ACOUSTIC CONSULTANTS LTD

Proposed Artificial Grass Pitch
Roefield Sports Pitches, Clitheroe

Noise Impact Assessment

Reference: 7156/DO
March 2018

Proposed Artificial Grass Pitch
Roefield Sports Pitches, Clitheroe

Noise Impact Assessment

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1. Introduction

Surfacing Standards Limited appointed Acoustic Consultants Limited to undertake an environmental noise assessment for the proposed new artificial grass pitch (AGP) at Roefield Sports Pitches in Clitheroe. The assessment considers the impact of environmental noise on the nearby noise-sensitive residential properties.

The assessment includes the prediction of noise emission from the AGP at the nearby noise-sensitive properties, based on a noise prediction model created using Datakustik's CadnaA software.

2. The Site

The proposal is to construct a new AGP to be located on existing playing fields. The proposed hours of use are Monday to Friday 09:00 to 22:00 hours; Saturday and Sunday 08:30 hours to 20:00 hours, we understand these are similar to the hours of use of the existing artificial grass pitches located directly to the West of the proposed AGP pitch location.

The nearest noise sensitive receivers to the proposed AGP are the residential dwellings approximately 30 metres to the South and 50 metres to the North East on Edisford Road and St Pauls Road respectively.

A 3.5 metre acoustic barrier is proposed along the southern boundary of the AGP. The proposed site is shown on Figure 1:

Figure 1: Proposed site plan

3. Planning and Noise

3.1. National Planning Policy Framework

The National Planning Policy Framework (NPPF) was published in March 2012 and replaces the withdrawn Planning Policy Guidance Document 24 entitled 'Planning and Noise'. Section 11 entitled 'Conserving and enhancing the natural environment' addresses noise as a requirement of planning.

Paragraph 109 states:

"109. The planning system should contribute to and enhance the natural and local environment by:

- *preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability."*

Paragraph 123 states:

"123. Planning policies and decisions should aim to:

- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*
- *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
- *identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."*

The document does not prescribe any assessment methodology or criteria to assess the adverse effect of noise.

3.2. Noise Policy Statement for England

The NPPF refers to the Noise Policy Statement for England (NPSE). This was published in March 2010 and aims to provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion and applies to all forms of noise including environmental noise, neighbour noise and neighbourhood noise.

The NPSE sets out the long term vision of Government noise policy. This long term vision is supported by three noise policy aims as follows:

"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 NPSE introduces the concept of "Significant adverse" and "Adverse" impacts of noise which relate to the noise policy aims. These are applied as follows:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur. With regard to where there is potential for noise impact it states the following in relation to the second noise policy aim:

"The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse

effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur."

The NPSE does not provide any assessment criteria for the noted effect levels and each case must be considered on its merits. The NPSE does, however, emphasise that in dealing with noise Local Planning Authorities are required to take a balanced approach in considering the benefits of development as against any adverse effects which arise. Paragraph 2.18 of the NPSE is particularly relevant in this respect and states:

"There is a need to integrate consideration of the economic and social benefits of the activity or policy under examination with proper consideration of the adverse environmental effects, including the impact of noise on health and quality of life. This should avoid noise being treated in isolation in any particular situation, i.e. not focusing solely on the noise impact without taking into account other related factors."

The planning need is outside the scope of noise and acoustics and will need to be addressed by others.

3.3. National Planning Practice Guidance, Noise (NPPG)

The National Planning Practice Guidance (NPPG) on noise referred to here is based on the current version (January 2015) as provided on the Planning Guidance Website.

It states that *"Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment."*

It provides generic guidance on how to determine the noise impact and what factors could be a concern.

It includes the option types to mitigate any adverse effects of noise stating that there are four broad types of mitigation. These are engineering, layout, using planning conditions or obligations and noise insulation.

Paragraph 5 of the NPPG provides a table identifying the effect level and examples of effect relating to the impact effect levels provided in the NPSE. The table is duplicated below:

Table 1: NPPG Noise – Perception of Effect Levels

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		Lowest Observed Adverse Effect Level	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

The table does not provide any objective assessment which equates to the noted effect levels.

The NPPG identifies that where noise is audible it is not necessarily intrusive. The effect and impact on people is based primarily on the level of noise.

The Noise Policy Statement for England (NPSE) states that noise levels above the Lowest Observed Adverse Effect Level are acceptable in planning where reduced to a minimum when taken into account against all other planning considerations.

