



Pioneer House High School

Noise Impact Assessment

dBx Acoustics Ltd
Beehive Mill
Jersey Street
Manchester
M4 6JG
0161 711 0320

22095 Pioneer House High School R01

22095-R01-LH

Client: Prospere Learning Trust

Date: 01/11/2022

TABLE OF CONTENTS

REVISION HISTORY	2
1 INTRODUCTION	3
BASIS OF NOISE ASSESSMENT	3
2 ASSESSMENT CRITERIA.....	5
LOCAL AUTHORITY REQUIREMENTS	5
NOISE FROM MUGA	5
BUILDING BULLETIN 93	6
BS 4142:2014 – METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND.....	8
3 SITE DESCRIPTION	9
SITE DESCRIPTION.....	9
NEARBY NOISE SENSITIVE RECEPTORS (NSRs)	9
4 NOISE SURVEY	10
METHODOLOGY	10
NOISE SOURCES	11
WEATHER CONDITIONS	11
EQUIPMENT	11
5 ENVIRONMENTAL NOISE SURVEY RESULTS.....	12
SHORT-TERM NOISE MONITORING - NOISE LEVELS	12
6 BUILDING ENVELOPE SOUND INSULATION	13
INTERNAL AMBIENT NOISE CRITERIA	13
ASSESSMENT OF VENTILATION STRATEGY	13
7 MUGA	14
8 BUILDING SERVICES NOISE EMISSIONS	16
9 SUMMARY AND CONCLUSION.....	17
APPENDIX A – GLOSSARY OF ACOUSTIC TERMINOLOGY.....	18

REVISION HISTORY

Revision	Date	Revision Details	Author	Checked
R01	01/11/2022	Original Issue	Luke Hine BSc AMIOA	<i>Susan Witterick</i> Susan Witterick BSc MIOA

