John Skirving
Kier Construction Ltd
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501 Ley Street,
Ilford, Essex. IG2 7QZ

14th June 2016

Dear John,

Your reference: Abacus Belsize Primary School - Environmental Noise Impact Assessment: Noise Impact assessment from the Play Areas.
Our reference: PC-14-0368-LT1 Rev A

Further to the environmental noise survey undertaken by Pace Consult Ltd, and the recently provided drawings, I am pleased to provide findings of our environmental sound level calculations for the play areas located externally at the Abacus Belsize Primary School building. This letter also clarifies the issues related with the inclusion of a transparent acoustic screen around the playground located on the roof of the new building, and the assessment of the calculated noise levels from the playground areas against the representative ambient noise levels affecting the nearest noise sensitive receptors.

1 Introduction

Pace Consult Ltd completed a background noise survey and documented the findings in the report PC-14-0368-RP1 dated 18th March 2015. The findings have been used to evaluate the noise impact from the two proposed play areas to the nearest noise sensitive receptor(s).

The expected noise levels from external play areas at the nearest noise sensitive receptors to the Abacus Belsize Primary School were calculated and compared against the representative noise levels affecting the nearest receptors during day time.

The levels used in the calculations were extracted from the noise database included within the acoustic software SoundPLAN v 7.4. This levels are similar to the levels measured by Pace Consult Ltd in similar locations. To undertake the outdoor sound level calculations Part 2 of ISO 9613 *Acoustics -- Attenuation of sound during propagation outdoors -- Part 2: General method of calculation* was used. This ISO standard is incorporated within SoundPLAN v 7.4.

This software was used to generate outdoor sound levels from the Abacus Belsize Primary School building to the nearest noise sensitive receptors and to produce noise contour maps. The noise emission from the play areas located within Abacus Belsize Primary School was assessed during the daytime period.

2 Criteria – Noise rating level at noise sensitive receptors

In order to assess the potential noise impact from the play areas on nearby residential properties, the table below shows the scale of significance effect for change in noise level. This table is generated by the Institute of Acoustics (IOA) & Institute of Environmental Management and Assessment (IEMA) working party's draft guidelines for noise impact assessment.

Change in noise level dB(A)	Magnitude of Impact
≥5.0	Major negative
3.0 to 4.9	Moderate negative
1.0 to 2.9	Minor negative
0 to 0.9	Negligible

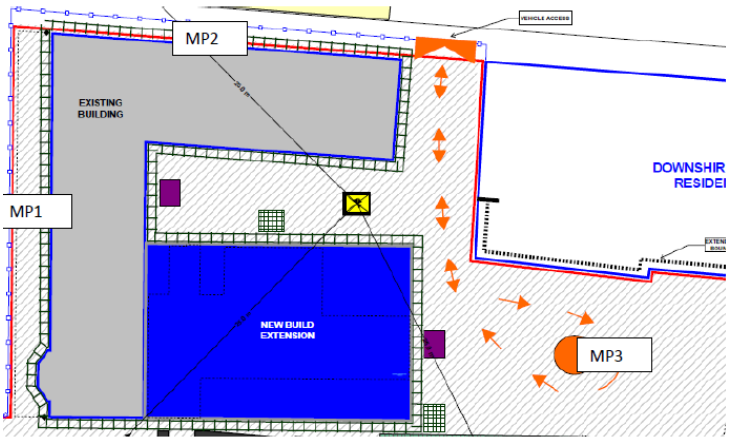
Negligible effect occurs when the calculated noise levels from the play areas will not have a representative increment in the ambient noise levels affecting the nearby residential receptor.

The existing ambient noise levels at the nearest residential is included in the table below

Table 4 - Environmental Noise Data MP3			
ID MP	LAeq dB (Log average)	LA1 dB Average	LA90, $_{15\,min}$ dB Lowest measured
Day (07:00-18:00)	49	58	40
Evening (18:00-23:00)	48	57	34
Night (23:00-07:00)	47	52	31

The table below includes the ambient noise levels measured at MP3 every hour during day time (07:00 to 18:00)

Time	L_{Aeq} 1 hr. dB
07:00- 08:00	49
08:00-09:00	47
09:00-10:00	47
10:00-11:00	51
11:00-12:00	47
12:00-13:00	49
13:00-14:00	48
14:00-15:00	52
15:00-16:00	46
16:00-17:00	49
17:00-18:00	48