Section 4 of this report identifies guidance which is considered to provide noise criteria equivalent to effect levels below the Lowest Observed Adverse Effect Level. This is where the perception of noise is "not noticeable" or "noticeable but not intrusive" as indicated in Table 1 above.

4. Relevant Noise Guidance for AGP Assessment

The following sections outline what we consider to be relevant guidance and suitable noise criteria within the context of national planning policy.

This includes advice contained within the Sport England Design Guidance Note 'Artificial Grass Pitch (AGP) Acoustics – Planning Implications' which refers to the following documents.

4.1. World Health Organisation 'Guidelines for Community Noise'

The World Health Organisation 'Guidelines for Community Noise' published in 1999 gives the following description of community noise.

"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; sport events including motor sports; playgrounds; car parks; and domestic animals such as barking dogs."

This includes "*sport events*" and as such the use of AGP sites.

For noise levels internally and externally to dwellings it states:

"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 LAmax 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"."

Based on the same methodology used to determine the night time noise level (with a 15 dB(A) for an open window) outside a residential property the daytime noise level about 1 metre from façades of living spaces should not exceed 50 dB L_{Aeq}.

Table 4.1 of the document provides guidelines for community noise in specific environments, suggesting noise levels at which adverse health and annoyance effects are likely. The relevant noise criteria are as follows:

Table 2: WHO Noise Criteria

Specific Environment	Critical Health Effect	$L_{eq(T)}$ dB(A)
Outdoor living area	Serious annoyance, daytime and evening	55
	Moderate annoyance, daytime and evening	50
Dwelling indoors	Speech intelligibility & moderate annoyance, daytime & evening	35

According to the WHO guidance moderate annoyance is caused by noise levels exceeding 50 $L_{Aeq(T)}$ dB externally and 35 $L_{Aeq(T)}$ dB internally. With relation to the adverse effect level we would consider this threshold of the Lowest Observed Adverse Effect Level.

Therefore, where noise levels from the proposed development do not exceed 50 $L_{Aeq(T)}$ dB externally and 35 $L_{Aeq(T)}$ dB internally, the effect is below the Lowest Observed Adverse Effect Level, and will have no adverse effect. The noise level of the AGP may be noticeable but not intrusive and is considered acceptable in planning terms.

The equivalent noise level is determined over a specific time period. The World Health Organisation guidelines for residential development are typically equivalent noise levels calculated over a 16-hour daytime period.

In our opinion an AGP 16-hour assessment period may not truly reflect the noise impact, as it takes into account times of use and non-use. We would propose an alternative, more stringent but appropriate assessment time period of one hour, $L_{Aeq\ (1\ hour)}$, as this is the typical time period for a community sports session on an AGP.

Therefore we would suggest the more stringent target noise level of 50 dB $L_{Aeq\ (1\ hour)}$ is more suitable for the more sensitive evening time.

The WHO criteria were reviewed in a report by the National Physical Laboratory (reference CMAM16) which states:

"Exceedance of the WHO guideline values does not necessarily imply significant noise impact and indeed, it may be that significant impacts do not occur until much higher levels of noise exposure are reached."

Therefore it is not necessarily the case that where these levels are exceeded the noise will adversely affect nearby residential properties.

4.2. British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings

British Standard 8233:2014 entitled 'Guidance on sound insulation and noise reduction for buildings' came into effect on 28th February 2014 and supersedes British Standard 8233:1999.

Table 4 of the British Standard provides internal ambient noise levels for dwellings from noise sources 'without a specific character' and are based on existing guidelines issued by the World Health Organisation in 1999. The British Standard provides no definition of noise 'without a specific character'.

No reference of guidance on sporting uses is given in the British Standard, unlike the WHO Guidelines. As such we propose that the definition of community noise is applicable to the proposed noise limits. The British Standard 8233:2014 provides the same guidance levels as the World Health Organisation document.

4.3. British Standard 4142:2014

The British Standard 4142:2014 entitled 'Method for rating and assessing industrial and commercial sound' was published on the 31st October 2014 and replaced British Standard 4142:1997. British Standard 4142:2014 describes methods for rating and assessing sound of an industrial and/or commercial nature by comparing the Rating level of the noise under assessment against the Background Noise Level.

