



Noise Impact Assessment

Sports Pitch Usage, Oakhill School, Whalley

Reference: 51-027-R1-1

Date: November 2023



NOISE IMPACT ASSESSMENT

Oakhill School,
Whalley

Prepared for:

Oakhill School

Report Ref: 51-027-R1-1

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EXECUTIVE SUMMARY

BACKGROUND

Site Address	Oakhill School, Wiswell Lane, Whalley, Lancashire BB7 9AF
National Grid Reference	E 373917 N 436870
Report Objectives	The objectives of this report are to: Identify, measure and assess the impact of noise associated with the usage of the All-Weather Pitch (AGP) at Oakhill School upon residential receptors to the north. The report follows current and relevant British Standards and guidance in order to provide a robust assessment.

ASSESSMENT

Surveys Completed	E3P have conducted a week long unattended ambient sound survey on the northern boundary of the school, approximately 1 m from the closest edge of the AGP during a period when matches were played in the afternoon and evening periods. The source levels were used to inform 3D noise modelling of the noise source as well as to capture baseline levels of noise when the pitch is not in use.
Assessments	A 3D noise model has been constructed to assess AGP usage noise impact at the residential dwellings to the north on Bennetts Close. AGP usage sound is assessed in accordance with the criterion provided in Sport England Guidance with reference to BS 8233:2014+A1:2019 and World Health Organisation Guidelines. E3P have also reviewed the findings of a report produced by the Environmental Health Officer which suggested a Statutory Nuisance exists.
Mitigation Requirements	The assessment found that noise levels at the receptors were at or below the 50 dB lower criterion given in BS 8233 and WHO Guidelines. As such, no adverse impact is present. Furthermore, E3P have considered maximum noise level impact at habitable room windows. The worst-case 10th highest level achieved the external criterion given in WHO Guidelines in order to achieve acceptable sleeping conditions with windows open. As such, no mitigation measures are required, beyond the proposed replacement fencing currently subject to planning determination. Furthermore, the existing time restrictions on the pitch are unsubstantiated.

CONCLUSIONS

This assessment has shown that no adverse impact currently exists from the usage of the sports pitch. Indeed, the restrictions on its current usage are considered excessive and the proposed replacement fencing will improve an already acceptable situation.



TABLE OF CONTENTS

EXECUTIVE SUMMARY	2
Background	2
Assessment.....	2
Conclusions	2
1. INTRODUCTION	4
1.1. Background	4
1.2. Limitations	4
2. ASSESSMENT METHODOLOGY	5
2.1. National Planning Policy Framework	5
2.2. National Planning Practice Guidance.....	5
2.3. British Standard BS 8233:2014 – Guidance on Sound Insulation and Noise Reduction for Buildings	7
2.3.1. Noise Criteria Limits	7
2.4. World Health Organisation (WHO) – Guidelines for Community Noise	8
2.5. Sport England (2015) Artificial Grass Pitch Acoustics – Design Guidance Note.....	8
3. SURVEY RESULTS.....	9
3.1. Unattended Ambient Sound Survey.....	9
4. AGP SOUND IMPACT ASSESSMENT.....	13
4.1. External Amenity Space Assessment	13
4.2. Internal Habitable Room Assessment	13
4.3. Discussion and Context	14
5. DISCUSSION	16
5.1. EHO Findings and Report	16
6. CONCLUSION AND RECOMMENDATIONS.....	18
APPENDIX I GLOSSARY OF ACOUSTIC TERMINOLOGY.....	19
APPENDIX II MEASUREMENT DATA.....	22
APPENDIX III FIGURES	29



1. INTRODUCTION

1.1. BACKGROUND

E3P were commissioned by Oakhill School to undertake a Noise Impact Assessment for the noise associated with the usage of the All-Weather Pitch (AGP) at Oakhill School in Whalley following complaints received from residents to the north.

This assessment looks to determine the key noise sources associated with the AGP and to assess its impact, if any, upon existing residential receptors and to specify mitigation measures, where required.

It is understood that the AGP was in operation prior to approval and occupation of the residential dwellings to the north but no Noise Assessment was requested at the planning stage by the Environmental Health Officer (EHO).

Following occupation, it is understood that complaints have been received and that the EHO has subsequently investigated the complaints and advised that a statutory nuisance exists. As such, this Noise Assessment has been conducted to determine whether the noise levels resultant from the AGP would constitute adverse impact. However, this report cannot counter claim against Statutory Nuisance but can provide sufficient evidence to suggest otherwise.

The key sources of sound impacting upon the receptors is understood to be raised voices and impact sounds from the ball hitting the fences. With regards to this last source, it is understood that the client proposes to change these fences to improve this and lower impact sound from this. However, as no details of this are available, nor is the sound reduction known, E3P have assumed the current situation is to remain.

1.2. LIMITATIONS

Where a noise or vibration survey is required to inform an assessment, E3P will endeavour to ensure that all noise and vibration measurements taken are robust, representative and reliable in order to inform an accurate assessment.

Where mitigation measures are specified in this report, it should be noted that these measures are relative to a specific sound or vibration source, both in terms of the measured sound pressure and vibration level and the character of the sound source. Where either the sound pressure level or the character of the sound varies following completion of the sound survey, E3P cannot be held responsible for any subsequent variations in the proposed mitigation performance.



2. ASSESSMENT METHODOLOGY

2.1. NATIONAL PLANNING POLICY FRAMEWORK

Planning policies and decisions should 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:

- ✿ Mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life.
- ✿ 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
- ✿ Limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

2.2. NATIONAL PLANNING PRACTICE GUIDANCE

Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

Local planning authorities' plan-making and decision-making should take account of the acoustic environment and in doing so consider:

- ✿ Whether or not a significant adverse effect is occurring or is likely to occur.
- ✿ Whether or not an adverse effect is occurring or is likely to occur.
- ✿ Whether or not a good standard of amenity can be achieved.

In line with the explanatory note of the NPSE, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase, where applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

The "observed effect levels" are as follows:

- ✿ **Significant observed adverse effect level:** This is the level of noise exposure above which significant adverse effects on health and quality of life occur.
- ✿ **Lowest observed adverse effect level:** This is the level of noise exposure above which adverse effects on health and quality of life can be detected.
- ✿ **No observed effect level:** This is the level of noise exposure below which no effect at all on health or quality of life can be detected.

Table 2.1 summarises the noise exposure hierarchy, based on the likely average response.



TABLE 2.1 NOISE EXPOSURE HIERARCHY

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, or having to close windows for some of the time because of the noise where there is no alternative ventilation. 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, having to keep windows closed most of the time because of the noise where there is no alternative ventilation. 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 effect	Avoid
Noticeable and Very Disruptive	Extensive and regular changes in behaviour and/or 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 (auditory and non-auditory).	Unacceptable adverse effect	Prevent

The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any situation. These factors include the following:

- ✳ The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day. The adverse effect can also be greater simply because there is less background noise at night.
- ✳ For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise can be important.
- ✳ The spectral content of the noise and the general character of the noise. The local topology and



topography should also be considered along with the existing and, where appropriate, the planned character of the area.

More specific factors to consider when relevant:

- ✳ Where applicable, the cumulative impacts of more than one source should be considered along with the extent to which the source of noise is intermittent and of limited duration.
- ✳ Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases, a suitable alternative means of ventilation is likely to be necessary.
- ✳ If external amenity spaces are an intrinsic part of the overall design, then the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.

2.3. BRITISH STANDARD BS 8233:2014 – GUIDANCE ON SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS

2.3.1. NOISE CRITERIA LIMITS

The scope of this standard is the provision of recommendations for the control of noise in and around buildings including residential dwellings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new buildings or refurbished buildings undergoing a change of use, rather than to assess the effect of changes in the external noise climate.