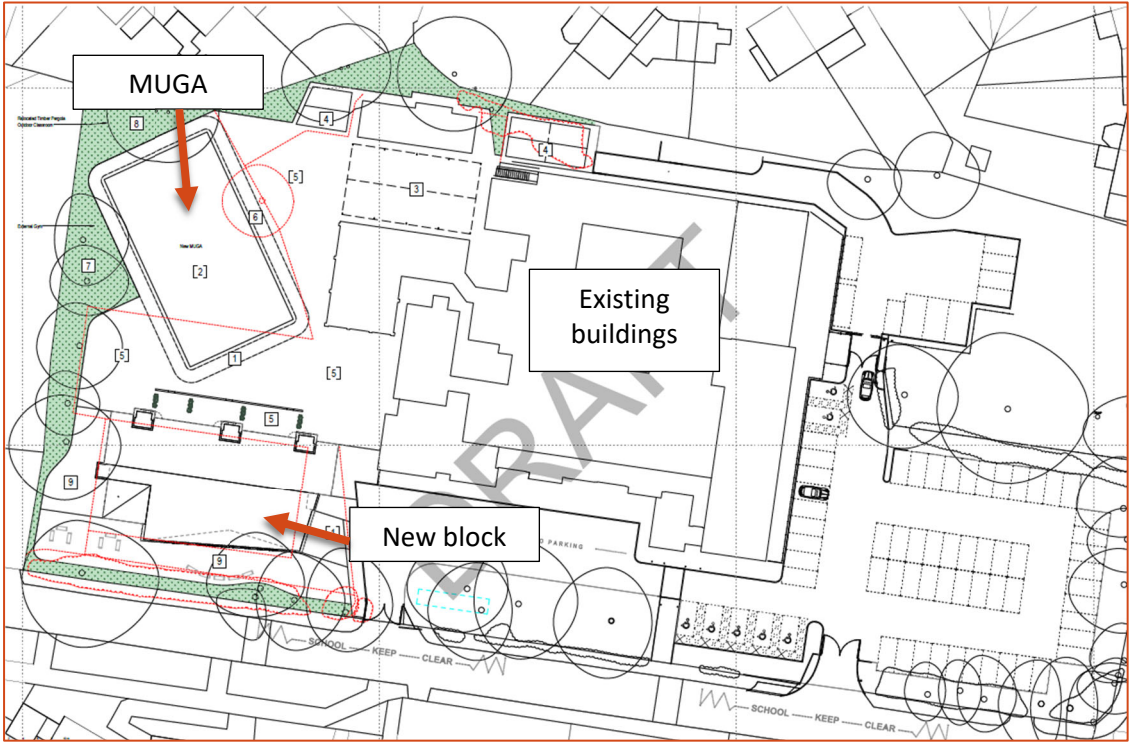
1 INTRODUCTION

- 1.1 dBx Acoustics Ltd has been appointed by Prospere Learning Trust to undertake a noise impact assessment for the proposed development at Pioneer House High School. The relevant Local Authority is Manchester City Council (MCC).
- 1.2 The proposed development comprises a new single storey teaching block, and a Multi Use Games Area (MUGA).
- 1.3 The school must comply with Requirement E4 of Part E of the Building Regulations concerning acoustics within the spaces intended for teaching and learning. To satisfy the requirements of Requirement E4, the school buildings must comply with the acoustic performance standards of Building Bulletin 93 (BB93) 'Acoustic Design of Schools' released in 2015.
- 1.4 A glossary of acoustic terminology is presented in Appendix A.

Basis of Noise Assessment

- 1.5 This report considers the Site's suitability for the nature of proposed uses through assessment of existing noise levels affecting the site, which have been used to carry out the following works:
 - To determine prevailing environmental noise levels affecting the site of the proposed school buildings due to nearby noise sources (e.g., road traffic);
 - Assessment of potential noise intrusion to school spaces and development of preliminary sound reduction requirements for the building façades with consideration of the proposed ventilation strategy.
 - Based on the requirements of the Local Authority and the results of the environmental noise survey, propose external building services noise emission limits.
 - To assess the potential noise impact of the proposed MUGA at the nearest noise sensitive receptors.
- 1.6 The noise impact assessment is based on the following:
 - Department for Education (2015) 'BB93 Acoustic Design of Schools'. (BB93)
 - Manchester City Council (October 2022) 'Planning and Noise Technical Guidance'
- 1.7 The location of the new block and MUGA are indicated in Figure 1, below.

Figure 1: Site Plan Indicating Development



2 ASSESSMENT CRITERIA

Local Authority Requirements

- 2.1 The site lies within the jurisdiction of Manchester City Council (MCC).

Noise Affecting Proposed Building

- 2.2 As noted within MCC's 'Planning and Noise Technical Guidance', City Wide Development Control Policy 26 – Development and Noise, DC26.2, requires that;

New noise-sensitive developments such as housing, schools, hospitals or similar activities will be permitted subject to their not being in locations which would expose them to high noise levels from existing uses or operations, unless the effects of noise can be realistically reduced.

- 2.3 As this is an existing school, it is assumed that there is no inherent reason relating to noise why the proposed teaching block would not be permitted, subject to achieving appropriate internal acoustic conditions.
- 2.4 It is assumed that the scheme should comply with Building Bulletin Guidance (BB93) as detailed below.

Noise from Building Services

- 2.5 In accordance with 3.7.1.5 of MCC's 'Planning and Noise Technical Guidance', the rating level for noise from any building services associated with the proposed development should be limited to achieve a rating level of 5dB (L_{Aeq}) below the typical background noise level (L_{A90}) at the nearest noise sensitive location when assessed in accordance with BS4142:2014, 'Methods for rating and assessing industrial and commercial sound'. This standard is discussed in detail below.

