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BARNSELY
Metropolitan Borough Council



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Dear Sirs

**NOISE IMPACT ASSESSMENT FOR 420 PLACE PRIMARY SCHOOL AND 26 PLACE NURSERY,
DONCASTER ROAD, GOLDTHORPE**

1.00 INTRODUCTION

- 1.01 Environmental Noise Solutions has been commissioned by NPS Barnsley Ltd to carry out a noise impact assessment for a proposed 420 place primary school and 26 place nursery at land off Doncaster Road, Goldthorpe (hereafter referred to as the application site).
- 1.02 The objectives of the noise impact assessment were to:
- Determine the ambient noise climate at the application site during representative periods of the daytime;
 - Determine the ambient noise climate in the vicinity of the nearest noise sensitive receptors to the application site during representative periods of the daytime;
 - Assess the potential noise impact with reference to:
 - Building Bulletin 93 'Acoustic Design of Schools'
 - World Health Organisation 'Guidelines for Community Noise'
 - British Standard 8233 'Sound Insulation and Noise Reduction for Buildings'
 - Provide recommendations for a scheme of glazing and ventilation to ensure suitable internal ambient noise levels throughout the proposed primary school and nursery; and
 - Provide recommendations for a scheme of boundary treatment to ensure suitable external ambient noise levels at the surrounding (existing and new build) residential development.
- 1.03 This report details the methodology and results of the assessment. It has been prepared to accompany a planning application to be submitted to Barnsley Metropolitan Borough Council (BMBC) for the proposed primary school and nursery.
- 1.04 This report has been prepared for NPS Barnsley Ltd for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties making reference to the report should consult NPS Barnsley Ltd and ENS as to the extent to which the findings may be appropriate for their use.
- 1.05 A glossary of acoustic terms used in the main body of the text is contained in Appendix 1.

2.00 SITE SETTING AND PROPOSED DEVELOPMENT

- 2.01 The application site is located off Doncaster Road, Goldthorpe and forms part of the 'Goldthorpe Masterplan'. The application site is currently bound by:
- Doncaster Road to the south (with existing residential dwellings on the opposite side of the road);
 - East Street to the east (with existing residential dwellings on the opposite side of the road);
 - The St John and St Mary Magdalene Church and West Street to the west (with existing residential dwellings on the opposite side of the road); and
 - Allotments to the north.
- 2.02 The southern half of the application site was previously occupied by residential dwellings, which have now been demolished. The northern half of the application site is currently occupied by allotments.
- 2.03 In addition to the surrounding existing residential dwellings which are to be retained (and in some cases, refurbished), there are a number of new residential dwellings to be constructed to the north of the playing fields associated with the proposed primary school and nursery.
- 2.04 Current layout proposals are for the main primary school building to be constructed parallel to Doncaster Road. The proposed primary school will have a capacity of 420 pupils with an additional 26 places for nursery age children. The playground and playing fields will be located to the north of the proposed primary school. Parking spaces will be located to the east of the proposed primary school (adjacent to East Street).

3.00 BASELINE NOISE SURVEY

- 3.01 In order to establish the ambient and background noise levels at the application site, a baseline noise survey was undertaken on Thursday 11th July 2013.
- 3.02 For the purpose of the assessment, the following noise monitoring positions were adopted (the approximate location of the noise monitoring positions is contained in Appendix 2):
- MP1 was located near to the Doncaster Road, at distances of 4 metres (MP1a), 10 metres (MP1b) and 30 metres (MP1c) to the nearside kerb;
 - MP2 was located near to the western site boundary, at a distance of 5 metres to the nearside kerb of West Street;
 - MP3 was located near to the northern boundary of the application site, indicative of ambient and background noise levels within the playground and playing fields; and
 - MP4 was located near to the eastern site boundary at a distance of approximately 5 metres to the nearside kerb of East Street.
- 3.03 Noise measurements were undertaken using a Bruel & Kjaer 2260 Type 1 integrating sound level meter. A windshield was fitted for all measurements. Measurements were made in a free field environment at 1.5 metres above local ground level. The measurement system calibration was verified immediately before the commencement of the measurement sessions and again at the end, using a Bruel & Kjaer Type 4231 calibrator. No drift in calibration level was noted. Weather conditions were considered suitable for monitoring.
- 3.04 Measurements consisted of A-weighted broadband parameters, together with linear one-third octave band L_{eq} levels. The following table contains a summary of the measurement data for each measurement session, at each measurement position, rounded to the nearest decibel.

