

Three Crutches Play Area

Noise Impact Assessment Report 1494.NIA.00

For

Mr Gavin Coward C/o

design i.d.

architecture & interior design

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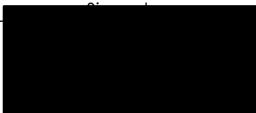
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Table 1. Author Qualifications

Report		Name and Position	Relevant Qualification
Undertaken and Prepared By		David Fernleigh Principal	MIOA
Checked By		David Fernleigh Principal	MIOA

This report has been prepared with all reasonable skill and care by dBA Acoustics for the Client named. Calculations and estimates made in this report are based on reasonable assumptions and good industry practice that, by their nature, involve uncertainties that could cause future on site results to differ materially from those predicted. dBA Acoustics does not guarantee or warrant any calculation or estimate made. The information contained herein is the property of, and confidential to, the Client. Any third-party information required and/or provided for the completion of this report should not be considered as verified by dBA Acoustics, unless otherwise stated.

1.0 INTRODUCTION

- 1.1 A pre-existing children's play area at The Three Crutches Public House has been relocated following redevelopment of part of the site.
- 1.2 A retrospective planning application (ref:20210795) including the relocated play area has been conditionally approved (28 September 2021).
- 1.3 dBA Acoustics have been commissioned to undertake a noise impact assessment in accordance with Local Authority requirements in support of the discharge of Condition 2 of the consented scheme.
- 1.4 This report concerns the assessment and/or control of atmospheric noise and/or vibration affecting neighbouring noise sensitive property for the purposes of planning. Detailed mechanical, structural, H, S&E and conservation considerations are beyond the expertise of this practice and should be dealt with by the relevant professional service providers.
- 1.5 Where sound pressure levels are quoted, they are in decibels ref: 2×10^{-5} Pa. Where sound power levels are quoted, they are in decibels ref: 1×10^{-12} W, unless otherwise indicated.

2.0 SUMMARY

- 2.1 Condition 2 of the approved application states that a noise impact assessment of the play area should reference BS8233:2014 and World Health Organisation. The criteria within these guidance documents are absolute numerical values. The play area cannot be used until Condition 2 is discharged, it being a pre-commencement Condition. Therefore, no environmental noise survey of the site is deemed necessary or has been undertaken.
- 2.2 A desktop noise impact assessment has been undertaken using historical data of nursery aged children engaged in unstructured play in a designated play area that included climbing structures.
- 2.3 The assessment undertaken predicts that likely noise levels in adjacent gardens as a result of children playing in the play area should generally be below the World Health Organisation lower guideline limit for outside amenity area.
- 2.4 The assessment undertaken predicts that likely noise levels in the worst affected overlooking 1st floor habitable rooms as a result of children playing in the play area should generally be below the BS8233:2014 design limit for daytime resting.
- 2.5 A nominal 1dB exceedance of the criteria is predicted based on a worst-case assessment understood to be atypical. The normal day-to-day use of the play area is not expected to result in an adverse impact.
- 2.6 This assessment is subject to the final approval of Gravesend Borough Council.

