Paul Horsley Acoustics Ltd
Acoustics & Noise Control Consultancy

Acoustic Report

Environmental Noise Survey
Proposed Basement Conversion to
Residential Dwellings at
103 Northgate, Almondbury, Huddersfield, HD5 8UU.

Our Reference – J3094 Rev 2

Survey Dates – Between 13th and 14th April 2022

Survey and Report by – Paul Horsley MIOA

Date of Report: 15.04.22

Paul Horsley Acoustics Limited, 1 Upper Lane, Gomersal, West Yorkshire, BD19 4JD Tel: 01274 879020
Web: www.paulhorsleyacoustics.com email: paulhorsleyacoustics@outlook.com
Registered in England No. 05630171 Directors: P Horsley MIOA, MJ Horsley

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Limitations

The assessments and interpretation have been made in line with legislation and guidelines in force at the time of writing, representing best practice at that time.

All of the comments and opinions contained in this report, including any conclusions, are based on the information obtained by Paul Horsley Acoustics Ltd during our investigations.

There may be other conditions prevailing on the site which have not been disclosed by this investigation and which have not been considered by this report. Responsibility cannot be accepted for conditions not revealed by the investigation.

Any diagram or opinion of the possible configuration of the findings is conjectural and given for guidance only and confirmation of intermediate ground conditions should be considered if deemed necessary.

Except as otherwise requested by the Client, Paul Horsley Acoustics Ltd is not obliged and disclaims any obligation to update the report for events taking place after:

a) the date on which this assessment was undertaken; and
b) the date on which the final report is delivered.

Paul Horsley Acoustics Ltd makes no representation whatsoever concerning the legal significance of its findings or to other legal matters referred to in the following report.

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1.0 Agent

Martin Walsh Associates Ltd
Firth Buildings
99-103 Leeds Road
Dewsbury
WF12 7BU

2.0 Subject

Proposed basement conversion and extension to form 2 No residential dwellings at Stonebow House, 103 Northgate, Almondbury, Huddersfield, HD5 8UU.

3.0 Aims

The aim of this report is to determine the existing baseline background noise environment levels, over a typical weekday day and nighttime period, affecting the proposed redevelopment location to inform Planning Application No 2022/90057 for the site.

Provide an assessment of the results in accordance with the recommendations laid down in the National Planning Policy Framework, NPPF, for the proposed redevelopment site with respect to noise.

Provide mitigating noise control advice relating to the achievement of an acceptable internal environment for the development as recommended with World Health Organization's "Guidance for Community Noise, 1999".

Consider any mitigation measures necessary to preserve the amenity of the incumbent residents.

4.0 Location and Description of Existing Noise Sources

The redevelopment site is located at the basement level of Stonebow House No 103 Northgate, Almondbury and is currently an unoccupied area of the property. The current ground floor area of the building is formed by commercial shop units, with the 1st and 2nd floor levels formed into 3 No self-contained residential flats.

There is a proposal to redevelop the basement area of the building to form 2 No self-contained residential premises, consisting of a 2 bedroomed flat and a studio apartment.

The specific site occupies the basement area of a semi-detached property located at the eastern side of Northgate, the main road running through Almondbury. Northgate includes a mix of commercial and residential premises along its length. The site has a private drive to a resident's only parking area to the east and no external recreational areas.

The site is bounded to the west by Northgate and on the opposite side of the road is a small bus station with further commercial premises. The attached property to the north of the site is occupied by a single storey commercial shop unit. The eastern site boundary is formed by the residential car park area with a perimeter wall. Beyond the wall is a former mill building currently used as a shop unit. The southern boundary is formed by a stone wall beyond which are the rear elevations of residential premises located along Watercroft.

The primary noise sources within the vicinity of the site are predominantly due to low traffic flow traffic noise along the Northgate and the nearby road network. Noise associated with birdsong is also audible during daytime periods.

5.0 Guidance on the Assessment of Noise Levels

The purpose of any criterion or standard for environmental noise should be to safeguard against unacceptable levels of community response, deemed as a feeling of annoyance during daytime or disturbance at night. WHO defines annoyance as "a feeling of displeasure evoked by noise"

The main source of information relating to noise and the community response are field studies including noise measurements and social surveys. These surveys attempt to establish a correlation between the two sets of results.

In the absence of any definitive guidance and to establish suitable noise criteria, it is necessary to rely on general guidance and assessment methods used for community noise sources. Discussions on the current methods are given below.

5.1 BS4142:2014+A1:2019 'Method for Rating and Assessing Industrial and Commercial Sound'

This recently revised standard provides a method for rating and assessing sound of an industrial and/or commercial nature. The method uses outdoor sound levels to assess the effect of sound on people who might be inside or outside a dwelling or premises used for residential purposes. It is limited to applicable sounds and is not intended for noise amounting to nuisance or rating noise outside the scope of the Standard.

Unlike the previous version of the Standard, rating levels are not prescriptive, but more context based, with the following applicable to rating values:

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

The Standard introduces additional rating elements, these being subject assessments of tonality, and impulsivity of a sound source, with weighted rating values accordingly applied at the judgment of the assessor.

5.1.1 Description of Acoustic Features

If the assessed plant noise contains attention catching features (such as tonal elements, whines, whistles, bangs etc.), the plant should be designed or acoustically treated to reduce the appropriate output based on the type and impact of the features.

If appropriate, a subjective assessment of the plant features can be adopted. Where the plant noise contains tonal elements, the following corrections can be made depending on how perceptible the tone is at the noise receptor:

- 0 dB where the tone is not perceptible.
- 2 dB where the tone is just perceptible.
- 4 dB where the tone is clearly perceptible.
- 6 dB where the tone is highly perceptible.

Where the plant noise is impulsive, the following corrections can be made depending on how perceptible the impulsivity is at the noise receptor:

- 0 dB where the impulse is not perceptible.
- 3 dB where the impulse is just perceptible.
- 6 dB where the impulse is clearly perceptible.
- 9 dB where the impulse is highly perceptible.

For noise, which is equally both impulsive and tonal, then both features can be considered by linearly summing the corrections for both characteristics.

If the plant has other distinctive characteristics, such as intermittency, then a +3 dB correction can be made.

If a subjective assessment is not appropriate, then an objective assessment can be made. A noise source is deemed to be tonal if the time averaged sound pressure level in a one-third octave band exceeds the level in adjacent one-third octave bands by the level differences given below:

- 15 dB in the low frequency one-third octave bands (25 Hz to 125 Hz)
- 8 dB in the mid frequency one-third octave bands (160 Hz to 400 Hz)
- 5 dB in the high frequency one-third octave bands (500 Hz to 10000 Hz)

If an objective assessment identifies the plant noise to be tonal then a 6 dB correction must be made.

