ACOUSTIC CONSULTANTS LTD

Noise Impact Assessment

Proposed Artificial Grass Pitch
Afan United Football Club

Reference: 11279/FD

Client:
Afan United Football Club Ltd

Document Control

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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.

The report limits itself to addressing solely on the noise, acoustic, and vibration aspects as included in this report. We provide advice only in relation to noise, vibration 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. 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.

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1. Introduction

Afan United Football Club Ltd appointed Acoustic Consultants Limited to undertake an environmental noise assessment in order to address condition 12 of planning application 'P2024/0194' in relation to the re-development of existing Multi-Use Games Area (MUGA) to an all-weather third-generation ('3G') pitch, spectator stand, changing rooms and clubhouse, sustainable drainage and associated works.

The assessment includes the predicted changes to the noise levels across the site based on the proposals and measured noise data of activities associated with an AGP.

The author of this report is a technician Member of the Institute of Acoustics and is considered suitably qualified to undertake this noise impact assessment. This report has been approved by a Member of the Institute of Acoustics (MIOA) and Director of the company with over 18 years' experience in the industry.

2. The Site

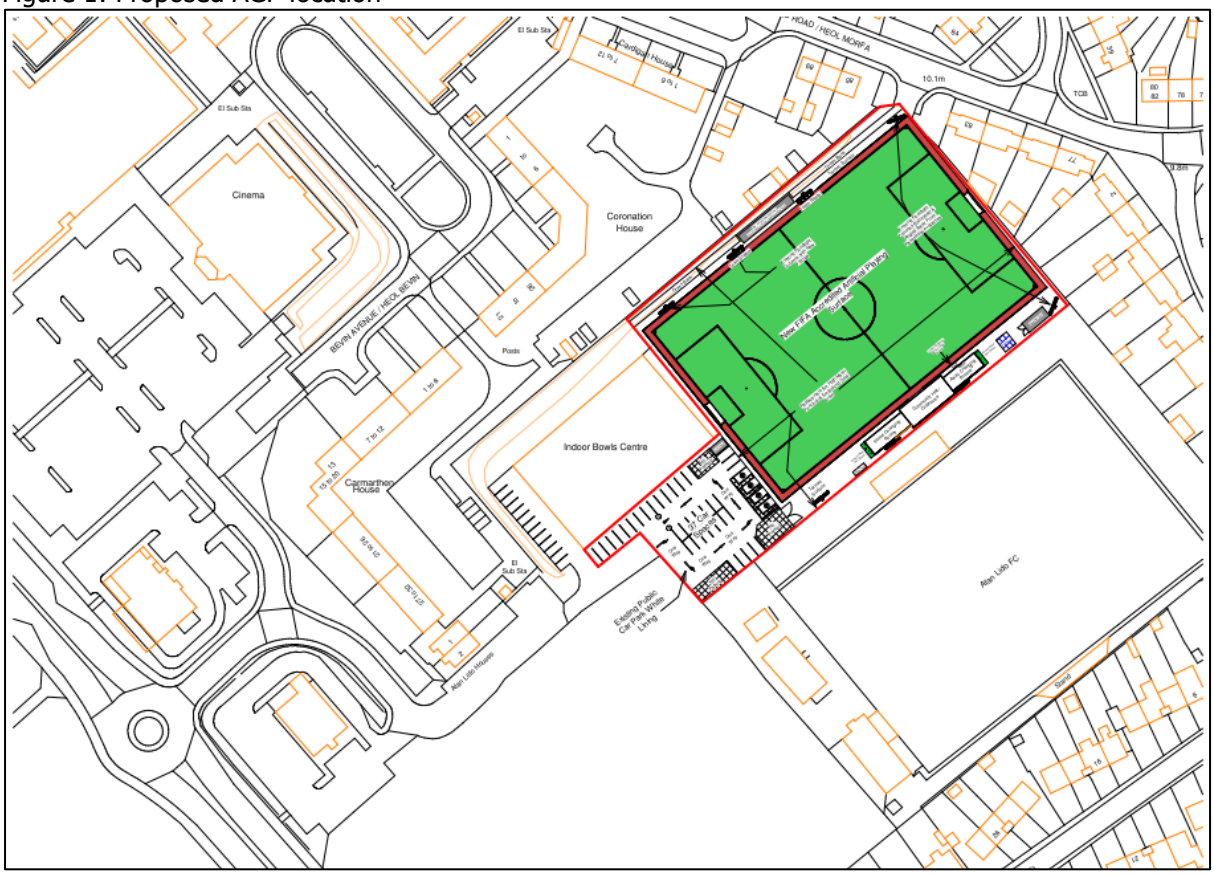
The site is to be located within grounds associated with AFAN FC. The nearest noise sensitive residential receivers in respect to the proposed AGP are understood to be approximately 10 metres away to the west. There is an existing pitch to the south east of the proposed pitch which is associated with Afan Lido Football Club which has been operating since the 1960's and is a sperate entity to Afan United Football Club.