Within section 1 'Scope', paragraph 1.3 states:

"The standard is not intended to be applied to the rating and assessment of sound from:
a) recreational activities, including all forms of motorsport."

Whilst a comparison with Background Noise Levels could be undertaken, there is no way of determining the impact on noise-sensitive properties or the likelihood of complaints from this noise type. It is therefore not considered appropriate to use the British Standard for the assessment of this type of activity and clearly should not be used.

4.4. Proposed Assessment Methodology

It is proposed to assess the development against the WHO guidelines. Where the predicted noise level of the AGP is below the WHO guidelines threshold for the onset of 'moderate annoyance' in terms of the NPPG the development will have 'no observed adverse effect'. The NPPG states that the perception of 'No Observed Adverse Effect' is 'noticeable and not intrusive' and gives an example outcome as follows:

"Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life."

The 'No Observed Adverse Effect' level falls below the Lowest Observed Adverse Effect Level of the NPPG.

On similar schemes within the council boundary the Local Authority have requested information on the maximum noise levels and noise characteristics, this is also provided within this assessment.

5. Noise Levels of AGP Use

Noise levels were measured at nine sports sessions on four separate AGPs. The measurements included football, hockey and rugby, with men, women and children participating in different sessions. The purpose of the measurements was to determine a 'typical' noise level for an AGP sports session.

Measurements were undertaken behind the goal line and to the side-line at the halfway line. It was found that noise levels at the halfway line were generally higher than behind the goal.

Noise levels from sporting activity were generally determined by person's voices. This is except for hockey where the balls hitting the backboard of the goal and perimeter boards of the pitch are the main noise sources. We understand that this surface is not suitable for Hockey.

From the measurement data, a typical free-field noise level of 58 dB $L_{Aeq\ (1\ hour)}$ at a distance of 10 metres from the side-line at the halfway line has been determined as representative for noise from an AGP. The following table summarises the measurement data undertaken.

Table 3: Summary of Measured Noise Levels

Monitoring Session	AGP Activity	Measured Noise Level, $L_{Aeq\ (1\ hour)}$ dB
1	Rugby training on one half of the pitch with approximately 20 players and football training on the other half with approximately 20 players.	60
1	8 a-side training match on one half of the pitch only with the other half unused.	56
1	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
1	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
1	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
1	Men's 6 a-side social football match using half the pitch and hockey goals (12 players).	51
2	Under sixteen football training with the pitch divided into four quarters and a total of approximately fifty players.	58 *
2	Two adult football games using half the pitch each with a total of 28 players.	56 *
2	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.

The following sections provide information on the measurements undertaken to determine the typical AGP noise levels stated above.

5.1. Noise monitoring session 1 – 18th February 2014

Measurements were undertaken at two AGP pitches at Coombe Dingle Sports Complex in Bristol. The Complex is owned and operated by the University of Bristol. The complex has one sand dressed pitch and a newer synthetic pitch.

Noise measurements were undertaken using CEL and B&K sound level meters. The equipment information and calibration status is as follows:

Table 4: Measurement Equipment – session 1

Equipment Description / Manufacturer / Type	Serial number	Date of calibration	Calibration Certification Number
Real Time Analyser, B & K Type 2250-A	3000994	12/03/13	K017112
Pre-Amplifier, B & K , Type ZC0032	14611	12/03/13	K017112
Microphone, B & K, Type 4189	2638388	12/03/13	K017112
Calibrator, B&K Type 4231	1934013	12/03/13	K017111
Real Time Analyser, CEL, Type 593	100972	17/06/2013	K031407
Pre-Amplifier, CEL, Type 527	3/0232063	17/06/2013	K031407
Microphone, GRAS 40AE	34509	17/06/2013	K031407
Calibrator, CEL, Type 284/2	5819051	17/06/2013	K031408

During the noise monitoring the conditions were calm, dry and overcast with an air temperature of 7 degrees centigrade. The conditions were considered suitable for noise monitoring.

Measurements of the synthetic pitch were undertaken at monitoring location 'A' 10 metres from the edge of the pitch on a slightly raised bund. The monitoring location had a full view of the pitch.

Measurements of the sand based pitch were undertaken at monitoring location 'B' 10 metres from the edge of the pitch on a slightly raised bund. The monitoring location had a full view of the pitch.

After the monitoring session, when there was no use of the pitch a five minute ambient noise measurement was undertaken, this was due to distant road traffic on the M5 to the South West.

