Noise Impact Assessment

Client: **Noord Developments**

Site: **Former Methodist Church, Carr Lane, HD7 5AN**

Reference: **0105251**

Revision: **0**

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Executive Summary

A noise and vibration assessment has been undertaken at the Former Methodist Church, Carr Lane, Slaithwaite in relation to the proposed change of use to apartments.

Environmental noise and vibration monitoring has been undertaken at the site from 14th – 15th May 2025. Noise affecting the development was determined to be primarily from road and rail sources.

A glazing and ventilation scheme has been given to ensure conditions in habitable rooms remain within the desired design criteria of BS8233:2014. The derived scheme is summarised below.

Glazing & Ventilation Scheme

Internal Space	Glazing		Ventilation	
	Minimum Performance R_w (+C_{tr})	Example Specification	Minimum Performance $D_{ne,w}$,+C_{tr} (Open)	Example Specification
Living Areas	30 (26)	Double Glazing: 4/16/4	32	Hit & Miss Trickle Vent (Open): Titon Trimvent XS13 4400EA
Bedrooms	34 (29)	Double Glazing: 4/16/6	40	Acoustically Treated Trickle Vent (Open): Titon Xtra Sound Attenuator V75 + C50

An assessment of the external amenity spaces has been undertaken which determined them to be within the 'acceptable' guideline of BS8233.

The vibration assessment determined a 'Low probability of adverse comment' with no mitigation deemed necessary.

Site plans are provided within **Appendix G.**

Contents

Executive Summary 2
1. Introduction 4
1.1. Proposal 4
1.2. Reason for Assessment 4
1.3. Planning Conditions 4
1.4. Assessment Guidance Documentation 4
2. Environmental Noise Survey 4
2.1. Survey Measurement 4
2.2. Measurement Location 4
2.3. Site Descriptions 5
2.4. Noise Affecting the Development 5
2.5. Environmental Noise Survey Results 5
2.6. Weather Conditions 6
2.7. Measurement Equipment 6
3. Internal Noise Level Assessment 6
3.1. Design Criteria 6
3.2. Assessment Noise Levels 7
3.3. Internal Noise Calculations 7
4. Sound Insulation Scheme 7
4.1. External Building Envelope 7
4.2. Glazing and Ventilation 7
5. Internal Noise Levels 8
6. External Amenity Areas 9
7. Vibration Assessment 9
7.2. Measurement Procedure 9
7.3. Measured Vibration Levels 9
7.4. Vibration Assessment Conclusion 10
8. Conclusions 10
APPENDIX A – Measurement Details 11
APPENDIX B - Equipment Details 11
APPENDIX C - Meteorology Details 11
APPENDIX D - Calibration Details 11
APPENDIX E – Noise & Vibration Survey Time History 12
APPENDIX F – BS8233 Rigorous Design Calculations 14
APPENDIX G – Site Plans 16
APPENDIX H – Legislation, Policy and Guidance 19
APPENDIX I – Acoustic Terminology 21

1. Introduction

1.1. Proposal

It is proposed to convert the former methodist church building at Carr Lane, Slaithwaite, Huddersfield into 7 apartments.

1.2. Reason for Assessment

A noise and vibration assessment has been recommended via pre-app advice to be submitted as part of the upcoming planning application to ensure desirable noise levels are met within the habitable rooms of the proposed development and external amenity areas. The assessment aims to provide a sound insulation scheme for the development.

1.3. Planning Conditions

No planning conditions have yet been set for the proposed development.

1.4. Assessment Guidance Documentation

Guidance on the assessment and design criteria will be drawn from BS8233:2014 - *Guidance on sound insulation and noise reduction for buildings.* Table 4 in Section 7.7.2 of this standard suggests indoor ambient noise levels for dwellings.

Additional guidance will be drawn from 'ProPG: Planning & Noise' which was published *"to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England."*

Where necessary, mitigation recommendations will be given to comply with the requirements of the National Planning Policy Framework (2024) and the Noise Policy Statement for England (2010). Further information on all guidance documentation can be found in **Appendix H**.

2. Environmental Noise Survey

2.1. Survey Measurement

To assess the environmental noise and vibration levels affecting the proposed site, an unattended noise and vibration survey has undertaken at the site from 14th – 15th May 2025. This period was selected to capture events and noise levels on a typical weekday from nearby road and rail sources as well as noise from other nearby residential and commercial sources.

Measurements of $L_{Aeq,T}$ and L_{AFmax} were logged in 5- minute intervals in accordance with the provisions of BS7445 - 'Description and Measurement of Environmental Noise'.

2.2. Measurement Location

Monitoring position M1 was located to the west side of the site. The microphone was positioned approximately 1.7 metres above ground level and away from any reflective surfaces.

The site and monitoring locations are shown below in **Figure 1**:

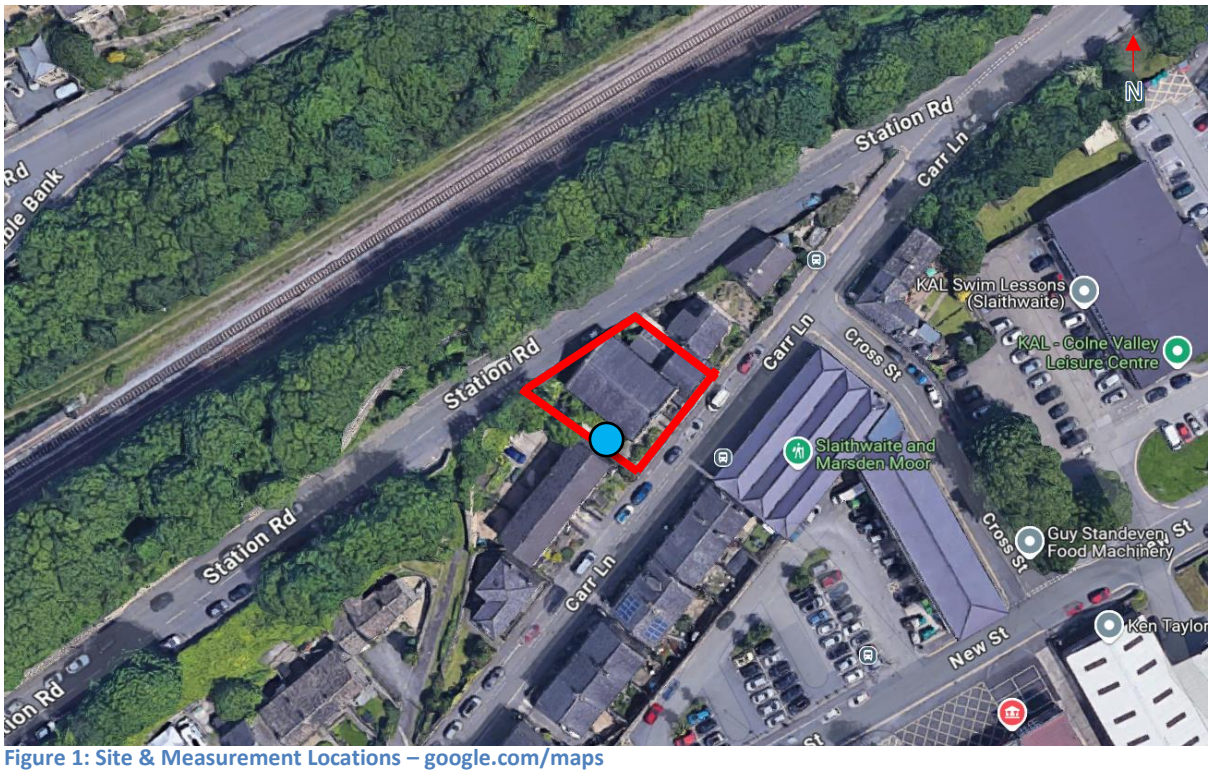


Figure 1: Site & Measurement Locations – google.com/maps

Monitoring Location (M1 & V1) Site Boundary (Approx.)

2.3. Site Descriptions

The site is located between Station Road and Carr Lane in Slaithwaite. To the northeast and southwest of the site are existing dwellings and gardens. On the opposite side of Carr Lane to the southeast there is also a terraced row of dwellings, a bus stop and Slaithwaite Town Hall and Library.

Station Road to the rear of the site is significantly higher than Carr Lane as the site is built into the side of a hill. Further to the rear of the site beyond station road and higher than the roof line of the site is a railway line running to and from Slaithwaite Station.

2.4. Noise Affecting the Development

The primary noise sources affecting the development were identified as light road traffic passing the site intermittently and trains passing also intermittently. Secondary sources were noted as high altitude air traffic and some construction noise at a nearby site.

2.5. Environmental Noise Survey Results

The results from the noise monitoring location M1 are summarised below.

The full-time history of the noise monitoring data is given in **Appendix E.**

Measurement	Date(s)	Period	L_{Aeq} (dB)	Typical* L_{AFmax} (dB)
M1	14th & 15th May 2025	Day (16hr Aggregate Periods)	54	-
	14th – 15th May 2025	Night (8hr)	49	76

Table 1: Environmental Measurement Summary

* The given 'Typical' L_{AFmax} levels are an average of the spectra of the noisiest 10 events of the night-time period.

2.6. Weather Conditions

Daytime temperatures of between 13 - 15°C were noted during the survey with winds of 3 – 5m/s. Detailed weather conditions are given in **Appendix C**.

2.7. Measurement Equipment

Measurement equipment complies with accuracy requirements for common environmental noise measurement standards. Equipment was calibrated before and after use and no significant drift occurred during measurements. Up-to-date calibration certification can be provided upon request. A detailed equipment list is given in **Appendix B** with calibration information in **Appendix D**.

3. Internal Noise Level Assessment

3.1. Design Criteria

BS8233:2014 - *Guidance on sound insulation and noise reduction for buildings* suggests indoor ambient noise levels for dwellings in Table 4, Section 7.7.2. These are summarised below.

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	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

Table 2: Indoor Ambient Noise Levels for Dwellings

BS8233 states that the guideline values given above are for 'noise without character', further stating:

> *"Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate."*

Table 4 of BS8233 also has accompanying notes that were subject to additions in ProPG. The relevant notes with the additions of ProPG are given below.

> *"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 LAmax,F more than 10 times a night."*

In considering the noise climate affecting the proposed development, as discussed in Section 2.4, it is deemed appropriate to use guidelines set out in BS8233 and ProPG to ensure the internal criteria set out by the WHO for internal noise maxima L_{Amax} and internal L_{Aeq}.

3.2. Assessment Noise Levels

In the interest of a robust assessment, the loudest of the measurement intervals, subject to irregular events, are to be considered in the assessment of internal noise levels and determining the sound insulation scheme.

The resultant external noise levels for the assessment of internal ambient noise levels are summarised in the table below.

Period	$L_{Aeq,T}$ (dB)	L_{Amax} (dB)
Daytime (1hr)	58	-
Night (1hr)	55	76

Table 3: Assessment Noise Levels

3.3. Internal Noise Calculations

Internal noise levels have been calculated to demonstrate that the proposed dwellings can achieve the desired design criteria when appropriate glazing and ventilation systems are utilised.

Internal arrangements of the dwellings have been submitted by the client, proposed drawings by 'Nick Moss Architects' have been used to scale room and glazing dimensions and can be found in **Appendix G**.

Assessment is not required for each individual room therefore a worst-case situation will be used in which the worst affected rooms/floors will be used.

Calculations of internal ambient noise levels have been undertaken using the 'rigorous calculation' method given in Annex G2 of BS8233:2014. Full details of the calculations are provided in **Appendix F.**

4. Sound Insulation Scheme

4.1. External Building Envelope

Material build-up of the façade will significantly dictate the noise levels within the proposed dwelling. For the purposes of this report, the heavyweight construction of the façade is assumed to provide a minimum sound reduction of 49 dB R_w.

Where the roof is to be utilised as a voided loft space with thermal insulation, no further details are required. If the proposed dwelling has rooms within the roof space, the additional material build-up will be assumed at a minimum sound reduction of 39 dB R_w.