Noise from MUGA

- 2.6 There is no specific guidance within the MCC documentation relating to the assessment of noise from external play / sports areas.
- 2.7 Similarly, there is no specific / typical guidance providing suggested noise limits for noise from recreational use of external spaces affecting the NSRs.
- 2.8 It is therefore proposed that the assessment should consider the level of change in ambient noise level at the NSRs occasioned by activity noise, as set out in the methodology below.

Institute of Environmental Management and Guidelines for Environmental Noise Impact Assessment

- 2.9 The Institute of Environmental Management and Assessment (IEMA) *Guidelines for Environmental Noise Impact Assessment* provides guidance on the impact arising from a change in sound level, reproduced in Table 1 below. This is considered to be an appropriate methodology for assessing noise impact due to activity associated with the proposed MUGA.

Table 1: IEMA Noise Change Categories

Change in Noise Level (dB)	Category
≥ 0 and < 3	Negligible Impact
≥ 3 and < 5	Minor Impact
≥ 5 and < 10	Moderate Impact
≥ 10	Major Impact

Building Bulletin 93

- 2.10 Requirement E4 from Part E of Schedule 1 to The Building Regulations 2000 (as amended) states that:

"Each room or other space in a school building shall be designed and constructed in such a way that it has the acoustic conditions and the insulation against disturbance by noise appropriate to its intended use."

- 2.11 These regulations came into force in July 2003.

- 2.12 Part E of the Building Regulations includes schools within its scope, and gives the following guidance:

"In the Secretary of State's view, the normal way of satisfying Requirement E4 will be to meet the values for sound insulation, reverberation time and internal ambient noise which are given in Section 1 of Building Bulletin 93 'The Acoustic Design of Schools', produced by DfES."

- 2.13 The School Premises Regulations contain similar statements and apply to both new and existing school buildings.

- 2.14 Building Bulletin 93 (BB93) was updated in 2014 and is the current design standard applicable to compliance with the Building Regulations and the School Premises Regulations. This document includes design standards for internal ambient noise levels, reverberation time, and sound insulation between critical spaces.

- 2.15 Building Bulletin 93 specifies upper limits for indoor ambient noise level for room types classified in terms of intended use.

2.16 The objective is to provide suitable indoor ambient noise levels (a) for clear communication of speech between teacher and student (b) clear communication between students and (c) learning and study activities. The indoor ambient noise level includes noise contributions from:

- External sources outside the school premises (including, but not limited to, noise from road, rail and air traffic, industrial and commercial premises);
- Building services (e.g. ventilation system, plant, etc); and
- Actuator and damper noise.

Table 2: BB93 Internal Ambient Noise Level Criteria

Room Type	Upper Limit for Internal Ambient Noise Level dB $L_{Aeq,30\ min}$	Upper Limit for Internal Ambient Noise Level (Natural Ventilation) dB $L_{Aeq,30\ min}$
General Classroom, Small Group Room	35	40
Resource Area (applied to proposed learning / social / common area)	40	45
Office	40	45

2.17 Where rooms are mechanically ventilated, the plant should be assumed to be running at its maximum operating duty.

2.18 Additionally, in order to protect students from regular discrete noise events, ambient noise levels should not exceed $60\text{dB}_{LA1,30\text{mins}}$.

2.19 The indoor ambient noise level excludes noise contributions from teaching activities within the school premises, including noise from staff, students and equipment within the building or in the playground. Noise transmitted from adjacent spaces is addressed by the airborne and impact sound insulation requirements, which will be determined as the building design progresses.