The monitoring locations and pitches are shown below. The monitoring locations were selected to reduce, as far as feasible, noise contributions from the other pitch.

Figure 2: Monitoring Location Site Plan – session 1

The activities that took place during the monitoring session on each pitch are as follows:

Synthetic AGP

19:00 hours to 20:00 hours

Clifton Hockey Club Ladies First Team. For first 30 minutes exercise and running drills without sticks or balls. The most significant noised was from player's voices but some extraneous noise from the other pitch (rugby and football training) was observed. Approximately 15 players on the pitch.

The second 30 minutes of the session involved the first team on one half and the third team on the other. The activities involved 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.

20:00 hours to 21:00 hours

Clifton Hockey Club Ladies first and third teams (approximately 30 players) undertaking defence/attack drills on different halves of the pitch. Single ball used per team so less stick on ball impacts than previous training.

21:00 hours to 22:00 hours

Men's 6-a-side social football match using half the pitch and hockey goals. It was observed that noise from the other pitch during this session was significant at the monitoring location.

Sand-Dressed Pitch

19:00 hours to 20:00 hours

Rugby training on one half of the pitch with approximately 20 players and football training on the other half with approximately 20 players.

20:00 hours to 21:00 hours

8-a-side training match on one half of the pitch only with the other half unused.

21:00 hours to 22:00 hours

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.

Measured Noise Levels

Noise measurements were undertaken at monitoring locations 'A' and 'B'; the measured noise levels have been corrected for ambient noise determined from the noise measurements undertaken after the pitches were in use.

The pitch noise levels are as follows:

Table 5: Measured Noise Levels

Session Period	Synthetic pitch Monitoring location 'B'		Sand dressed pitch Monitoring location 'A'	
	$L_{Aeq\ (1\ hour)}$	$L_{Amax\ (fast)}$	$L_{Aeq\ (1\ hour)}$	$L_{Amax\ (fast)}$
19:00 to 20:00 hours	56	83	60	78
20:00 to 21:00 hours	58	86	56	82
21:00 hours to 22:00 hours	51	78	56	78

5.2. Noise monitoring session 2 – 5th March 2014

Measurements were undertaken at a 3G AGP pitch at Clifton College Sports Ground on the outskirts of Bristol. The complex has a number of artificial pitches, the newest one being the 3G pitch on which monitoring took place.

Noise measurements were undertaken using Svantek and B&K sound level meters. The equipment information and calibration status is as follows:

Table 6: Measurement Equipment – session 2

Equipment Description / Manufacturer / Type	Serial number	Date of calibration	Calibration Certification Number
Real Time Analyser, B & K Type 2250-A	3000994	12/03/13	K017112
Pre-Amplifier, B & K , Type ZC0032	14611	12/03/13	K017112
Microphone, B & K, Type 4189	2638388	12/03/13	K017112
Calibrator, B&K Type 4231	1934013	12/03/13	K017111
Sound Level Meter, Svantek 959	14784	08/04/13	K0200009
Calibrator, CEL, Type 110	045169	08/04/13	K020983
Microphone, GRAS 40AE	98073	08/04/13	K0200009

During the noise monitoring the conditions were calm, dry and overcast with an air temperature of 8 degrees centigrade. The conditions were considered suitable for noise monitoring.

Measurements of the pitch were undertaken at monitoring location 'A' 10 metres behind the goal line of the pitch and monitoring location 'B' 10 metres from the halfway line of the pitch. The monitoring locations had a full view of the pitch.

The monitoring locations are shown below.

Figure 3: Monitoring Location Site Plan – session 2

The activities that took place during the monitoring session are as follows:

18:00 hours to 19:00 hours

Under sixteen football training with the pitch divided into four quarters and a total of approximately fifty players.

19:00 hours to 20:00 hours

Two adult football games using half the pitch each with a total of 28 players.

20:00 hours to 21:00 hours

Two 8 a-side adult football games using half the pitch each with a total of 32 players.