4.2. Glazing and Ventilation

The following glazing and ventilation scheme for the development has been derived with a view of achieving the internal noise level criteria given in Table 2.

Internal Space	Glazing		Ventilation	
	Minimum Performance R_w (+C_{tr})[1]	Example Specification[2]	Minimum Performance $D_{ne,w}$,+C_{tr} (Open)	Example Specification[3]
Living Areas	30 (26)	Double Glazing: 4/16/4	32	Hit & Miss Trickle Vent (Open): Titon Trimvent XS13 4400EA
Bedrooms	34 (29)	Double Glazing: 4/16/6	40	Acoustically Treated Trickle Vent (Open): Titon Xtra Sound Attenuator V75 + C50

Table 4: Glazing & Ventilation Scheme

N.B. Note that other glazing configurations and ventilators can achieve the given minimum performance requirements.

[1] *The sound insulation value of the glazing should take into account the glass as well as the frame and perimeter seal.*

[2] *Example glazing specification format given as 'XXmm Float / 16mm Air gap / XXmm Float'*

[3] *It is noted that BS8233 section 7.2.2 states 'If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level'. This statement implies that the use of closed windows and an alternative means of ventilation is acceptable.*

5. Internal Noise Levels

It is determined that by using mitigation as specified in **Table 4** for the building façades, the outcome summarised in the following table is achieved.

Internal Space	Noise Parameter	Internal Noise Level (dB)	Within Design Criteria?
Living Room	Daytime $L_{Aeq,\ 16hr}$	31	Yes
Bedroom	Daytime $L_{Aeq,\ 16hr}$	27	Yes
	Night-time $L_{Aeq,\ 8hr}$	24	Yes
	Night-time $L_{Amax\ F}$	45	Yes

Table 5: Internal Noise Levels

For the daytime assessment for living areas, the desirable limit of BS8233:2014 suggests a guideline of 35 dB $L_{Aeq,16hr}$ for resting conditions, and up to 40 dB is considered acceptable for necessary developments.

All results, with the implementation of the derived sound insulation scheme given in **Table 4**, would place the internal daytime noise levels below 35 dB, therefore within the desired limit.

For the night-time assessment for bedrooms, BS8233:2014 suggests a desirable guideline of 30 dB $L_{Aeq,\ 8hr}$ for sleeping conditions, with an acceptable limit of 35 dB $L_{Aeq,\ 8hr}$.

Implementation of the derived sound insulation scheme given in **Table 4** would place the internal continuous night-time noise levels below 30 dB, therefore within the desirable category.

For the night-time assessment for bedrooms, ProPG suggests that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night.

Implementation of the derived sound insulation scheme given in **Table 4** would place the internal $L_{Amax,F}$ night-time events below 45 dB, therefore within the criteria.

6. External Amenity Areas

BS8233:2014 provides a desirable guideline of 50 dB $L_{Aeq,16hr}$ for external amenity spaces and an acceptable guideline of 55 dB $L_{Aeq,16hr}$ for noisier environments.

External noise levels have been measured on site to be 54dB $L_{Aeq,\ 16hr}$ which places the site within the 'acceptable' guidelines for external amenity noise levels.

7. Vibration Assessment

Vibration generated by the nearby roads and railway line is to be assessed against 'Table 1 of BS6472-1:2008', which determines the likelihood of adverse comment based on VDV day/night levels, as given below:

Place and Time	Low probability of adverse comment $m/s^{-1.75}$	Adverse comment possible $m/s^{-1.75}$	Adverse comment probable $m/s^{-1.75}$
Residential buildings *(16 hr day)*	0.2 – 0.4	0.4 – 0.8	0.8 – 1.6
Residential buildings *(8 hr night)*	0.1 – 0.2	0.2 – 0.4	0.4 – 0.8

Table 6: Vibration Criteria

7.2. Measurement Procedure

Measurements of VDV were undertaken using a Svantek 958 logging vibration meter and Svantek SV84 Ground Vibration Accelerometer. The accelerometer was mounted upon a Svantek SA207B base plate and placed to the southwest side of the site, as indicated in Figure 1 (V1). The orientation of the accelerometer was as follows:

Axis	Position
X	~Perpendicular to Rail Lines
Y	~Parallel to Rail Lines
Z	90° Vertical to ground

Table 7: Accelerometer Orientation

Full details of instrumentation are given in **Appendix B**.

7.3. Measured Vibration Levels

The results of the vibration survey are shown below:

Place and Time	Periods	Vibration Dose Value $m/s^{-1.75}$			BS6472-1 Outcome
		X Axis	Y Axis	Z Axis	
VDV *(16 hr day)*	14th & 15th May 2025	0.0010	0.0009	0.0040	*Low probability of adverse comment*
VDV *(8 hr night)*	14th - 15th May 2025	0.0005	0.0004	0.0014	*Low probability of adverse comment*

Table 8: Vibration Levels Results

The full-time history of the vibration monitoring data is given in **Appendix E.**

7.4. Vibration Assessment Conclusion

The measured results demonstrate that the vibration levels are highest in the Z-Axis, corresponding to vertical vibrations. All results, however, fall well below the range of 'Low probability of adverse comment' in accordance with BS 6472-1:2008. No mitigation to protect future occupants of the proposed dwellings from vibration is therefore deemed necessary.

8. Conclusions

A noise and vibration assessment has been undertaken at the Former Methodist Church, Carr Lane, Slaithwaite in relation to the proposed change of use to apartments.

Environmental noise and vibration monitoring has been undertaken at the site from 14th – 15th May 2025. Noise affecting the development was determined to be primarily from road and rail sources.

A glazing and ventilation scheme has been given to ensure conditions in habitable rooms remain within the design criteria.

Internal noise levels are anticipated to be within the guidelines of BS8233 with comments from ProPG.

The vibration assessment determines a 'Low probability of adverse comment' with no mitigation necessary.