BS 4142:2014 – Methods for Rating and Assessing Industrial and Commercial Sound

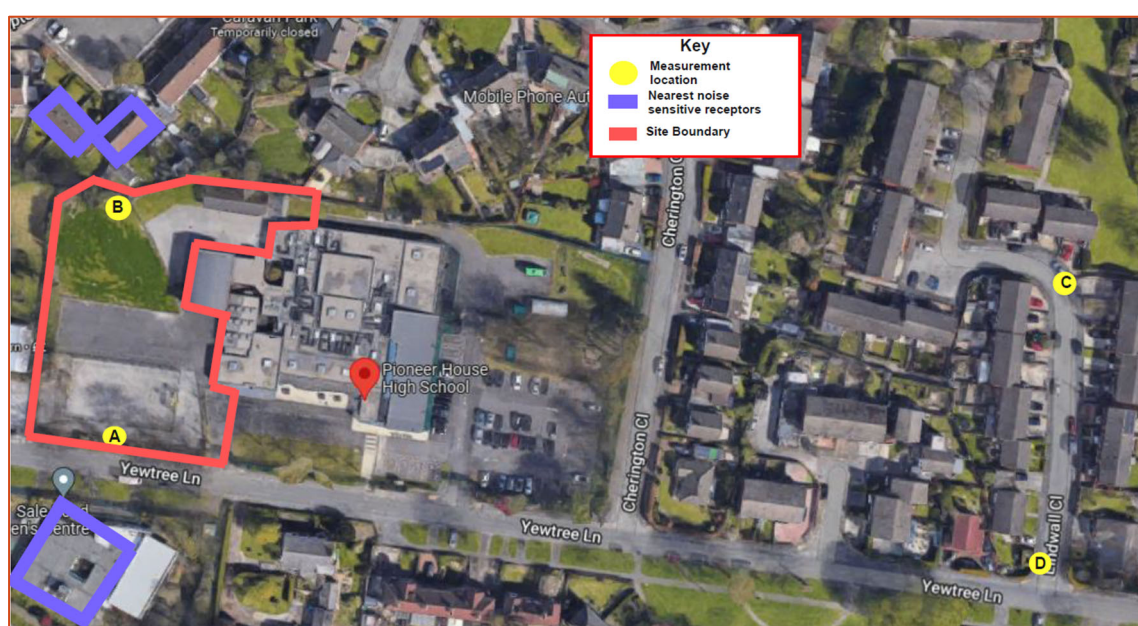
- 2.20 BS 4142:2014 sets out a procedure for assessing noise impact whereby a Noise Rating is determined and compared with the existing local Background Sound Level.
- 2.21 The Rating Level ($dB_{L_{Ar,Tr}}$) is evaluated from the Specific Noise Level by including several, cumulative corrections to account for factors such as distinguishable tone, impulse, intermittency or other readily distinguishable sound characteristics.
- 2.22 BS 4142:2014 seeks to determine a “representative” Background Sound Level, stating that
“...the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods”.
- 2.23 The assessment of the impact depends upon the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level. An initial estimate of the impact of the specific sound is made by subtracting the Background Sound Level from the Rating Level, while considering the following points:
- a) Typically, the greater this difference, the greater the magnitude of the impact.
 - b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
 - c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
 - d) 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.

3 SITE DESCRIPTION

Site Description

- 3.1 The site is bordered by the Yewtree Lane to the South. The M60 motorway lies approximately 200m to the north, and the A5103 Princess Parkway is approximately 790m to the East.
- 3.2 There are residences to the north, south and east of the site. To the immediate west is a commercial premises. Immediately south of the development area on Yewtree Lane is a Children's Centre.
- 3.3 Figure 2 below illustrates the location of the Site boundary and the nearby noise sensitive receptors.

Figure 2 – Site Boundary and Nearby Noise Sensitive Properties



Nearby Noise Sensitive Receptors (NSRs)