The standard suggests suitable internal noise levels within different types of buildings, including residential dwellings, as shown in Table 2.2.

TABLE 2.2 BS 8233:2014 RECOMMENDED INTERNAL NOISE LEVELS

CRITERION	TYPICAL SITUATION	DESIGN CRITERION, $L_{Aeq,T}$ (dB)
Suitable Resting and Sleeping Conditions	Living Room	35
	Bedroom	30

BS 8233 goes on to recommend noise levels for gardens:

It is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors might be warranted.

BS 8233 goes on to say:

In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited.



2.4. WORLD HEALTH ORGANISATION (WHO) – GUIDELINES FOR COMMUNITY NOISE

The WHO gives guidance on desirable levels of environmental noise. The levels presented in the WHO Community Guidelines are those at which adverse effects become measurable.

A report was submitted to the WHO in 1995 for consideration as a revision to the 1980 document and revised community guidelines were issued in 2000. In the 2000 guidelines, it is considered that the sleep disturbance criteria should be taken as an internal noise level of 30 dB $L_{Aeq,8\text{ hr}}$ or an external level of 45 dB $L_{Aeq,8\text{ hr}}$. It also recommends that internal L_{Amax} levels of 45 dB and external L_{Amax} levels of 60 dB should be limited where possible.

2.5. SPORT ENGLAND (2015) ARTIFICIAL GRASS PITCH ACOUSTICS – DESIGN GUIDANCE NOTE

The Design Guidance Note Artificial Grass Pitch (AGP) Acoustics, provides details of acoustic implications associated with such facilities and follows on from an acoustic research programme involving detailed analysis of relevant noise guidance documents and site testing in a range of locations. It proposes appropriate noise criteria and assessment methods and outlines practical measures that can be applied to reduce noise in particular sensitive areas. There is no previous guidance or assessment methodology specifically relating to noise from AGPs and this guidance considers the issues from first principles.

With no specific noise criteria for an AGP, the following documents are considered the most relevant and the most commonly applied for the assessment of AGP noise:

- 📌 World Health Organisation 'Guidelines for Community Noise'; and,
- 📌 IOA / IEMA Working Party Consultation Draft 2002.

The World Health Organisation's (WHO) Document provides guidance for outdoor living areas stating that to avoid 'moderate annoyance' during the daytime and evening the noise level should not exceed 50dB $L_{Aeq,16\text{ hr}}$. However, for an AGP, a 16-hour assessment period may not truly reflect the noise impact as it takes into account time of use and non-use. It is suggested that an appropriate assessment time period is for one 1-hour as this is typically the time period for a community sports session on an AGP.

In some circumstances, an alternative assessment methodology may be appropriate such as where there are changes to an existing natural turf or AGP pitch. The IOA / IEMA Working Party Consultation Draft 2002 categorises the significance of a change in noise level. A 'slight' impact is considered for an increase of less than 3dB which is generally accepted as being the minimum perceptible change to a human ear. The noise levels are to be measured using the L_{Aeq} parameter over the same time period, T (taken as being 1-hour).

The Design Guidance Note goes on to state that a typical free-field noise level of 58dB $L_{Aeq,1\text{ hr}}$ at a distance of 10m from the side-line halfway marking has been determined as being representative of noise from an AGP.



3. SURVEY RESULTS

E3P have conducted a full week survey in order to capture baseline levels of noise, i.e. existing without the AGP usage, and source when the AGP is in use.

As access to the residential receptor was not possible or considered appropriate due to the unattended nature of the survey, a position that intersects the source path between source and receiver was used approximately 1 m from the closest edge of the AGP.

E3P were provided with the booking sheet for the periods monitored and measured noise levels clearly show that all matches took place as planned with younger players and also external bookings by adults. As such, the measured levels are considered robust and representative of typical matches played.

Weather conditions were monitored throughout and although some days were not ideal, as the source levels are taken on face value, would represent worst-case levels.

The measurement position is detailed in Figure 1 of Appendix II.

3.1. UNATTENDED AMBIENT SOUND SURVEY

E3P has undertaken an unattended weekday and weekend background and ambient sound survey in a position considered representative of the existing residential receptors to the north. The survey was carried out over the following period:

📅 10:00 Monday 6th November to 09:00 Tuesday 14th November 2023.

The following noise measurement position was chosen for the Ambient Sound Survey:

📍 Noise Measurement Position 1 (NMP1): Located on the existing hit and miss fence on the northern boundary of the school in a position representative of the existing residential receptors. The microphone was installed in free-field conditions and at a height of 1.5 m. The sound climate was dominated by road traffic along the local road network in between usage of the AGP.

The Table below details noise levels before, during and after the matches as well as school operational hours when playgrounds would be in use by pupils. The maximum noise levels relate to the 10th highest during each afternoon/evening period match source as, in accordance with WHO Guidelines, this would normally be across the full night-time period (8 hours).

The data and information align with the booking sheet provided by the client and appended to the rear of the report.



TABLE 3.1 SUMMARY OF MEASURED DATA

DATE	TIME PERIOD	SOURCE	JUNIOR OR ADULT PLAYERS	MEASURED AMBIENT NOISE LEVEL, $L_{Aeq,1hr}$ (dB)	10th HIGHEST MAXIMUM NOISE LEVEL FROM PITCH USE, $L_{Amax,fast}$ (dB)
Monday 6th November 2023	10:00-11:00	School + Road	-	62.5	88.5
	11:00-12:00	Road traffic	-	55.5	
	12:00-13:00	School + Road	-	67.4	
	13:00-14:00	School + Road	-	62.0	
	14:00-15:00	Road traffic	-	57.2	
	15:00-16:00	Road traffic	-	58.1	
	16:00-17:00	Road traffic	-	56.2	
	17:30-18:30	Whalley Juniors	Juniors	56.2	
	18:30-19:30	Oaks Fives	Adult	62.4	
	19:30-20:30	Private Booking	Adult	61.6	
	21:00-22:00	Road Traffic	-	56.4	
Tuesday 7th November 2023	08:00-09:00	Road Traffic	-	56.7	84.2
	09:00-10:00	Road Traffic	-	56.1	
	10:00-11:00	School + Road	-	63.4	
	11:00-12:00	Road traffic	-	54.4	
	12:00-13:00	School + Road	-	66.9	
	13:00-14:00	School + Road	-	64.7	
	14:00-15:00	Road traffic	-	57.4	
	15:00-16:00	Road traffic	-	55.5	
	16:00-17:00	Road traffic	-	56.3	
	17:30-18:30	Whalley Juniors Under 7s	Juniors	61.8	
	18:30-19:30		Juniors	65.8	
	19:30-20:30	Mellor Juniors FC	Juniors	62.8	
	21:00-22:00	Road Traffic	-	58.2	
Wednesday 8th November 2023	08:00-09:00	School + Road	-	60.3	87.5
	09:00-10:00	School + Road	-	61.3	
	10:00-11:00	School + Road	-	63.1	
	11:00-12:00	Road traffic	-	55.4	
	12:00-13:00	School + Road	-	64.1	



