



Noise Impact Assessment of a Proposed Multi-Use Games Area

Client: Manchester Youth Academy Ltd

Address: Rushford Park,
Slade Lane,
Manchester,
M19 2AH.

Date: 26/06/2020



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Executive summary

It is proposed that a Multi Use Games Area be developed at Brookside Court, Slade Lane, Manchester, M19 2AH. The current usage of the site is a grass sports field associated with the school.

The proposed operational hours of the development are assumed to be up to 23:00 in the evening. Due to the proximity of residential dwellings to the proposed site, there is a likelihood of noise impact from the proposed usage including, shouting from participants, spectators, referees' whistles, and ball impacts against fences. Whilst the existing usage is in keeping with the proposed usage and the character of the existing noise emissions will not change significantly, the proposed usage presents an intensification of use and therefore the likely noise impact is assessed in this report.

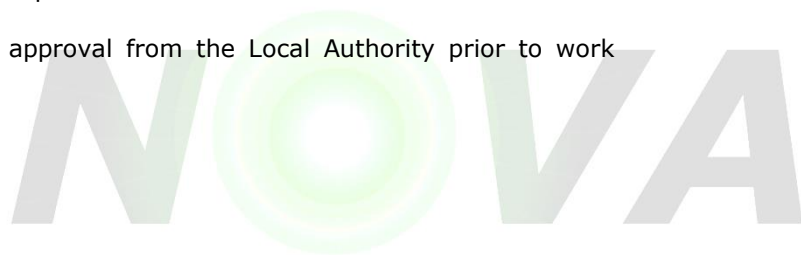
It is important to mention that there are no Standards that are specifically designed for assessing a development of this type and the structure of this report is primarily based on information and guidance presented by 'Sport England' in the document 'Artificial Grass Pitch Acoustics' and the World Health Organisation 'Guidelines for Community Noise'.

The proposed development has been assessed using the following methods, these include:

- Using measured L_{Aeq} noise levels associated with the proposed development to model and predict the compliance with the W.H.O. Guidelines on internal ambient noise levels.
- Using measured L_{Aeq} noise levels associated with the proposed development to model and predict the compliance with the W.H.O. Guidelines on external ambient noise.
- Using measured maximum noise associated with the proposed development to model and predict the compliance with the W.H.O. Guidelines on internal ambient noise levels.

The results of the assessments indicate that all internal noise criteria can be achieved except the L_{Amax} values. The L_{Amax} criteria is exceeded by just 1 dB. This exceedance is deemed to be negligible as the human auditory system typically is not able to experience a difference of less than 3 dB. This indicates therefore that the internal noise levels from maximum noise events are unlikely to cause an adverse impact. As the site is already used for sport in proximity to the nearest residents it can be assumed the type of noise is not deemed out of place with the current acoustic environment.

The findings of this report will require written approval from the Local Authority prior to work commencing.



1. Introduction

1.1 Overview

NOVA Acoustics Ltd has been commissioned to prepare a noise assessment for a proposed MUGA football pitch ('the Proposed Development') at Brookside Court, Slade Lane, Manchester, M19 2AH ('the Site').

The client is preparing a full planning application ('the Application') to Manchester City Council ('the Council').

Accordingly, the following technical noise assessment has been produced to accompany the Application to the local authority.

This report models and predicts the absolute sound level at the nearest receptors, and compares the predicted levels to absolute noise criteria.

This noise assessment is necessarily technical in nature; therefore, a glossary of terms is included in Appendix A to assist the reader.

1.2 Scope & Objectives

The scope of the noise assessment can be summarized as follows:

- Detailed sound modelling, acoustic calculation and analysis in accordance with ISO9613 – 1 prediction methodology to predict sound levels at the NSR.;
- A detailed assessment of the suitability of the Site, in accordance with relevant standards in respect of sound from the proposed sources; and
- Recommendation of mitigation measures, where necessary, to comply with the requirements of the National Planning Practice Guidance in England and Wales, BS8233:2014, and other relevant standards.

1.3 Legislation, Policy and Guidance

This report is to be primarily based on the following legislation, policy and guidance.

- National Planning Policy Framework (2019)
- Noise Policy Statement for England
- IEMA Guidelines on Noise Impact Assessments
- BS8233:2014
- ISO 9613-2 Attenuation of sound during propagation outdoors
- World Health Organization 'Guidelines for Community Noise'

1.4 Assessment Criteria

W.H.O. Guidelines state acceptable noise levels for external amenity areas, such as gardens. This can be used when assessing sports pitches by judging if the amenity of local residents will be affected by the development. The World Health Organization 'Guidelines for Community Noise' states the following:

"Community noise (also called environmental noise, residential noise or domestic noise) is defined as noise emitted from all sources except noise at the industrial workplace. Main sources of community noise include road, rail and air traffic, industries, construction and public work, and the neighbourhood. Typical neighbourhood noise comes from premises and installations related to the catering trade (restaurant, cafeterias, discotheques, etc.); from live or recorded music; sports events including motorsports; playgrounds; car parks; and domestic animals such as barking dogs."