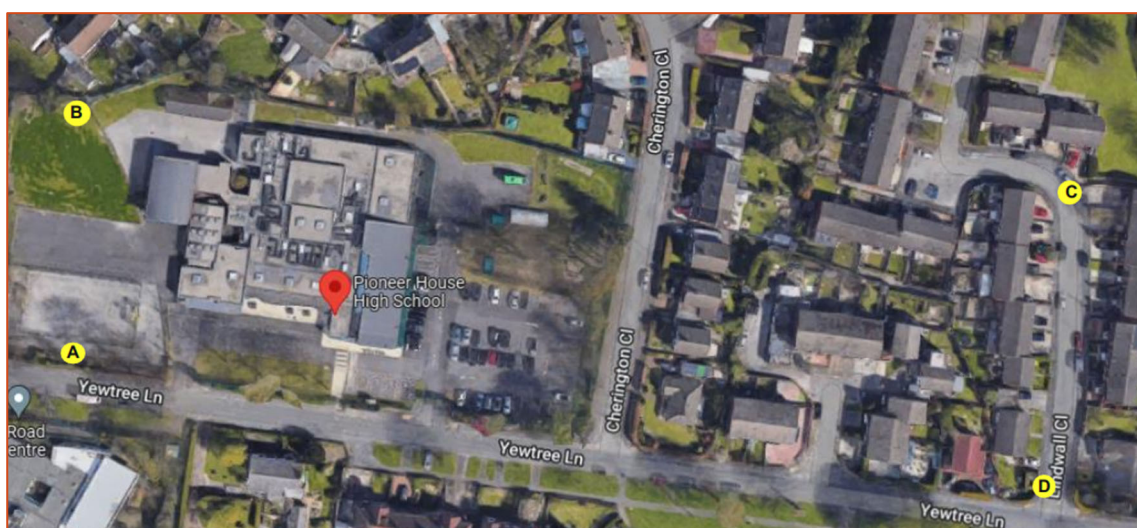
- 3.4 There are various residential properties in the nearby vicinity to the proposed development, the most sensitive of which are the two properties on Tipton Drive located approximately 20m to the north of the proposed multi use games area (MUGA).
- 3.5 The nearest noise sensitive receptor to the proposed new teaching block is the Children's Centre on Yewtree Lane.

4 NOISE SURVEY

Methodology

- 4.1 dBx Acoustics carried out an attended environmental noise survey at the site on Wednesday 26th October to establish the existing ambient, background and maximum noise levels affecting the site and its surroundings. Measurements were made between approximately 08:45h and 11:40h.
- 4.2 Figure 3 below indicates the approximate measurement locations.
- 4.3 Initially, measurements were to be undertaken at locations A (representing road traffic noise levels affecting the proposed teaching block, and background noise levels at the Children's Centre), and B, representing the noise sensitive receptors at Tipton Drive.
- 4.4 However, construction noise nearby affected measurements at Location B. In order to compensate for this, a substitute location (C) at a similar distance from the primary noise sources was selected. Measurements were also made at D for direct comparison with location A, to support the supposition that traffic noise levels affecting the development site and the substitute monitoring locations are comparable.
- 4.5 The measurements were made during the morning period and are considered as being representative of existing noise levels affecting the site.
- 4.6 All measurements were undertaken in accordance with BS 7445-1:2003 *Description and Measurement of Environmental Noise*, with microphones located at approximately 1.5 metres above the local ground level and at least 3.5 metres away from reflective surfaces other than the ground which can be considered as in free field conditions. All measurements were 30 minutes in duration.

Figure 3 – Noise Monitoring Locations



Noise Sources

- 4.7 The dominant noise sources affecting the site and noise sensitive receptors are road traffic noise from the M60 motorway to the North.

Weather Conditions

- 4.8 Weather conditions during the measurement period at noise monitoring locations were generally cool and cloudy, with scattered clouds.
- 4.9 Wind speeds were within suitable parameters for the measurement of environmental noise (i.e. generally under 5 ms^{-1}). All microphones were protected with a windshield for the duration of the survey.

Equipment

- 4.10 The equipment used during the environmental noise survey is detailed in Table 3, below.

