

Planning Stage Environmental Noise Assessment

Varley Street SEN School

Manchester

M40 8EF

Stroma Built Environment Ltd.

SBE Ref: 092958 – AC - 1v1

I. Revision History

Revision	Date	Description		
1v1	28/03/2023	First Issue		
		Compiled By	Authorised By	
		Louis Hadaway AMIOA Acoustic Consultant	Tom Chaffer MIOA Principal Acoustic Consultant	

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II. Executive Summary

A planning stage environmental noise assessment has been undertaken for the proposed development of Varley Street SEN School. The project comprises construction of a new single storey school building on a site adjacent to Sawley Road. The school will provide education for students with varying Special Educational Needs (SEN).

Assessment of the site is based on a site noise survey undertaken between 21st and 22nd of March 2023. Existing measured site noise levels are such that Indoor Ambient Noise Levels (IANL) for a new school building given in Building Bulletin 93 '*Acoustic design of school: performance standards*' (BB93) can be met in all areas with appropriate specification of the building envelope, glazing and ventilation strategy. Classrooms and group rooms will require a ventilation system which operates with windows closed to meet BB93 IANL requirements.

Representative site background noise levels have been used to inform noise limits proposed to control noise emissions from new sources of building services noise introduced by the scheme, in line with guidance given in BS 4142:2014 '*Methods for rating and assessing industrial and commercial sound*'.

The rating level from new building services plant should be limited at least 5 dB below the existing site representative background sound level, an indication of a 'low noise impact'.

Noise survey results, site observations and noise assessment indicate that typical operational noise due to the proposed development is not predicted to significantly impact the local area of identified noise sensitive receptors. It is therefore concluded that the proposed site is suitable for development of an educational building.

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1. Introduction

- 1.1 Stroma Built Environment (SBE) has been appointed by ISG (client) to undertake acoustic consultancy services for the proposed development of Varley Street SEN School, situated on empty land next to industrial premises along James Street and Vickers Street to the Southeast, and residential accommodation along Sawley Road to the Northwest.
- 1.2 The project comprises of a new single storey school building for students with varying Special Educational Needs (SEN). A site plan is included within Appendix I.
- 1.3 The purpose of this assessment is to consider the existing and future noise climate around the proposed development site in order to determine the suitability of the development proposals. The assessment will also consider potential noise impacts at nearby noise sensitive receptors due to the proposed scheme.
- 1.4 This document has been prepared for the sole use, benefit and information of the client for the purposes set out in the document or instructions commissioning the works. The liability of SBE in respect of the information contained herein will not extend to any third party.
- 1.5 This report is limited to addressing the specific acoustic issues contained herein and is based on information and drawings provided by the client.
- 1.6 Whilst every effort has been made to ensure that this report is easy to understand, it is technical in nature. To assist the reader a glossary of terminology is included in Appendix II.
- 1.7 All the acoustic standards and guidance documents that have been used to complete this assessment are detailed within Appendix III. The standards and guidance documents that have been used are the following: National Planning Policy Framework, Noise Policy Statement for England, Part E Building Regulations – BB93 Acoustic Performance Standard for Teaching Spaces, BS 4142:2014 ‘Methods for rating and assessing industrial and commercial sound’ (BS 4142), World Health Organisation ‘Guidelines for Community Noise’ and Sport England - ‘Artificial Grass Pitch (AGP) Acoustics – Planning.

2. Site Description and Noise Survey

- 2.1 The development site is located in between Sawley Road and James Street on an empty piece of grassland. Development proposals are for the construction of a new Special Educational Needs (SEN) school building with a External Play Area and car park.
- 2.2 The closest noise sensitive receptor (NSR) to the site is identified as residential properties along Sawley Road, Northwest of the site. This has been labelled as NSR A.
- 2.3 The location of the measurement positions can be seen below in Figure 1.