We do not currently know the exact proposed hours of use, but we have presumed a worst-case typical operation of:

- 08:00 to 22:00 Monday to Friday
- 08:00 to 18:00 Saturday & Sunday

The proposed AGP site plan and location is provided on the figure below.

Figure 1: Proposed AGP location



3. Planning Condition

Condition 12 of Planning Application P2024/0194 states:

"*A noise assessment of the existing noise climate at the development site shall be submitted to and approved in writing by the Local Planning Authority. The report shall include a scheme of noise mitigation measures for the proposed development. The approved mitigation measures shall be implemented prior to the commencement of the use and be permanently maintained / complied with thereafter.*

Reason:
In order to secure appropriate mitigation and safeguard the amenities of nearby in accordance with Policy BE1 of the Neath Port Talbot Local Development Plan (January 2016)."

4. Site Noise Monitoring

An attended site noise survey was undertaken from the 16th of May 2025 until the 19th May 2025. The purpose of the noise survey was to determine the existing ambient noise climate at a location representative of the nearest noise sensitive residential property during the proposed AGP hours of use.

4.1. Monitoring Equipment

Sound Pressure Levels were measured using Class 1 sound level meters with a half-inch condenser microphone, using the 'fast' setting. The equipment is checked regularly using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2017 "General requirements for the competence of testing and calibration laboratories"; in accordance with British Standard EN 10012:2003 "Measurement management systems. Requirements for measurement processes and measuring equipment"; and traceable to the National Standards.

This equipment was checked and calibrated as noted below and the certificates are available for inspection.

Table 1: Equipment and Calibration Status

Equipment Description / Manufacturer / Type	Serial Number	Date of Calibration	Calibration Certification Number
SLM, NTI, XL2	A2A-11041-E0	07/07/2023	44799
Pre-Amp, NTI, MA220	1822	07/07/2023	44799
Microphone, NTI, MC230	9583	07/07/2023	44799
Calibrator, Larson Davis, CAL200	18273	27/02/2025	1511387-2

The measurement equipment was checked before and after use with the noted calibrators and no significant drift was detected.

4.2. Weather Conditions

During the measurement, the weather was dry with no rain and the temperature ranged between 4 and 20 degrees centigrade. Wind speeds during the noise monitoring exercise were between 2 and 5 metres per second, with a predominantly westerly direction. The weather conditions are not expected to have affected the measured noise data.

4.3. Monitoring Procedure

Noise monitoring was undertaken in a location representative of the nearest noise sensitive receivers to the proposed AGP. Noise measurements were undertaken between the 16th May and 19th of May 2025.

During the measurements the noise climate was primarily determined by road traffic from the nearby road networks. The microphones were in free-field positions, approximately 1.5 metres above ground on tripods. The monitoring location is shown on the figure below:

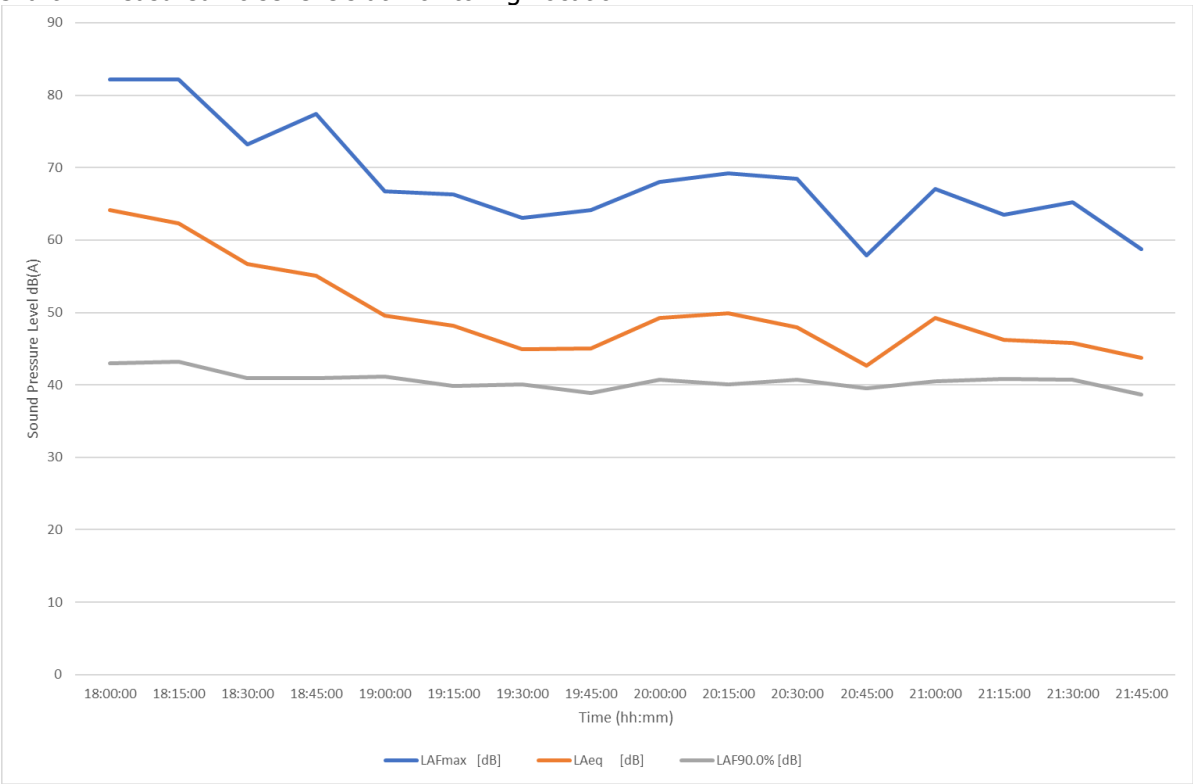
Figure 2: Monitoring Location

4.4. Measured Noise Levels

4.4.1. Monitoring Location 1

The following chart provides the measured noise levels for the duration of the measurement period:

Chart 1: Measured noise levels at Monitoring Location 1



The following table provides the equivalent noise level over each hour.

Table 2: Measured noise levels at Monitoring Location 1

Time	$L_{Aeq,1\ hour}$ (dB)
18:00	61
19:00	47
20:00	48
21:00	47

5. Change in Noise Levels Due to Development

The site is currently occupied by an existing Multi-Use Games Area (MUGA) which includes line markings for football and has historically been in operational use for a range of sporting activities. The proposals involve the redevelopment of the existing playing surface to provide an all-weather third-generation (3G) Artificial Grass Pitch (AGP), along with the addition of ancillary facilities including spectator stands, changing rooms, and a clubhouse.

The footprint, location, and orientation of the proposed AGP are to remain identical to that of the existing pitch. As such, no change in noise levels at the nearest sensitive receptors (NSRs) is anticipated as a result of the pitch being repositioned or enlarged.

The proposed hours of operation for the AGP will align with the existing permitted hours of use for the site. Consequently, the overall impact on the acoustic environment is expected to remain unchanged, with no increase in noise exposure due to extended or intensified use.

In terms of noise character and levels, the change of use from MUGA to AGP is unlikely to result in an increase in noise emissions. Sporting activities such as football, rugby, and hockey typically generate sound primarily from participant vocalisations rather than from equipment or surface interaction. Therefore, the acoustic profile of activities conducted on the proposed AGP is expected to remain consistent with that of the previous MUGA use.