5.1.2 Uncertainty

The introduction of Uncertainty has been applied to the measured values; again, consideration of this is left to the professional executing the survey and assessment. However, steps are provided within the Standard for the reduction of uncertainty in both measurement and calculations of the sound source and rating value.

Actual meteorological conditions are now required to be recorded and reported upon for the survey and report.

5.2 British Standard 8233:2014

The scope of British Standard 8233: 2014: *Sound insulation and noise reduction for buildings* is the provision of guidance for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations; the primary intention of these is to guide the design of new buildings or refurbished buildings undergoing a change of use rather than to assess the effect of changes in the external noise climate.

The standard suggests suitable internal noise levels within diverse types of buildings, including residential dwellings, as shown in Table below.

Indoor Ambient Noise Levels in Spaces When They Are Unoccupied

Activity	Typical Situations	Design Range LAeq, T dB	
		0700h to 2300h	2300h to 0700h
Resting	Living rooms	35	--
Dining	Dining Room / Area	40	--
Sleeping	Bedrooms	35	30

BS 8233:2014 states in Note 4 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 $L_{Amax,\ F}$ depending on the character and number of events per night. Sporadic noise events could require separate values."

As such it has been considered appropriate to define a limit for regular maximum indoor noise levels of 45 dB(A) with sporadic events not exceeding 50 dB(A).

BS8233 also suggests noise limits for external areas or a property such as gardens or balconies. It states that:

'For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,\ T}$, with an upper guideline value of 55 dB $L_{Aeq,\ T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as a city centre, or urban area adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited.'

5.3 National Planning Policy Framework, NPPF.

The newly incumbent National Planning Policy Framework, NPPF, provides advice to planning authorities in England on how they must seek to minimise the adverse impact of noisy activities on noise sensitive receptors. This NPPF, replacing PPG 24, and is not prescriptive with respect to specific noise levels, and is concerned with the advising on good practice for environmental noise assessment.

In the absence of definitive noise criterion within the NPPF most Local Authorities in England default to the daytime noise levels inside dwellings not to exceed NR 35; and NR 25, to be achieved inside dwellings at night to avoid sleep disturbance, based upon ingress of external noise sources.

5.4 Noise Policy Statement for England, NPSE.

The document "Noise Policy Statement for England" sets out the following vision for ongoing noise policy:

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

This vision should be achieved through the following Noise Policy Aims:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:"
"avoid significant adverse impacts on health and quality of life;"
"mitigate and minimise adverse impacts on health and quality of life; and"
"where possible, contribute to the improvement of health and quality of life."

To achieve this vision the Noise Policy Statement sets three noise levels to be defined by the assessor:

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 Noise Policy Statement considers that noise levels above the SOAEL would be seen to have, by definition, significant adverse effects and would be considered unacceptable. Where the assessed noise levels fall between the LOAEL and the SOAEL Noise levels, the Policy Statement requires that:

"all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development…. This does not mean that such adverse effects cannot occur."

Where noise levels are below the LOAEL it is considered there will be no adverse effect. Once noise levels are below the NOEL there will be no observable change.

5.5 World Health Organization 1999 "Guidance for Community Noise"

This document provides a review of the effects of noise and a description of the principles of the WHO health criteria and guidelines for Community Noise.

The effects of noise in dwellings are identified as sleep disturbance, annoyance, and speech interference. For bedrooms, the critical effect is sleep disturbance. Indoor guideline values for bedrooms are 30 dB LAeq for continuous noise and 45 dB LAmax for sound events. At nighttime, outside sound levels about 1 metre from facades of living spaces should not exceed 45 dB LAeq, so that people may sleep with bedroom windows open. This value is equivalent to that specifies in the Criteria 12 document; however, it is now assumed that the noise reduction from outside to inside with the window open is 15 dB.
To enable casual conversation indoors during the daytime, the sound level of the interfering noise should not exceed 35 dB LAeq.

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 50 dB LAeq.

Table 1 of the document summarises the guideline values for community noise in specific environments and includes the noise indices to be adopted. Significantly, the corresponding time base to be used for the assessment is also included.

The relevant extracts of Table 1 are reproduced thus:

Specific Environment	Critical health effect (s)	LAeq dB	Time Base hours	LAMax dB
Outdoor living area	Serious annoyance, daytime, and evening	55	16	-
	Moderate annoyance, daytime, and evening	50	16	-
Dwelling, Indoors	Speech intelligibility & moderate annoyance daytime & evening.	35	16	-
	Sleep Disturbance, night-time	30	8	45
Outside Bedroom	Sleep disturbance, window open (Outdoor Values)	45	8	60

5.6 Subjective Impression of Noise Changes

The following Table provides a semantic scale that may be used to "subjectively" rate changes in sound pressure level.

Table 1: Subjective effect of changes in sound pressure level

Change in sound level dB	Change in Power		Change in apparent loudness
	Decrease	Increase	
3	1/2	2	Just perceptible
5	1/3	3	Clearly noticeable
10	1/10	10	Half / Twice as loud
20	1/100	100	Much quieter / louder

After Bies and Hansen

This table is taken from Professor Colin H Hansen's publication "Fundamentals of Acoustics" page 41, for the Department of Mechanical Engineering, University of Adelaide.

This table also appears in "Engineering Noise Control" by Colin Hansen and David Bies, a comprehensive reference book, amongst others.

6.0 Survey Equipment

Svantek Sound and Vibration Analyser, SVAN 979, Type 1, Serial No 92932, Calibration Date 19.07.21
Svantek Preamplifier, SV 17 Microphone Serial No 106523, Calibration Date 19.07.21
GRAS Pre-Amplifier, Type GRAS 40AE, Serial No 370153
RION NC-74 Calibrator Serial No 530712, Calibration Date 14.07.21
Windshield
Tripod

7.0 Survey Method

An attended pre-development environmental noise assessment survey was carried out encompassing daytime, and nighttime periods between 13th and 14th April 2022 by the author.

LA_{eq}, LA_{90}, LA_{10} and LA_{max} sound measurements were taken using the sound analyser.

The measurement indices noted above are defined as follows:

LA_{eq}, T the "A" weighted equivalent continuous noise level of sample period T

LA_{10}, T the "A" weighted level exceeded for 10% of sample period T

LA_{90}, T the "A" weighted level exceeded for 90% of sample period T

LA_{max} The "A" weighted maximum level during the sample period T

Various sound measurements were taken using the sound analyser. The meter was calibrated before and after the measurements using the calibrator to ensure accuracy of the results. No fluctuations were noted between calibrations and the results obtained can be deemed to be an accurate representation of the levels recorded.