"In Dwellings. The effect of noise in dwellings, typically, are sleep disturbance, annoyance and speech interference. For bedrooms, the critical effect is sleep disturbance. Indoor guideline values for bedrooms are 30 LAeq for continuous noise and 45 L_{Amax} for single sound events. Lower noise levels may be disturbing depending on the nature of the noise source. At night-time, outside sound levels about 1 metre from façades of living spaces should not exceed 45 dB LAeq, so that people may sleep with bedrooms open. This value was obtained by assuming the noise reduction from outside to inside with the window open is 15 dB. To enable casual conversation indoors during daytime, the sound level of interfering noise should not exceed 35 dB LAeq. The maximum sound pressure level should be measured with the sound pressure meter set at "fast"."

It is noted that this includes 'Sports Events' and therefore the noise criteria are deemed acceptable to assess the suitability of internal/external noise levels. Therefore, If the external noise levels do not exceed 50dB L_{Aeq,tr} and the internal noise levels do not exceed 35dB L_{Aeq,tr} the effect is below the Lowest Observed Adverse Effect Level and will have no adverse effect.

The criteria outlined above is based upon a 16-Hour assessment period, to account for the intensification of usage at the site we would propose a more stringent assessment period of 1-hour. It is important to understand that this is an absolute criterion and thus does not provide an effective level based on the existing ambient sound level at the site. Thus, it is imperative that the decision-maker considers the outcome of this assessment alongside the following 'Increase in Ambient Sound Level' assessment.

Whilst the methodology above outlines an appropriate assessment method for average noise levels, further consideration must be taken for maximum noise events such as shouts and screams, referees whistles and ball impacts on fencing.

BS8233:2014 or WHO Guidelines do not provide any specific criteria for internal maximum noise levels during the daytime. The standard does, however, provide internal maximum noise levels during the night time of 45dB L_{AFMax}, with further consideration being taken for the frequency of maximum events.

This criterion is implemented to minimise sleep disturbance and provide an adequate environment for sleep and rest for a typical person. Therefore, it is not deemed to be appropriate to apply this objective criterion to daytime maximum noise events. It is however noted that there are no specific objective criteria that we are aware of, to assess the suitability of maximum internal noise events during the day. Therefore, any decision would have to be solely based on the subjective impression of the effect level. We, therefore, present the following objective criteria considering the internal sound levels presented in the WHO Guidelines and BS8233:2014. The night time maximum noise

level criteria is 45dB $L_{AFMax,8hour}$ and the average noise level criteria is 35 dB $L_{Aeq,16hour}$ during the day and 30dB $L_{Aeq,8hour}$ at night, if the difference between average noise criteria is applied to the maximum noise criteria the associated maximum would be 50 dB $L_{AFMax,DAY}$. This would provide an internal noise criteria of 50 dB $L_{AFMax,DAY}$, dependent on the frequency of events. Subsequently, the external noise criteria and façade sound level would be 65 dB $L_{AFMax,DAY}$, when considering an open window.

The Sport England 'Artificial Grass Pitch Acoustics' document suggests methods in which the noise levels generated by all-weather pitches can be modelled in accordance with planning applications. In this guidance, it is suggested that the pitch is viewed as an area noise source, and individual maximum events viewed as point sources. It is also stated that in some circumstances, where an all-weather pitch would be classed as in-keeping with the existing acoustic environment, an IEMA 'Increase in Ambient Noise Levels' assessment can be used to assess the change in acoustic levels. It also provides guidance on minimum distances that the sports pitches should be from any gardens of residential dwellings within the vicinity of the proposed development site.



2. Site Description & Background Information

2.1 Site & Surroundings

The proposed site is located within the grounds of Rushford Park at Brookside Court, Slade Lane, Manchester, M19 2AH. The surrounding area is primarily residential with some commercial units.

The proposed MUGA Pitches are located in the eastern side of the park, close to the Manchester Mail trainline. Further to the east, approximately 35m away are residential dwellings at Pennington Street and Swallow Street. To the south of the site runs Park Grove which is mainly residential dwellings approximately 40m from the southern perimeter of the proposed pitches. To the west runs Slade Lane – A5079 which facilitates moderate to high levels of road traffic. To the north, adjacent to the proposed site there is an EI substation. Finally, to the north-west runs Styla trainline. Due to the proximity of the dwellings at Pennington Street, Swallow Street and Park Grove to the proposed development site, they will be considered the closest Noise Sensitive Receptors (NSRs) in the subsequent assessment.