Table 3: Equipment Used in the Environmental Noise Survey

Equipment	Manufacturer & Part No.	Serial Number
Sound Level Meter	Cirrus CR:171C	G300741
Pre-amplifier	Cirrus Pre-amp	9082F
Microphone	MK:224	211753D
Calibrator	Cirrus CR:515	87921

- 4.11 The sound level meter was calibrated before and after measurements, with no significant drift recorded. An accredited laboratory calibrated the equipment not more than two years prior to the measurements being made, with the exception of the calibrator, which had been calibrated not more than one year prior to the survey.

5 ENVIRONMENTAL NOISE SURVEY RESULTS

Short-term Noise Monitoring - Noise Levels

- 5.1 A summary of the noise levels measured at noise monitoring Locations A, C and D are presented in Table 4, below.

Table 4: Summary of Noise Survey Results at Short-term Noise Monitoring- Position A, C and Position D (Figure 3)

Location (Figure 2)	Period, hh:mm	Ambient Noise Level (dBL _{Aeq,30mins})	Maximum Noise Level (dBL _{A1,30mins})	Background Noise Level (dBL _{A90,30mins})
A – Yewtree Road	08:44 – 09:14	55	62	52
C – Lindwall Close representing Tipton Drive	09:58 – 10:28	54	59	52
	11:10 – 11:40	53	60	50
D – Yewtree Road	10:34 – 11:04	53	62	48

Note: All figures rounded to the nearest whole decibel.

- 5.2 The measurements were consistent across the survey period and can therefore be considered to be representative of the noise climate across the site.

6 BUILDING ENVELOPE SOUND INSULATION

Internal Ambient Noise Criteria

- 6.1 The relevant internal noise criteria which have been adopted for the proposed school development using BB93 are outlined in Table 2, above.
- 6.2 An external noise break-in assessment has been undertaken to assess the suitability of the site for the proposed development.
- 6.3 In accordance with BB93 guidance, for naturally ventilated teaching spaces, an internal noise level limit of 40 dBL_{Aeq,30mins} is considered appropriate for classrooms. BB93 also states that where external ambient free field noise levels at the façade do not exceed the IANL figures given in Table 2 by more than 16 dB for single sided ventilated spaces and 20dB for cross ventilated or roof ventilated spaces, the criteria for natural ventilation can usually be achieved.
- 6.4 Therefore, natural ventilation is generally likely to be appropriate for general teaching rooms where the external noise level does not exceed 56 dB L_{Aeq,30min} for spaces within single sided ventilation, or 60 dB L_{Aeq,30min} for cross ventilated or roof ventilated spaces.