DATE	TIME PERIOD	SOURCE	JUNIOR OR ADULT PLAYERS	MEASURED AMBIENT NOISE LEVEL, $L_{Aeq,1hr}$ (dB)	10th HIGHEST MAXIMUM NOISE LEVEL FROM PITCH USE, $L_{Amax,fast}$ (dB)
	13:00-14:00	School + Road	-	62.3	
	14:00-15:00	School + Road	-	64.4	
	15:00-16:00	Road traffic	-	54.5	
	16:00-17:00	Road traffic	-	55.4	
	17:30-18:30	Whalley Juniors Under 7s	Juniors	62.9	
	18:30-19:30	Oak Fives	Adults	65.0	
	19:30-20:30	Private Booking	Adults	63.2	
	21:00-22:00	Road Traffic	-	59.9	
Thursday 9th November 2023	08:00-09:00	Road Traffic	-	55.4	84.0
	09:00-10:00	Road Traffic	-	55.7	
	10:00-11:00	School + Road	-	62.2	
	11:00-12:00	Road traffic	-	54.5	
	12:00-13:00	School + Road	-	65.0	
	13:00-14:00	School + Road	-	67.4	
	14:00-15:00	School + Road	-	65.0	
	15:00-16:00	Road traffic	-	55.8	
	16:00-17:00	Road traffic	-	55.4	
	17:30-18:30	Whalley Juniors Under 7s	Juniors	62.6	
	18:30-19:30	Private Booking	Adult	62.8	
	19:30-20:30	Private Booking	Adult	60.5	
	21:00-22:00	Road Traffic		52.5	
Friday 10th November 2023	08:00-09:00	Road Traffic	-	54.4	80.5
	09:00-10:00	Road Traffic	-	55.5	
	10:00-11:00	School + Road	-	59.5	
	11:00-12:00	Road traffic	-	52.6	
	12:00-13:00	School + Road	-	67.1	
	13:00-14:00	School + Road	-	63.6	



DATE	TIME PERIOD	SOURCE	JUNIOR OR ADULT PLAYERS	MEASURED AMBIENT NOISE LEVEL, $L_{Aeq,1hr}$ (dB)	10th HIGHEST MAXIMUM NOISE LEVEL FROM PITCH USE, $L_{Amax,fast}$ (dB)
	14:00-15:00	School + Road	-	62.2	
	15:00-16:00	Road traffic	-	53.2	
	16:00-17:00	Road traffic	-	53.8	
	17:30-18:30	Oaks Fives	Adult	60.0	
	18:30-19:30	Langho FC	Juniors	63.1	
	19:30-20:30	Road Traffic		52.1	
	20:00-21:00	Road Traffic		51.9	

From the above, the highest match noise level, 65.8 dB is taken and corrected for residual noise, i.e. the noise level after matches have taken place. In this case, this resulted in a worst-case noise level of 64.7 dB, rounded to 65 dB at the measurement position. This will be used to calibrate the noise model.

It is important to note that existing school noise and outdoor area usage by the pupils between 08:00 and 15:00 ranges between 59.5 and 67.4 dB. As such, the resultant noise from the pitch at the measurement position is no louder than that already resultant from typical school noise, i.e. children playing outside. Indeed, the highest pitch noise is lower than the highest school source noise level.

The equipment outlined in Table 3.2 was used for the noise survey.

TABLE 3.2 NOISE MEASUREMENT EQUIPMENT AND CALIBRATION DATES

MEASUREMENT POSITION	EQUIPMENT DESCRIPTION	MANUFACTURER & TYPE NUMBER	SERIAL NUMBER	CALIBRATION DUE DATE AT TIME OF SURVEY
NMP1	Sound Level Meter	01 dB Fusion	14226	01/12/2023
	Pre-amplifier	01dB Pre22	2135072	
	Microphone	GRAS 40CD	470570	
	Calibrator	Cirrus CR515	99204	08/08/2024

The sound level meter was field calibrated on site using the above-mentioned calibrator prior to and after noise measurements were taken. No significant drift was witnessed as noted above. Calibration certificates are available upon request.



4. AGP SOUND IMPACT ASSESSMENT

For the purposes of this assessment, E3P has used noise modelling software, CadnaA 2023 MR1, to determine the impact of noise from usage of the AGP.

The following inputs have been included in the model:

- ✳ NMP1 corrected worst case source noise level of 65 dB is used to calibrate the AGP which is input as an area source with a source height of 1.5 m above ground level. This calibration also shows that the expected noise level of 58 dB at 10 m from the halfway line, stipulated in Sport England Guidance, is achieved here which provides confirmation of the validity of the measurements.
- ✳ Site elevations have been taken as existing by way of a 1 m grid Digital Terrain Model (DTM) which contains public sector information licensed under the Open Government Licence v3.0.
- ✳ A reflection order of 1 has been used in all calculations. Ground absorption has been assumed as 0.75 due to the soft intervening ground between the source and receiver.
- ✳ Noise levels generated using ISO 9613-1 and ISO 9613-2 "Acoustics – Attenuation of sound during propagation outdoors" as incorporated into CadnaA software.

4.1. EXTERNAL AMENITY SPACE ASSESSMENT

The noise model has been used to predict noise levels in the rear amenity spaces which are to be used for relaxation, notably the patio area and grassed areas closest to the AGP for receptors to the north.

As can be seen, noise levels are expected to be, at most, 52 dB at the very edge of the garden and 50 dB within the patio areas.

As such, it is predicted that the No Observed Adverse Effect Level (NOAEL) is achieved in rear garden areas with the following commentary:

"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."

Accordingly, no further action is required to mitigate noise levels in these areas.

Furthermore, E3P would point to the Sport England Guidance that stipulates where AGPs are within close proximity to residential dwellings, noise levels resultant from the AGP should not exceed 50 dB. As shown above, the main garden areas and patios would experience noise levels below this threshold.

4.2. INTERNAL HABITABLE ROOM ASSESSMENT

In addition to garden areas, consideration has been given to habitable rooms, specifically in relation to the maximum noise level ($L_{Amax,fast}$). Here, it is important to note that this is normally applied to bedrooms at night in relation to sleep disturbance. However, to inform a robust assessment, it is assumed that residents could be sleeping during daytime or evening periods.



Accordingly, the external criterion of 60 dB $L_{Amax,fast}$ as stipulated in WHO Guidelines is applied here. However, E3P note that this assumes a reduction of 15 dB for an open window when, following recent research, this is now considered to be 13 dB. As such, a limit of 58 dB is applied.

E3P have determined the 10th highest maximum noise level from each day whilst matches were taking place and then assessed the highest day, which is 88.5 dB.

It is reasonably assumed that this was due to impacts upon the fence adjacent to the meter at a distance of 1 m and that this level could be applied universally at 1 m from the fence around the perimeter. Indeed, the hardest impacts are likely in and around the goal mouth where high powered shots are taken, which were captured here.

This level is then distance corrected to the closest façade, resulting in an expected external maximum noise level of 58 dB. This achieves the strict night-time criterion to protect against sleep disturbance and is unlikely to cause annoyance in accordance with WHO Guidelines.

Furthermore, the internal noise levels with windows open during a match are no more than 36 dB as a result of AGP usage. The survey determined that noise from surrounding sources, mainly road traffic, results in noise levels between 21:00 and 22:00 of between 51 and 55 dB. As this is likely resultant from the A671, it is shown that noise levels in habitable rooms with windows open are already exceeded, with internal noise levels expected to be at least 38 dB in the evening when the AGP is not in use.

4.3. DISCUSSION AND CONTEXT

This is a very strong indication that noise impact from the AGP is not considered adverse, especially considering the context. Here, matches are restricted to between 17:30 and 20:30 during the week and no matches at weekends. Subjectively this is considered an over mitigation and, considering the outcome of the assessment, is unwarranted.

Indeed, the operation of the AGP does not exceed widely acceptable external and internal noise levels in accordance with BS 8233 and WHO Guidelines.

A further point to note is existing school noise and outdoor area usage by the pupils between 08:00 and 15:00 ranges between 59.5 and 67.4 dB. As such, the resultant noise from the pitch at the measurement position is no louder than that already resultant from typical school noise, i.e. children playing outside. Indeed, the highest pitch noise is lower than the highest school source noise level. This is extremely important when considering context and the nature of the noise. Raised voices and use of the pitches already takes place as part of the school operations during the day. As such, the use of the pitches does not resultant in a new noise source nor one of higher intensity.