APPENDIX A – Measurement Details

Measurement(s)	Kit	Start Date	Start Time	End Date	End Time
M1 & V1	1	14/05/2025	14:50	15/05/2025	13:25

APPENDIX B - Equipment Details

Kit	Equipment	Make	Model	Class	Serial Number
1	Noise & Vibration Meter	Svantek	958	1	34525
	Pre-Amp	Svantek	SV12L	1	32484
	Microphone	Microtech Gefell	MK255	1	11561
	Base plate	Svantek	SA207B	1	34525
	Accelerometer	Svantek	SV84	1	D8652

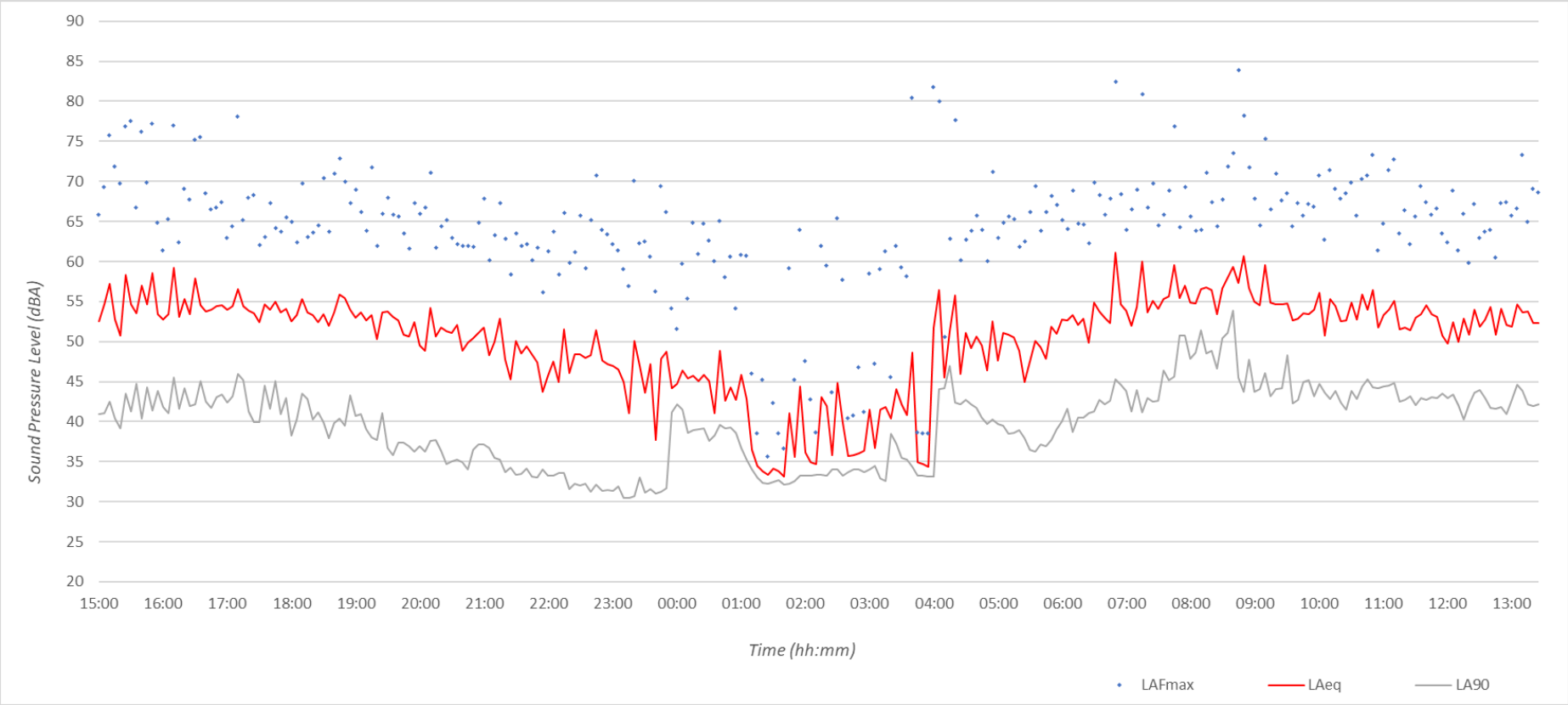
APPENDIX C - Meteorology Details

Date	Temp C°	Wind Speed m/s	Wind Direction	Humidity %	Precipitation mm	Cloud Cover (Oktas)
14/05/2025	14	3	NE	52	0	3/8
15/05/2025	15	5	S	66	0	4/8