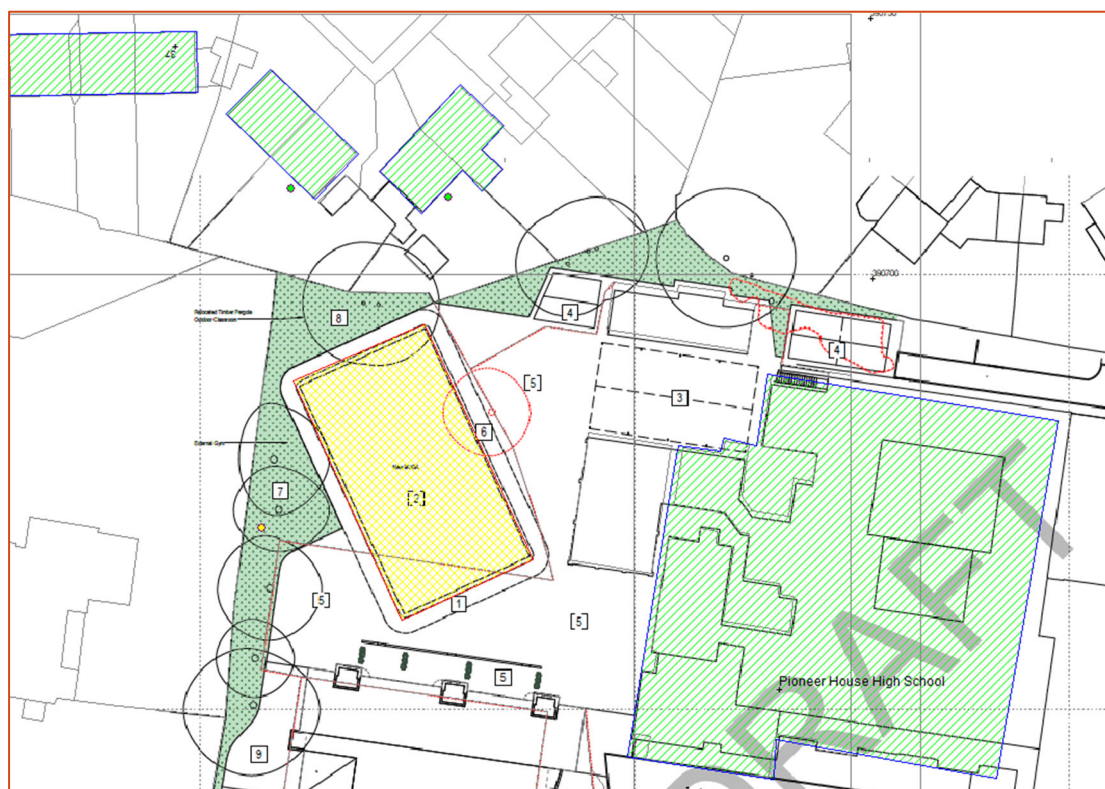
Assessment of Ventilation Strategy

- 6.5 The results of the noise survey and assessment indicate that the predicted typical worst-case daytime external noise levels at the facades of the proposed teaching block vary between 53-55 dBL_{Aeq,30min}.
- 6.6 Based on this, natural ventilation is therefore likely to be suitable for spaces within the proposed new teaching block.
- 6.7 Given that natural ventilation via open windows is likely to be acceptable, there are no specific requirements for the acoustic performance of the building façade or glazing. Any construction achieving a sound insulation performance of 26 dBR_w or greater would be sufficient, which is not an onerous requirement and can typically be achieved with thermally insulating double glazed units.

7 MUGA

- 7.1 As indicated in Figure 1, a new MUGA is proposed for the use of the School, to the south of the residential properties on Tipton Drive.
- 7.2 No information on proposed operational hours or intensity of use has been provided. For the purposes of this assessment it is assumed that the MUGA would only be used during the school daytime period.
- 7.3 According to the Sport England *Design Guidance Note on Artificial Grass Pitch Acoustics*¹ a typical noise level of 58 dB $L_{Aeq, 1hr}$ can be assumed to arise at 10 m from the side-line halfway marking of a sports pitch. This noise level is based on a combination of player voices and ball impacts and is unlikely to be significantly affected by the nature of the surface (e.g. artificial, grass or hard standing).
- 7.4 This level has been used in our assessment and the MUGA has been modelled as an area source (to allow for free movement of participants across the pitch) calibrated to 58 dB $L_{Aeq, 1hr}$ at 10 m.
- 7.5 Based on the typical daytime ambient noise level at the receptors measured during the noise survey of 53dB $L_{Aeq, 16hr}$ this indicates that an activity noise level of up to 58dB $L_{Aeq, T}$ would be expected to be of negligible impact.
- 7.6 A screenshot from the noise model is presented as Figure 4, below.