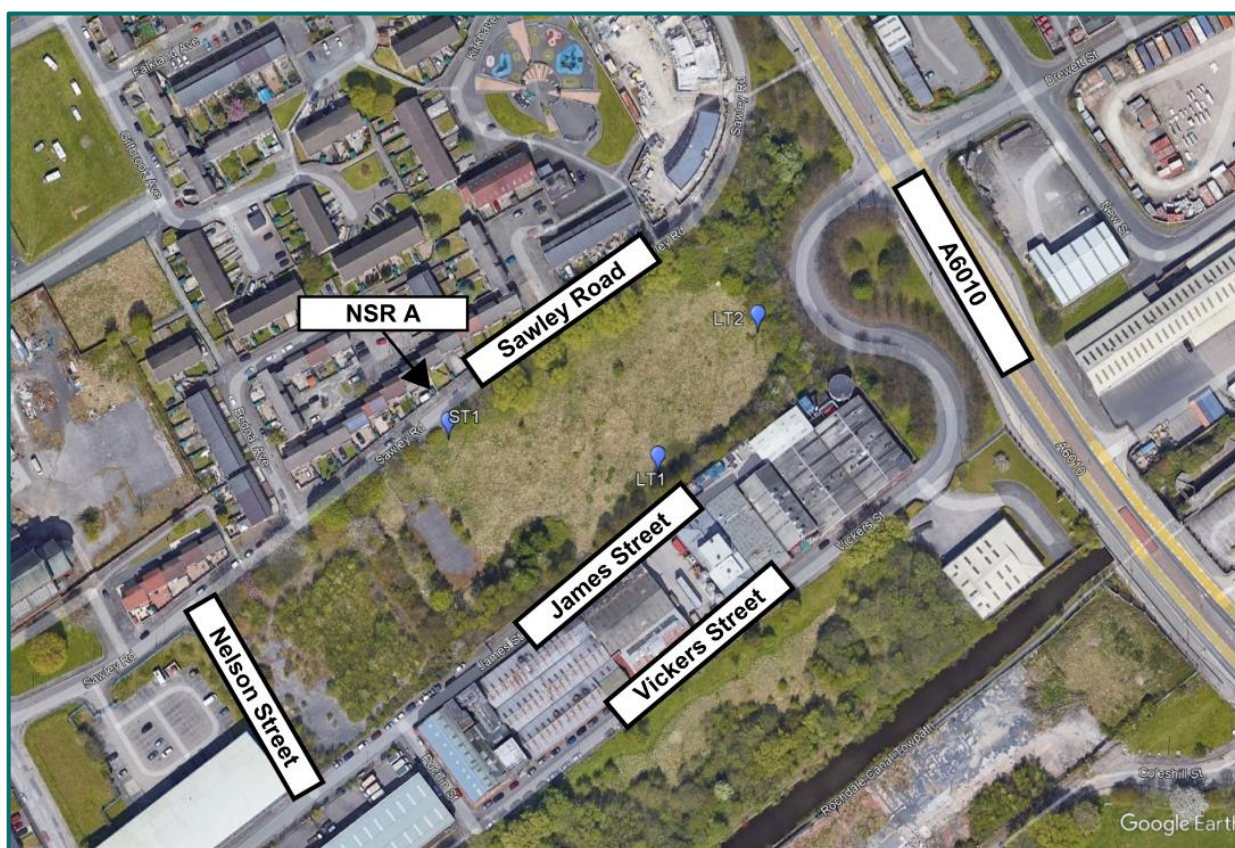


Figure 1: Site plan with approximate noise measurement locations

Noise Survey

- 2.4 A noise survey was undertaken at the site between 21st of March 2023 and 22nd of March 2023. A site plan with approximate noise measurement locations is shown in Figure 1 above.
- 2.5 The survey consisted of two long term measurement positions (LT1 and LT2) with one short term measurement position (ST1) to assess noise levels across the site.

- 2.6 The noise environment at the time of the noise survey was primarily controlled traffic noise from the A6010 dual carriageway to the north, with additional passing traffic along Varley Street and industrial noise from units on James Street, with additional contributions from local.
- 2.7 Measured noise levels are summarised in Table 1 below.
- 2.8 Based on site noise, measurements and subjective observations, noise levels at the facades of the new building are expected to be less than 60 dB $L_{Aeq,30min}$.

Table 1: Summary of noise survey

Measurement Location	Start Time	Measurement Period	$L_{Aeq,T}$ (dB) ^{[1]±}	$L_{A90,T}$ (dB) ^[2]
LT1	13:12 – 23:00	Day	59	57
	23:00 – 07:00	Night	58	57
	07:00 – 13:52	Day	59	56
LT2	13:21 – 23:00	Day	60	57
	23:00 – 07:00	Night	59	56
	07:00 – 13:47	Day	60	58
ST1	13:42 – 14:13	Day	52	50
Notes to Table 1 [1] logarithmic average of the measurement period [2] Arithmetic average of the measurement period				