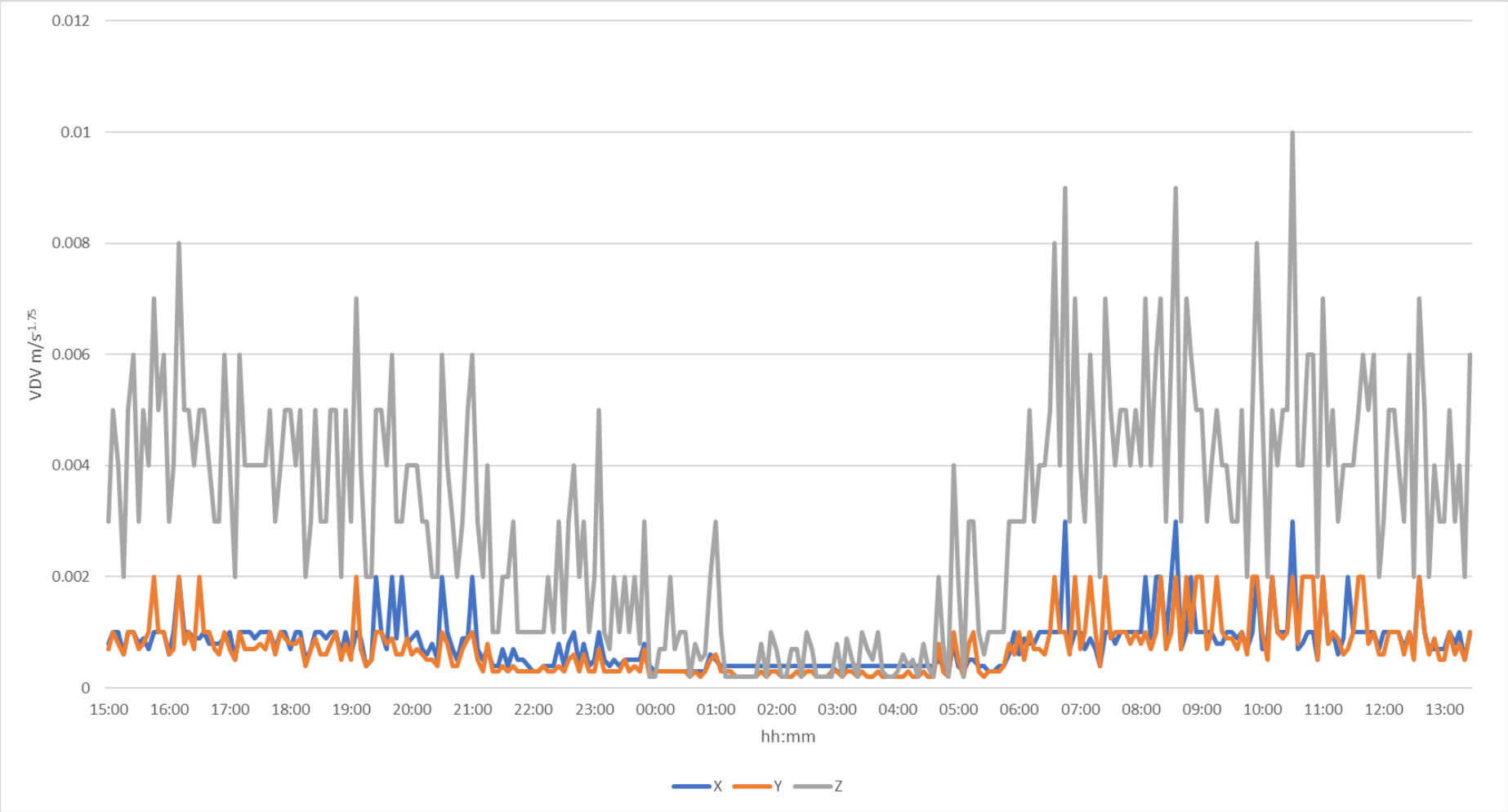
APPENDIX D - Calibration Details

Kit	Calibrator Ref Level (dB)	Deviation Before (dB)	Deviation After (dB)
1	113.80	0.3	0.2

APPENDIX E – Noise & Vibration Survey Time History



Environmental Noise Measurement M1 Time History: 14th – 15th May 2025



Environmental Vibration Measurement V1 Time History: 14th – 15th May 2025

APPENDIX F – BS8233 Rigorous Design Calculations

Living / Kitchen

BS8233:2014 Façade Noise Break In Calculator

	125	250	500	1k	2k	dBA
Daytime External Noise Level - LAeq - 1 hour	55.4	53.3	51.9	53.4	50.3	57
Night-time External Noise Level - LAeq - 1 hour						
Night-time Lmax Noise Levels - 10 times per night						

Room Properties					Room Coefficient					
Width (m)	Height (m)	Depth (m)	Glazing	Reverb Time	14	14	15	16	15	A
4	2.4	6.5	7	0.7	0.7	0.7	0.7	0.6	0.7	RT

Façade Construction		SRI (Sound Reduction Index)					Rw
Wall Construction	Brick and block, 75mm cavity, 60mm Fibreglass	31	46	43	49	56	49(44)
Roof Construction	Not Within Roof Space	0	0	0	0	0	N/A
Glazing Spec	4 / 16 / 4	24	18	26	40	45	30(26)
Ventilation Spec	Hit & Miss Trickle Vent (Open)	38.4	36.8	33.8	29.7	33.8	32

Calculation Results			125	250	500	1k	2k	dBA
Daytime Internal Noise Level - LAeq	Target Value <	35	16.5	26.9	23.9	26.9	21.1	31.4
Night-time Internal Noise Level - LAeq	Target Value <							
Internal LAmax Noise Levels	Target Value <							

Sound Insulation Requirement

	Minimum Sound Insulation Requirement		Suitable Systems
Glazing	**30(26)**	dB $R_{W(+Ctr)}$	*Double Glazing*
			4 / 16 / 4
Ventilation	**32**	$D_{n,e,w+Ctr}$	*Hit & Miss Trickle Vent (Open)*
			Titon Trimvent XS13 4400EA

Suitable systems given as reference only. Other products that achieve the required sound insulation values are available.

Calculations conducted in accordance with BS8233:2014 rigorous calculation method

$$L_{eq,2} = L_{eq,ff} + 10\log_{10}\left(\frac{A_0}{S}10^{\frac{-D_{AS}}{10}} + \frac{S_{wi}}{S}10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S}10^{\frac{-R_{ew}}{10}} + \frac{S_{tr}}{S}10^{\frac{-R_{tr}}{10}}\right) + 10\log_{10}\left(\frac{S}{A}\right) + 3$$

Bedroom

BS8233:2014 Façade Noise Break In Calculator

	125	250	500	1k	2k	dBA
Daytime External Noise Level - LAeq - 1 hour	55.4	53.3	51.9	53.4	50.3	57
Night-time External Noise Level - LAeq - 1 hour	52.1	51.5	49.6	51.0	47.1	54
Night-time Lmax Noise Levels - 10 times per night	73.3	71.4	70.3	70.8	68.0	74

Room Properties					Room Coefficient					
Width (m)	Height (m)	Depth (m)	Glazing	Reverb Time	5	5	6	6	6	A
2.8	2.4	3	2.3	0.6	0.6	0.6	0.6	0.5	0.5	RT

Façade Construction		SRI (Sound Reduction Index)					Rw
Wall Construction	Brick and block, 75mm cavity, 60mm Fibreglass	31	46	43	49	56	49(44)
Roof Construction	Not Within Roof Space	0	0	0	0	0	N/A
Glazing Spec	4 / 16 / 6	24	21	29	43	43	34(29)
Ventilation Spec	Acoustically Treated Trickle Vent (Open)	40.7	38.8	35.8	42.3	43.9	40