3.0 SITE

3.1 The proposed site plan excerpt below shows the location of the development site, as indicated:

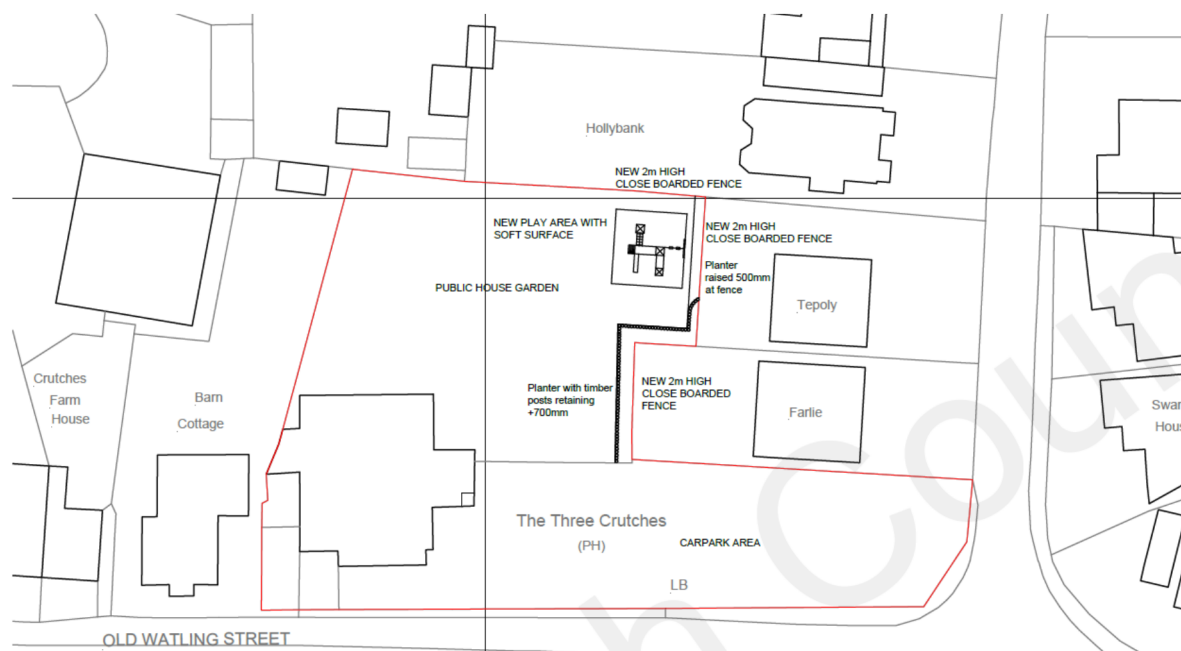


Figure 1. Site Location – Proposed Site Plan Excerpt – Mark Carter Associates Drawing No 3318-001 rev B

4.0 CRITERIA

4.1 Condition 2 of the approved scheme states:

“Prior to bringing into use of the play equipment hereby permitted a noise impact assessment of the existing play area on nearby residential properties shall be carried out, and a full report of the findings and recommendations submitted to the LPA for approval, with reference to World Health Organisation (WHO) Guidelines for Community Noise, and BS8233:2014. Any works identified as being required to achieve the above shall be carried out prior to the first operational use of the equipment.”

World Health Organisation 1999

4.2 The following guidelines are found in WHO1999 publication Guidelines for Community Noise:

Table 2. WHO 1999 Guidelines for Community Noise

Environment	Critical Health Effect	L _{Aeq,T} dB	L _{Afmax} dB	Time base
Outdoor living area (noise from sources other than road traffic, railways, aircraft or wind turbines)	Serious annoyance, daytime and evening	55	-	16 hours 07:00-23:00
	Moderate annoyance, daytime and evening	50	-	16 hours 07:00-23:00
Dwellings indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	-	16 hours 07:00-23:00
	Sleep disturbance, night-time	30	45	8 hours 23:00-07:00

BS8233:2014 Guidelines on Sound Insulation and Noise

4.3 The guidance relating to residential development as set out in BS8233:2014 is closely aligned with WHO and specifically provides guideline limits for noise within internal living spaces and external residential amenity areas.

4.4 Table 4 from BS8233:2014 gives the following internal guideline values:

Table 3. BS8233:2014 Internal Guideline Levels

Activity	Location	07:00-23:00	23:00-07:00
Resting	Living Room	35 dB L _{Aeq} 16hr	
Dining	Dining room/area	40 dB L _{Aeq} 16hr	
Sleeping (daytime resting)	Bedroom	35 dB L _{Aeq} 16hr	30 dB L _{Aeq} 8hr

4.5 In BS8233:2014 design limits for noise affecting external amenity areas are given as 50 dB L_{Aeq,T} with an upper guideline of 55 dB L_{Aeq,T}.