Measured Noise Levels

Noise measurements were undertaken at monitoring locations 'A' and 'B'; the pitch noise levels are as follows:

Table 7: Measured Noise Levels

Session Period	Monitoring location 'A' Behind Goal Line		Monitoring location 'B' On Halfway Line	
	$L_{Aeq(1\ hour)}$	$L_{Amax(fast)}$	$L_{Aeq(1\ hour)}$	$L_{Amax(fast)}$
18:00 to 19:00 hours	42 dB	71 dB	58 dB	82 dB
19:00 to 20:00 hours	39 dB	71 dB	56 dB	76 dB
20:00 to 21:00 hours	39 dB	65 dB	56 dB	85 dB

6. Noise Modelling Methodology

The measured AGP noise emission data have been used to generate a noise map of the site, in order to predict the noise level at the nearby noise-sensitive residential properties.

The modelling has been undertaken using noise mapping software CadnaA by DataKustik. This uses the calculation method of ISO 9613 to predict noise levels.

The assessment is based on the noise modelling methodology using an area source covering the playing surface as the noise source. The area source is at a height of 1.5 metres representative of head height.

To validate the modelling methodology, we have created a noise map of one of the sites where AGP noise was measured (Coombe Dingle in Bristol). The noise map in Figure 4 shows the noise propagation of an area source created from thirty moving point sources. The second noise map (Figure 5) shows the noise propagation of thirty individual point sources spread across the playing surface.

Figure 4: Noise model using an area source

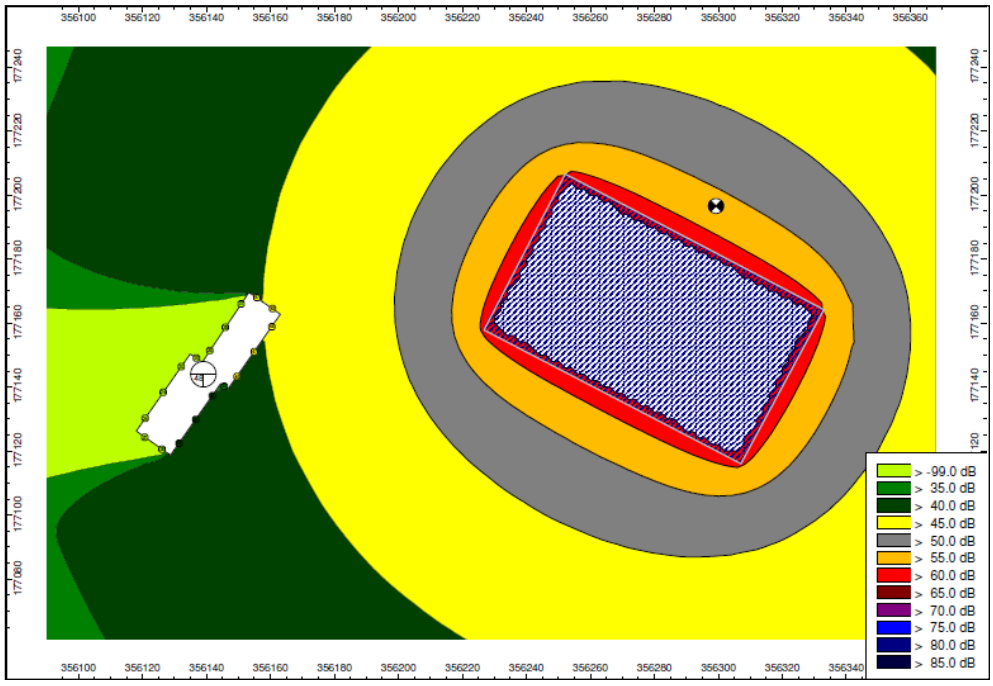
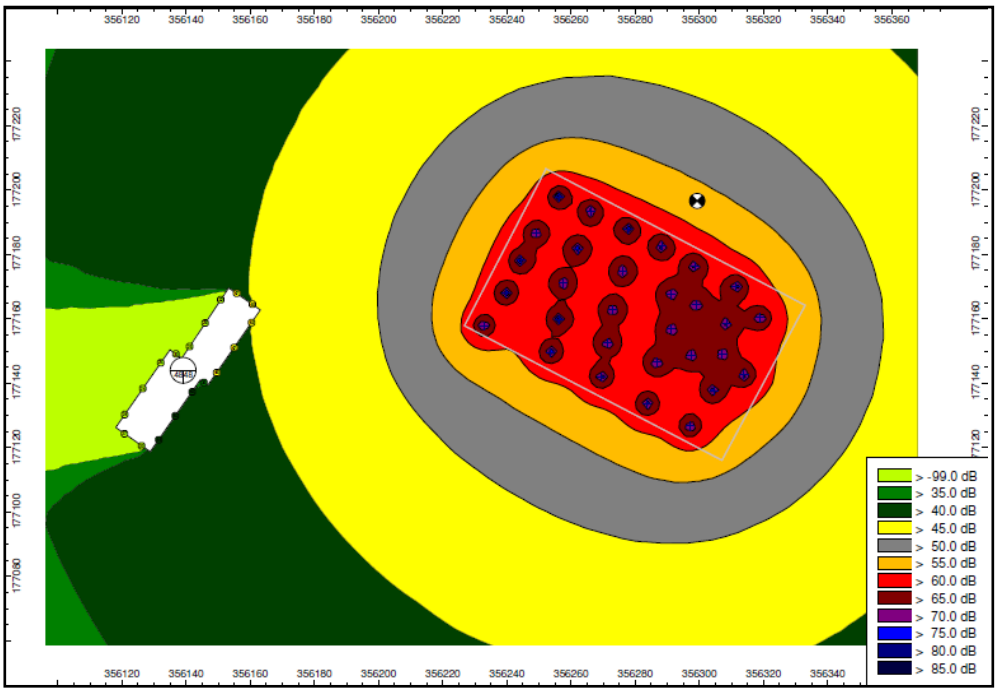