3. Site Suitability Assessment

Façade Noise Expose

- 3.1 Based on the survey information set out above, noise levels at the facades of the new school building will be up to 60 dB $L_{Aeq,30mins}$ controlled by local and distant road traffic noise and industrial noise from James Street.
- 3.2 There are various internal ambient noise level (IANL) criteria defined in BB93 for different spaces. Teaching spaces intended specifically for students with special hearing and communication needs has the most onerous IANL criterion of ≤ 30 dB $L_{Aeq,30min}$. Other noise sensitive spaces within the school have IANL requirements of 35 dB or 40 dB $L_{Aeq,30min}$.
- 3.3 BB93 states that the noise level should not regularly exceed 60 dB $L_{A1,30mins}$.
- 3.4 The building envelope is required to provide adequate sound reduction of external noise levels to achieve the internal design criteria. Based on existing site noise survey data, minimum façade construction sound insulation performances outlined in Table 2 are calculated to provide BB93 compliant internal noise levels with windows closed.

Table 2: Minimum building facade sound insulation requirements

Building Element	Minimum Airborne Sound Insulation Performance
Walls	45 dB R_w
Façade glazing Classrooms and Group Rooms	36 dB R_w
Façade glazing All other spaces	32 dB R_w
Roof	40 dB R_w

- 3.5 For all classrooms and group room spaces glazing rated 36 dB R_w (or higher) is calculated to provide BB93 compliant internal noise levels with windows closed. For all other spaces glazing rated 32 dB R_w (or higher) is calculated to provide BB93 compliant internal noise levels with windows closed.
- 3.6 Typical building envelope systems will be capable of meeting the sound insulation requirements in Table 2

Ventilation Strategy

- 3.1 Section 1.1.3 of BB93 addresses natural and hybrid ventilation in schools and states that a 5 dB relaxation of BB93 indoor ambient noise levels is applicable in teaching spaces when the proposed ventilation systems are operating in their normal condition. Section 1.1.3 of BB93 defines the normal condition for a natural or hybrid ventilation system as follows:

“The normal condition for a ventilation system in natural or hybrid mode is defined as when the system is operating to limit the daily average carbon dioxide concentration to no more than 1,500ppm with the maximum concentration not exceeding 2,000ppm for more than 20 consecutive minutes on any day. This would normally equate to a minimum ventilation rate of approximately 5l/s per person.”

- 3.2 Based on measured noise levels areas that are specified as teaching spaces intended specifically for students with special hearing or communication needs will need to be ventilated with a windows closed. This can be achieved either with a mechanical ventilation system or acoustically attenuated façade mounted ventilators. This applies to all classrooms and group rooms.
- 3.3 All other spaces within the new building can use open windows as the ventilation strategy.

Boost Ventilation and Control of Summertime Overheating

- 3.4 Control of summertime overheating should be provided by mechanical ventilation within teaching spaces intended specifically for students with special hearing or communication needs. Based on measured noise levels use of openable windows will not be acceptable within classrooms and group rooms. All other spaces may use open windows as part of the ventilation/overheating strategy.

External Noise Levels

- 3.5 Although not included in BB93 mandatory performance standards, additional guidance published in ‘Acoustics of Schools: A Design Guide’ states that noise levels in unoccupied playgrounds, playing fields and other outdoor areas should generally not exceed 60 dB $L_{Aeq,30min}$. 55 dB $L_{Aeq,30min}$ is quoted as a good practice level for external areas for school use, and there should be at least one area suitable for outdoor teaching activities where noise levels are below 50 dB $L_{Aeq,30min}$.
- 3.6 External amenity spaces around the school are located to the north east of the building, and within an eastern courtyard formed by the building geometry, to be used as an informal social space (ref site plan Appendix I). These areas are exposed to noise levels of up to 60 dB $L_{Aeq,30mins}$ due to traffic noise from the A6010 to the north and industrial units to the east on James Street.
- 3.7 It is anticipated that the Hard Sports area will be exposed to noise levels of < 55 dB $L_{Aeq,30 mins}$, which is considered suitable for external sports use,
- 3.8 Due to the distance between the A6010 and the site boundary it is not considered practical to provide acoustic screening to northern external areas, as any acoustic barrier would need to exceed 4m in height to provide a significant reduction in traffic noise.
- 3.9 It is possible to reduce noise levels within the more enclosed ‘courtyard’ area by providing an acoustic screen to the eastern boundary to mitigate industrial noise sources.

3.10 SBE recommends that a 2.4m acoustic barrier is installed at the location displayed below in Figure 2 to reduce the noise levels at the external amenity areas of the school. The barrier should be formed of a dense solid material such as timber with a minimum mass per unit area of 10kg/m^2 . It is anticipated that the proposed barrier will reduce noise levels within the courtyard area to $\leq 55\text{ dB } L_{\text{Aeq},30\text{mins}}$ in line with BB93 guidance.