Table 3.1 – Summary of Noise Measurement Data

Position	Date	Time	L _{Aeq} (dB)	L _{A90} (dB)	L _{A10} (dB)	L _{A1} (dB)	Comment
MP1a (4m)	11/07/13	11:47-12:07	66	51	70	77	Road traffic along Doncaster Road (250 v/hour)
MP1b (10m)	11/07/13	11:15-11:45	62	49	67	72	
MP1c (30m)	11/07/13	13:42-14:12	58	47	60	69	
MP1c (30m)	11/07/13	15:27-15:45	57	46	60	67	
MP2	11/07/13	12:59-13:27	52	45	55	63	Distant road traffic
MP3	11/07/13	14:24-14:54	51	46	54	59	Distant road traffic
MP4	11/07/13	12:18-12:42	53	44	57	64	Distant Road traffic noise
Daytime ambient noise level of 66 dB L_{Aeq,T} at MP1a, 62 dB L_{Aeq,T} at MP1b and 57-58 dB L_{Aeq,T} at MP1c, Daytime ambient noise level of ≤ 53 dB L_{Aeq,T} at MP2, MP3 and MP4							

3.04 With the exception of the Doncaster Road frontage, ambient noise levels across the majority of the application site are relatively low (less than circa 53 dB L_{Aeq,T} during the daytime).

3.05 It is understood that the nearest façade of the proposed primary school is to be located approximately 10 metres from the nearside kerb of Doncaster Road (MP1b) and, as a consequence, a design level of up to 62 dB L_{Aeq,T} has been adopted.

4.00 NOISE IMPACT ASSESSMENT

Glazing and Ventilation Considerations for the Proposed Primary School

4.01 Guidance on the acoustic design of schools is given in Building Bulletin 93 (BB93). BB93 aims to:

- Provide a regulatory framework for the acoustic design of schools in support of the Building Regulations;
- Give supporting advice and recommendations for planning and design of schools; and
- Provide a comprehensive guide for architects, acousticians, building control officers, building services engineers, clients, and others involved in the design of new school buildings.

4.02 The objective is to provide suitable indoor ambient noise levels for:

- Clear communication of speech between teacher and student, and between students; and
- For study activities.

4.03 The indoor ambient noise level includes noise contributions from:

- External sources outside the school premises, including, but not limited to, noise from road, rail and air traffic, industrial and commercial premises; and
- Building services (e.g. ventilation system, plant, etc). If a room is naturally ventilated, the ventilators or windows should be assumed to be open as required to provide adequate ventilation. If a room is mechanically ventilated, the plant should be assumed to be running at its maximum operating duty.

- 4.04 BB93 advises that for primary school classrooms, general teaching areas, etc the indoor ambient noise level should be less than 35 dB L_{Aeq} (30mins). Research indicates that even where the internal noise levels are below 35 dB L_{Aeq} (30mins), teaching may also be disrupted by individual noisy events such as aircraft flyovers. As a consequence, the indoor ambient noise level for classrooms should also not regularly exceed 55 dB L_{A1} (30 min).
- 4.05 BB93 also advises that for ancillary spaces, such as kitchens and toilets, the indoor ambient noise level should be less than 50 dB L_{Aeq} (30 mins).
- 4.06 For reference, the World Health Organisation (WHO) Guidelines for Community Noise (1999) consider a partially open window will provide circa 15 dB reduction between external and internal noise levels. The implication of this statement is that if external noise levels do not regularly exceed 50 dB L_{Aeq} (30 mins) and 70 dB L_{A1} (30mins), satisfactory internal noise levels will occur within classrooms via natural ventilation (i.e. with partially open windows).
- 4.07 Building Bulletin 101 (BB101) provides the regulatory framework in support of the Building Regulations for the adequate provision of ventilation in schools. It deals with the design of school buildings to meet the ventilation requirements of both the School Premises Regulations and the Building Regulations Part F (Ventilation). BB101 is quoted in Approved Documents F and L2 (amended 2006) as a means of compliance with Regulations F1 and L of the Building Regulations for school buildings.
- 4.08 Naturally ventilated schools are required to meet the standards defined by BB93. Since the publication of BB93, definitive guidance for meeting the indoor ambient noise levels has been provided by BB101 as follows:
- For the Minimum Fresh Air Supply Rate of 3 l/s per person, the design should achieve the performance standards for the indoor ambient noise levels in Table 1.1 of Building Bulletin 93. If the design uses a Minimum Fresh Air Supply Rate that is greater than 3 l/s per person, the indoor ambient noise levels with this ventilation rate should still achieve the BB93 performance standards in Table 1.1 of BB93. When the Design Capability Supply Rate of 8 l/s per person is provided by natural ventilation, the design should achieve the BB93 performance standards for the indoor ambient noise levels in Table 1.1 of BB93 when they have been increased by 5 dB L_{Aeq} (30 mins).*
- 4.09 The airborne sound insulation of a partially open classroom window is considered to be 15 dB R_w . The implication of this statement is that if external noise levels do not regularly exceed 55 dB L_{Aeq} (30 mins) and 75 dB L_{A1} (30 mins), satisfactory internal noise levels (in accordance with BB101) will occur within classrooms via natural ventilation (i.e. with partially open windows).
- 4.10 This is also broadly consistent with the advice contained within the forthcoming revision to BB93.
- 4.11 Noise levels measured at the southern part of application site ranged from:
- 66 dB $L_{Aeq,T}$ at 4 metres to the nearside kerb of Doncaster Road;
 - 62 dB $L_{Aeq,T}$ at 10 metres to the nearside kerb of Doncaster Road; and
 - 58 dB $L_{Aeq,T}$ at 30 metres to the nearside kerb of Doncaster Road.
- 4.12 It should be noted that with proposed primary school constructed, it is considered that the ambient noise level at 30 metres to the nearside kerb of Doncaster Road would be 3 decibels lower due to a reduced angle of view to the road.
- 4.13 With respect to the glazing specification, it is considered that standard double glazing (4 mm glass / (6–20 mm cavity) / 4 mm glass) will be suitable throughout the proposed development.
- 4.14 With respect to the ventilation specification, natural ventilation will be appropriate for any classroom windows greater than 30 metres from Doncaster Road (or screened from Doncaster Road). Where there are classroom windows less than 30 metres from Doncaster Road and with a direct line of sight to the road, it is considered that an alternative means of ventilation (for example mechanical ventilation) should be provided.