Lastly, it is understood that an application is currently live for the replacement of the green mesh fencing to be replaced with a lower noise fence with resilient fixtures to lessen impact sounds. Were this to be approved and installed, this would further reduce noise levels at the receptors bringing noise levels comfortably below the criterion further.

The findings of this report support those concluded in the Lighthouse Acoustics Report, appended to the rear of this report, which was completed in August 2021, following complaints being received, and included extensive noise monitoring, as undertaken here. The report concluded:

A detailed environmental sound survey has been undertaken in order to establish existing sound levels at the site boundary.



An assessment of activity noise from the existing sports pitch upon the nearest residential property has been undertaken. The assessment indicates that activity sound levels are likely to achieve the design guidance upper noise limit at the nearest residential property.

Additional guidance has been proposed in order to minimise activity noise from the existing sports pitch upon the nearest residential property.

In addition to the above, more weight should be given to this report due to the additional tests undertaken in relation to existing ambient noise levels and assessment of internal average and maximum noise levels to further support the case for no adverse impact from the site on existing receptors.



5. DISCUSSION

5.1. EHO FINDINGS AND REPORT

E3P are in receipt of the survey results and report of the EHO's initial assessment of the noise from the AGP. As such, E3P have reviewed this, based on factual evidence and the findings of the monitoring and assessments provided in this report. E3P have not, however, considered the existence, or absence, of Statutory Nuisance but commentary is provided on this subjectively.

From the 'Oakhill Noise Readings' note, E3P note that monitoring was undertaken during the following periods:

- 📍 3rd April 2023 between 19:30-20:30; and
- 📍 7th June 2023 between 19:00-20:00.

From these measurements, source levels are derived. From this, it is clear that residual noise levels have not been established and, considering their importance in the assessment above, is considered a serious omission with no consideration to this given. Indeed, this is highlighted in the report within the Findings section 4.1:

The background noise level at the complainant's property is dominated by road traffic noise due to the close proximity to the main road (A671). This road traffic noise masks a significant amount noise generated by users of the AGP.

This should be considered in the assessment. However, no allowance or context is given to this and is considered a significant and fundamental omission.

Following this, the report only details the maximum noise levels, $L_{Amax,fast}$, with no consideration to the average noise levels. This is highly irregular, and no single assessment of noise solely uses the $L_{Amax,fast}$ descriptor to ascertain noise impact. Indeed, Sport England Guidance does not recommend the use of this descriptor for assessment of such noise. It is unclear how the use of this would be able to ascertain that a Statutory Nuisance exists. E3P note the below taken from UK Government Guidance:

For the noise to count as a statutory nuisance it must do one of the following:

- *unreasonably and substantially interfere with the use or enjoyment of a home or other premises*
- *injure health or be likely to injure health*

Considering the outcome of the assessments and that the criteria adhered to is specifically to protect against harm and to ensure residents can relax in external and internal areas, it is deemed that noise from the AGP does not achieve the above test for Statutory Nuisance. Indeed, considering the quote above and that no assessment of average noise levels is undertaken, it is clear that this is not a noise issue and rather that the maximum noise levels have been used to determine impact, albeit incorrectly.

The EHO states:



Subjectively, because the noise from balls striking the fence/boarding and the noise from shouting is sudden, loud, and unexpected, it has a tendency to startle the listener. If this type of noise was persistent and frequent, it would substantially interfere with use and enjoyment of the rear garden and constitute a statutory nuisance.

The use of maximum noise levels outside has, in my professional opinion and experience, never been used to consider noise impact, unless excessive. In order to consider whether this is excessive, E3P have considered the 10th highest maximum noise level from the EHO results, which is 60.3 dB noted on 7th June 2023. This achieves the WHO Guidelines external noise limit of 60 dB. As we are concerned with external areas and not its impact inside, as assessed by E3P, the application of 60 dB is considered acceptable and shows compliance in this situation.

As such, the results of the EHO monitoring have also shown no adverse impact in accordance with WHO Guidelines and supports the outcome of the E3P assessment.



6. CONCLUSION AND RECOMMENDATIONS

E3P were commissioned by Oakhill School to undertake a Noise Impact Assessment for the noise associated with the usage of the AGP at Oakhill School in Whalley following complaints received from residents to the north.

This assessment looks to determine the key noise sources associated with the AGP and to assess its impact, if any, upon existing residential receptors and to specify mitigation measures, where required.

It is understood that the AGP was in operation prior to approval and occupation of the residential dwellings to the north but no noise assessment was requested at the planning stage by the EHO.

Following occupation, it is understood that complaints have been received and that the EHO has subsequently investigated the complaints and advised that a statutory nuisance exists. As such, this noise assessment has been conducted to determine whether the noise levels resultant from the AGP would constitute adverse impact. However, this report cannot counter claim against statutory nuisance but can provide sufficient evidence to suggest otherwise.

The key sources of sound impacting upon the receptors is understood to be raised voices and impact sounds from the ball hitting the fences. With regards to this last source, it is understood that the client proposes to change these fences to improve this and lower impact sound from this. However, as no details of this are available, nor is the sound reduction known, E3P have assumed the current situation is to remain.

E3P have conducted a week long unattended ambient sound survey on the northern boundary of the school, approximately 1 m from the closest edge of the AGP during a period when matches were played in the afternoon and evening periods. The source levels were used to inform 3D noise modelling of the noise source as well as to capture baseline levels of noise when the pitch is not in use.

The assessment found that noise levels at the receptors were at or below the 50 dB lower criterion given in BS 8233 and WHO Guidelines. As such, no adverse impact is present.

Furthermore, E3P have considered maximum noise level impact at habitable room windows. The worst-case 10th highest level achieved the external criterion given in who guidelines in order to achieve acceptable sleeping conditions with windows open.

As such, no mitigation measures are required, beyond the proposed replacement fencing currently subject to planning determination. Furthermore, the existing time restrictions on the pitch are unsubstantiated.

END OF REPORT



APPENDIX I

GLOSSARY OF ACOUSTIC TERMINOLOGY

NOISE

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source. The most widely used weighting mechanism that best corresponds to the response of the human ear is the "A"-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq} , L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective but, as a general guide, a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions. An indication of the range of sound levels commonly found in the environment is given in the following table.

TABLE A1 TYPICAL SOUND PRESSURE LEVELS

SOUND PRESSURE LEVEL	LOCATION/EXAMPLE
0	Threshold of hearing
20–30	Quiet bedroom at night
30–40	Living room during the day
40–50	Typical office
50–60	Inside a car
60–70	Typical high street
70–90	Inside a factory
100–110	Burglar alarm at 1 m away
110–130	Jet aircraft on take off
140	Threshold of pain



ACOUSTIC TERMINOLOGY

TABLE A2 TERMINOLOGY

DESCRIPTOR	EXPLANATION
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2E-05 Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. "A" weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
L_{Aeq, T}	L _{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
L_{Amax}	L _{Amax} is the maximum A-weighted sound pressure level recorded over the period stated. L _{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, 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.
L₁₀ and L₉₀	If a non-steady noise is to be described, it is necessary to know both its level and the degree of fluctuation. The L _n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L ₁₀ is the level exceeded for 10% of the time and as such can be regarded as the "average maximum level". Similarly, L ₉₀ is the "average minimum level" and is often used to describe the background noise. It is common practice to use the L ₁₀ index to describe traffic noise.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and away from buildings.
Fast	A time weighting used in the root-mean-square section of a sound level meter with a 125-millisecond time constant.
Slow	A time weighting used in the root-mean-square section of a sound level meter with a 1000-millisecond time constant.