Figure 1.0 – Site and Surroundings

2.2 Background

The current site is managed by Manchester Youth Academy Ltd (MYAL). The current site is comprised by 2No. 5-a-side pitches located at the northern side, 1 No. senior pitch (22 players) at the center of the park and a training area at the eastern side. Moreover, there is a pavilion building with small kitchen, a multi-use space, toilet and changing rooms and two secure containers for storage.

Manchester Youth Academy has a long term ambition to create a vibrant community hub that is used and valued by local residents, building on football as a hook to attract a wide range of communities to participate in social and physical activities and achieve positive social change, in this relatively

deprived area particularly short of sports facilities. MYAL has a 25-year lease for the site, running from 2014.

It is proposed that the existing eastern grass training area be converted into 2 No. 5-a-side pitches and 1No. 7-a-side pitch, with an associated ecological area at the south. The current land is already being used for sports activities and thus it is assumed that the proposed activities will not change the character of the area. The operational hours are proposed to be extended till 23:00. Location and site plans can be found in Appendix C and D respectively.



3. MUGA Pitch Noise Assessment

To assess the proposed development, three modes of assessment will be used. These include:

- Using L_{Aeq} noise levels associated with the proposed development to model and predict compliance with the WHO Guidelines on internal ambient noise levels.
- Using L_{Aeq} noise levels associated with the proposed development to model and predict compliance with the WHO Guidelines on external ambient noise levels.
- Using maximum noise levels associated with the proposed development to model and predict compliance with the WHO Guidelines on internal ambient noise levels.

3.1 WHO Guidelines L_{Aeq} Internal Noise Levels Assessment

To predict the sound levels generated by the activities on the pitch, noise emissions measured by the technical acoustic consultant for 'Sport England' have been used; further information is presented in Appendix F. These noise levels were measured during nine sports sessions on three separate AGPs. The sessions included football, hockey and rugby and participation by men, women and children. The purpose was to determine a 'typical' noise level generated from a 'typical' AGP sports session. The L_{Aeq} noise level at 10m is recorded as 58.0 dB. This value was then calibrated in SoundPlan software and a sound power level of 97.0 dB was found to be appropriate. The results can be seen in the table below.

Description	$L_{Aeq,1hour}(dBA)$	Area (56.0m x 37.0m)	Calibrated L_w
Pitch 5-a-side	58.0	700	92.0
Pitch 7-a-side	58.0	1400	94.0

Table 1.0 – Specific Sound Level Summary

The specific sound level at the NSRs has been calculated using SoundPlan Essential 8.1, which undertakes its calculation in accordance with the guidance given in ISO9613 – 1:1993 and ISO9613 – 2:1996. The following assumptions have been made within the calculation software:

- To accurately model the land surrounding the development the topographical data has been taken from Google Maps, it is assumed this has an accuracy within the last 3 years.
- The ground between the source and receiver is mixed, 'soft' and 'hard', for the purpose of the assessment the ground has been considered as 'soft'.
- The sound power shown in the table above have been used to as noise emissions of the area sources at the sound model.
- The source height has been set at 1.5m.
- The grid noise map height has been set at 4m in order to show the most exposed floor of the NSRs.

The sound map showing the specific sound level emissions without mitigation can be seen below in Figure 2.0.