Calculation Results			125	250	500	1k	2k	dBA
Daytime Internal Noise Level - LAeq	Target Value <	35	16.5	23.3	21.1	16.2	12.7	26.5
Night-time Internal Noise Level - LAeq	Target Value <	30	13.1	21.5	18.8	13.7	9.5	24.3
Internal LAmax Noise Levels	Target Value <	45	34.4	41.4	39.5	33.5	30.4	44.6

Sound Insulation Requirement

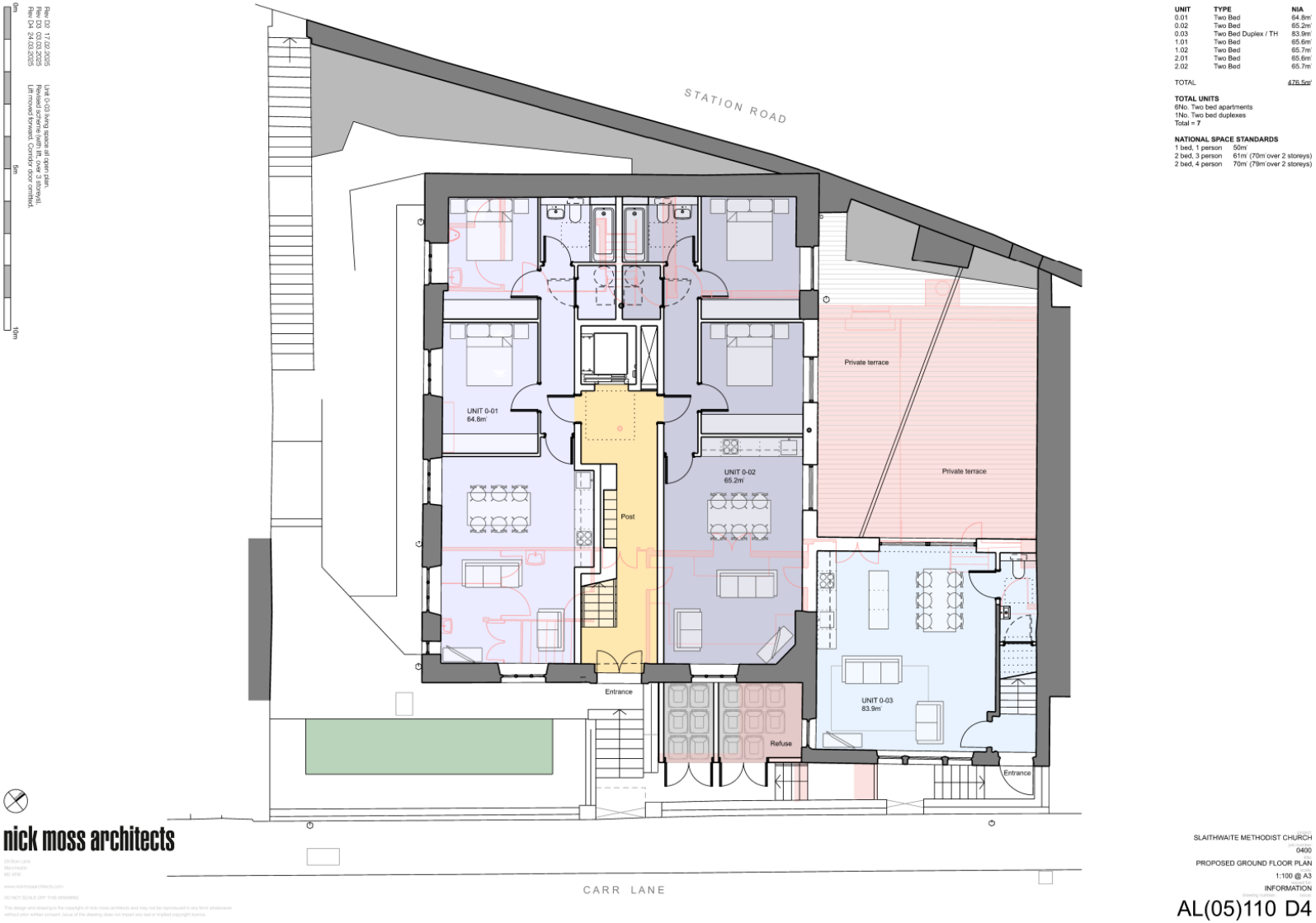
	Minimum Sound Insulation Requirement		Suitable Systems
Glazing	**34(29)**	dB $R_{W(+Ctr)}$	*Double Glazing*
			4 / 16 / 6
Ventilation	**40**	$D_{n,e,w+Ctr}$	*Acoustically Treated Trickle Vent (Open)*
			Titon Xtra Sound Attenuator V75+C50