Figure 5: Noise model using point sources



As can be seen from the two maps, there is no significant difference in the noise propagation and as such it is our opinion that an area source is suitable for noise modelling of AGPs.

7. AGP Noise Emission Prediction

A noise model has been generated of the development site. The AGP location and surrounding area has been determined from the Surfacing Standards Limited proposed site plan drawing (SSL2464 Proposed Site Plan Revision 01).

The topography of the site and surrounding area have been determined from 1 metre resolution Environment Agency Lidar DTM. The ground of the playing fields is considered to be 'soft' (i.e. grass) for the purposes of the assessment. Roads and car parks are considered to be 'hard' surfaces, where a ground absorption of zero has been assumed. Third-order reflections are calculated.

Residential and non-residential buildings in the vicinity of the playing fields have been built within the model. Houses have a height of 6 metres.

The noise from an AGP is primarily from voice. The noise source is at a height of 1.5 metres above the ground (approximately head height).

A 3.5 metre high acoustic barrier as indicated as a red line on Figure 6 has been proposed and included within the prediction. This is located on top of the cutting at the existing ground level so site above the level of the pitch.

This will be necessary to achieve the required noise level criteria at the nearest noise-sensitive receivers. In practice, this must have a minimum surface density of 10 kilogrammes per square metre and have no gaps. This could be in the form of a close-boarded timber fence. The barrier should be built on top of the cutting slope which is above the height of the AGP.