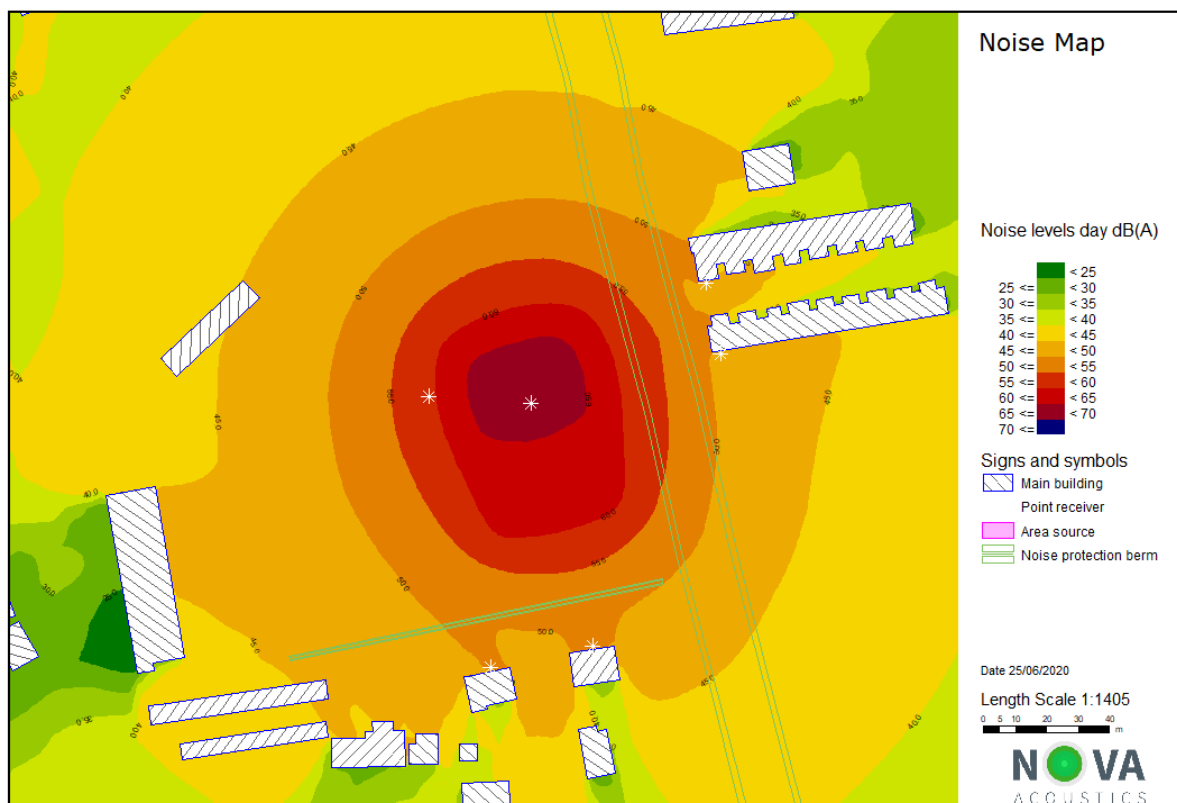


Figure 2.0 – Specific Sound Level Map – $L_{Aeq,1hour}$

A summary of the specific sound levels at the NSRs, based on the sound map shown in Figure 2.0, can be seen in the following table.

NSR	Façade Specific Sound Level (dBA)	Center Garden Specific Sound Level (dBA)
NSR 1	50.0	52.0
NSR 2	50.0	48.0

Table 2.0 - Specific Sound Level at NSR Summary

An appropriate internal noise level for bedroom day time resting is stated in the WHO Guidelines as 35.0 dB $L_{Aeq,t}$. The calculated internal noise levels are shown below considering the attenuation provided by a partially open window (-15 dB as stated in BS8233:2014).

Location	Façade Noise Level ($L_{Aeq,1hour}$ dB)	Attenuation Provided by Open Window (dB)	Calculated Internal level (dB)	WHO Guidelines Criteria	Exceedance Over Guidelines (dB)
NSR 1	50.0	-15.0	35.0	35 dB $L_{Aeq,16hour}$	+0.0
NSR 2	50.0	-15.0	35.0	35 dB $L_{Aeq,16hour}$	+0.0

Table 3.0 – BB93:2015 Internal $L_{Aeq,1hour}$ Noise Level Analysis

Discussion

As can be seen in the assessment above, considering 15 dB attenuation from an open window, the internal day time noise criteria for bedrooms is not exceeded, thus showing that no impact is expected. In addition, the site is currently used as sports facility and hence the NSRs will likely have a slightly higher tolerance for this type of noise as sports noise is already a defining feature of the surrounding acoustic environment and as such, any impact is expected to be further reduced.

3.2 External Noise Level Assessment

The following table analyses the expected external noise levels within the external amenity areas of the closest NSRs to site.

Location	Time Period	Garden Noise Level (dBA)	WHO Guidelines Criteria	Exceedance over Criteria (dBA)
NSR 1	Day time	52.0	50-55 dB $L_{Aeq,16hour}$	+0.0
NSR 2	Day time	48.0	50-55 dB $L_{Aeq,16hour}$	+0.0

Table 4.0 – BS8233 External Noise Level Analysis

Discussion

As can be seen in the assessment above the noise levels at the centre of the closest gardens to the proposed spots pitch fall below the criteria set out at WHO Guidelines thus indicating no impact on the NSR. In addition, as stated above the site is currently used as a playing field and as such the proposed noise source is not out of character for the area. Therefore, the actual impact is likely to be reduced.

3.3 L_{Amax} Internal Noise Levels Assessment

It is thought that the loudest sport to be played on the all-weather pitch will be football. It is assumed that hockey, tennis and other sports could also be played, but measurements taken from the 'Sport England' document suggest these are lower in noise level.