The meter was mounted on the tripod at a height of 1.5m above ground and at least 3m from any reflective plain. Refer to Appendix A for a marked up locational sketch for the survey points.

8.0 Prevailing Weather Conditions

13-14th April 2022 - Nighttime - 9°C, 5% cloud cover, wind W 0-2 mph, 89% rh, 1019 mb
14th April 2022 - Daytime - 15C, 85% cloud cover, wind WSW 0-1 mph, 78% rh, 1021 mb

Road surfaces were dry throughout the monitoring periods.

9.0 Pre-Development Noise Survey Results

During the monitoring period separate noise samples were recorded, using a 1/1 Octave Centre Band analysis. These monitoring samples were collected from the eastern boundary at the same location for daytime, and nighttime periods. This was to establish the general noise levels experienced externally by the site at the most exposed position available and therefore likely to experience the worst-case noise climate.

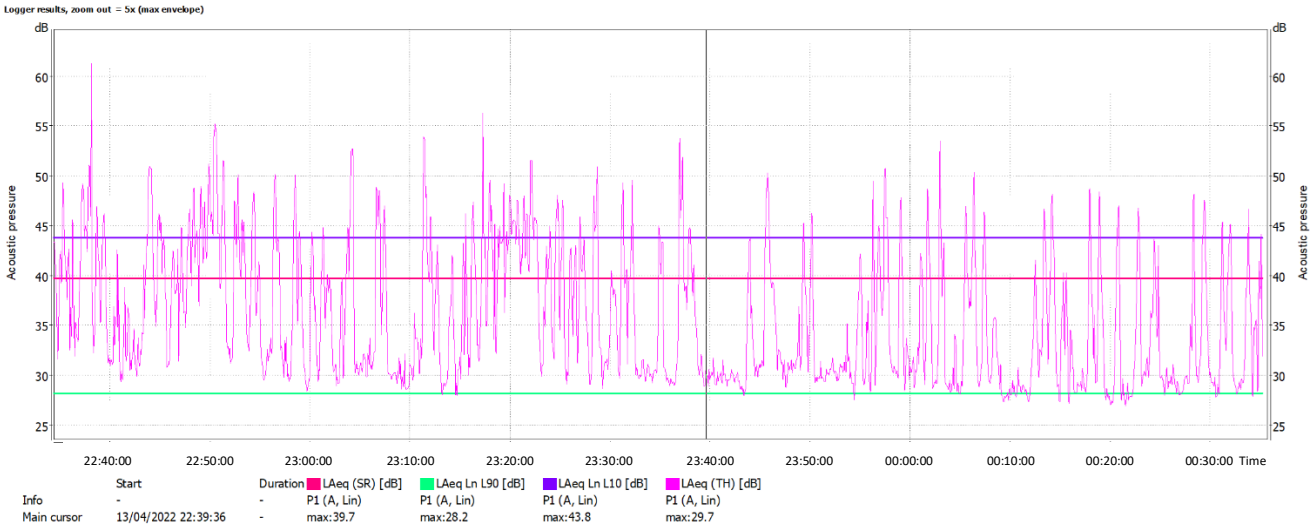
The table of results on the following page indicates the noise levels recorded for the site location selected during the monitoring period, with a brief description of the noise sources contributing to the individually monitored noise levels recorded.

The above monitoring locations should be read in conjunction with the site layout appearing in Appendix A of this report.

10.0 Noise Survey Results Tables

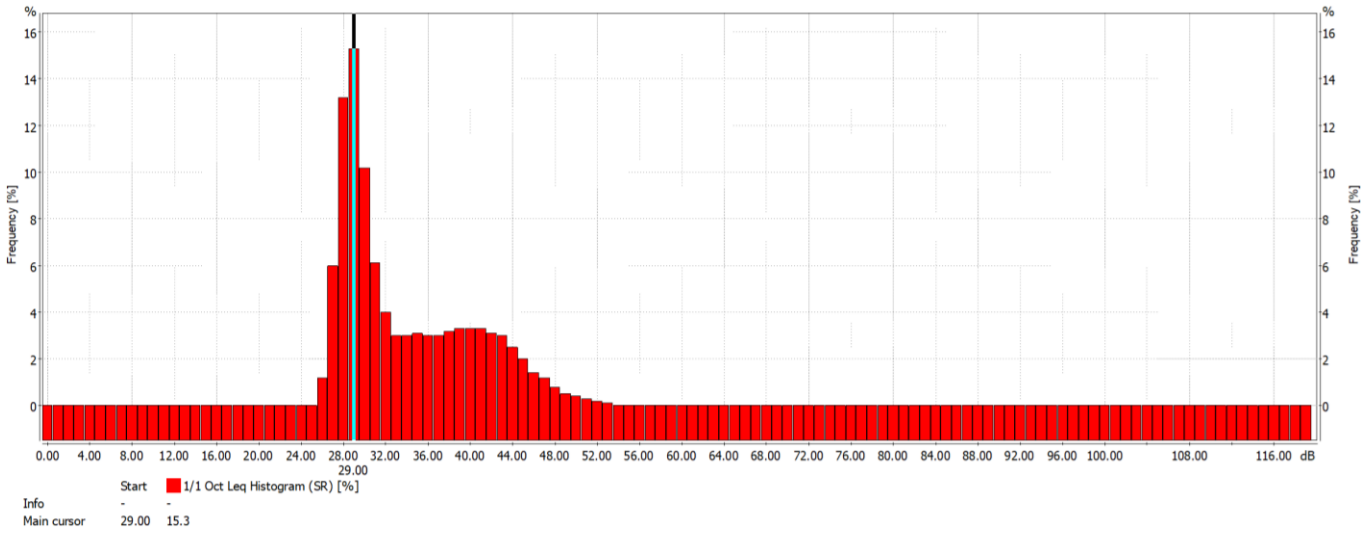
The tables below provide the details of the results collected during the noise monitoring sessions.