5.0 ASSESSMENT

5.1 The proposed site plan excerpt below shows the play area in its new position:

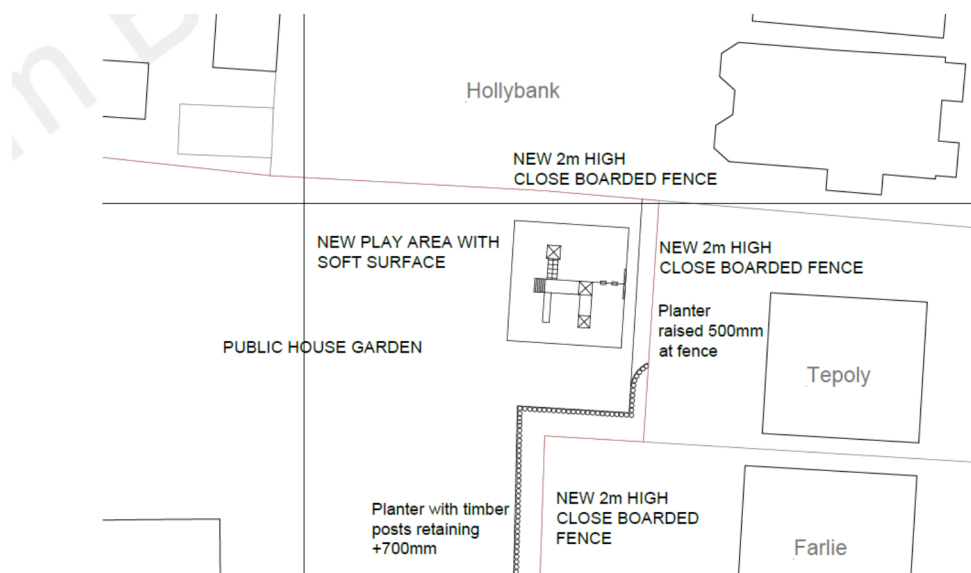


Figure 2. Proposed Play Area Location – Detail from Mark Carter Associates Drawing No 3318-001 rev B

5.2 The drawing excerpt below provides the dimensions and arrangement of the play area structure:

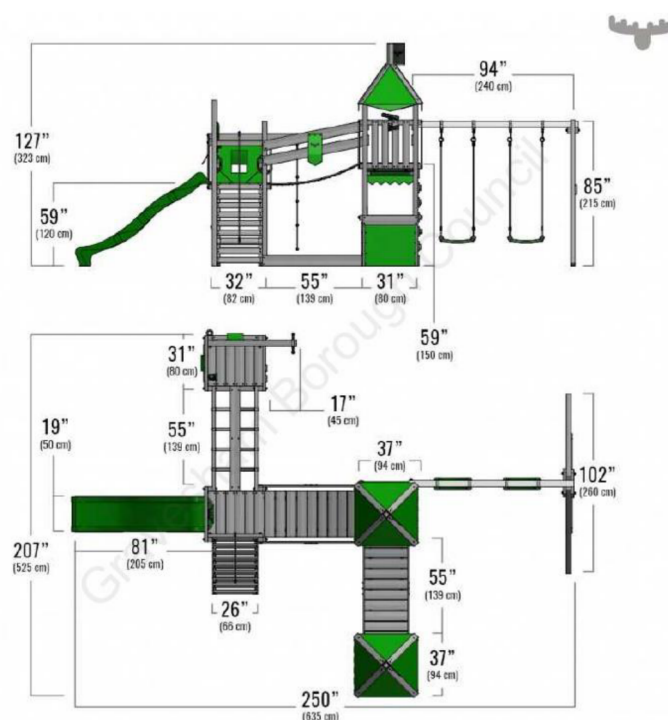


Figure 3 Play Area Structure Dimensions

- 5.3 In order to understand the expected play area activity the Client has provided the following information based on experience of the operational activity of the play area in its former location:

Table 4. Expected Play Area Activity

Expected Play Area Activity	
Question	Answer
Approximate maximum number of kids using play area at any one time	10
Approximate typical number of kids using play area at any one time	2-3
At its busiest, how long is the play area used for	Half day
Typically, week to week, how often is the play area used	Twice a week
In its original location were there ever any complaints received about noise from children playing	Client not aware of any complaints
Any other comments that illustrate how the play area is used	Not a primary use but nice addition to a family pub garden

- 5.4 dBA Acoustics have previously undertaken measurements of children at play in an outdoor nursery setting that included climbing structures, the results of these measurements are shown in the table below:

Table 5. Historic Measurements of Children at Play

Historic Measurement Results of Children at Play (Nursery)				
	No. or children	Measurement location	Activity type	L _{Aeq,5min}
Play area	40 -55	center	unstructured play	66.8
Play area	74	center	unstructured play	70.3
At boundary	74	at edge of play area	unstructured play	63.1
Play area	60	towards one end	unstructured play	66.9
Play area	22	center	unstructured play	69.7
Play area no kids	0	center	n/a	51.6

- 5.5 Based on the above information calculations have been undertaken to determine the likely noise impact at the two closest adjacent residential receptors namely, Teploy and Hollybank.
- 5.6 Where applicable corrections have been applied for number of children; size of play area; distance; screening and the effects of sound passing through an open window.
- 5.7 To account for the difference in ground level in the gardens and play area the following relative heights have been estimated based on a notional seated head height in the receptor garden ; and the source noise being from children either all on the structure turrets (worst-case) or all at ground level (best-case). This should provide a range of likely noise levels. The estimated heights are given in the table below:

Table 6. Acoustic Screening input Data

Dimensions used in Screening Calculations (Maekewa Method)				
	Teploy worst m	Teploy best m	Hollybank worst m	Hollybank best m
Source height	2.4	1.3	2.4	1.3
Source to barrier distance	3	3	5	5
Effective barrier height	2.5	2.5	2	2
Barrier to receiver distance	3	3	3	3
Effective receiver height	1.8	1.8	1.8	1.8

5.8 Calculations have been undertaken to estimate the noise impact of both typical use (3 children) and maximum expected use (10 children) at the following receptor points:

- Inside 1st floor rear bedroom Teploy
- Inside 1st floor rear bedroom Hollybank
- 3m from boundary fence within Teploy garden, receptor seated
- 3m from boundary fence within Hollybank garden, receptor seated

5.9 The following tables present the summary results of the calculations. The detailed calculations can be found within Appendix A.