The following section uses the L_{Amax} levels measured of:

- An adult male shouting
- A ball impacting a chain link fencing
- A referee's whistle

A worst-case scenario where a total of 11 men could be heard shouting, one ball could hit a chain-link fence, and the referee could blow his whistle simultaneously. The values that have been used for the sound model are shown in the table below. An average head height of 1.5m has been assumed for all sources.

Noise Levels		
Description	L_{Amax} (dB)	L_w (dBA)

Raised Voice (Adult Male)	89.0	97.0
Ball Impact on Fence	94.0	102.0
Referee's Whistle	105.0	113.0

Table 5.0 – L_{Amax} Noise Levels

The specific sound level at the NSRs has been calculated using SoundPlan Essential 8.1, which undertakes its calculation in accordance with the guidance given in ISO9613 – 1:1993 and ISO9613 – 2:1996.

The following assumptions have been made within the calculation software:

- To accurately model the land surrounding the development the topographical data has been taken from Google Maps, it is assumed this has an accuracy within the last 3 years.
- The ground between the source and receiver is mixed, 'soft' and 'hard', for the purpose of the assessment the ground has been considered as 'soft'.
- The sound levels indicated in the table above have been used to calibrate the sound model.
- The source height has been set at 1.5m.
- The grid noise map height has been set at 4m in order to show the most exposed floor of the NSRs.

The sound map showing the specific sound level emissions from the Proposed Development can be seen below in Figure 3.0.

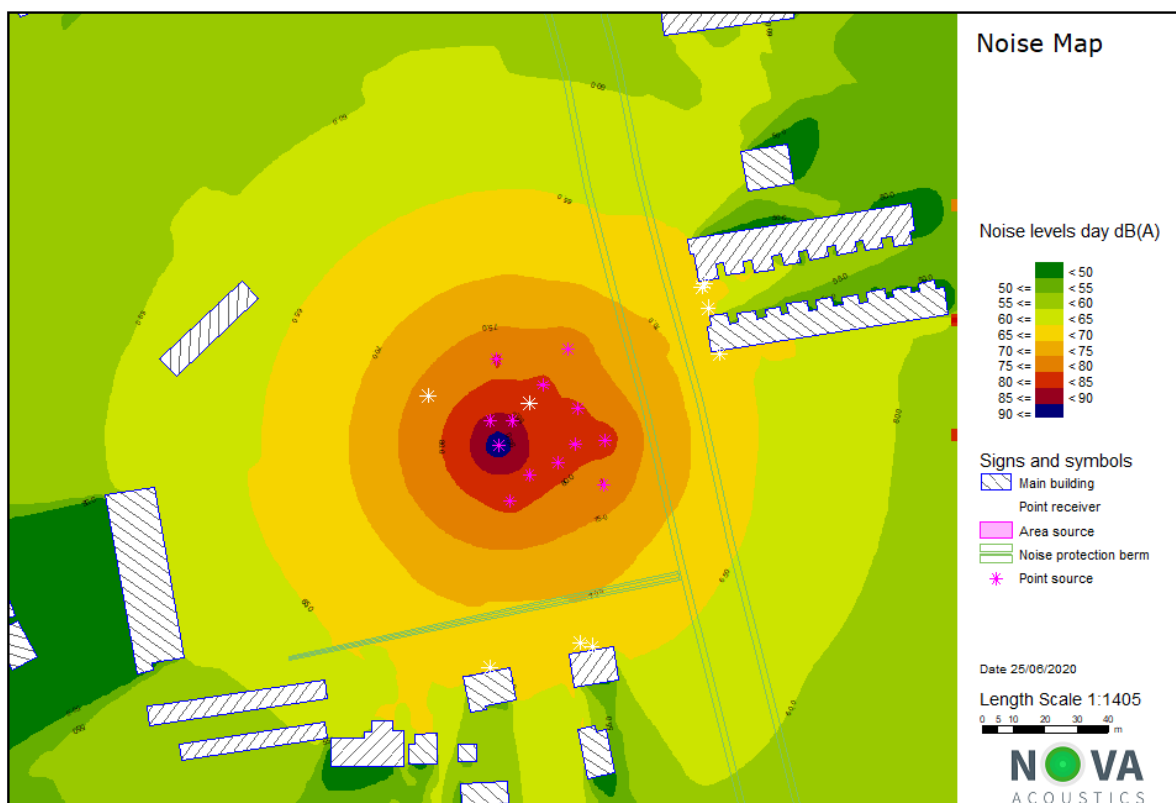


Figure 3.0 – Specific Sound Level Map – L_{Amax} Levels

NSR	Façade Noise Level (L_{Amax} dB)	Attenuation of an open window (dB)	Expected internal level (dB)	L_{Amax} Criteria	Exceedance over criteria (dB)
1	66.0	-15	51.0	50 dB $L_{Amax,16hour}$	+1.0
2	66.0	-15	51.0	50 dB $L_{Amax,16hour}$	+1.0