10.1.1 Results Histogram Table - Nighttime



The above table indicates the noise data time history with a 1 second exposure

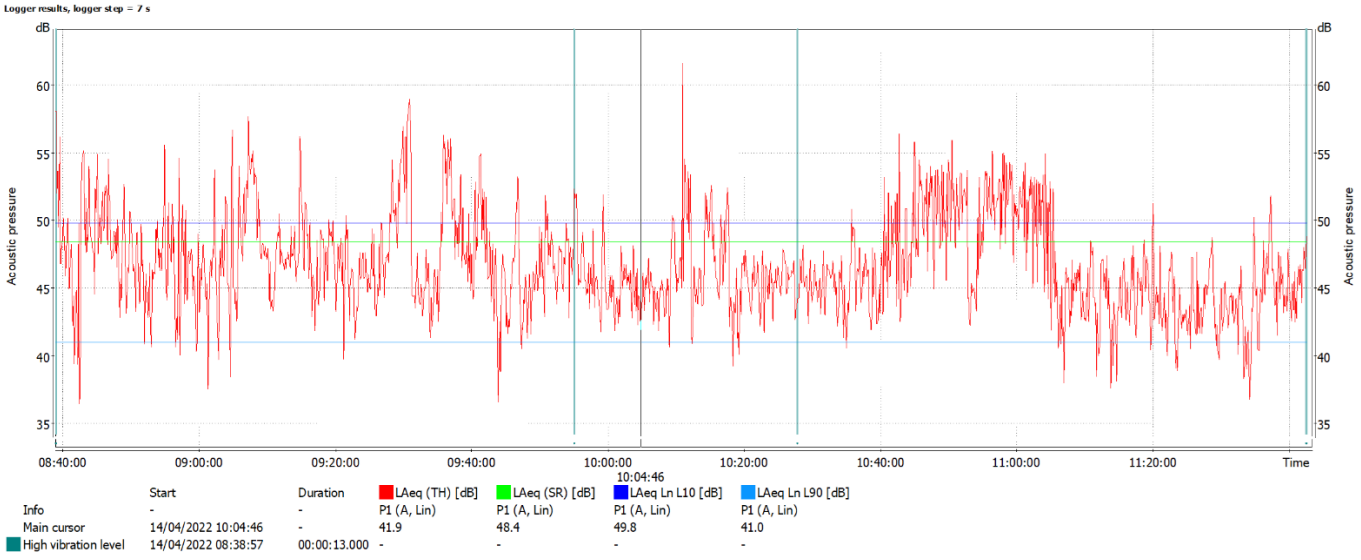
10.1.2 Results Occurrence Histogram - Nighttime



10.1.3 Results Table Overview with Octave Band Analysis - Nighttime

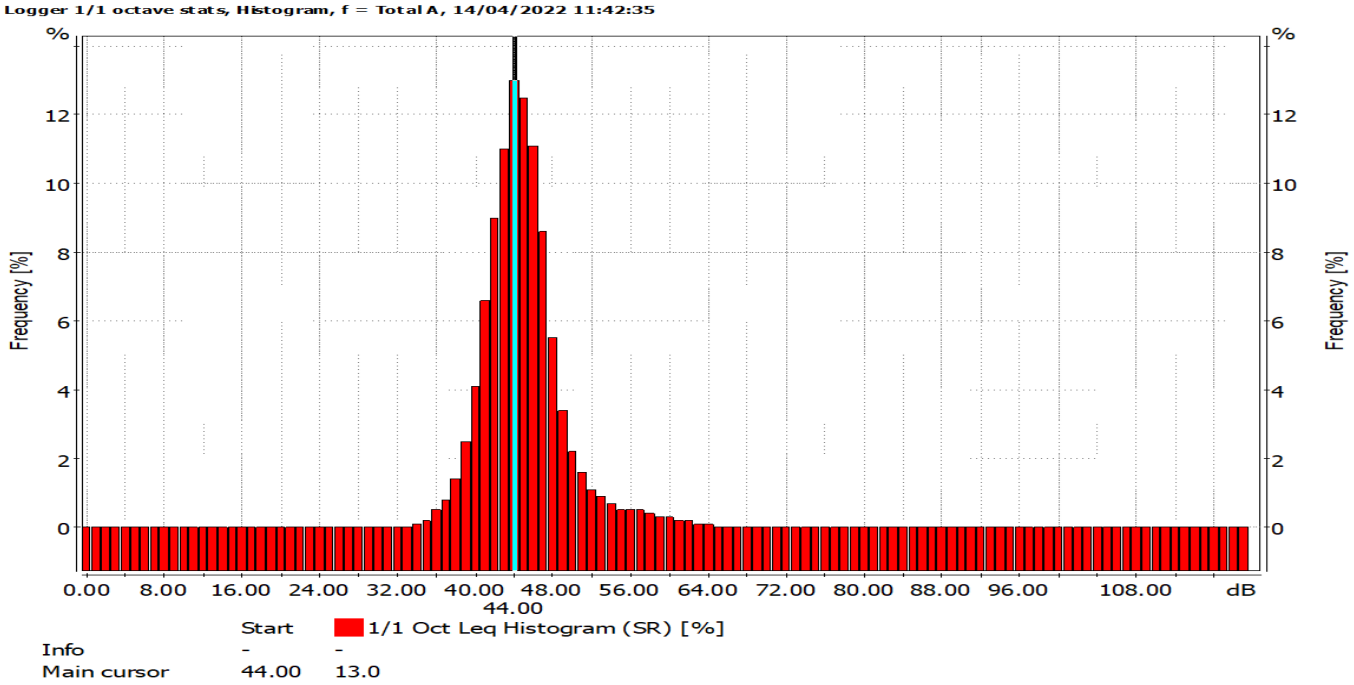
J3094-1 : Total Results - Nighttime			
Start date & time	**13/04/2022 22:34:24**		
Duration	**02:00:49.000**		
LAFmax [dB]	LAFmax [dB]		60.3
LAeq [dB]	LAeq [dB]		39.7
LAeq Histogram [dB]	L90	Total A	28.2
1/1 Oct Leq [dB]	63 Hz		44.9
1/1 Oct Leq [dB]	125 Hz		39.1
1/1 Oct Leq [dB]	250 Hz		38.2
1/1 Oct Leq [dB]	500 Hz		34.9
1/1 Oct Leq [dB]	1000 Hz		36.8
1/1 Oct Leq [dB]	2000 Hz		31.6
1/1 Oct Leq [dB]	4000 Hz		24.1
1/1 Oct Leq [dB]	8000 Hz		20.0
1/1 Oct Leq Histogram [dB]	L90	63 Hz	36.8
1/1 Oct Leq Histogram [dB]	L90	125 Hz	33.0
1/1 Oct Leq Histogram [dB]	L90	250 Hz	30.2
1/1 Oct Leq Histogram [dB]	L90	500 Hz	25.7
1/1 Oct Leq Histogram [dB]	L90	1000 Hz	23.7
1/1 Oct Leq Histogram [dB]	L90	2000 Hz	13.6
1/1 Oct Leq Histogram [dB]	L90	4000 Hz	12.2
1/1 Oct Leq Histogram [dB]	L90	8000 Hz	14.1