The permitter fencing around the site is to be replaced with a like for like mesh fencing. Although this is the same and will not result in a change in noise levels, we would recommend, in order to minimise the impact on the NSR's, that an alternative fixing method for the fence panels is applied to the fence to the East of the pitch. This would comprise a continuous neoprene or rubber strip fixed to the posts for their full height. The strip would separate the panel from the post. Another strip would then be applied to the face of the panel prior to the overlapping panel being fixed. The intention is that there is no metal to metal contact of overlapping panels or posts which could cause rattling sound. The fixings would then include neoprene isolators to again ensure no metal to metal contact.

The surface of the pitch will change; however, this will not have an overbearing effect on the noise levels at the site - as previously stated, the typical noise levels produced from sporting activity were generally determined by person's voices.

On the basis of the above, the proposed works to the existing MUGA to convert it into an Artificial Grass Pitch will have no noise impact on noise sensitive receptors as it will result in no change in noise level, time of exposure to noise or change the character of the sound.

The only other material alterations that are proposed that would give rise to increased noise levels is the proposed spectator stand to the north east of the pitch, the following section addresses noise from this element of the development.

6. Noise from Proposed Stands

6.1. Noise from Spectator Stands

The pitch and stands are to be designed to accommodate 500 persons.

Data for noise from specific spectator noise is not available. We have predicted noise emission based on the noise level of different types of speech (Stated in Figure 4.1 of Acoustics of Schools: A Design Guide) which is duplicated below.

Figure 3: Figure 4.1 of Acoustics of Schools: A Design Guide

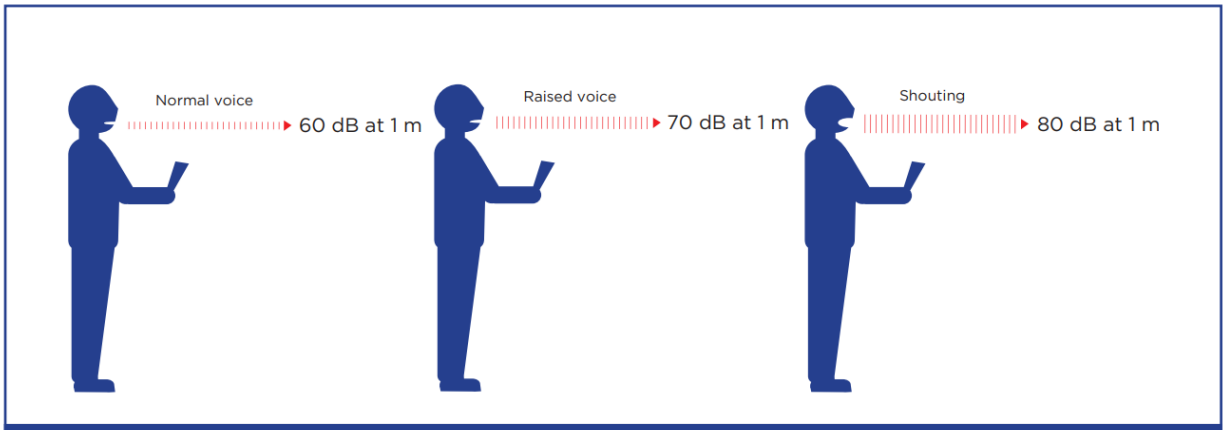


Figure 4.1: Sound pressure levels of speech at 1 m

For the assessment, it is considered that people will be present within the stadium for two hours; 15 minutes prior to kick off, the 90-minute match and 15 minutes of half time. The assessment considers that each person would be speaking for approximately half of this time as follows:

- 48 minutes talking
- 10 minutes raised voice
- 2 minutes shouting

This equates to a noise emission per person of 64 dB LAeq (1 hour) at a distance of 1 metre, whilst on site and this is equivalent to the 1 hour equivalent noise level period used in the noise assessment.

6.2. Assessment of Spectator Area Noise Impact

A noise model has been generated of the development site in accordance with ISO9613 using an area source populated with the number and noise level of spectators at the location shown in Figure 1.