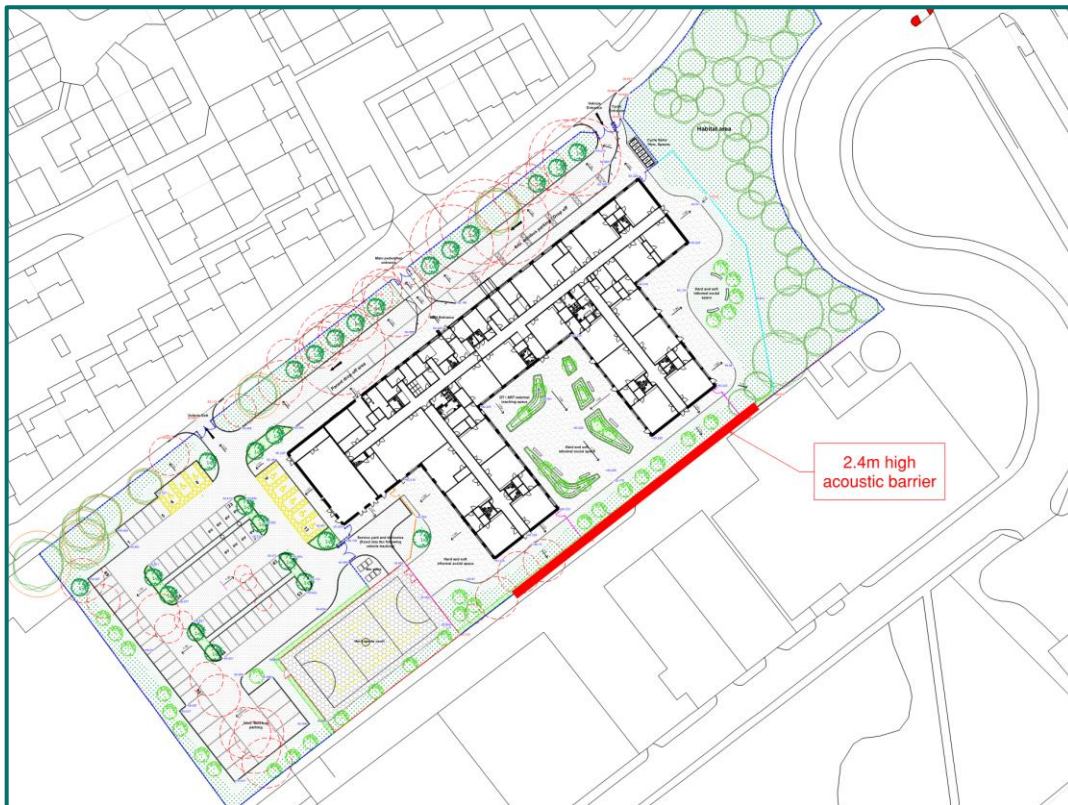


Figure 2: 2m barrier location

4. Noise Impact Assessment

Control of Building Services External Noise

- 4.1 Representative measured background noise levels for daytime and night-time periods have been used to set limits for new sources of building services plant.
- 4.2 It is recommended that noise limits for new sources of building services plant are controlled such that they are at least 5 dB below the prevailing background sound levels at the closest noise sensitive premises, which indicates a low noise impact based on BS 4142 guidance. On this basis, provisional plant noise limits are provided in Table 3.
- 4.3 Building services plant equipment will operate only when the building is in use, therefore there will be no building services plant operation at night (23:00 – 07:00).
- 4.4 It is recommended that mechanical engineers are made aware of the proposed plant noise limits in order to inform plant unit specification and selection. The rating level should be assessed in accordance with BS 4142:2014, including appropriate consideration of any tonal or impulsive characteristics of the proposed mechanical services plant.