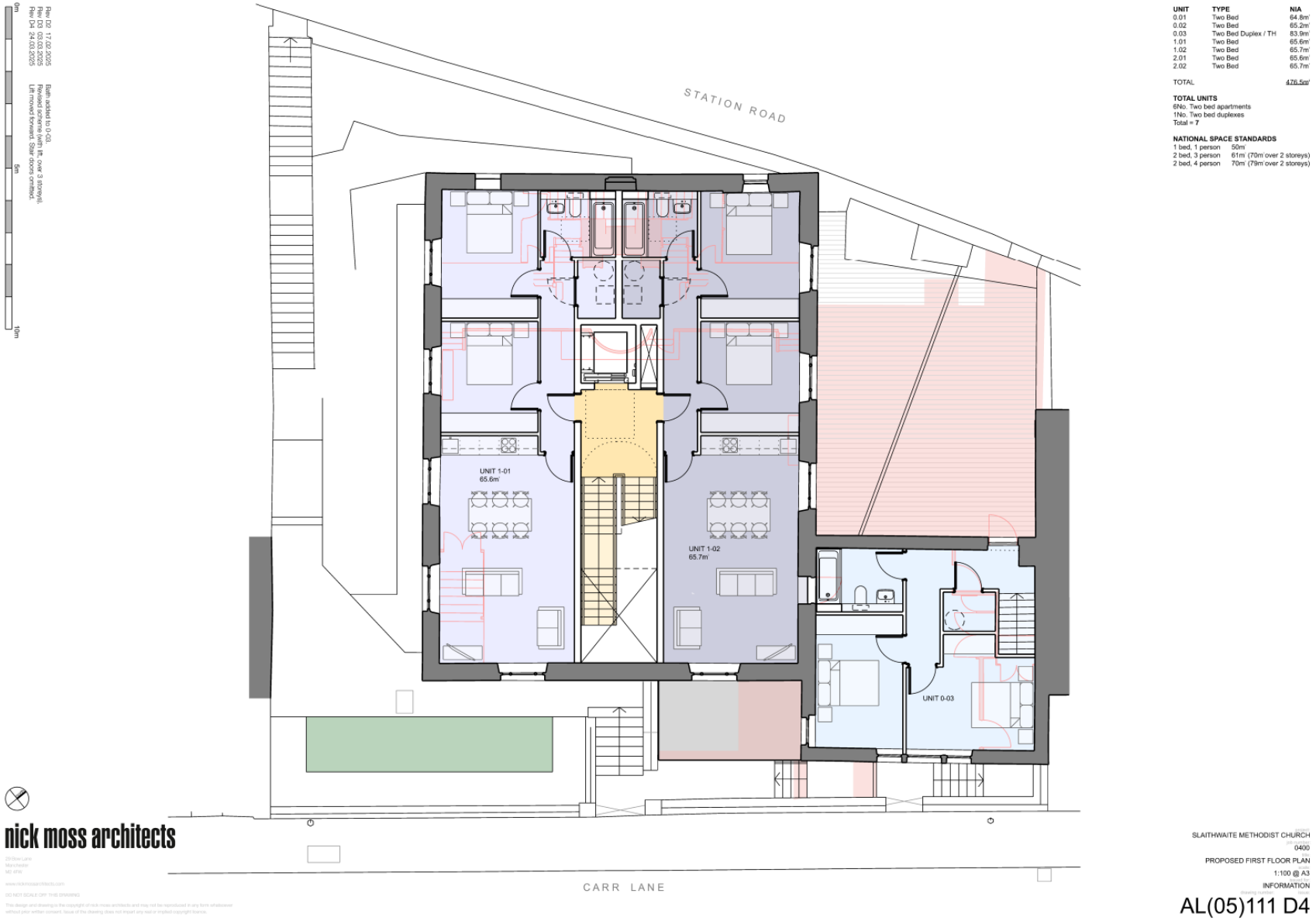
Suitable systems given as reference only. Other products that achieve the required sound insulation values are available.

Calculations conducted in accordance with BS8233:2014 rigorous calculation method

$$L_{eq,2} = L_{eq,ff} + 10\log_{10}\left(\frac{A_0}{S}10^{\frac{-D_{ss}}{10}} + \frac{S_{wi}}{S}10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S}10^{\frac{-R_{ew}}{10}} + \frac{S_{tr}}{S}10^{\frac{-R_{tr}}{10}}\right) + 10\log_{10}\left(\frac{S}{A}\right) + 3$$