The AGP location and surrounding area has been determined from drawing shown in figure 1. The surrounding area has been determined from Google Maps imagery.

The ground of the area 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.

The topography of the site has been determined by LIDAR data for the purposes of the noise modelling.

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

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

Third-order reflections are calculated.

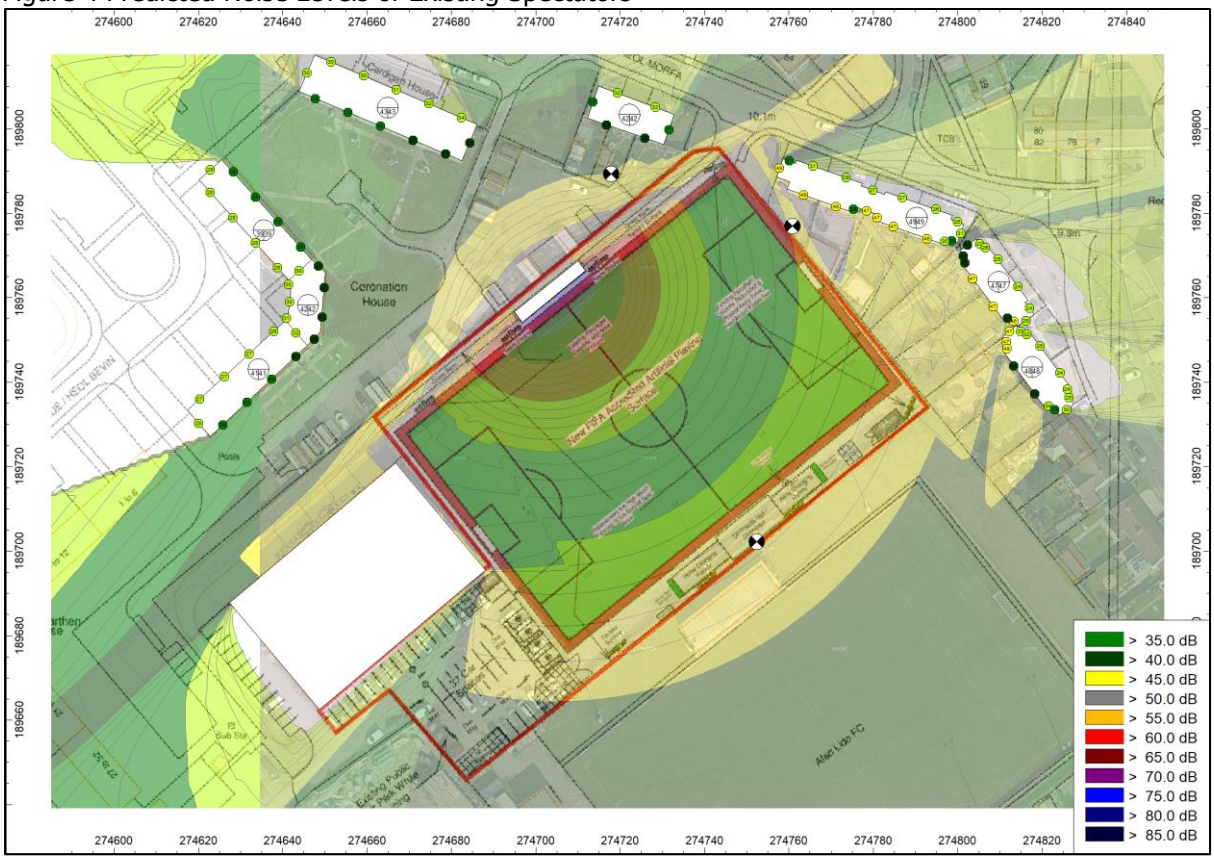
The noise map in Figure 4 below shows noise emission from the AGP predicted at ground floor level (1.5 metres above the ground), which is typical of a 'daytime' habitable room in a house and external amenity areas. The building noise map (the dots on the facades of the building) is predicted at 1.5 metres for houses.

The models have been predicted with spectator area at a capacity of 40 people. Which is considered to be typical of the current number of spectators on the site.