Table 3: BS 4142:2014 Proposed plant noise limits

Location	Period	Representative background noise level, L_{A90} (dB)	BS4142 Rating Level, $L_{A,T}$ (dB)
1m from the façade of the nearest noise sensitive receptor	Daytime (07:00-23:00)	50	≤ 45

External Sports Facilities Operational Noise Impact

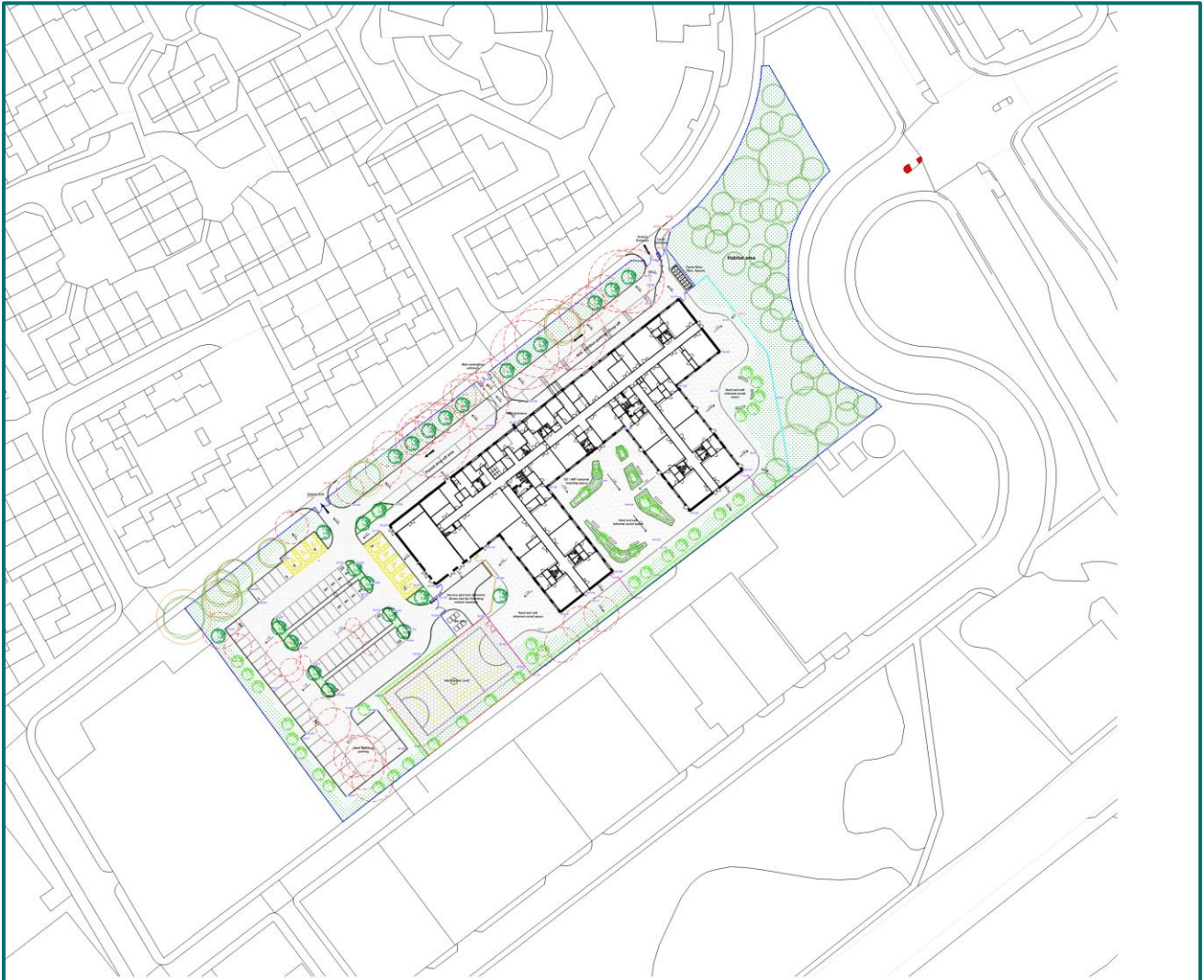
- 4.5 A External Play Area is displayed on the site plan drawing displayed in Appendix I, it is to be located to the Southeast of the new school building.
- 4.6 From previous noise assessments of external sports pitches, typical noise levels alongside a pitch in use for football and rugby training are in the order of 63 dB $L_{Aeq,T}$ at the side of the pitch. These levels are in agreement with Sport England data published in the document '*Artificial Grass Pitch (AGP) Acoustics - Planning Implications*' 2015, which provides noise levels for artificial pitches and External Play Areas of 58 dB $L_{Aeq,T}$ at a distance of 10m from the side of the pitch.
- 4.7 Sport England guidance '*Artificial Grass Pitch (AGP) Acoustics - Planning Implications*' recommends a maximum noise level of 50 dB $L_{Aeq,1hour}$ at the closest residential dwelling, which is considered a suitable criterion and in line with World Health Organisation (WHO) guidance.

