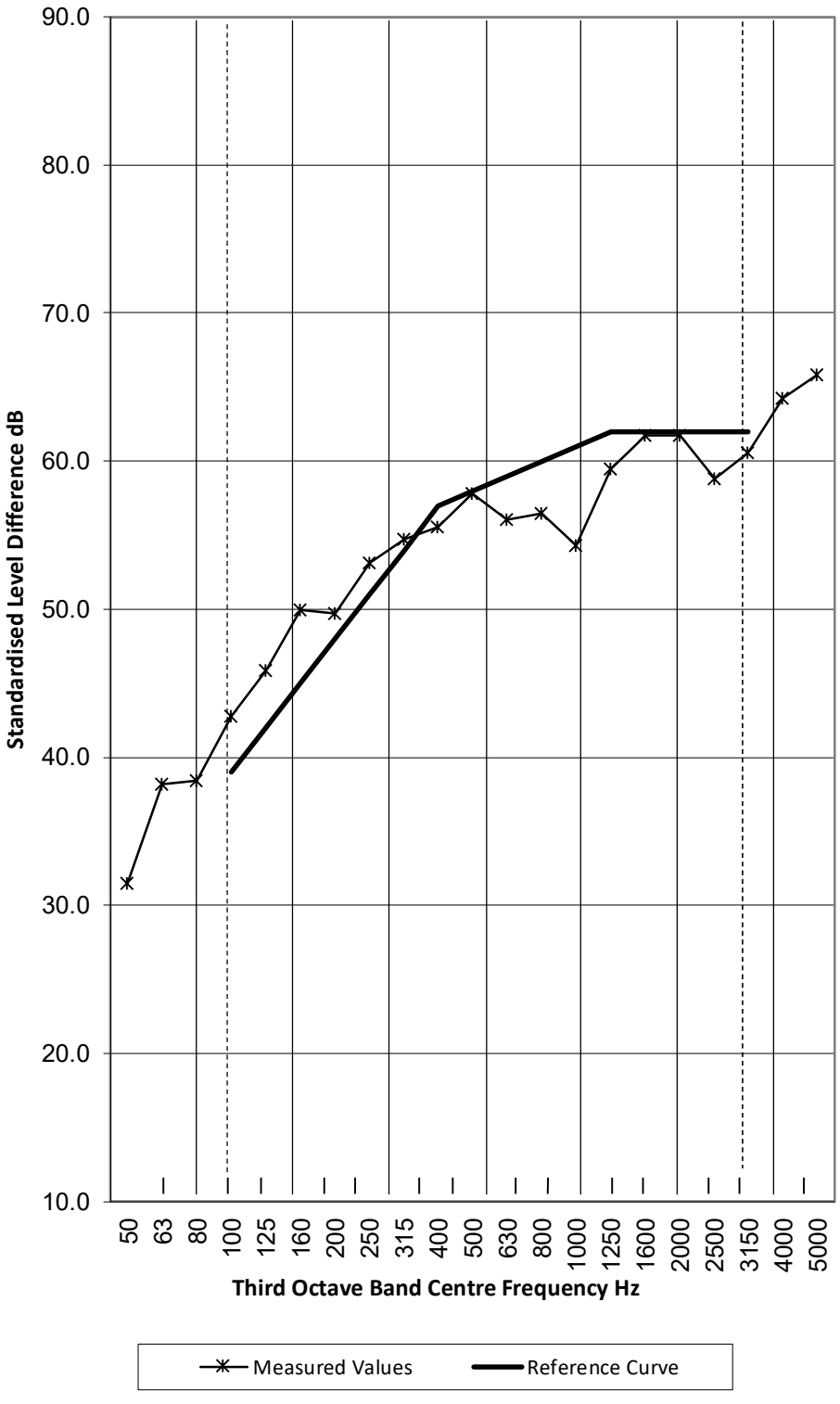
Engineer :

Source Room
Ground floor
Unit 2
Volume m^3 = 96

Receiver Room
First floor
Living
Volume m^3 = 896

Airborne Floor	
	Limit
Third Octave Band Frequency Hz	Third Octave Band D_{nT} dB
50	31.5
63	38.2
80	38.4
100	42.8
125	45.9
160	49.9
200	49.7
250	53.1
315	54.7
400	55.6
500	57.8
630	56.1
800	56.4
1000	54.3
1250	59.4
1600	61.8
2000	61.7
2500	58.8
3150	60.6
4000	64.2
5000	65.8

$D_{nT,w} + C_{tr}$	**55 dB**
$D_{nT,w}$ (C;C_{tr})	$D_{nT,w}$
58(-1;-3) dB	**58 dB**