10.2.1 Results Histogram Table – Daytime



The above table indicates the noise data time history with a 1 second exposure

10.2.2 Results Occurrence Histogram – Daytime



10.2.3 Results Table Overview with Octave Band Analysis - Daytime

J3094-2 : Total Results - Daytime			
Start date & time	**14/04/2022 08:38:54**		
Duration	**03:03:41.000**		
LAFmax [dB]	LAFmax [dB]		75.4
LAeq [dB]	LAeq [dB]		48.4
LAeq Histogram [dB]	L90	Total A	41.0
1/1 Oct Leq [dB]	63 Hz		52.7
1/1 Oct Leq [dB]	125 Hz		47.4
1/1 Oct Leq [dB]	250 Hz		43.9
1/1 Oct Leq [dB]	500 Hz		42.3
1/1 Oct Leq [dB]	1000 Hz		42.2
1/1 Oct Leq [dB]	2000 Hz		39.1
1/1 Oct Leq [dB]	4000 Hz		42.6
1/1 Oct Leq [dB]	8000 Hz		39.3
1/1 Oct Leq Histogram [dB]	L90	63 Hz	44.2
1/1 Oct Leq Histogram [dB]	L90	125 Hz	39.6
1/1 Oct Leq Histogram [dB]	L90	250 Hz	38.2
1/1 Oct Leq Histogram [dB]	L90	500 Hz	35.9
1/1 Oct Leq Histogram [dB]	L90	1000 Hz	36.2
1/1 Oct Leq Histogram [dB]	L90	2000 Hz	31.8
1/1 Oct Leq Histogram [dB]	L90	4000 Hz	24.2
1/1 Oct Leq Histogram [dB]	L90	8000 Hz	16.9

11.0 Results Analysis

The above noise survey, carried out between 13th and 14th April 2022, was chosen as a representative weekday period to reflect the typical noise climate for the area surrounding the proposed development site.

The noise survey results obtained for the site can, therefore, be deemed to be representative of normal activities for the area and will be used as the base for analysis and assessment purposes below.

Assessments of the results indicate that the site affected primarily by noise associated with the traffic noise sources from the movements along Northgate and the local road network.

From the data acquired during the assessment period the following exposure noise levels have been established for the site.

11.1 Table of Exposure Levels

Period	Site Noise Exposure Levels
Daytime (0700 – 2300 Hrs)	LAeq, 48 dB
Night-time (2300 – 0700 Hrs)	LAeq, 38 dB LAFmax 60 dB LAFmax (11th Value) 53 dB

12.0 Noise Mitigation Considerations

The proposal is to redevelop the basement area of No 103 Northgate to form of 2 No residential dwellings.

The basement dwellings will be individually accessed from a formed patio area from the existing rear car park area of the site. See Appendix A-2 for details.

There are 5 main areas to consider within the redevelopment of the site to ensure that the building provides adequate attenuation against the ingress of external noise sources that are likely to affect the comfort and amenity of the residents.

- Construction Phase (Temporary)
- Building Fabric Construction
- Glazing Units
- Ventilation
- External Recreational Areas

12.1 Construction Phase Noise (Temporary)

It is common practice that construction will take place during typical daytime hours only. The acceptable time periods for the development phase of the works as following.

Monday to Friday 08.00 to 18.00 hours
Saturday 08.00 to 13.00 hours.
No construction work assumed for Sunday or Public Holidays.

There are items of plant, such as generators that may operate 24 hours dependent upon their function and these plant items may unduly affect the existing amenity of the nearby residential premises.

Noise generated by construction work has the potential to increase the noise levels at the nearby noise sensitive residential premises due to the operation of plant and equipment associated with the construction phase of the development. The level of potential increase will depend on many factors, including locality of the activities on site relative to the recipient, type of activity being undertaken, and control measures implemented.

To minimize the potential impact of the noise impact mitigation measures are proposed for the construction phase as noted below.

12.1.1 Construction Noise Mitigation

Construction noise is an inevitable part of any development, however, the change in noise levels is usually short term and temporary during the construction phase of the project only.

12.1.2 Noise Action Plan

It is recommended that a Noise Action Plan is implemented for the development, addressing all aspects of the construction, including mitigation measures and procedures for dealing with on-site activities and complaints, should any arise.

The Control of Pollution Act and BS 5228 define a set of Best Practice working methods and mitigation measures, referred to as Best Practicable Means (BPM).

The following are examples of what could be included within a Noise Action Plan.

- Selective location temporary plant so that it is screened by on-site structures, such as site cabins.
- Using modern equipment and ensuring such equipment is properly maintained and correctly operated by trained staff.
- Acoustically enclosing noisy equipment if possible.
- Ensure that mobile plant is well maintained and there are no excessive rattles or vibrations that can be addressed.
- Ensuring plant machinery is turned off when not in use.
- Provide residents with 24-hour contact details for a site representative.
- Inform residents about the works advising of any specific noisy events and provide a contact telephone number, as noted above.
- Keep noisy deliveries to the midday period where possible.

12.1.3 Site Training / Instruction

The site training and induction programme, including site specific rules will include good working practice instructions for site staff, managers, visitors, and contractors to minimise noise whilst working on the site. Good working practice guidelines/instructions should include the following points as a minimum requirement:

- Avoid unnecessary revving of plant and equipment engines.
- Intermittently used plant should be isolated between operational periods.
- Avoid reversing unnecessarily using tonal reverse horns, fit broad band warning horns where possible.
- Report any defective equipment/plant immediately so that corrective maintenance can be completed.
- Minimise noise when handling or moving materials on site.

12.1.4 Plant Maintenance

All temporary plant items arriving on site should be in good working order and have written proof of maintenance prior to use.

Maintenance of temporary plant on site should be carried out routinely and in accordance with the manufacturers' guidance and recommendations.

Regular inspection of all plant and equipment must be undertaken to ensure that:

- all plant is in a good state of repair and operating correctly.
- any plant required maintenance has been identified and isolated until maintenance has been completed.
- acoustic enclosures fitted to plant are in a good state of repair and correctly fitting,
- doors and covers remain closed during operation.
- all repairs should be completed by a fully qualified maintenance engineer for the specific plant item under consideration.

Although the above are procedural recommendations and not fully quantifiable it is possible that they could reduce perceived noise levels on the site by about -5 dB.

12.2 Building Fabric Construction

The Building Regulation, relating to the minimum acoustic requirements for the various areas of the development, must be met.

Actual verification of the acoustic properties of the buildings fabric will need to be executed by pre-completion sound testing prior to occupation, or through certified test data with a Robust Details construction method.

12.2.1 External Building Envelope

Based upon the external baseline noise levels recorded, primarily due to traffic and fixed plant noise, the minimum weighted sound reduction, Rw, of the external façades will need provide an SRI value of at least 50 dB to ensure that an internal specification of 30 $L_{Aeq,\ 8hours}$ dB maximum, (equivalent to NR 25), is met within the noise sensitive dwelling areas during nighttime periods, as determined within the WHO recommendations. The monitored 11th highest LAFmax of 53 dB will be attenuated such that the internal level will be up to a maximum value of 3 LAFmax dB, again in line with the specific requirements of WHO.