Table 7. Estimated Noise Impact in Adjacent Gardens

Estimated Noise Impact in Gardens	Teploy		Hollybank	
No of children at play	10.0	3.0	10.0	3.0
Noise level in adjacent garden if kids on turrets	46.8	41.5	50.6	45.4
Noise level in adjacent garden if kids on ground	40.4	35.2	45.1	39.9
WHO outdoor amenity lower level	50.0	50.0	50.0	50.0
WHO outdoor amenity upper level	55.0	55.0	55.0	55.0
Exceedance above WHO	none	none	1dB	none

Table 8. Estimated Noise Impact inside Adjacent Bedrooms

Estimated Noise Impact in Rear Bedrooms	Teploy		Hollybank	
No of children at play	10.0	3.0	10.0	3.0
Predicted noise level inside bedroom	36.2	31.0	36.2	31.0
BS8233/WHO daytime resting limit	35.0	35.0	35.0	35.0
Exceedance above BS8233 / WHO	1dB	none	1dB	none

5.10 From the range of results in the above tables it can be seen that in general the noise impact at surrounding receptors is estimated to be within the guideline levels from BS8233 and WHO.

5.11 Only when the maximum expected number of children are all on the turrets at the same time are the guideline levels given in BS8233 and WHO nominally exceeded by 1 dB.

5.12 The play area is auxiliary to the public house and beer garden. As such, the likely frequency of use can be expected to be less than would be expected of a public play area.

5.13 As the beer garden/play area are pre-existing (albeit in a more distant location), and the magnitude of the predicted exceedance is lower than that which could normally be noticed, and given that 10 children using the play area is the expected maximum rather than the typical, it is concluded that normal use of the play area should not lead to an adverse noise impact.

6.0 MITIGATION

- 6.1 The calculations undertaken assume a degree of acoustic screening provided by the installed boundary fencing.
- 6.2 In order that the screening corrections allowed for are reliably achieved in practice it should be ensured that the existing boundary fencing is enhanced if/as necessary to achieve the following:
- The boundary screening should provide a minimum superficial density of 10kg/m².
 - The screening material should be imperforate with no gaps between panels/planks (e.g. solid sheet material or tongue-in-groove timber).
 - Alternate materials other than timber may be used provided they conform to the above requirements.

7.0 CONCLUSION

- 7.1 Condition 2 of the approved application states that a noise impact assessment of the play area should reference BS8233:2014 and World Health Organisation. The criteria within these guidance documents are absolute numerical values. The play area cannot be used until Condition 2 is discharged, it being a pre-commencement Condition. Therefore, no environmental noise survey of the site is deemed necessary or has been undertaken.
- 7.2 A desktop noise impact assessment has been undertaken using historical data of nursery aged children engaged in unstructured play in a designated play area that included climbing structures.
- 7.3 The assessment undertaken predicts that likely noise levels in adjacent gardens as a result of children playing in the play area should generally be below the World Health Organisation lower guideline limit for outside amenity area.
- 7.4 The assessment undertaken predicts that likely noise levels in the worst affected overlooking 1st floor habitable rooms as a result of children playing in the play area should generally be below the BS8233:2014 design limit for daytime resting.
- 7.5 A nominal 1dB exceedance of the criteria is predicted based on a worst-case assessment understood to be atypical. The normal day-to-day use of the play area is not expected to result in an adverse impact.
- 7.6 This assessment is subject to the final approval of Gravesend Borough Council.