APPENDIX II

MEASUREMENT DATA

TABLE A1: HOURLY AMBIENT AND BACKGROUND SOUND LEVEL DATA

PERIOD START	AMBIENT SOUND LEVEL, $L_{Aeq,1hr}$ (dB)	BACKGROUND SOUND LEVEL, $L_{A90,1hr}$ (dB)
06/11/2023 10:00	62.5	53.5
06/11/2023 11:00	55.6	52.9
06/11/2023 12:00	67.4	53.3
06/11/2023 13:00	62.0	53.1
06/11/2023 14:00	57.2	54.0
06/11/2023 15:00	58.0	55.2
06/11/2023 16:00	56.2	55.2
06/11/2023 17:00	56.2	55.2
06/11/2023 18:00	58.7	55.3
06/11/2023 19:00	62.4	54.9
06/11/2023 20:00	61.6	53.9
06/11/2023 21:00	56.4	53.6
06/11/2023 22:00	54.0	53.3
06/11/2023 23:00	53.8	53.1
07/11/2023 00:00	54.2	53.0
07/11/2023 01:00	53.4	52.7
07/11/2023 02:00	53.6	52.6
07/11/2023 03:00	53.0	52.5
07/11/2023 04:00	53.1	52.5
07/11/2023 05:00	53.6	52.7
07/11/2023 06:00	54.7	53.4
07/11/2023 07:00	56.8	54.8
07/11/2023 08:00	56.7	54.9
07/11/2023 09:00	56.1	54.2
07/11/2023 10:00	63.4	53.6
07/11/2023 11:00	54.4	53.4
07/11/2023 12:00	66.8	53.6
07/11/2023 13:00	64.7	54.0
07/11/2023 14:00	57.5	54.1
07/11/2023 15:00	55.5	54.2
07/11/2023 16:00	56.3	54.8
07/11/2023 17:00	61.8	54.7



PERIOD START	AMBIENT SOUND LEVEL, $L_{Aeq,1hr}$ (dB)	BACKGROUND SOUND LEVEL, $L_{A90,1hr}$ (dB)
07/11/2023 18:00	65.7	56.0
07/11/2023 19:00	62.8	55.0
07/11/2023 20:00	58.2	53.2
07/11/2023 21:00	55.1	53.0
07/11/2023 22:00	53.8	52.8
07/11/2023 23:00	53.7	52.8
08/11/2023 00:00	53.3	52.5
08/11/2023 01:00	53.0	52.4
08/11/2023 02:00	52.7	52.2
08/11/2023 03:00	52.6	52.0
08/11/2023 04:00	54.1	52.1
08/11/2023 05:00	55.5	53.0
08/11/2023 06:00	56.6	54.3
08/11/2023 07:00	59.0	56.5
08/11/2023 08:00	60.3	57.9
08/11/2023 09:00	61.3	55.5
08/11/2023 10:00	63.1	54.3
08/11/2023 11:00	55.4	54.1
08/11/2023 12:00	64.1	54.4
08/11/2023 13:00	62.3	53.4
08/11/2023 14:00	64.5	53.3
08/11/2023 15:00	54.5	53.5
08/11/2023 16:00	55.4	54.1
08/11/2023 17:00	62.9	54.5
08/11/2023 18:00	65.0	55.2
08/11/2023 19:00	63.2	54.2
08/11/2023 20:00	59.9	52.3
08/11/2023 21:00	52.9	51.5
08/11/2023 22:00	52.6	51.3
08/11/2023 23:00	52.6	51.2
09/11/2023 00:00	52.5	51.2
09/11/2023 01:00	51.7	50.8
09/11/2023 02:00	51.5	50.6



PERIOD START	AMBIENT SOUND LEVEL, $L_{Aeq,1hr}$ (dB)	BACKGROUND SOUND LEVEL, $L_{A90,1hr}$ (dB)
09/11/2023 03:00	51.2	50.5
09/11/2023 04:00	52.0	50.8
09/11/2023 05:00	53.1	51.2
09/11/2023 06:00	54.6	52.8
09/11/2023 07:00	56.1	54.4
09/11/2023 08:00	55.3	53.8
09/11/2023 09:00	55.7	54.1
09/11/2023 10:00	62.2	53.4
09/11/2023 11:00	54.5	53.1
09/11/2023 12:00	65.0	53.7
09/11/2023 13:00	67.4	54.0
09/11/2023 14:00	65.0	54.1
09/11/2023 15:00	55.8	54.5
09/11/2023 16:00	55.4	54.0
09/11/2023 17:00	62.7	54.1
09/11/2023 18:00	62.8	55.1
09/11/2023 19:00	60.5	53.2
09/11/2023 20:00	53.2	51.6
09/11/2023 21:00	52.5	51.2
09/11/2023 22:00	52.4	51.0
09/11/2023 23:00	51.5	50.4
10/11/2023 00:00	51.1	50.2
10/11/2023 01:00	50.6	50.0
10/11/2023 02:00	50.5	49.9
10/11/2023 03:00	50.6	50.0
10/11/2023 04:00	50.9	50.1
10/11/2023 05:00	51.8	50.4
10/11/2023 06:00	52.6	50.9
10/11/2023 07:00	53.7	51.9
10/11/2023 08:00	54.4	52.9
10/11/2023 09:00	55.5	52.1
10/11/2023 10:00	59.4	51.3
10/11/2023 11:00	52.6	51.3



PERIOD START	AMBIENT SOUND LEVEL, $L_{Aeq,1hr}$ (dB)	BACKGROUND SOUND LEVEL, $L_{A90,1hr}$ (dB)
10/11/2023 12:00	67.1	52.0
10/11/2023 13:00	63.6	51.9
10/11/2023 14:00	62.2	51.9
10/11/2023 15:00	53.2	51.9
10/11/2023 16:00	53.8	52.6
10/11/2023 17:00	53.4	52.4
10/11/2023 18:00	59.9	52.4
10/11/2023 19:00	63.1	51.9
10/11/2023 20:00	52.1	50.5
10/11/2023 21:00	51.8	50.3
10/11/2023 22:00	52.8	51.0
10/11/2023 23:00	53.1	50.4
11/11/2023 00:00	51.5	49.6
11/11/2023 01:00	50.2	49.2
11/11/2023 02:00	49.8	49.1
11/11/2023 03:00	49.7	49.0
11/11/2023 04:00	49.9	49.0
11/11/2023 05:00	50.6	49.3
11/11/2023 06:00	51.7	49.7
11/11/2023 07:00	53.2	50.9
11/11/2023 08:00	54.1	51.9
11/11/2023 09:00	53.1	51.3
11/11/2023 10:00	52.4	51.0
11/11/2023 11:00	52.6	50.4
11/11/2023 12:00	51.8	50.2
11/11/2023 13:00	51.6	50.2
11/11/2023 14:00	51.2	49.3
11/11/2023 15:00	52.4	50.6
11/11/2023 16:00	53.9	52.2
11/11/2023 17:00	53.3	51.4
11/11/2023 18:00	52.6	50.9
11/11/2023 19:00	58.6	50.3
11/11/2023 20:00	52.9	50.1