Based upon the existing wall construction, comprising an internal leaf of concrete block / brick, lined externally with stone and a cavity between of at least 75mm, the following performance would be expected from the external façade construction:

Frequency in Hz	63	125	250	500	1000	2000	4000
SRI of Facade	31	37	42	52	60	63	68

12.2.2 Party Walls and Floors

All party walls or floors will need to provide the minimum acoustic requirements necessary to meet with the Building Regulations, Resistance to the Passage of Sound, Approved Document E of $D_{nT,w}$ + C_{tr} 43 dB for airborne noise transmission and $L_{nT,w}$ 64 dB for impact noise transmission between floors, when considered between all attached student units.

Where the dividing elements are between noise producing areas, such as the ground floor commercial units and the residential areas of the development, it is recommended that a minimum sound insulation value of $D_{nT,w}$ + C_{tr} 55 dB is achieved or, at least -15 dB below the highest generated sound level centre

band frequenies of concern within the source room, when considered inside the dwelling area. This is required to allow the amenity levels inside the residental dwelling to be achieved.

Compliance will need to be demonstrated either by use of Robust Details or via a sound insulation Pre-Completion Test upon completion for the party walls for new build applications as directed by your Building Control officer dealing with the project.

12.2.3 Glazing Units

The primary weakness in any building envelope is usually due to windows, ventilation louvres and other apertures.

In order to provide adequate attenuation against the sound levels in the area and achieve the Building Regulations and WHO criteria, it is recommended that the formed apertures are fitted with suitable acoustic glazing units.

Using the sound exposure levels assessed for the site the minimum recommended Rw dB rating for the glazing systems for the site should be as follows for each façade considered.

All Facades

Period	Noise Exposure Level	Internal Living Space / Bedroom Target Level	Minimum Rw Values Required
Daytime (0700 – 2300 Hrs)	LAeq, 16 Hours – 48 dB	LAeq, 16 Hours – 35 dB	**Rw 13 dB**
Night-time (2300 – 0700 Hrs)	LAeq, 8 Hours – 38 dB 11th Highest LAmax - 53 dB	LAeq, 8 Hours – 30 dB LAmax - 45 dB	**Rw 8 dB** **Rw 8 dB**

Based upon a double glazing system it is possible to provide the necessary sound insulation using the following for each façade indicated above:-

Facade	Minimum Glazing Recommendation	Glazing Specification
All	6mm Float Glass/4mm Argon Filled Airspace/6mm Float Glass.	R_w 31 dB, R_c 30 dB, $R_{c,Tr}$ 27 dB (1)

The acoustic properties of the above glazing are provided below for reference.

Glazing type	Frequency in Hz	63	125	250	500	1000	2000	4000
6/4/6	R_W of Facade	20	20	18	28	38	34	38

(1) Based upon generic acoustic performance data.

12.2.4 Ventilation Considerations

If we consider opening a window within a bedroom to provide additional rapid room ventilation, the accepted attenuation value of the open window is -15 dB, this would allow for an internal noise level within the apartments of 23 LAeq dB at nighttime. This level of ingress is deemed as not likely to result in sleep disturbance due to external sources, set at 30 LAeq dB within WHO.

If we also consider to intermittent noise source, deemed as the 11th highest LAFmax dB, recorded at 53 dB, we find that the ingress with a window open scenario will be 38 LAFMax dB. This level of ingress is again deemed as not likely to result in sleep disturbance due to external intermittent sources, set at 45 LAFMax dB, as per WHO.

No further consideration will be required for alternative arrangements to provide background or rapid ventilation for the individual welling spaces since the area noise climate is so low.

12.2.5 External Recreational Areas

The site will not include for any external recreational areas; therefore, no further consideration is necessary.

12.3 BS8233:2014 Noise Ingress Assessment

To provide further evidence that the above recommended mitigation measures will be adequate to achieve a comfortable internal environment within the dwellings once occupied, a BS8233:2014 assessment will be completed.

This assessment will account for the daytime, nighttime and maximum nighttime values recorded and compare the results against the limiting criteria necessary to demonstrate an acceptable internal environment without giving rise to any undue loss of amenity to the incumbent residents.

Below is an overview of the results of the calculations completed.

Location	Daytime	Nighttime	Nighttime Maximum	Comments
Limiting Values	**35 dBA (NR 30)**	**30 dBA (NR 25)**	**45 dBA (NR 40)**	
All Facades	32.3 dBA (NR 27)	24.4 dBA (NR 20)	38.5 dBA (NR 35)	Design Target Met

The above assessments are made assuming a window open scenario for ventilation.

With a window closed the above values will be -15 dBA lower than indicated.

As can be seen from the above overview the mitigation recommendations will allow the internal noise criterion to be fully achieved.

Refer to Appendix B for details of the full calculation data sheets.

13.0 Report Summary

An attended pre-development acoustic assessment of the existing noise levels around the proposed basement redevelopment at No 103 Northgate, Almondbury has been undertaken to inform the planning application No 2022/90057 for the site with respect to noise.

The noise survey established the pre-existing noise climate and sources for the area, which are primarily due to traffic movements along Northgate and the local road network.

To achieve an acceptable and comfortable internal noise climate for the potential residents the WHO guidance community noise has been utilized for the acoustic target levels for the internal criteria of the dwelling areas of the development. The National Planning Policy Framework has been considered, with NR 35 daytime and NR 25 nighttime internal limits being utilized since the NPPF is not prescriptive in its noise limits.

Mandatory mitigating recommendations are necessary to provide adequate protection against intrusion from external noise sources and achieve the WHO guidelines for the internal noise climate of the residences.