- 4.15 The provision of ancillary spaces in close proximity to Doncaster Road would however be appropriate (without a formal requirement for mechanical ventilation).

Outdoor Areas

- 4.16 The ambient noise levels in the proposed outdoor areas will be well below 55 dB L_{Aeq} (30 mins), which is acceptable.

Predicted Noise Impact at Surrounding Residential Dwellings

- 4.17 In gardens and balconies etc. BS 8233 states that it is considered desirable that the steady noise level does not exceed 50 dB L_{Aeq} (0700–2300) and 55 dB L_{Aeq} (0700–2300) should be regarded as the upper limit.
- 4.18 The WHO Guidelines for Community Noise consider that few people are seriously annoyed (a significant effect) by activity with levels below 55 dB L_{Aeq} in the daytime .
- 4.19 Noise levels have previously been measured by ENS at a junior school in Rotherham (capacity of 490 pupils) during a break time at a distance of approximately 30 metres to the centre of the playground (i.e. at a similar distance to that between the (assumed) playground area and the nearest existing residential dwellings to the west of the application site). The ambient noise level was measured at 70 dB $L_{Aeq,T}$ during break time.
- 4.20 In order to reduce noise levels to circa 55 dB $L_{Aeq,(0700-2300)}$ at the surrounding residential dwellings (gardens), it is recommended that a barrier is constructed around the perimeter of the outdoor play areas (i.e. the northern, western and eastern boundaries). It is recommended that the barrier is circa 3 metres in height.
- 4.21 Such a barrier will fully and significantly break the line of sight between the outdoor play areas and the surrounding residential dwellings. It is therefore considered that such a barrier should reduce noise levels by circa 15 dB, which is considered appropriate.

5.00 CONCLUSIONS

- 5.01 A noise impact assessment has been undertaken for proposed primary school at land off Doncaster Road, Goldthorpe as part of the 'Goldthorpe Masterplan'.
- 5.02 The proposed primary school is to have a capacity of 420 places (along with a further 26 nursery places).
- 5.03 A scheme of glazing and ventilation has been suggested, based on measured external noise levels, to ensure that internal ambient noise levels within the proposed primary school are in line with the recommendations of BB93.
- 5.04 Boundary screening has also been suggested to ensure that the noise impact of the outdoor areas (including the playing field) on existing and proposed residential dwellings is reduced as far as practicable.

I trust the foregoing is sufficient for your needs. Should you have any queries regarding the above, please do not hesitate to contact me.

Yours sincerely

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cc File

Appendix 1

Glossary of Acoustic Terms

Sound Pressure Level (L_p)

The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 μ Pa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$$L_p = 20 \log_{10}(p/p_0)$$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = reference sound pressure (20 μ Pa).

A-weighting Network

A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$

The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T , has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq, 16h}$ (07:00 to 23:00 hours) and $L_{Aeq, 8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10, T}$

The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T . $L_{A10, 18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90, T}$

The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T . L_{A90} is typically taken as representative of background noise.

$L_{AF \max}$

The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

Sound Exposure Level (SEL or L_{AE})

The energy produced by a discrete noise event averaged over one second, no matter how long the event actually took. This allows for comparison between different noise events which occur over different lengths of time.

Weighted Sound Reduction Index (R_w)

Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_w is used to characterise the insulation of a material or product that has been measured in a laboratory).

Appendix 2
Drawings (Site Plan / Noise Monitoring Positions)