Figure 4: Screenshot from Noise Model



¹ <https://www.sportengland.org/media/4515/agp-acoustics-planning-implications.pdf>

- 7.7 Based on observations made on site, there are no windows to habitable rooms on the gable end of the residential receptors. The model has therefore been used to predict the noise level due to use of the MUGA arising at the ground and first floor facades of the two nearest residential properties to the MUGA on Tipton Drive.
- 7.8 The highest predicted noise level due to MUGA activity is $56\text{dB}_{\text{L}_{\text{Aeq,T}}}$ at the first floor windows. No allowance has been made in the model for screening due to intervening fences etc and therefore this can be considered worst-case assessment.
- 7.9 This is 3dB higher than the typical daytime ambient noise level of $53\text{dB}_{\text{L}_{\text{Aeq,T}}}$ representative of these receptors, and in accordance with the IEMA noise change categories set out in Table 1 above is therefore a negligible impact.
- 7.10 It should be noted that the proposed MUGA replaces an existing external play area, and hence will not significantly affect the character of the noise in this area.

8 BUILDING SERVICES NOISE EMISSIONS

- 8.1 Any building services required to provide ventilation to the building should be designed to avoid any adverse impact on the existing and proposed residential amenity of the surrounding housing and Children's centre.
- 8.2 In accordance with 3.7.1.5 of MCC's 'Planning and Noise Technical Guidance', the rating level for noise from any building services associated with the proposed development should be limited to achieve a rating level of 5dB (L_{Aeq}) below the typical background noise level (L_{A90}) at the nearest noise sensitive location when assessed in accordance with BS4142:2014, 'Methods for rating and assessing industrial and commercial sound'.
- 8.3 Therefore, plant noise levels should not exceed 45dB $L_{Ar,Tr}$ at Tipton Drive, and 47dB $L_{Ar,Tr}$ at the Children's Centre on Yewtree Road.

9 SUMMARY AND CONCLUSION

- 9.1 dBx Acoustics Ltd has been appointed by the Prospere Learning Trust to undertake a noise survey and noise impact assessment for the development of a new teaching block and an external Multi Use Games Area (MUGA) at Pioneer School, Wythenshawe, M23 0FF.
- 9.2 A noise survey has been undertaken at the site to establish the existing ambient and background noise levels affecting the development site and the nearby noise sensitive receptors.
- 9.3 Based on the measured noise levels, it has been identified that natural ventilation using open windows is an acoustically appropriate ventilation strategy for the proposed teaching block, to allow compliance with the requirements of Building Bulletin 93.
- 9.4 In accordance with the requirements of Manchester City Council, noise emission limits for any proposed building services plant have been set.
- 9.5 Use of the proposed MUGA has been assessed using a modelling exercise. It has been determined that use of the MUGA would have a negligible noise impact at the nearby residential premises.
- 9.6 Taking the above into account, noise should not be a limiting factor in any planning application.

APPENDIX A – GLOSSARY OF ACOUSTIC TERMINOLOGY

Decibel, dB	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. For sound pressure level (L_p) the reference quantity is 2×10^{-5} N/m ² . The sound pressure level existing when microphone measured pressure is 2×10^{-5} N/m ² is 0 dB, the threshold of hearing.
L	Instantaneous value of Sound Pressure Level (L_p) or Sound Power Level (L_w).
Frequency	Number of cycles per second, measured in hertz (Hz), related to sound pitch.
A-weighting	Arithmetic corrections applied to values of L_p according to frequency. When logarithmically summed for all frequencies, the resulting single "A weighted value" becomes comparable with other such values from which a comparative loudness judgement can be made, then, without knowledge of frequency content of the source.
$L_{eq,T}$	Equivalent continuous level of sound pressure which, if it actually existed for the integration time period T of the measurement, would possess the same energy as the constantly varying values of L_p actually measured.
$L_{Aeq,T}$	Equivalent continuous level of A weighted sound pressure which, if it actually existed for the integration time period, T, of the measurement would possess the same energy as the constantly varying values of L_p actually measured.
$L_{n,T}$	L_p which was exceeded for n% of time, T.
$L_{An,T}$	Level in dBA which was exceeded for n% of time, T.
$L_{max,T}$	The instantaneous maximum sound pressure level which occurred during time, T.
$L_{Amax,T}$	The instantaneous maximum A weighted sound pressure level which occurred during time, T.