Within the existing noise model, the 40 spectators are spread evenly around all sides of the pitch and within the proposed model the spectators are all located in the new spectator area to the South.

The predicted noise levels from the existing and proposed spectator area are as follows.

Figure 4 Predicted Noise Levels of Existing Spectators



The predicted noise level from spectators in is 49 dB $L_{Aeq,1\ hour}$ to the worst-case NSR.

The predicted noise level is below the proposed criterion of 50 dB $L_{Aeq\ (1\ hour)}$ derived from WHO 1999 as being the threshold for the onset of moderate community annoyance.

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 34 dB $L_{Aeq\ (1\ hour)}$ at the nearest NSR.

The highest predicted noise level in the gardens is 50 dB $L_{Aeq\ (1\ hour)}$, which is within the proposed criterion of 50 dB $L_{Aeq\ (1\ hour)}$.

The following table gives overall change in noise level and IEMA classification at the most noise sensitive location based on the existing ambient noise level and predicted AGP noise levels above. This shows the worst-case noise levels at facades of the NSR. There is a table containing the number of dwellings that will have a significant impact from the proposal.

Table 3: Change in noise levels at the NSRs surrounding the site

Date	Time	**Existing Equivalent Noise Level, LAeq,1hr**	**Predicted Equivalent Noise Level, LAeq,1hr**	**Change**	**Long Term Impact on Existing Noise Climate**
16/05/2025	18:00	51	49	+2.3 dB	Negligible
	19:00	50		+2.4 dB	Negligible
	20:00	46		+4.9 dB	Minor
	21:00	42		+7.7 dB	Moderate
17/05/2025	18:00	48		+3.8 dB	Minor
	19:00	51		+2.0 dB	Negligible
	20:00	44		+6.5 dB	Moderate
	21:00	43		+6.9 dB	Moderate
18/05/2025	18:00	47		+4.0 dB	Minor
	19:00	49		+2.8 dB	Negligible
	20:00	37		+11.9 dB	Major
	21:00	37		+12.1 dB	Major

As can be seen in the table above the pitch has a 'negligible' to 'major' long term impact on the existing noise climate.

Please note that, although at times the long-term impact on the existing noise climate is considered to be of 'major impact' when assessed to the IEMA guidelines this is not necessarily representative of the impact on the NSRs. The overall noise levels at the NSR are below the proposed criterion of 50 dB $L_{Aeq\ (1\ hour)}$ derived from WHO 1999 as being the threshold for the onset of moderate community annoyance, as such the impact at the dwelling is considered low and acceptable.

It is also pertinent to note that the assessment considers a worst-case scenario with a high number of people in the stand. This will only occur, at most, during competitive matches which typically would be every other week during the football season and principally in the day. This would be an infrequent occurrence which would further reduce any potential noise impact on noise sensitive receptors.

7. Noise Management Plan

The assessment undertaken in this report considers a change in noise levels between the proposed and existing sites.

In addition to the level of noise, it is also important to consider the content. From 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 operator. 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 site 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.

8. Summary and Conclusions

Afan United Football Club Ltd appointed Acoustic Consultants Limited to undertake an environmental noise assessment in order to address condition 12 of planning application 'P2024/0194' in relation to the re-development of existing Multi-Use Games Area (MUGA) to an all-weather third-generation ('3G') pitch, spectator stand, changing rooms and clubhouse, sustainable drainage and associated works.

A noise impact assessment has been undertaken for the proposed redevelopment of the existing sports pitch to a third-generation (3G) Artificial Grass Pitch. The proposed works to the existing MUGA to convert it into an Artificial Grass Pitch will have no noise impact on noise sensitive receptors as it will result in no change in noise level, time of exposure to noise or change the character of the sound.

A noise model of the proposed spectator stand has been generated, utilising the layout plans provided, the maximum number of spectators within the stand and the data detailed in Section 6 of this report. The predicted noise levels at the worst-case NSR due to the spectator stands is within the WHO:1999 guidelines for the onset of community annoyance. It is also pertinent to note that the assessment considers a worst-case scenario with a high number of people in the stand. This will only occur, at most, during competitive matches which typically would be every other week during the football season and principally in the day. This would be an infrequent occurrence which would further reduce any potential noise impact on noise sensitive receptors.