- 4.8 Noise emission from the External Play Area has been calculated based on the guideline noise levels presented in the Sport England document. Calculations are based on a noise level of 58 dB $L_{Aeq,1hour}$ at 10m from the edge of the midpoint of the External Play.
- 4.9 Calculations indicate that noise levels in residential amenity areas of the closest properties to the East of the site will not exceed 50 dB $L_{Aeq,1hour}$ whilst the External Play Area is in use. This level is in line with Sport England recommendations and will meet best practice guidance set by the World Health Organisation (WHO) for external residential amenity.
- 4.10 Based on the relatively low calculated noise levels meeting Sport England and WHO guidance, mitigation of noise transfer from external sports facilities in the form of noise barriers is not considered to be necessary.

Car Park Assessment

- 4.11 Final Car parking proposals are shown on the site plan in Appendix I. A car park with 78 spaces is proposed to the South of the Site. Calculations have been undertaken to assess the noise impact of the car park on adjacent residential houses.
- 4.12 It is anticipated that the majority of vehicle movements in the car park will be at the start and end of the School day, with a reduced number of vehicle movements during the day. It is assumed that there will be up to 78 vehicle movements per hour at the start and end of the day, with a total of 5 vehicle movements per space throughout the day.
- 4.13 Calculations indicate that the highest noise level at the closest residential houses will be up to 56 dB $L_{Aeq,1hour}$ with an average daytime noise level of 50 dB $L_{Aeq,16hours}$. The average daytime noise level in line with WHO guidance set out in Appendix III, Table 4. Higher peak use noise levels will be of limited duration at the start and end of the school day. On the basis of the predicted noise levels, it is not considered necessary to provide mitigation to reduce noise levels from the car park.

Appendix I. Site Plan



Appendix II. Acoustic Glossary

Sound pressure level and the decibel, dB

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. The decibel is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120 dB (threshold of pain).

Frequency and hertz, Hz

Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kilohertz (kHz), where 1 kHz = 1000 Hz. The human range of hearing is commonly accepted to be 20 Hz to 20,000 Hz. Additionally, an octave can be used to describe the interval between a frequency in Hz and either half or double that frequency.

Frequency weighting

Different weighting networks can be applied to a given sound level in each stated octave band by a specified amount, in order to better represent the response of the human ear. The most commonly used weighting network is the 'A' weighting, and the letter 'A' will be included within a descriptor to indicate that the value has been 'A' weighted, e.g. $L_{Aeq,T}$ or L_{A90} . An 'A' weighted noise level may also be written as dB(A). Other weightings less commonly used are 'C' and 'D' weighting.

Noise indices

When a noise level varies with time, the measured 'A' weighted dB level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple 'A' weighted dB value. In order to describe noise where the level is continuously varying, a number of other indices, including statistical parameters, are used. The various indices used are described as below:

$L_{Aeq,T}$	The 'A' weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period, T
L_{Amax}	The maximum 'A' weighted noise level that was recorded during the monitoring period.
L_{A10}	The 'A' weighted noise level that was recorded for at least 10% of the monitoring period.
L_{A90}	The 'A' weighted noise level that was recorded for at least 90% of the monitoring period, usually taken as the underlying 'background' noise level.

Sound level difference, D

The sound level difference between two internal spaces, or between internal and external spaces. The ' D ' value is used to denote the differences at each third octave or octave band, with a single figure 'weighted' value to describe an overall performance. Note that the ' D ' value will always describe an in-situ or on-site acoustic performance. All values are described using the decibel.

D_w	Single figure weighted sound level difference, simply the measured source noise level minus receiver noise level, not adjusted to reference conditions
$D_{nT,w}$	Weighted normalised sound level difference – a single, weighted sound insulation value, normalised to a reference reverberation time using the measured reverberation time in the receive room
$D_{nT,w} + C_{tr}$	As above, with a spectral adaptation term applied to account for the effects of low frequency noise, and based on urban traffic noise
$D_{nf,w}$	Overall flanking normalised level difference - A parameter that defines the flanking transmission of sound from room to room where a dividing partition or floor construction abuts a flanking building element common to both rooms, such as the building façade or ceiling

Sound reduction index, R

This describes the sound transmitted through a material or building element, such as a wall, door or window. It is measured in a laboratory with suppressed flanking transmission. The ' R ' value is used to denote the differences at each third octave or octave band, with a single figure 'weighted' value to describe an overall performance. All values are described using the decibel.

R_w	Weighted single figure sound reduction index
$R_w + C_{tr}$	As above, with a spectral adaptation term applied to account for the effects of low frequency noise, and based on urban traffic noise
R'_w	The 'apparent sound reduction index', a field measurement to obtain the sound reduction index of a material or element, with all effects of site installation accepted.