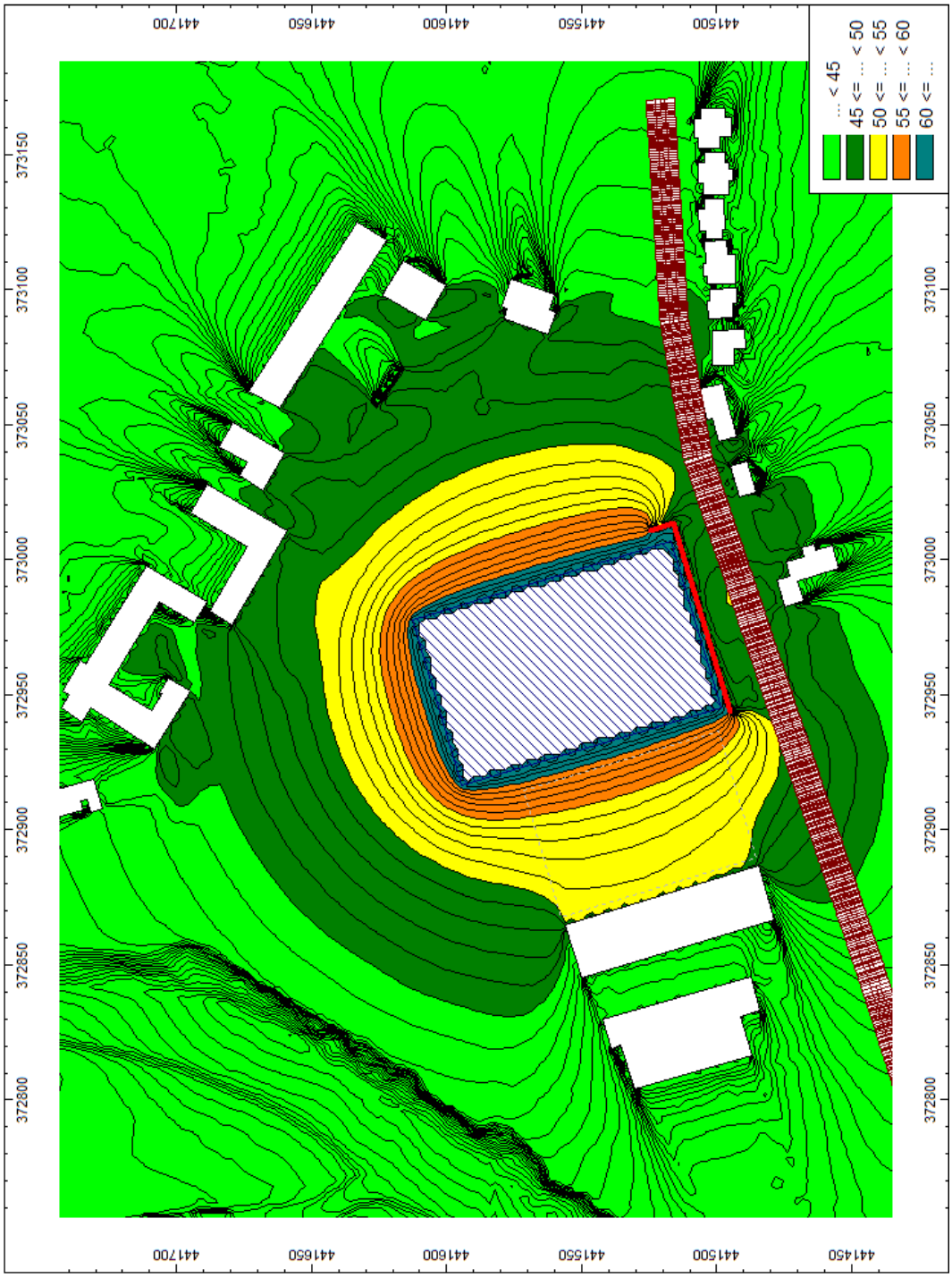
The sound reduction provided by the boundary fences around the gardens is not considered in the modelling as it cannot be demonstrated that the construction complies with the requirements of ISO 9613.

Noise maps show noise emission from the AGP predicted at ground floor level (1.5 metres above the ground), which is typical of a 'daytime' habitable room in a house and external amenity areas.

8. AGP Predicted Noise Levels

The following figure shows the predicted noise emission from the proposed AGP.

Figure 6: Predicted AGP Noise Emission (1.5 metres above the ground).



With the proposed acoustic barrier, the predicted noise level at the façades of the exposed noise-sensitive properties to both the South and North East is 47dB $L_{Aeq\ (1\ hour)}$.

9. Assessment of Noise Impact

With the proposed acoustic barrier, the predicted noise level at the façades of the exposed noise-sensitive property is 47dB $L_{Aeq\ (1\ hour)}$.

The predicted noise level of 47 dB in gardens falls below the guideline value of WHO 1999 at which moderate community annoyance can occur.

The World Health Organisation provides a sound reduction through an open window of 15 dB(A) which results in a predicted internal equivalent noise level of 32 dB $L_{Aeq\ (1\ hour)}$.

The World Health Organisation guidance states *"To enable casual conversation indoors during daytime, the sound level of interfering noise should not exceed 35 dB LAeq."* British Standard 8233:2014 provides the same noise criteria for a bedroom during the daytime period.

On the above basis the proposal in considered acceptable in environmental noise terms. Noise emission is adequately controlled at the nearby residential properties and is not expected to adversely affect nearby residents by way of noise.

Noise characteristics will be similar to that generated by the existing artificial pitch being that the majority of noise is determined by voice. We would also point out that the impact sound that occurs on the smaller pitches enclosed by plywood boards will not occur to the same degree or frequency as the perimeter fencing of the proposed AGP is outside the playing area of the pitch and there are no boards at low level to hit a ball off.

10. Noise Management Plan

The assessment undertaken in this report considers noise levels against relevant criteria to avoid an adverse effect on nearby residential properties.