Table 6.0 – BS8233 Internal L_{Amax} Noise Level Analysis

Discussion

The L_{Amax} assessment shows that the maximum noise levels from the proposed development are predicted to exceed the proposed criteria by just 1 dB. This exceedance is deemed to be negligible as the human hearing system typically is not able to experience a difference of less than 3 dB. This indicates therefore that the internal noise levels from maximum noise events are unlikely to cause an adverse impact. As the site is already used for sport in proximity to the nearest residents it can be assumed the type of noise is not deemed out of place with the current acoustic environment.

3.4 MUGA Assessment Mitigation Measures and Recommendations

The following section of the report outlines further mitigation and recommendation measures that should be implemented to ensure the proposed development has the lowest impact possible on the surrounding residential dwellings.

- The usage of the pitches should be restricted after 23:00.



Appendix A – Acoustic Terminology

Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of 20µPa (20x10 ⁻⁶ Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log ₁₀ (s1 / s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20µPa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
L _{eq,T}	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
L _{max,T}	A noise level index defined as the maximum noise level during the period T. L _{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L _{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L _{90,T}	A noise level index. The noise level exceeded for 90% of the time over the period T. L ₉₀ can be considered to be the "average minimum" noise level and is often used to describe the background noise.
L _{10,T}	A noise level index. The noise level exceeded for 10% of the time over the period T. L ₁₀ can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m
Facade	At a distance of 1m in front of a large sound reflecting object such as a building façade.
Fast Time Weighting	An averaging time used in sound level meters. Defined in BS 5969.

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In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided. The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at 1m away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

The ear is less sensitive to some frequencies than to others. The A-weighting scale is used to approximate the frequency response of the ear. Levels weighted using this scale are commonly identified by the notation dB(A).

In accordance with logarithmic addition, combining two sources with equal noise levels would result in an increase of 3 dB(A) in the noise level from a single source. A change of 3 dB(A) is generally regarded as the smallest change in broadband continuous noise which the human ear can detect (although in certain controlled circumstances a change of 1 dB(A) is just perceptible). Therefore, a 2 dB(A) increase would not be normally be perceptible. A 10 dB(A) increase in noise represents a subjective doubling of loudness.

A noise impact on a community is deemed to occur when a new noise is introduced that is out of character with the area, or when a significant increase above the pre-existing ambient noise level occurs.

For levels of noise that vary with time, it is necessary to employ a statistical index that allows for this variation. These statistical indices are expressed as the sound level that is exceeded for a percentage of the time period of interest. In the UK, traffic noise is measured as the L_{A10} , the noise level exceeded for 10% of the measurement period. The L_{A90} is the level exceeded for 90% of the

time and has been adopted to represent the background noise level in the absence of discrete events. An alternative way of assessing the time varying noise levels is to use the equivalent continuous sound level, L_{Aeq} .

This is a notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound. To put these quantities into context, where a receiver is predominantly affected by continuous flows of road traffic, a doubling or halving of the flows would result in a just perceptible change of 3 dB, while an increase of more than 25%, or a decrease of more than 20%, in traffic flows represent changes of 1 dB in traffic noise levels (assuming no alteration in the mix of traffic or flow speeds).

Note that the time constant and the period of the noise measurement should be specified. For example, BS4142:2014 specifies background noise measurement periods of 1 hour during the day and 15 minutes during the night. The noise levels are commonly symbolised as $L_{A90,1\text{hour}}$ dB and $L_{A90,15\text{mins}}$ dB. The noise measurement should be recorded using a 'FAST' time response equivalent to 0.125ms.



Appendix B – Legislation, Policy and Guidance

This report is to be primarily based on the following legislation, policy and guidance.

National Planning Policy Framework (2019)

Government policy on noise is set out in the National Planning Policy Framework (NPPF), published in 2019. This replaced all earlier guidance on noise and places an emphasis on sustainability. In section 15, Conserving and enhancing the natural and local environment, paragraph 170e, it states:

Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;

Paragraph 180 states:

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

- a) Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- b) Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- c) Limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

Noise Policy Statement for England

Paragraph 180 of the NPPF also refers to advice on adverse effects of noise given in the Noise Policy Statement for England (NPSE). This document sets out a policy vision to:

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

To achieve this vision the Statement identifies the following three 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;*
- *Where possible, contribute to the improvement of health and quality of life.*

In achieving these aims the document introduces significance criteria as follows:

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur. It is stated that “significant adverse effects on health and quality of life should be avoided while also considering the guiding principles of sustainable development”.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected. It is stated that the second aim above lies somewhere between LOAEL and SOAEL and requires that: “all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also considering the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur.”