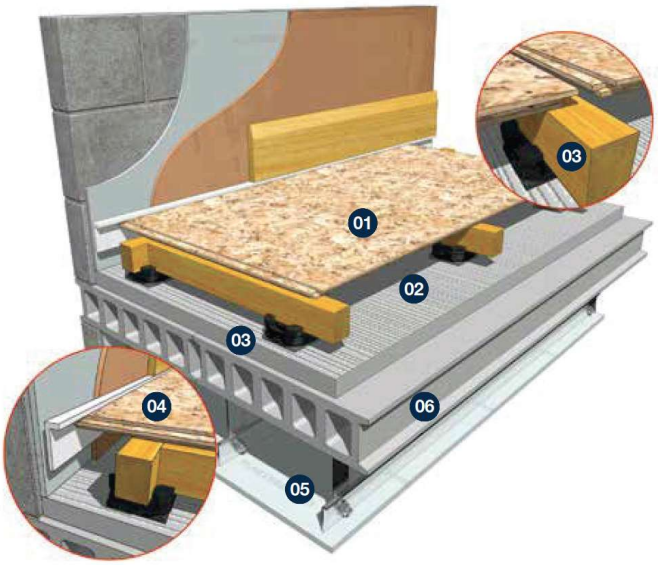
Appendix E: Product information

Acoustic Cradle Levelling System

CONCRETE FLOOR CRADLE & BATTEN

nssPlus

Datasheet 52



01 Minimum 18mm t&g chipboard

02 40mm min directly applied sand & cement or proprietary screed (min 80kg/m²)

03 JCW Acoustic Cradle Levelling System

04 JCW L Shaped or Flat Perimeter Edging Strip detail

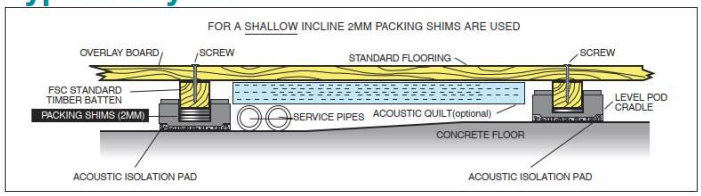
05 Metal Ceiling System with 100mm (min) void and 1 layer of 8kgs/m² gypsum based board

06 150mm (min) Concrete Floor

Note: Beam & Block floor type E-FC-7 requires Mineral Wool Fibre between the battens of 25mm (min) 10-36 kg/m³.

CONTACT TECHNICAL DEPARTMENT FOR GUIDANCE ON CRADLE AND BATTEN CENTRES

Typical Layout



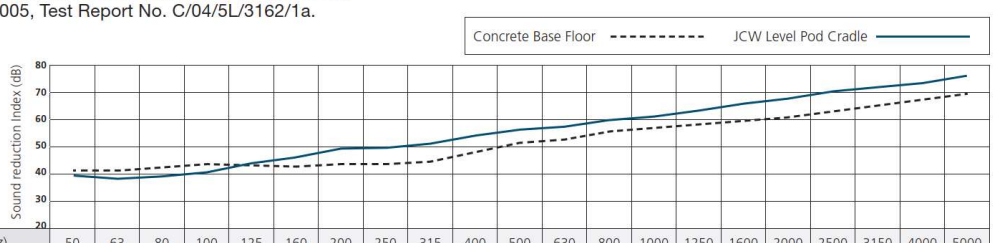
JCW ACOUSTIC SUPPLIES

Airborne Sound Insulation

The table below represents a comparison of the airborne sound insulation offered by the floating floor system as tested on a concrete floor. The tests were carried out on a 150mm deep hollowcore precast concrete plank with a 20mm sand and cement screed total mass of 335kg/m². The test sample consisted of a 18mm tongue and groove chipboard with 45 x 45mm battens on JCW Level Pod Cradles with 50mm mineral wool insulation between battens. Tests were carried out by Sound Research Laboratories, UKAS accredited test laboratory No. 0444 on the 24th February 2005, Test Report No. C/04/5L/3162/1a.

Acoustic Performance dB

Concrete Base Floor (Rw + Ctr)	51 dB
JCW Level Pod Cradle (Rw + Ctr)	55 dB
Improvement (Airborne test data not required by Robust Details Part E)	+4 dB



Frequency (Hz)	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
Concrete Base Floor	40.6	40.8	42.1	43.3	42.8	41.9	43.5	43.6	44.7	48.4	51.2	53	55.4	56.4	57.6	59.1	61.6	63.5	65.3	67	69.5
JCW Level Pod Cradle	39.7	38.7	39	40.7	44.5	46.5	49	49.6	52.4	54.8	56	57.3	59.5	61	63	64.9	67.3	70.6	72.1	73.4	75.7

References

[i] BS 8233: 2014 Guidance on sound insulation and noise reduction for buildings, BSI, February 2014
[ii] Core Strategy, North Somerset Council, April 2012
[iii] Guidelines for Community Noise, World Health Organization, April 1999
[iv] BS 7445-1: 2003 'Description and measurement of environmental noise – Part 1: Guide to quantities and procedures'
[v] BS EN 61672-1: 2013 'Electroacoustics – Sound level meters – Part 1: Specifications', BSI, September 2013
[vi] BS EN 60942: 2018 'Electroacoustics – Sound calibrators', BSI, March 2018
[vii] ISO 9613-2: 1996 Attenuation of sound during propagation outdoors, Part 2: Engineering method for the prediction of sound pressure levels outdoors
[viii] ISO 17534-1:2015 Acoustics - Software for the calculation of sound outdoors, Part 1: Quality requirements and quality assurance, ISO, May 2015
[ix] Approved Document F, F1 Means of Ventilation, The Building Regulations 2010, HM Government, October 2010
[x] ENGLAND AND WALES. Building Regulations 2010 (England and Wales), as amended. London: The Stationery Office.
[xi] Watson 8686 - IWESTO65, www.wunderground.com, February 2024