In addition to the level of noise, it is also important to consider the content. From past experience we have found that where complaints have been made it is often due to anti-social behaviour such as swearing. Anti-social behaviour is not necessarily related to the noise level and is something that cannot effectively be 'engineered out'.

As such, it is proposed that a noise management plan is implemented as part of the development.

The noise management plan should include a method of informing the users that swearing and anti-social behaviour is unacceptable and that the centre reserves the right to dismiss users from the pitch and ban future use if this is the case.

It is advised that neighbours are given a facility to report excessive noise or anti-social behaviour directly to the sports centre. This will allow the complaint to be investigated and addressed quickly.

It is important that complaints are investigated swiftly, that action is taken where necessary and that the complainant is kept informed of progress, especially where it is not possible to address or resolve complaints straight away.

Staff at the school should have a written action plan to deal with complaints. This would include the ability to warn or ban user groups from the pitches. A log of complaints should also be kept.

It is also advised that all perimeter fencing is fixed to the support posts with a neoprene isolator installed to fully isolate the panels from the posts. This measure greatly reduces the 'rattling' associated with ball impacts on metal fencing.

11. Limitations

The report limits itself to addressing solely on the environmental noise aspects as included herein. We provide advice only in relation to noise and acoustics. It is recommended that appropriate expert advice is sought on all the ramifications (e.g. CDM, structural, condensation, fire, legal, etc.) associated with any proposals in this report or as advised and concerning the appointment.

The report has been prepared in good faith, with all reasonable skill and care, based on information provided or available at the time of its preparation and within the scope of work agreement with the client. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above.

The report is provided for the sole use of the named Client and is confidential to them and their professional advisors. No responsibility is accepted to other parties.

It should be noted that noise predictions are based on the current information as we understand it and on the performances noted in this report. Any modification to these parameters can alter the predicted level. All predictions are in any event, subject to a degree of tolerance of normally plus or minus three decibels. If this tolerance is not acceptable, then it would be necessary to consider further measures.

12. Summary and Conclusions

Surfacing Standards Limited appointed Acoustic Consultants Limited to undertake an environmental noise assessment for the proposed new artificial grass pitch (AGP) at Roefield Sports Pitches in Clitheroe. The assessment considers the impact of environmental noise on the nearby noise-sensitive residential properties.

The proposal is to construct a new AGP to be located on existing playing fields. The proposed hours of use are Monday to Friday 09:00 to 22:00 hours; Saturday and Sunday 08:30 hours to 20:00 hours, we understand these are similar to the hours of use of the existing artificial grass pitches located directly to the West of the proposed AGP pitch location.

The nearest noise sensitive receivers to the proposed AGP are the residential dwellings approximately 30 metres to the South and 50 metres to the North East on Edisford Road and St Pauls Road respectively.

A 3.5 metre acoustic barrier is proposed along the southern boundary of the AGP.

Noise levels were measured at nine sports sessions on four separate AGPs. The measurements included football, hockey and rugby, with men, women and children participating in different sessions. The purpose of the measurements was to determine a 'typical' noise level for an AGP sports session.

A noise model has been generated of the development site, utilising these previous measurements as its basis. The proposed 3.5 metre high reflective barrier has been included within the prediction model.

With the proposed increased acoustic barrier, the predicted noise level at the façades of the exposed noise-sensitive property is 47dB $L_{Aeq\ (1\ hour)}$.

The World Health Organisation provides a sound reduction through an open window of 15 dB(A) which results in a predicted internal equivalent noise level of 32 dB $L_{Aeq\ (1\ hour)}$.

The World Health Organisation guidance states *"To enable casual conversation indoors during daytime, the sound level of interfering noise should not exceed 35 dB LAeq."* British Standard 8233:2014 provides the same noise criteria for a bedroom during the daytime period.

The predicted noise level of 47 dB in gardens below the criteria at which moderate community annoyance in outside living areas (such as gardens) can occur, stated in World Health Organisation 1999 as 50 dB $L_{Aeq\ (1\ hour)}$.

With regards to planning policy we would expect that the development would potentially be noticeable but not intrusive and would result in 'no observed adverse effect'. This is defined in the NPPG as *'Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life'.*

Noise from the AGP may be noticeable but not intrusive as defined by the 'No Observed Adverse Effect' level of the NPPG. This falls below the 'lowest observed adverse effect level' of the NPPG: Noise and therefore complies with the aims of the Noise Policy Statement for England (NPSE) requirements.

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