PERIOD START	AMBIENT SOUND LEVEL, $L_{Aeq,1hr}$ (dB)	BACKGROUND SOUND LEVEL, $L_{A90,1hr}$ (dB)
11/11/2023 21:00	51.8	50.0
11/11/2023 22:00	51.6	49.6
11/11/2023 23:00	51.2	49.5
12/11/2023 00:00	50.9	49.2
12/11/2023 01:00	50.1	48.8
12/11/2023 02:00	49.4	48.4
12/11/2023 03:00	49.2	48.3
12/11/2023 04:00	49.1	48.3
12/11/2023 05:00	49.2	48.3
12/11/2023 06:00	50.0	48.5
12/11/2023 07:00	50.8	48.8
12/11/2023 08:00	52.2	49.9
12/11/2023 09:00	54.3	51.1
12/11/2023 10:00	55.0	52.1
12/11/2023 11:00	54.2	52.3
12/11/2023 12:00	54.1	52.3
12/11/2023 13:00	55.0	53.0
12/11/2023 14:00	55.3	52.7
12/11/2023 15:00	54.3	51.9
12/11/2023 16:00	53.7	51.1
12/11/2023 17:00	54.0	51.7
12/11/2023 18:00	53.8	50.8
12/11/2023 19:00	53.7	50.2
12/11/2023 20:00	51.4	49.3
12/11/2023 21:00	50.9	48.8
12/11/2023 22:00	50.0	48.4
12/11/2023 23:00	49.4	48.3
13/11/2023 00:00	49.1	48.1
13/11/2023 01:00	48.8	48.0
13/11/2023 02:00	49.0	47.9
13/11/2023 03:00	48.7	47.9
13/11/2023 04:00	51.8	49.0
13/11/2023 05:00	51.8	49.3



PERIOD START	AMBIENT SOUND LEVEL, $L_{Aeq,1hr}$ (dB)	BACKGROUND SOUND LEVEL, $L_{A90,1hr}$ (dB)
13/11/2023 06:00	54.1	51.3
13/11/2023 07:00	56.6	54.5
13/11/2023 08:00	57.6	55.6
13/11/2023 09:00	57.0	54.7
13/11/2023 10:00	66.0	56.3
13/11/2023 11:00	64.5	58.3
13/11/2023 12:00	66.5	60.1
13/11/2023 13:00	64.7	59.2
13/11/2023 14:00	68.3	58.7
13/11/2023 15:00	59.8	56.4
13/11/2023 16:00	60.3	56.5
13/11/2023 17:00	57.2	55.4
13/11/2023 18:00	56.2	54.0
13/11/2023 19:00	54.5	52.4
13/11/2023 20:00	53.0	51.8
13/11/2023 21:00	53.1	51.6
13/11/2023 22:00	53.0	51.2
13/11/2023 23:00	51.7	51.0
14/11/2023 00:00	54.3	51.5
14/11/2023 01:00	52.1	51.4
14/11/2023 02:00	51.7	51.2
14/11/2023 03:00	51.6	51.0
14/11/2023 04:00	51.9	51.1
14/11/2023 05:00	53.2	51.7
14/11/2023 06:00	54.1	52.5
14/11/2023 07:00	56.3	54.2
14/11/2023 08:00	56.5	54.9



APPENDIX III

FIGURES

Figure 1 - Daytime Grid Noise Map - Calculation at 1.5m above ground level



Project:
AWP Usage

Project-No:
51-027

Client:
Oakhill School

Noise Level, L _{Aeq,1hr} (dB)	
...	<= 48
48 < ...	<= 50
50 < ...	<= 52
52 < ...	<= 55
55 < ...	<= 58
58 < ...	<= 60
60 < ...	<= 62
62 < ...	<= 65
65 < ...	

- Noise Map Objects**
- Area Source
 - Road
 - Parking Lot
 - Building
 - Foliage
 - Receiver
 - Building Evaluation
 - Calculation Area

APPENDIX IV

BOOKING SHEET

	5 Sunday	6 Monday	7 Tuesday	8 Wednesday	9 Thursday	10 Friday	11 Saturday
4:30 pm							
5:00 pm							
5:30 pm		5:30 - 6:30 Whalley Juniors Under 7's 3G Pitch Hire	5:30 - 6:30 Whalley Juniors Under 7's 3G Pitch Hire	5:30 - 6:30 Whalley Juniors Under 7's 3G Pitch Hire	5:30 - 6:30 Whalley Juniors Under 7's 3G Pitch Hire	5:30 - 6:30 Oaks Fives 3G Pitch Hire	
6:00 pm		JUNIORS	JUNIORS	JUNIORS	JUNIORS	ADULT	
6:30 pm		6:30 - 7:30 Oaks Fives 3G Pitch Hire	6:30 - 7:30 Whalley Juniors Under 7's 3G Pitch Hire	6:30 - 7:30 Oaks Fives 3G Pitch Hire	6:30 - 7:30 Andy Stanworth 3G Pitch Hire	6:30 - 7:30 Langho FC 3G Pitch Hire	
7:00 pm		ADULT	JUNIORS	ADULT	ADULT	JUNIORS	
7:30 pm		7:30 - 8:30 Peter Stevenson 3G Pitch Hire	7:30 - 8:30 Mellor Juniors FC 3G Pitch Hire	7:30 - 8:30 Karl Furnell 3G Pitch Hire	7:30 - 8:30 Nick Simpson 3G Pitch Hire		
8:00 pm		ADULT	JUNIORS	ADULT	ADULT		
8:30 pm							
9:00 pm							

APPENDIX V
LIGHTHOUSE ACOUSTICS
AUGUST 2021 NOISE
ASSESSMENT

Sports Pitch Oakhill School Whalley

Acoustic Report
0849/AR1

4 August 2021

For:

Withy Trees Ltd t/a Oakhill Leisure
Wiswell Lane
Whalley
Clitheroe
BB7 9AF



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Acoustic Report

0849/AR1

Contents	Page
1.0 Introduction	1
2.0 Objectives	1
3.0 Site Description	1
4.0 Design Guidance	2
5.0 Environmental Sound Survey	2
6.0 Assessment	5
7.0 Additional Guidance	7
8.0 Conclusions	8

Appendices

Time History Graph 0849/THG1

This report (including any enclosures and attachments) has been prepared by Lighthouse Acoustics with reasonable skill and care in accordance with generally accepted acoustic principles and the terms agreed between Lighthouse Acoustics and our Client. Any information provided by third parties and referred to herein may not have been checked or verified by Lighthouse Acoustics unless expressly stated otherwise. This document contains confidential information and no part of this report should be reproduced, distributed or communicated to any third party unless Lighthouse Acoustics provide express prior written consent. We do not accept any liability if this report is used for an alternative purpose from which it is intended, nor to any third party in respect of this report. Where a sound survey has been undertaken, this report is based on the sound climate at the site at the time of the survey and no warranty is given as to the possibility of changes at differing times.

Lighthouse Acoustics is the trading name of Lighthouse Enterprises UK Limited
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Registered in England and Wales Company No. 09085491

1.0 Introduction

An existing 3G sports pitch is situated at Oakhill School, Whalley. It is understood that a complaint has been received from a resident regarding activity noise during the evening period when the sports pitch is available for hire by 5-a-side football teams.

Lighthouse Acoustics has been appointed by Withy Trees Ltd t/a Oakhill Leisure to undertake an assessment of existing activity noise to the nearest residential property.

The survey methodology, results and assessment are presented in this report.

2.0 Objectives

To visit site to undertake a detailed environmental sound survey in order to establish existing sound levels at the site boundary.

To undertake an assessment of activity noise from the existing sports pitch upon the nearest residential property.

To propose additional guidance where required in order to minimise activity noise from the existing sports pitch upon the nearest residential property.

3.0 Site Description

Oakhill School is situated on Wiswell Lane, Whalley and comprises numerous classroom buildings, sports hall, leisure facility, 3G sports pitch and playing fields. The site includes a nursery, primary school and secondary school.

The 3G sports pitch is situated to the north east corner of the site. It is understood to be available for use by pupils during school hours and for hire by 5-a-side football teams between 18:30 and 20:30 hours (1 hour sessions) on weekdays.