Standardised impact sound pressure level, $L'_{nT,w}$

$L'_{nT,w}$ is the single figure used to characterise the impact sound pressure level in a receiving room, normalised to a reference reverberation time. Impact noise can be classified as (but is not limited to) the result of footfall impact on a separating floor to a habitable space below. All values are described using the decibel.

Reverberation time, T and T_{mf}

The reverberation time of a space is a measure of the rate at which sound decays, measured in seconds. It is defined as the time taken for the sound pressure level to reduce by 60 dB from its original impulse level. Reverberation time is commonly quoted in terms of the mid-frequency reverberation time, T_{mf} , the arithmetic average of the reverberation times in the 500 Hz, 1 kHz and 2 kHz octave bands.

Absorption Coefficient

The acoustic absorption provided by a surface is defined as the sound absorption coefficient α , which denotes the fraction of sound energy absorbed between 0 (no absorption) and 1 (no reflection). The absorption coefficient of a material varies with the frequency of incident sound waves, therefore is considered for different frequencies.

Absorption Class

Based on the absorption coefficients, the overall sound absorption of a material is classified from Class A to Class E as defined in BS EN ISO 11654:1997, with Class A providing the highest level of acoustic absorption.

Noise rating, NR

The noise rating or NR system is commonly used in the design of noise emitted by internal building services systems. The system is frequency dependent, and was empirically derived to prevent disturbance to occupants in habitable or working areas from building services noise that exhibits 'tonal' elements, e.g. rumbles, whines, whistles etc. There is no direct relationship between the average 'A' weighted noise level in dB and the NR. However, as a guide, and assuming the absence of strong low frequency content in a given noise, the NR could generally be said to be 6 dB less than the average 'A' weighted dB value.

Privacy

Privacy is the addition of the level of sound insulation between two rooms and the background noise within a receiving room. It can be used to assess the level of privacy afforded in the 'receiving room' for speech from the 'source room'. The 'privacy factor' is a unit-less value that is the combination of the average 'A' weighted background noise level in dB and the weighted sound level difference (D_w) in dB.

Appendix III. Relevant Acoustic Guidance and Criteria

National Planning Policy Framework

The current planning guidance for the assessment of the potential environmental noise impact is outlined in the National Planning Policy Framework (NPPF). Whilst the NPPF does not set criteria that must be achieved, the NPPF states the following in relation to the appropriate control of potential noise impacts (paragraph 185):

“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 impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life; [...]”

Therefore the policy requires that new developments are not affected to an unacceptable degree by environmental noise and existing development is not put at an unacceptable risk from noise due to adjacent new development.

Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) provides further guidance on the Government’s policy with regard to the potential impacts of noise. The NPSE states the aims of Government policy relating to noise are:

“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”*

The Explanatory Note to the NPSE provides further guidance on how significant noise effects should be determined. The concepts of No Observed Effect Level (NOEL), Lowest Observed Adverse Effect Level (LOAEL – the lowest noise level at which an adverse effect can be observed) and Significant Observed Adverse Effect Level (SOAEL – the noise level above which significant adverse effects on health and quality of life can be observed) are introduced, however the NPSE also states that:

“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.”

The document '*Guidelines for Environmental Noise Impact Assessment*' published by the Institute of Environmental Management and Assessment (2014) provides further guidance and suggests that the daytime threshold of Lowest Observed Adverse Effect Level is typically 50 dB $L_{Aeq,16hours}$ for residential dwellings.

Part E Building Regulations – BB93 Acoustic Performance Standard for Teaching Spaces

Section 8 of Approved Document E states that the normal way of satisfying Requirement E4 of Part E to Schedule 1 of the Building Regulations 2010 for new school buildings is to meet the performance standards set out in Building Bulletin 93 '*Acoustic design of schools: performance standards*' (BB93).

Section 1.1 of BB93 presents Indoor Ambient Noise Level upper limit criteria (IANL) for various types of teaching, study, and ancillary spaces. Teaching spaces intended specifically for students with special hearing and communication needs are to achieve a maximum IANL of 30 dB $L_{Aeq,30mins}$. In addition BB93 states that the indoor ambient noise level should not regularly exceed 60 dB $L_{A1,30min}$.

Note that the BB93 IANL criteria include contributions from external sources outside the school premises and building services noise but exclude contributions from teaching activity/equipment, staff, and students within the school premises.