APPENDIX G – Site Plans



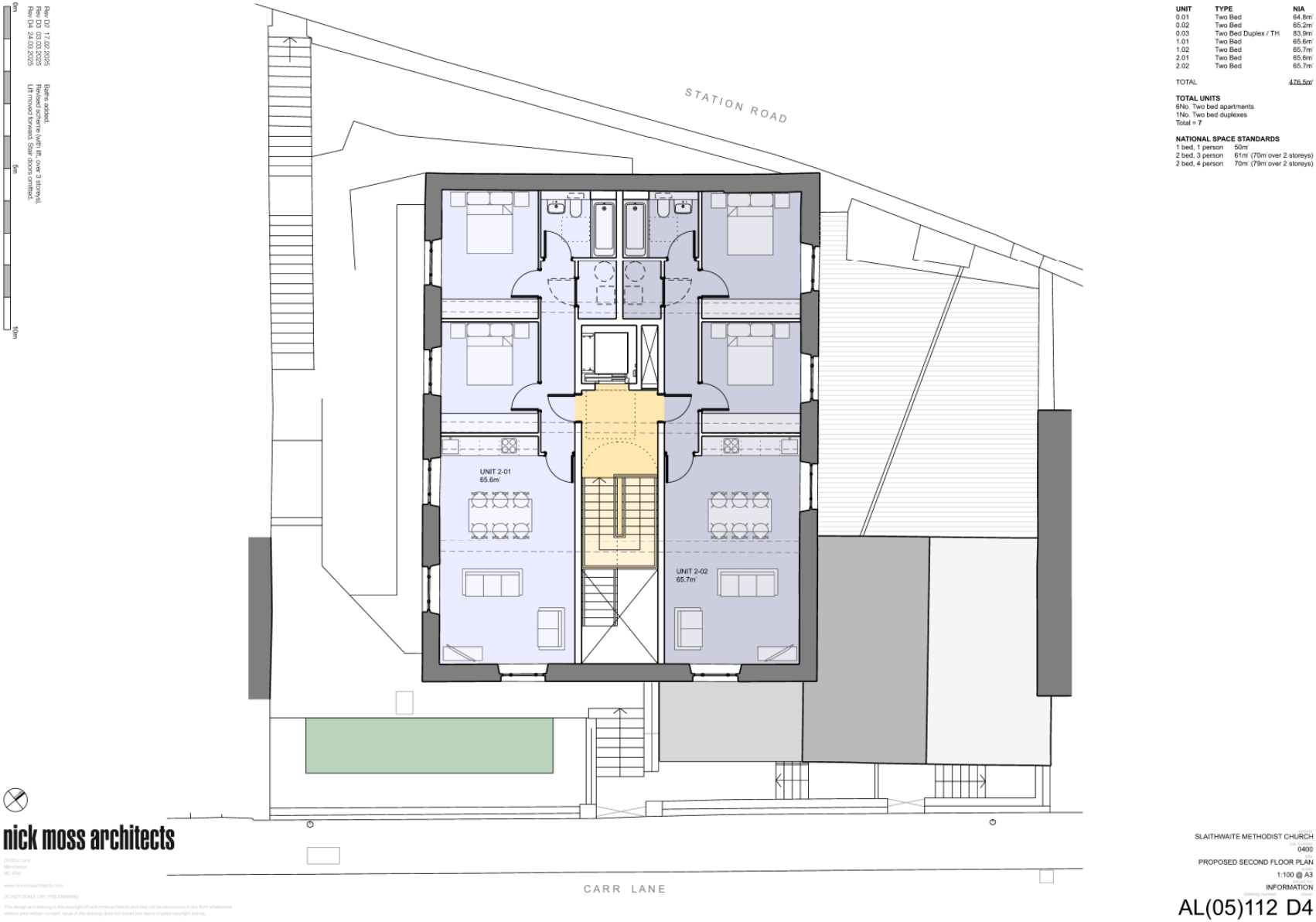


UNIT	TYPE	NIA
0.01	Two Bed	64.8m²
0.02	Two Bed	65.2m²
0.03	Two Bed Duplex / TH	83.9m²
1.01	Two Bed	65.6m²
1.02	Two Bed	65.7m²
2.01	Two Bed	65.6m²
2.02	Two Bed	65.7m²
TOTAL		476.5m²

TOTAL UNITS
6No. Two bed apartments
1No. Two bed duplexes
Total = **7**

NATIONAL SPACE STANDARDS

1 bed, 1 person	50m²
2 bed, 3 person	61m² (70m² over 2 storeys)
2 bed, 4 person	70m² (79m² over 2 storeys)



UNIT	TYPE	NIA
0.01	Two Bed	64.8m²
0.02	Two Bed	65.2m²
0.03	Two Bed Duplex / TH	83.9m²
1.01	Two Bed	65.6m²
1.02	Two Bed	65.7m²
2.01	Two Bed	65.6m²
2.02	Two Bed	65.7m²
TOTAL		476.5m²

TOTAL UNITS
6No. Two bed apartments
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Total = **7**

NATIONAL SPACE STANDARDS

1 bed, 1 person	50m²	
2 bed, 3 person	61m²	(70m² over 2 storeys)
2 bed, 4 person	70m²	(79m² over 2 storeys)

APPENDIX H – Legislation, Policy and Guidance

Guidance for the assessment of noise affecting new residential development is given in the National Planning Policy Framework (NPPF). Section 15 of the NPPF states:

> *"174. 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…noise pollution."*

Section 185 further states:

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

Section 187 states:

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

To avoid and mitigate adverse noise effects on health arising from and impacting on new development, the NPPF makes reference to NPSE. The Noise Policy Statement for England (NPSE) was published in March 2010 and covers all forms of noise other than occupational noise.

The Noise Policy Statement for England (NPSE) states the following aims in paragraph 2.2.

> **NOEL – No Observed Effect Level.**
> *This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.*
>
> **LOAEL – Lowest Observed Adverse Effect Level**.
> *This is the level above which adverse effects on health and quality of life can be detected.*
>
> **SOAEL – Significant Observed Adverse Effect Level.**
> *This is the level above which significant adverse effects on health and quality of life occur.*

The NPSE does not define the SOAEL numerically, stating in paragraph 2.22:

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

There is no local or national guidance on how the three terms should be defined numerically, it is for the assessor to collate and interpret appropriate guidance on noise, such as may be found in British Standards, and correlate the guidance with the concepts of NOEL, LOAEL and SOAEL.

BS8233:2014 - *Guidance on sound insulation and noise reduction for buildings* suggests indoor ambient noise levels for dwellings in Table 4, Section 7.7.2. These are summarised below.

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	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

BS8233 states that the guideline values given above are for 'noise without character', further stating:

> *"Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate."*

Table 4 of BS8233 also has accompanying notes that were subject to additions in ProPG. The relevant notes with the additions of ProPG are given below.

> *"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 LAmax,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 LAmax,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."*

"NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal LAeq target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved."

APPENDIX I – Acoustic Terminology

To aid the understanding of acoustic terminology and the relative difference between noise levels the following background information is provided.

We perceive sound when the ear detects fluctuations in air pressure (sound waves), which are then processed by the brain and perceived as sound. Humans can hear an incredibly wide range of sound intensities ranging from jet engines to fingertips lightly brushing against each other. This range is quantified using a logarithmic scale called the decibel scale (dB). The comfortable range of the decibel scale typically ranges from 0dB (the threshold of hearing) to around 140dB. Here are some examples of common environments and their typical noise levels.

Noise Level	Environment
0 dB(A)	Threshold of hearing
20 to 30 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a moving car
60 to 70 dB(A)	Typical high street
100 to 110 dB(A)	Fire alarm at 1 meter away
140 dB(A)	Threshold of pain

Terminology

dB (decibel) – A unit used to quantify the pressure level of sound. Defined as 20 times the logarithm of the ratio between the root-mean-square pressure of a given sound field and a reference pressure level ($2x10^{-5}$ Pa – threshold of hearing).

$L_{Aeq,T}$ – The equivalent continuous sound pressure level over a stated period. It quantifies a fluctuating sound level over a given period as the equivalent continuous sound level over which the same amount of acoustic energy is contained over. This is A-weighted in order to assess human perception.

L_{Amax} – the maximum RMS A-weighted sound pressure level occurring within a specified time period; the time weighting is typically either Fast or Slow.

A-Weighting – A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.

R_w – The Weighted Sound Reduction Index (R_w) is a number used to rate the effectiveness of a soundproofing system or material.

$D_{n,e,W}$ – The Weighted Sound Reduction Index specifically for ventilators.

C_{tr} – C_{tr} is a spectrum adaptation term which method is defined in BS EN ISO 717. The standard uses a reference curve to determine the weighted value of airborne sound insulation. The spectrum adaptation terms C and C_{tr} may are used to take into account different source spectra. 'C_{tr}' is the A-weighted urban traffic noise spectrum.