Report end

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APPENDIX A – CALCULATIONS

Table 9. Detailed Calculations

Tepoly inside 1st floor room						Hollybank inside 1st floor room					
no of children at play				10.0	3.0	no of children at play				10.0	3.0
source level 22 children				69.7	69.7	source level 22 children				69.7	69.7
correction for 10 children	22.0	10.0	0.5	-3.4		correction for 10 children	22.0	10.0	0.5	-3.4	
correction for 3 children	22.0	3.0	0.1		-8.7	correction for 3 children	22.0	3.0	0.1		-8.7
play area correction	5.3	6.4	33.3	15.2	15.2	play area correction	5.3	6.4	33.3	15.2	15.2
sound power of play area				81.5	76.3	sound power of play area				81.5	76.3
distance correction			13.0	-30.3	-30.3	distance correction			13.0	-30.3	-30.3
maekewa barrier correction						maekewa barrier correction					
incident at nearest window				51.2	46.0	incident at nearest window				51.2	46.0
correction for slightly open window				-15.0	-15.0	correction for slightly open window				-15.0	-15.0
predicted level inside				36.2	31.0	predicted level inside				36.2	31.0
BS8233 daytime resting				35.0	35.0	BS8233 daytime resting				35.0	35.0
exccdance above BS3233				1.2	-4.0	exccdance above BS3233				1.2	-4.0
Tepoly seated in garden 3m from boundary						Hollybank seated in garden 3m from boundary					
no of children at play				10.0	3.0	no of children at play				10.0	3.0
source level 22 children				69.7	69.7	source level 22 children				69.7	69.7
correction for 10 children	22.0	10.0	0.5	-3.4		correction for 10 children	22.0	10.0	0.5	-3.4	
correction for 3 children	22.0	3.0	0.1		-8.7	correction for 3 children	22.0	3.0	0.1		-8.7
play area correction	5.3	6.4	33.3	15.2	15.2	play area correction	5.3	6.4	33.3	15.2	15.2
sound power of play area				81.5	76.3	sound power of play area				81.5	76.3
distance correction			6.0	-23.6	-23.6	distance correction			8.0	-26.1	-26.1
on turrets maekewa barrier correction				-11.2	-11.2	on turrets maekewa barrier correction				-4.8	-4.8
on ground maekewa barrier correction				-17.5	-17.5	on ground maekewa barrier correction				-10.3	-10.3
incident in adjacent garden if on turrets				46.8	41.5	incident in adjacent garden if on turrets				50.6	45.4
incident in adjacent garden if on ground				40.4	35.2	incident in adjacent garden if on ground				45.1	39.9
WHO outdoor amenity lower level				50.0	50.0	WHO outdoor amenity lower level				50.0	50.0
WHO outdoor amenity upper level				55.0	55.0	WHO outdoor amenity upper level				55.0	55.0
exceedance above WHO				none	none	exceedance above WHO (lower)				0.6	none

APPENDIX B - DEFINITION OF TERMS

$L_{Aeq,T}$ is the equivalent continuous A-weighted sound pressure level defined in BS4142:2014 as the value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T = t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time.

L_{A90} is the background sound level as defined in BS4142:2014 as the A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T , measured using time weighting F and quoted to the nearest whole number of decibels.

L_{Amax} Defined in WHO as the maximum outdoor sound pressure level associated with an individual noise event.

Background Sound Level is the L_{A90} , see above.

BB93 is Building Bulletin 93 "Acoustic Design of Schools: Performance standards" and sets out the minimum performance standards for the acoustics of school buildings.

IANL as defined in BB93 is the indoor ambient noise level within teaching accommodation and is comprised of a 30minute L_{Aeq} .

Ambient Sound as defined by BS4142:2014 is the totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far.

Specific Sound as defined by BS4142:2014 is the sound source being assessed.

Residual Sound as defined by BS4142:2014 is the ambient sound remaining at the assessment location when the specific sound is suppressed to such a degree that it does not contribute to the ambient sound.

Rating Level as defined by BS4142:2014 is the specific sound level plus any adjustment for the characteristic features of the sound.

Tonal Characteristic as defined by BS4142:2014 Annex C: For a prominent, discrete tone to be identified as present, the time-averaged $L_{Zeq,T}$ sound pressure level in the one-third-octave band of interest is required to exceed the time-averaged $L_{Zeq,T}$ sound pressure levels of both adjacent one-third-octave bands by some constant level difference.

The level differences between adjacent one-third-octave bands that identify a tone are:

- 15 dB in the low-frequency one-third-octave bands (25 Hz to 125 Hz); $\left\{ \begin{smallmatrix} L \\ SEP \end{smallmatrix} \right\}$
- 8 dB in the middle-frequency one-third-octave bands (160 Hz to 400 Hz); $\left\{ \begin{smallmatrix} L \\ SEP \end{smallmatrix} \right\}$ and $\left\{ \begin{smallmatrix} L \\ SEP \end{smallmatrix} \right\}$
- 5 dB in the high-frequency one-third-octave bands (500 Hz to 10 000 Hz). $\left\{ \begin{smallmatrix} L \\ SEP \end{smallmatrix} \right\}$

WHO refers to the World Health Organisation.