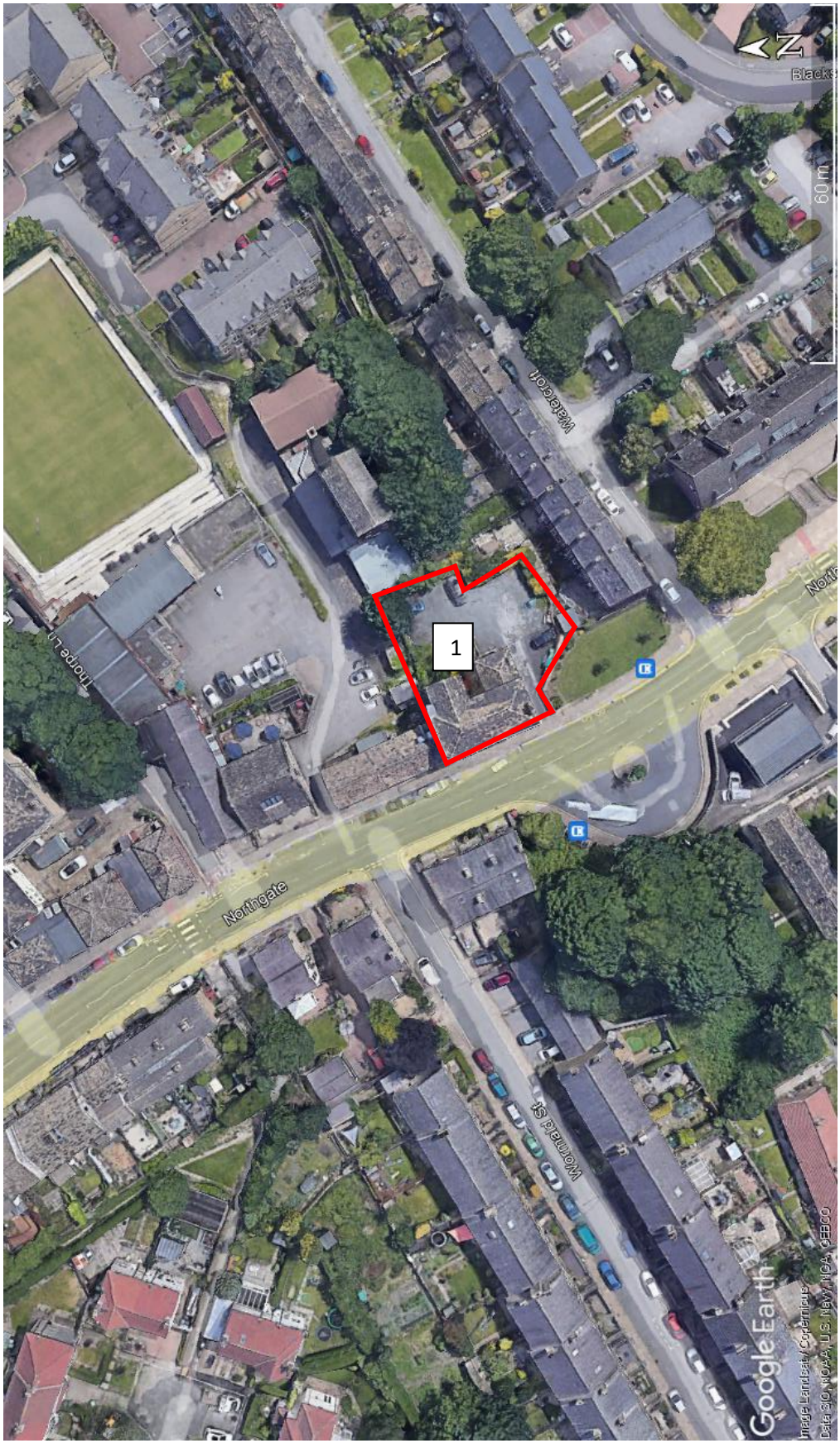
Recommendations have been proposed for the glazing systems to be employed on this development, to achieve the internal dwelling room design target exposure levels as determined within WHO recommendations.

To provide background ventilation opening windows is acceptable due to the low background noise climate and no further secondary ventilation method is necessary as a consequence to allow the internal noise climate design targets to be met with an open window scenario.

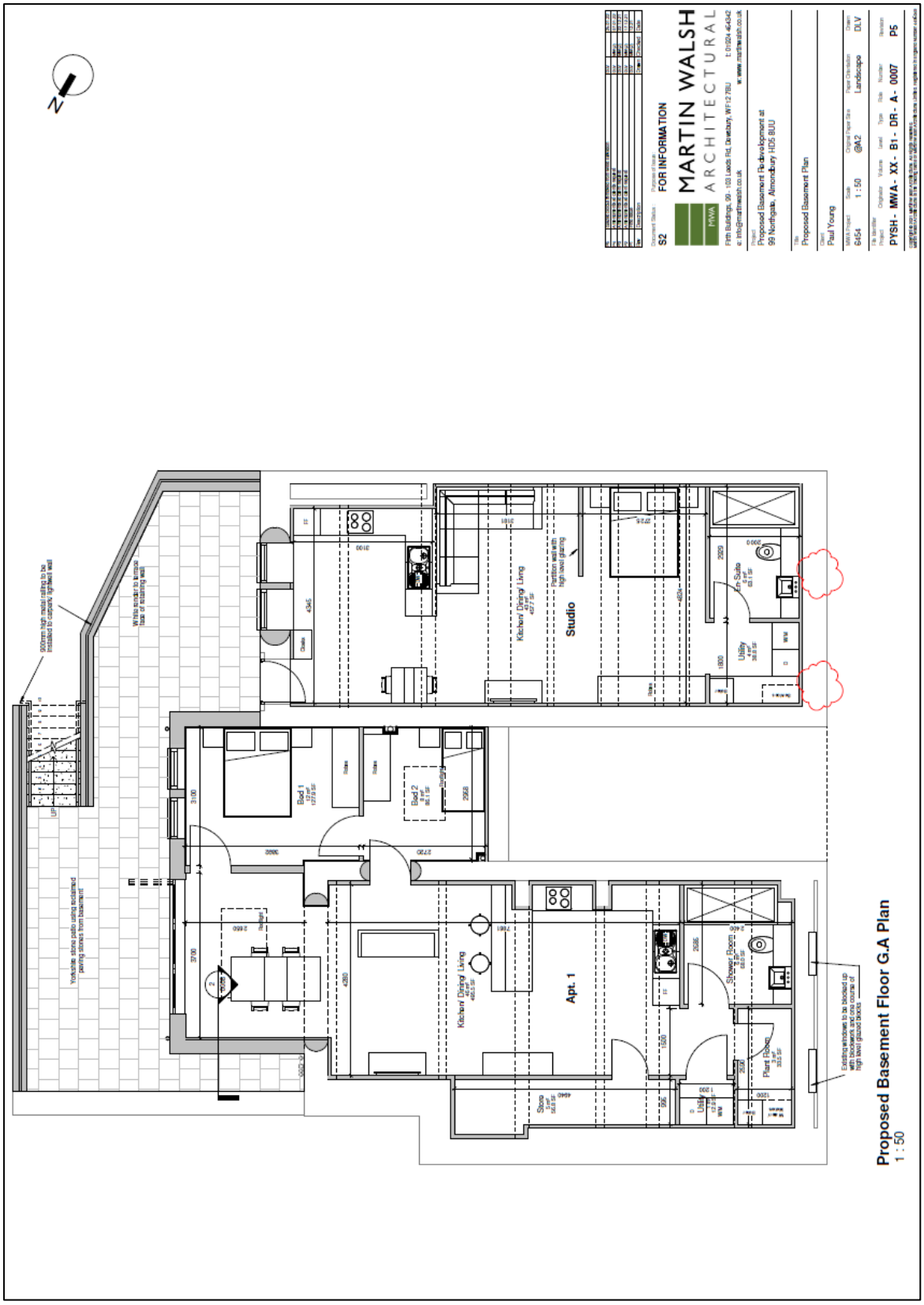
The development will not include for any external recreational spaces.