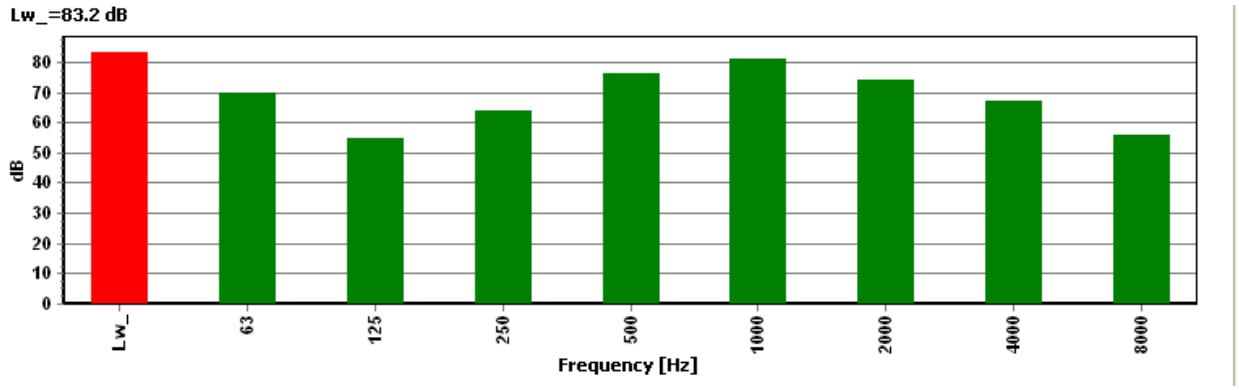


Note. Position MP3 is representative of the noise climate at the nearest noise sensitive receptors.

In order to evaluate the noise emission from the play areas at 1 metre from the façade of the nearest noise sensitive receptors, SoundPLAN v 7.4 was used. The methodology used to evaluate the noise emission is the ISO 9613-2 “Acoustics- Attenuation of sound during propagation outdoors”. Although there are different methodologies to calculate the outdoor noise propagation, ISO 9613- 2 is well regarded for the evaluation of outdoor noise propagation.

3 Calculation assumptions

In order to evaluate the noise emission from the play areas, the following noise level is used in the calculation.



The noise source used in the calculation equates to raised voices. This provides a good representation of the expected average noise level emmisions.

4 Calculation Summary

The table below shows the nearest noise sensitive receptors included in the noise impact assessment.

ID	Calculated Sound Pressure Level
R1	Rosslyn Hill
R2	
R3	

4.1 Play areas noise impact

The calculated sound levels at the nearest noise sensitive receptors based on the information included in section 3 are included in the table below.

The table below shows the assessment against the noise climate measured on site during day time. Roof and ground level play areas combined.

ID	Floor	Calculated Sound Pressure Level	Noise climate LAeq dB	Calculated noise levels above pre-existing noise climate
R1	GF	55	49	6
	1st	57		8
	2nd	56		7
	3rd	55		6
R2	GF	51		2
	1st	52		3
	2nd	52		3
R3	GF	47		-2
	1st	51		2

The magnitude of noise impact based on the change in noise levels, is of major negative at receiver 1, and negligible/ minor negative at receiver 2.

It is not possible to reduce noise transfer from the play area located at ground level and at the roof of the new building to the nearest residential properties without the inclusion of costly measures (design of an acoustic barrier at least 4.5 metres surrounding this play area).

Although noise from this area will be audible at the nearest residential properties, the space will only be used during the school day, and will only be used as a play area during the mid-morning and early afternoon periods; this should help to minimise the impact on residents.

The table below shows the mean propagation Leq at Receiver 1 1st floor (worst case scenario).

Source	Source type	Lw dB(A)	l or A m,m²	KI dB	KT dB	Ko dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	ADI dB	dLrefl dB	Ls dB(A)	dLw dB	Cmet dB	ZR dB	Lr dB(A)
Ground	Area	82.7	50	0	0	0	12.47	-32.9	3	0	-0.1	0	3.8	56.5	0	0	0	57
Roof	Area	82.7	146.8	0	0	0	17.52	-35.9	3	-19.8	-0.1	0	3	32.9	0	0	0	33

Legend

Source		Name of source
Source type		Type of source (point, line, area)
Lw	dB(A)	Sound power level per unit
l or A	m ,m²	Size of source (Length or area)
KI	dB	Correction for source impulsiveness
KT	dB	Correction for source tonality
Ko	dB	Correction for propagation in limited spacial angle
S	m	Distance source - receiver
Adiv	dB	Mean attenuation due to geometrical spreading
Agr	dB	Mean attenuation due to ground effect
Abar	dB	Mean attenuation due to screening
Aatm	dB	Mean attenuation due to air absorption
ADI	dB	Mean directivity correction
dLrefl	dB	Level increase due to reflections
dLw	dB	Correction due to source operation time
Cmet	dB	Meteorological correction
ZR	dB	Correction for rest periods
Lr	dB(A)	Assessed level of time slice

5. Conclusions and Discussion

The calculated noise emission from the play areas within the Abacus Belsize Primary School show that the average noise levels are above the levels measured during day time. The impact from the play areas at nearest receptors can be reduced using noise mitigation measures such as acoustic screen.

Yours sincerely,
For Pace Consult

Joan-Carles Blanco
Acoustic Consultant