The site is bound by a stream to the north, fields to the east and south and Wiswell Lane and residential properties to the west. Residential properties are situated to the north of the site opposite the stream along Bennetts Close. These were noted to feature close boarded fencing (approximately 1.8m high) to the rear gardens running along the stream. The A671 is situated approximately 100m to the east of the site.

It is understood that the complaint has been received from a resident along Bennetts Close.

The site plan overleaf indicates the site boundary and the surrounding environment.



Site plan indicating the site boundary and the surrounding environment

4.0 Design Guidance

Sports England published a Design Guidance Note "Artificial Grass Pitch (AGP) Acoustics – Planning Implications" in August 2015. This states the following:

"The determining noise criteria for AGPs proximity to residential properties, to avoid moderate annoyance in the daytime and evenings, as set by The World Health Organisation's 'Guidelines for Community Noise': = 50dB $L_{Aeq(1hour)}$ upper noise limit external to residential properties and within external living areas."

5.0 Environmental Sound Survey

5.1 Measurements

Automated environmental sound measurements were undertaken from 10:00 hours on Monday 5 July 2021 to 10:00 hours on Wednesday 6 July 2021. During this period the L_{Aeq} sound pressure levels were measured continuously over 15 minute periods.

This period was selected in order to capture activity noise during the evening periods when the sports pitch is available for hire by 5-a-side football teams between 18:30 and 20:30 hours (1 hour sessions) on weekdays.

5.2 Weather Conditions

At the start of the survey period there was a light westerly breeze (<3m/s) and the sky was scattered cloud. There was no rainfall and road surfaces were dry. The temperature was approximately 14°C.

At the end of the survey period there was a light westerly breeze (<3m/s) and the sky was scattered cloud. There was no rainfall and road surfaces were damp. The temperature was approximately 15°C.

Based on publicly available weather data for the survey period it is understood that there were periods of significant rainfall between 00:00 and 08:00 hours on Tuesday 6 July 2021 and between 00:00 and 03:00 hours on Wednesday 7 July 2021.

Since these periods are outside the times of interest (18:30 to 20:30 hours) they do not affect the survey results.

Based on publicly available weather data for the remaining survey periods it is understood that there were no periods of significant rainfall or strong breezes. The weather conditions during these periods are therefore considered to be suitable for undertaking measurements of sound levels.

5.3 Measurement Position

Environmental sound levels were measured at a single position as described in the table below.

Position	Description
A	Microphone situated towards the north east corner of the site along the site boundary approximately 5m to the north of the sports pitch at 1.5m above ground level in free field conditions.

The measurement position is shown on the site plan below.



Site plan showing measurement position

Measurement Position A was selected in order to assess typical environmental sound levels at the site boundary.

5.4 Equipment

The following equipment was used to undertake the environmental sound survey.

Equipment	Manufacturer	Model	Serial No.	Calibration Date
Class 1 Sound Level Meter	Casella	633C	0721320	25/09/2019
Preamplifier	Casella	495	001414	25/09/2019
Microphone	Casella	251	1025	25/09/2019
Environmental Noise Kit	Casella	6847	-	-
Microphone Extension Cable	Casella	C6717/5	-	-
Weather Protection System	Casella	6737	-	-
Class 1 Sound Calibrator	120/1	3864878	3864878	26/10/2020

Field calibration checks were performed on the sound level meter prior to and on completion of the survey and were found to be within acceptable tolerance limits.

5.5 Results

5.5.1 Time History Graph

The results of the environmental sound survey are presented on Time History Graph 0849/THG1 enclosed at the rear of the report.

5.5.2 $L_{Aeq,15min}$ Sound Levels

In order to compare the results of the environmental sound survey with the design guidance level upper noise limit it is necessary to convert the $L_{Aeq,15min}$ sound levels during periods of activity into single figure $L_{Aeq,1hour}$ sound levels. This has been calculated using the following formula:

$$L_{Aeq,T} = 10 \log_{10} \left(\frac{1}{N} \sum_i^N 10^{L_{Aeq,15min}i/10} \right)$$

The calculated $L_{Aeq,1hour}$ sound levels during periods of activity at the measurement position are presented in the table below.

Date	Time Period	Calculated $L_{Aeq,1hour}$ Sound Pressure Level (dB)
Monday 5 July 2021	18:30-19:30	54
	19:30-20:30	54
Tuesday 6 July 2021	18:30-19:30	55
	19:30-20:30	58

5.6 Discussion of Sound Climate

At the start and end of the survey period the dominant sound source at Position A was noted to be distant road traffic noise from the nearby A671.

During external play times, pupil noise was the dominant noise source comprising shouting, screaming and ball impacts against the perimeter metal mesh fence/timber boarding of the sports pitch.

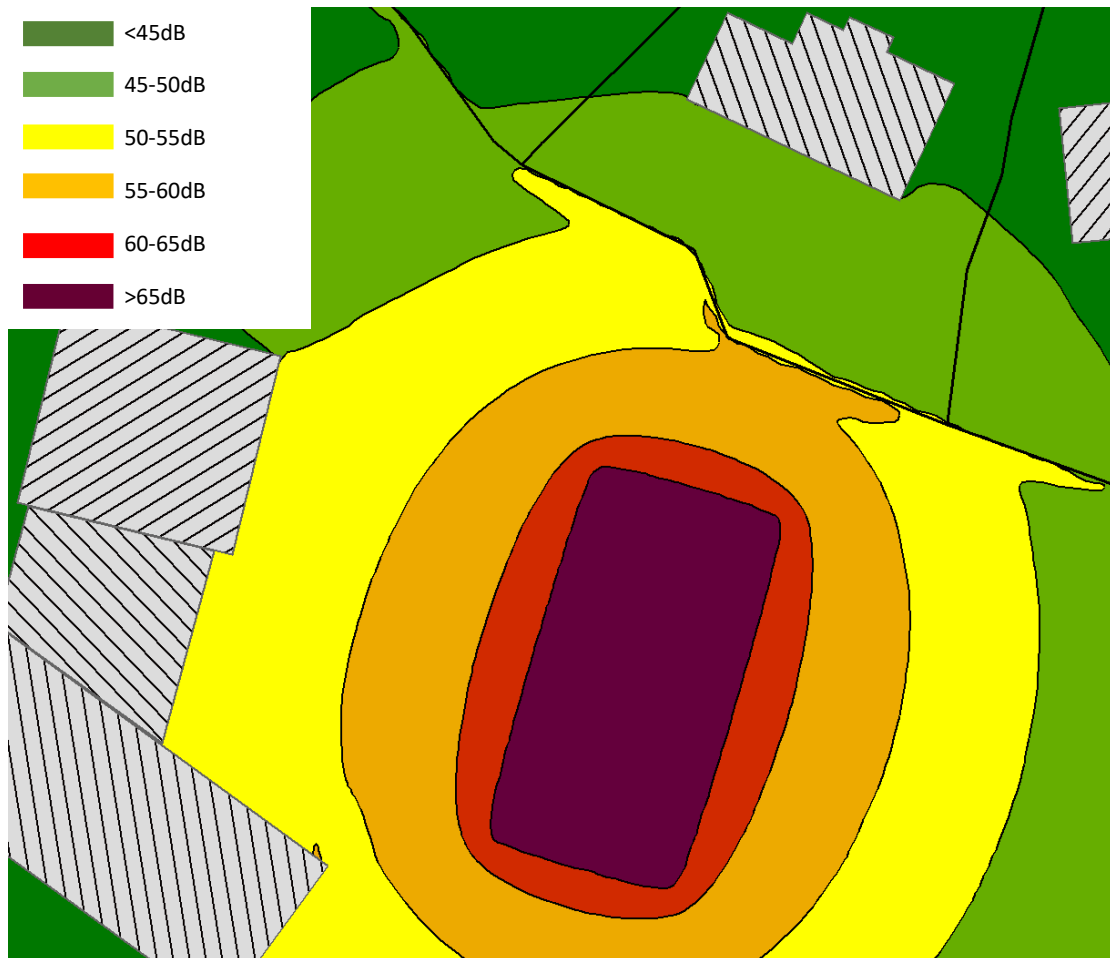
During 5-a-side football times, player noise was the dominant noise source comprising shouting and ball impacts against the perimeter metal mesh fence/timber boarding of the sports pitch.