Provided that the recommendations presented within this report are adhered to during the redevelopment of the site the amenity of the incumbent and nearby residents will have been achieved.

Appendix A-1 Locational Outline and Monitoring Position



Appendix A-2 Proposed Site Plan Illustration



Appendix B BS8233:2014 Noise Ingress Assessment

BS8233:2014 NOISE INGRESS CALCULATION - Basement 103 Northgate, Almondbury

Position Assessment - Living Space	Leq Octave band noise levels (dB)							dBA
	63 Hz	125 Hz	250 Hz	500 Hz	1K Hz	2K Hz	4K Hz	
Façade - Daytime								
Average façade noise levels	52.7	47.4	43.9	42.3	42.2	39.1	40.0	**47.3**
Noise reduction through façade elements								
SRI External solid wall	-31	-37	-42	-52	-60	-63	-68	
absorption area	-3	-3	-3	-3	-3	-3	-3	
noise level through wall	18.7	7.4	0.0	0.0	0.0	0.0	0.0	**6.5**
SRI windows - Acoustic Double glazing (6-4-6)	-20	-20	-18	-28	-38	-34	-38	
absorption area - Window 1.8m x 1.2m	-6.7	-6.7	-6.7	-6.7	-6.7	-6.7	-6.7	
noise through windows	26.0	20.7	19.2	7.6	0.0	0.0	0.0	**13.4**
SRI acoustic ventilator - Open Window	-15	-15	-15	-15	-15	-15	-15	
absorption area - N/A	0	0	0	0	0	0	0	
noise level through vent	37.7	32.4	28.9	27.3	27.2	24.1	25.0	**32.3**
Total noise internally								
through wall	18.7	7.4	0.0	0.0	0.0	0.0	0.0	6.5
through glazing	26.0	20.7	19.2	7.6	0.0	0.0	0.0	13.4
through vent	37.7	32.4	28.9	27.3	27.2	24.1	25.0	32.3
Combined total	37.8	32.6	29.7	27.2	27.2	24.3	25.0	**32.3**
Criteria - Living Room - Daytime								**35.0**
NR 30 Criteria	**59**	**48**	**40**	**34**	**30**	**27**	**25**	
Variance and Actual NR Value Achieved	-21.2	-15.4	-10.3	-6.8	-2.8	-2.7	0.0	**NR 27**

Position Assessment - Bedroom	Leq Octave band noise levels (dB)							dBA
	63 Hz	125 Hz	250 Hz	500 Hz	1K Hz	2K Hz	4K Hz	
Façade - Nighttime								
Nighttime façade noise levels	44.9	39.1	38.2	34.9	35.8	31.6	24.1	**39.4**
Noise reduction through façade elements								
SRI External solid wall	-31	-37	-42	-52	-60	-63	-68	
absorption area	-3	-3	-3	-3	-3	-3	-3	
noise level through wall	10.9	0.0	0.0	0.0	0.0	0.0	0.0	**6.3**
SRI windows - Acoustic Double glazing (6-4-6)	-20	-20	-18	-28	-38	-34	-38	
absorption area - Window 1.8m x 1.2m	-6.7	-6.7	-6.7	-6.7	-6.7	-6.7	-6.7	
noise through windows	18.2	12.4	13.5	0.2	0.0	0.0	0.0	**8.9**
SRI acoustic ventilator - Open Window	-15	-15	-15	-15	-15	-15	-15	
absorption area - N/A	0	0	0	0	0	0	0	
noise level through vent	29.9	24.1	23.2	19.9	20.8	16.6	0.0	**24.2**
Total noise internally								
through wall	10.9	0.0	0.0	0.0	0.0	0.0	0.0	6.3
through glazing	18.2	12.4	13.5	0.2	0.0	0.0	0.0	8.9
through open window	29.9	24.1	23.2	19.9	20.8	16.6	0.0	24.2
Combined total	30.0	24.3	24.1	19.8	20.8	17.0	4.8	**24.4**
Criteria - Bedroom - Nighttime								**25.0**
NR 20 Criteria	**52**	**40**	**31**	**24**	**20**	**18**	**15**	
Variance and Actual NR Value Achieved	-22.0	-15.7	-6.9	-4.2	0.8	-1.0	-10.2	**NR 20**

Appendix B BS8233:2014 Noise Ingress Assessment

BS8233:2014 NOISE INGRESS CALCULATION - Basement 103 Northgate, Almondbury

Position Assessment - Bedroom	Leq Octave band noise levels (dB)							dBA
	63 Hz	125 Hz	250 Hz	500 Hz	1K Hz	2K Hz	4K Hz	
Façade - Nighttime								
MAX façade noise levels	46.1	49.2	48.2	48.6	50.0	46.6	40.5	**53.4**
Noise reduction through façade elements								
SRI External solid wall	-31	-37	-42	-52	-60	-63	-68	
absorption area	-3	-3	-3	-3	-3	-3	-3	
noise level through wall	12.1	9.2	3.2	0.0	0.0	0.0	0.0	**6.6**
SRI windows - Acoustic Double glazing (6-4-6)	-20	-20	-18	-28	-38	-34	-38	
absorption area - Window 1.8m x 1.2m	-6.7	-6.7	-6.7	-6.7	-6.7	-6.7	-6.7	
noise through windows	19.4	22.5	23.5	13.9	5.3	5.9	0.0	**17.6**
SRI acoustic ventilator - Open Window	-15	-15	-15	-15	-15	-15	-15	
absorption area - N/A	0	0	0	0	0	0	0	
noise level through vent	31.1	34.2	33.2	33.6	35.0	31.6	25.5	**38.4**
Total noise internally								
through wall	12.1	9.2	3.2	0.0	0.0	0.0	0.0	6.6
through glazing	19.4	22.5	23.5	13.9	5.3	5.9	0.0	17.6
through vent	31.1	34.2	33.2	33.6	35.0	31.6	25.5	38.4
Combined total	31.2	34.4	34.0	33.4	35.0	31.8	25.5	**38.5**
Criteria - Bedroom - Nighttime								**45.0**
NR 40 Criteria	**67**	**57**	**49**	**44**	**40**	**37**	**35**	
Variance and Actual NR Value Achieved	-35.8	-22.6	-15.0	-10.6	-5.0	-5.2	-9.5	**NR 35**