Based on the above, the proposals are considered acceptable in terms of noise.

9. Appendix 1 – Glossary of Acoustic Terminology

A-weighted sound pressure pA – value of overall sound pressure, measured in pascals (Pa), after the electrical signal derived from a microphone has been passed through an A-weighting network.

A-weighted sound pressure level, L_{pA} - quantity of A-weighted sound pressure given by the following formula in decibels (dBA)

$L_{pA} = 10 \log_{10} (p_A/p_0)^2$

where:

p_A is the A-weighted sound pressure in pascals (Pa);
p_0 is the reference sound pressure (20 µPa)

Background sound level, $L_{A90,T}$– A-weighted sound pressure level that is exceeded by the residual sound assessment location for 90% of a given time interval, T, measured using weighting F and quoted to the nearest whole number of decibels

Break-in - noise transmission into a structure from outside.

Decibel (dB) – The decibel is the unit used to quantify sound pressure levels. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). Therefore, a logarithmic scale is used to describe sound pressure levels and also sound intensity and power levels. The logarithms are taken to base 10. Hence an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in the sound pressure level (measured in Pascals). Subjectively, this increase would correspond to a doubling of the perceived loudness of sound.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$ – value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, T = t2 – t1, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation:

$$L_{AeqT} = 10\lg_{10}\left\{(1/T)\int_{t_1}^{t_2}[p_A(t)^2/p_0^2]\mathrm{d}t\right\} \qquad (1)$$

where:

p_0 is the reference sound pressure (20 µPa); and

$p_A(t)$ is the instantaneous A-weighted sound pressure (Pa) at time t

NOTE The equivalent continuous A-weighted sound pressure level is quoted to the nearest whole number of decibels.

Facade level – sound pressure level 1 m in front of the façade. Facade level measurements of L_{pA} are typically 1 dB to 3 dB higher than corresponding free-field measurements because of the reflection from the facade.

Free-field level – sound pressure level away from reflecting surfaces. Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e. not 3.5 m from the reflecting surface in the direction of the source).

Octave and Third Octave Bands – The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz and is generally more sensitive to medium and high frequencies than to low frequencies within the range. There are many methods of describing the frequency content of a noise. The most common methods split the frequency range into defined bands, in which the mid-frequency is used as the band descriptor and in the case of octave bands is double that of the band lower. For example, two adjacent octave bands are 250 Hz and 500 Hz. Third octave bands provide a fine resolution by dividing each octave band into three bands. For example, third octave bands would be 160 Hz, 250 Hz, 315 Hz for the same 250 Hz octave band.

Sound pressure level – Sound pressure level is stated on many of the charts. It is the amplitude of the acoustic pressure fluctuations in a sound wave, fundamentally measured in Pascals (Pa), typically from 20 micro-Pascals to 100 Pascals, but commonly simplified onto the decibel scale.

Sound reduction index, R – laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.

Specific sound level, $L_s = L_{Aeq,Tr}$ – equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.

Structure-borne noise – audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements.

Rating level, $L_{Ar,Tr}$ – Specific sound level plus any adjustment for the characteristic features of the sound.

Reverberation Time, T – The reverberation time is defined as the time taken for a noise level in an enclosed space to decay by 60 dB from a steady level once the noise source has stopped. It is measured in seconds. Often a 60 dB decay cannot be measured so the reverberation time is measured over a lesser range and corrected back to the time for a 60 dB drop assuming a constant decay rate. Common parameters are T20 (time taken for a 20 dB decay multiplied by three) and T30 (time taken for a 30 dB decay multiplied by two).

Vibration Dose Value, VDV – measure of the total vibration experienced over a specified period of time.

Estimated Vibration Dose Value, eVDV – estimation of the total vibration experienced over a specified period of time. This is usually based on the number of events and shortened measurement data.

Weighted sound reduction index, R_w – Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies. The weighted sound reduction index is used to characterize the insulation of a material or product that has been measured in a laboratory (see BS EN ISO 717-1).

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