6.0 Assessment

In order to assess activity sound levels incident upon the facades of the residential property and within the external living areas a three dimensional model of the site has been constructed using SoundPLAN sound mapping software. The software uses the measured sound data to predict how activity sound radiates across the site returning a colour contour map showing the variations in sound levels. The calculation method used by the software takes into account all standard acoustic corrections such as distance propagation, ground absorption, reflections and screening.

The sound maps have been calibrated using the highest $L_{Aeq,1hour}$ sound level during periods of activity at the measurement position of 58dB.

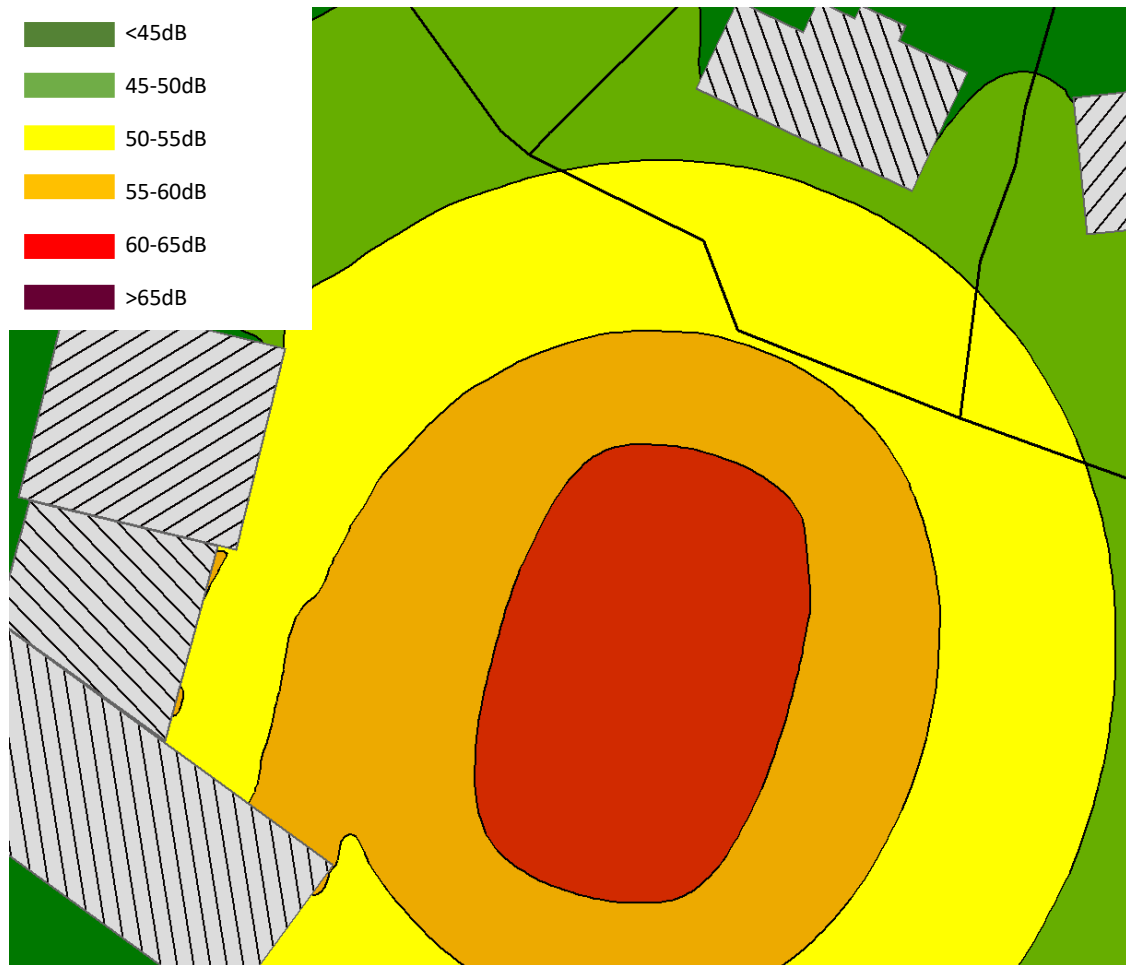
The sound map below shows the predicted $L_{Aeq,1hour}$ activity sound levels incident upon the facades of the nearest residential property at ground floor level and within the external living areas at head height (1.8m).



Sound map showing predicted $L_{Aeq,1hour}$ activity sound levels incident upon the facades of the nearest residential property at ground floor level and within the external living areas at head height (1.8m)

As can be seen, the predicted $L_{Aeq,1hour}$ activity sound levels are likely to achieve the design guidance upper noise limit of $L_{Aeq,1hour}$ 50dB at the facades of the nearest residential property at ground floor level and within the external living areas at head height.

The sound map below shows the predicted $L_{Aeq,1hour}$ activity sound levels incident upon the facades of the nearest residential property at first floor level (5.0m).



Sound map showing predicted $L_{Aeq,1hour}$ activity sound levels incident upon the facades of the nearest residential property at first floor level (5.0m)

As can be seen, the predicted $L_{Aeq,1hour}$ activity sound levels are likely to achieve the design guidance upper noise limit of $L_{Aeq,1hour}$ 50dB at the facades of the nearest residential property at first floor level.

7.0 Additional Guidance

In order to minimise activity noise from the existing sports pitch upon the nearest residential property the following guidance is proposed.

- Foul language and anti-social behaviour on the sports pitch is unacceptable and should not be permitted by the operator. Signage should state this on the sports pitch and within the hire agreement. The operator should reserve the right to dismiss users from the sports pitch and ban future use if required.
- The sports pitch should be regularly attended by the operator when in use to observe the activity and ensure that unacceptable behaviour does not occur.

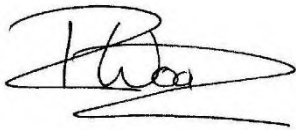
- Neighbours should be provided with contact details to report noise issues with the operator at the time they occur. The operator should investigate complaints as soon as reasonably possible.
- The perimeter metal mesh fencing should be fixed to support posts with a resilient isolator in order to reduce the 'rattling' sound due to ball impacts. Fixings should be inspected regularly to ensure they remain tight.
- The low level perimeter timber boarding which is situated in front of the metal mesh fencing should be fixed to support posts with a resilient isolator in order to reduce the 'rattling' sound due to ball impacts. Fixings should be inspected regularly to ensure they remain tight.

8.0 Conclusions

A detailed environmental sound survey has been undertaken in order to establish existing sound levels at the site boundary.

An assessment of activity noise from the existing sports pitch upon the nearest residential property has been undertaken. The assessment indicates that activity sound levels are likely to achieve the design guidance upper noise limit at the nearest residential property.

Additional guidance has been proposed in order to minimise activity noise from the existing sports pitch upon the nearest residential property.



Robin Wood
LIGHTHOUSE ACOUSTICS

Sports Pitch, Oakhill School, Whalley
Time History Graph - Monday 5 July 2021 to Wednesday 7 July 2021
 $L_{Amax,15min}$, $L_{Aeq,15min}$ & $L_{A90,15min}$ Noise Levels at Position A