BS 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142)

BS 4142 describes a method for assessing the potential adverse impact from noise sources that are of an industrial nature (e.g. fans, pumps, chillers, air handling units etc.). The assessment methodology is based upon determining a 'rating level' for the equipment being assessed, which is the level of noise from the item or items of plant being assessed (measured as L_{Aeq}).

The rating level is then compared with the underlying background noise level (measured as L_{A90}) in the absence of noise from the item or items of plant being assessed.

- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

BS 4142 states that a penalty should be added for any plant which gives rise to noise features that may increase disturbance such as tonal, impulsive, or intermittent characteristics. With respect to the acoustic feature correction, BS 4142 states:

“Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level.”

Generally a rating penalty for a sound should be based on a subjective assessment of its characteristics.

World Health Organisation ‘Guidelines for Community Noise’

The World Health Organisation (WHO) has published guidelines that relate to acceptable levels of noise from a health perspective detailed in the WHO ‘*Guidelines for Community Noise*’, 1999. The ‘*Guidelines for Community Noise*’ set out the following criteria that should be achieved on residential balconies, terraces and in outdoor living areas to protect the majority of people from being annoyed during the daytime. This is applicable to the assessment of noise impact on residential areas.

Table 4: Guideline values for community noise in specific environments (WHO)

Specific Environment	Guidance	Criteria Limit $L_{Aeq,16hr}$ (dB)
Outdoor living area	‘Few seriously annoyed’ in outdoor living areas	≤ 55
	‘Few moderately annoyed’ in outdoor living areas	≤ 50

Sport England - ‘Artificial Grass Pitch (AGP) Acoustics - Planning Implications’

Sport England document ‘*Artificial Grass Pitch (AGP) Acoustics - Planning Implications*’ (2015) provides guidance on acoustic assessment of artificial pitches and sports facilities. The guidance provides noise levels for artificial pitches and External Play Area which can be used to inform an assessment.

With regard to acceptable noise levels at adjacent residential dwellings the guidance states:

“The determining noise criteria for AGPs proximity to residential properties, to avoid moderate annoyance in the daytime and evenings, as set by The World Health Organisation’s ‘Guidelines for Community Noise’ [is set at] 50 dB $L_{Aeq}(1 \text{ hour})$ upper noise limit external to residential properties and within external living areas”.

Appendix IV. SBE Acoustic Credentials

SBE have specialised in providing the UK Construction Industry with a range of acoustics services since 2006. Specialising in Building Acoustics, all SBE acousticians are members of the Institute of Acoustics.

SBE is accredited for on-site acoustic testing by United Kingdom Accreditation Service (UKAS) (Testing Laboratory Number 2731).

SBE meet the relevant acoustic requirements typically required in the UK, including for sound insulation testing as defined in Approved Document E for the purposes of testing for Part E to the Building Regulations 2010.

This report has been authorised by Tom Chaffer, Principal Acoustic Consultant who meets the BREEAM requirements for a suitably qualified acoustician (SQA) as follows;

1. Holds an MSc degree in Audio Acoustics from the University of Salford
2. Has been an Acoustic Consultant for more than three year's (within the last five years). This experience includes a practical understanding of factors affecting acoustics in relation to construction and the built environment; including, acting in an advisory capacity to provide recommendations for suitable acoustic performance levels and mitigation measures.
3. Holds Membership of the Institute of Acoustics - MIOA membership.

This report has been read and reviewed by Tom Chaffer and has been found to;

1. Represent sound industry practice
2. Be appropriate given the building being assessed and scope of works proposed
3. Avoid invalid, biased and exaggerated recommendations.

Appendix V. Report Conditions

This document has been prepared for the sole use, benefit and information of the Client. The liability of Stroma Built Environment Ltd. in respect of the information contained herein will not extend to any third party unless prior agreement is obtained in writing from Stroma Built Environment Ltd.

This report is limited to addressing the specific acoustic issues contained herein. Advice has been provided for acoustic reasons only and it is recommended that appropriate expert advice be sought on all the ramifications, e.g. safety, fire, structural, CDM etc., associated with any proposals contained herein.

The in-situ performance of acoustic measures is influenced to a large extent by the quality of workmanship and compliance with the specifications on-site during construction, as such, Stroma Built Environment Ltd. accepts no liability for issues with acoustic performance arising from such factors.

Acoustic survey and testing work carried out for the project is representative of the prevailing conditions at the time of the work. Conditions can vary and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times.

In particular, it should be noted that where calculations are carried out that are based on assumptions regarding certain aspects where information has not been supplied, these are provided for indicative purposes only and should be treated as such.