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. This can be related to the third aim above, which seeks: “where possible, positively to improve health and quality of life through the pro-active management of noise while also considering the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim.”

The NPSE recognises that it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations and provides no guidance as to how these criteria should be interpreted. It is clear, however, that there is no requirement to achieve noise levels where there are no observable adverse impacts but that reasonable and practicable steps to reduce adverse noise impacts should be taken in the context of sustainable development and ensure a balance between noise sensitive and the need for noise generating developments.

Any scheme of noise mitigation outlined in this report will, therefore, aim to abide by the above principles of the NPPF and NPSE whilst recognizing the constraints of the site.

IEMA Guidelines on Noise Impact Assessments

The IEMA Guidelines for Environmental Noise Assessment address the key principles of noise impact assessment and are applicable to all development proposals where noise effects may occur. The guidelines set out key principles for noise impact assessment relevant to all types of project regardless of size. The guidance provides advice with regards to the collection of baseline noise data, prediction of noise levels and how noise should be assessed. The guidance recognizes that the effect associated with a noise impact will be dependent on a number of factors including but not limited to the sensitivity of the receptor, frequency and duration of the noise source and time of day. The Guidelines accept that a simple change in noise levels using a single noise indicator may fail to adequately reveal the actual noise impact of the proposal. The character of the noise must be considered and the Guidelines suggest comparing several noise indicators such as the LAeq, LMax and LA90 as a more rigorous approach.

Absolute levels such as those set out in WHO Guidelines are also considered and the Guidelines suggest that a change in noise levels in an area where the existing levels are above WHO Guidelines should be considered as having more of an adverse effect than a change in noise levels in an area where existing levels are well below.

The Guidelines stop short of providing specific assessment criteria which developments should achieve but instead suggests that the methodology adopted should be selected on a site by site basis regarding relevant national and local standards.

The Guidelines contain effect descriptors for changes in noise levels and for noise effect levels. These are summarized below:

Effect Descriptors	
Very substantial	Greater than 10 dB L_{Aeq} change in sound level perceived at a receptor of great sensitivity to noise
Substantial	Greater than 5 dB L_{Aeq} change in sound level at a noise sensitive receptor, or a 5 to 9.9 dB L_{Aeq} change in sound level at a receptor of great sensitivity to noise
Moderate	A 3 to 4.9 dB L_{Aeq} change in sound level at a sensitive or highly sensitive noise receptor, or a greater than 5dB L_{Aeq} change in sound level at a receptor of some sensitivity
Slight	A 3 to 4.9 dB L_{Aeq} change in sound level at a receptor of some sensitivity
None/Not Significant	Less than 2.9 dB L_{Aeq} change in sound level and/or all receptors are of negligible sensitivity to noise or marginal to the zone of influence of the proposals

Table 7.0 – IEMA Guidelines Effect Descriptors

Noise Effect Level			
Time	Lowest Adverse Effect Level	Observed Adverse Effect Level	Significant Observed Adverse Effect Level
07:00 - 23:00	50 dB $L_{Aeq,16\text{ hour}}$		60 dB $L_{Aeq,16\text{ hour}}$
23:00 - 07:00	40 dB $L_{Aeq,8\text{ hour}}$		55 dB $L_{Aeq,8\text{ hour}}$
	60 dB L_{AFMax} (at the facade)		80 dB L_{AFMax} (at the facade)

Table 8.0 – IEMA Guidelines Noise Effect Level

The Guidelines are not prescriptive as to how a noise impact assessment should be carried out, and allow assessors to consider factors such as frequency spectra, days and times of operation, frequency of operation and any other factor which allows the noise to be assessed in context.

BS4142:2014

BS4142:2014 sets out a method to assess the likely effect of sound from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises, on people who might be inside or outside a dwelling or premises used for residential purposes in the vicinity.

The procedure contained in BS4142:2014 for assessing the effect of sound on residential receptors is to compare the measured or predicted sound level from the source in question, the $L_{Aeq,T}$ 'specific sound level', immediately outside the dwelling with the $L_{A90,T}$ background sound level.

Where the sound contains a tonality, impulsivity, intermittency and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific sound level to obtain the $L_{Ar,Tr}$ 'rating sound level'. A correction to include the consideration of a level of uncertainty in sound measurements, data and calculations can also be applied when necessary.

BS4142:2014 states: "The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs". An estimation of the impact of the specific sound can be obtained by the difference of the rating sound level and the background sound level and considering the following:

- "Typically, the greater this difference, the greater the magnitude of the impact."
- "A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context."
- "A difference of around +5dB 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 negligible impact, depending on the context."

Interpreting the guidance given in BS4142:2014, with consideration of the guidance given in the NPSE and NPPG Noise, an estimation of the impact of the rating sound is summarised in the following text:

- A rating sound level that is +10 dB above the background sound level is likely to be an indication of a Significant Observed Adverse Effect Level;
- A rating sound level that is +5 dB above the background sound level is likely to be an indication of a Lowest Observed Adverse Effect Level;
- The lower the rating sound 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 sound level does not exceed the background sound level, this is an indication of the specific sound source having a negligible impact, and would therefore be classified as a No Observed Adverse Effect Level.

During the daytime, the assessment is carried out over a reference time period of 1-hour. The periods associated with day or night, for the purposes of the Standard, are 07.00 to 23.00 and 23.00 to 07.00, respectively.

BS8233:2014 `Guidance on sound insulation and noise reduction for buildings'

The British Standard BS 8233: 2014, Guidance on Sound insulation and noise reduction for buildings provides additional guidance on noise levels from sources without specific character in the built environment, based on the recommendations of the World Health Organization; specifically, WHO Guidelines on Community Noise, 1999. The criteria desirable levels of steady state, "anonymous" noise in unoccupied spaces within dwellings, from sources such as road traffic, mechanical services and other continuously running plant, are tabulated below:

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

Table 9.0 - BS8233 criteria for internal noise levels in dwellings

It is noted, however that where development is considered necessary or desirable, despite external noise level above WHO guidelines, the above target levels may be relaxed by up to 5 dB.

The standard also recommends that for traditional external amenity areas, such as gardens, it is desirable that external noise levels do not exceed 50 dB $L_{Aeq,T}$, and that 55 dB $L_{Aeq,T}$ would be acceptable in noisier environments. However, it is recognised that these values may not be achievable in all areas where development is desirable and in such locations, development should be designed to achieve the lowest practicable levels.

General recommendations for mitigation to enable these targets to be achieved are provided, including the use of bunds and barriers to reduce external noise and space planning and sound insulation for the control of internal noise levels.

For this assessment, the above criteria are considered to be the LOAEL as defined in the NPSE above.

ISO 9613-2 Attenuation of sound during propagation outdoors

The ISO 1996 series of standards specifies methods for the description of noise outdoors in community environments. Part 2 of ISO 9613 is intended to enable noise levels in the community to be predicted from sources of known sound emission. The method is general in the sense that it may be applied to a wide variety of noise sources, and cover most of the major mechanisms of attenuation.

This standard provides guidance on the outdoor propagation of sound. It is widely used to establish the different attenuations that occur during the transmission of the sound from the sources to the receivers. The total attenuation is the sum of the following: geometrical divergence, atmospheric absorption, ground effect, barriers, and miscellaneous other effects.

Appendix C – Location Plans

SITE LOCATION PLAN
Rushford Park Sports Complex, Saddle Lane, Rusholme, Manchester
Scale = 1:1250 @ A1

NOVA

Appendix D – Site Plan


NOVA

Appendix E – Summary of AGP Measured Noise Levels

The measured noise data is taken from the Sport England's Technical Acoustic Consultants investigations into noise emissions from sports pitches.

AGP Activity	Measured Noise Level, L _{Aeq} (1 hour) dB
Rugby training on one half of the pitch with approximately 20 players and football training on the other half with approximately 20 players.	60
8 a-side training match on one half of the pitch only with the other half unused.	56
Football training for a single club of approximately 22 players. The start of the session involved heading drills before the full pitch was used to play an 11 a-side game.	56
Ladies Hockey Club training involving stick drills, passing etc., with multiple balls per team and therefore a lot of impact noise from stick on ball. Approximately 30 players on the pitch.	56
Ladies Hockey Club undertaking defence/attack drills on different halves of the pitch. Single ball used per team with less stick on ball impacts than previous training. Approximately 30 players on the pitch.	58
Men's 6 a-side social football match using half the pitch and hockey goals (12 players).	51
Under sixteen football training with the pitch divided into four quarters and a total of approximately fifty players.	58*
Two adult football games using half the pitch each with a total of 28 players.	56*
Two 8 a-side adult football games using half the pitch each with a total of 32 players.	56*

* During these measurements, noise levels were measured 10 metres from the halfway line (stated noise level) and 10 metres behind the goal line. The measured noise levels behind the goal line were at least 15 decibels lower than those measured at the half way line.