

ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants

ADT 2081

15 August 2014

On behalf of:

P. & D.M.J. Atkinson and Son Ltd

Aldi Stores Ltd

Dearne Estates Ltd

FOODSTORE AND RESIDENTIAL DEVELOPMENT, GOLDTHORPE, BARNLEY

ENVIRONMENTAL NOISE IMPACT ASSESSMENT

ACOUSTIC CONSULTANCY REPORT ADT 2081/ENIA

Revision	Date	Issued By	Checked By	Revision Notes
-	1 August 2014	Edward Barnett	Chris Middleton	Initial issue
A	15 August 2014	Andy Pagett	-	Client details amended

1.0 SUMMARY

The proposal is to construct an Aldi foodstore (use class A1) with associated access, delivery bay, car parking and landscaping, and a small residential development.

Acoustic Design Technology Limited have undertaken an environmental noise survey to determine the typical ambient noise levels on the site and in the vicinity of the nearest noise sensitive properties.

BS 4142 rating level limits have been proposed for the new fixed plant installations.

Analysis of the noise impact of the existing road network on the proposed residential development reveals that with suitable choice of acoustic glazing and ventilators, the local authority's normal requirements for internal ambient noise should be achievable.

Analysis of noise associated with servicing arrangements shows that the noise impact on surrounding noise sensitive properties should not have a significant impact.

Analysis of the noise generated by the car park shows that it should not have a significant noise impact on the nearby noise sensitive properties.

2.0 BASIS OF ASSESSMENT

2.1 Site Location

The site is located on Barnsley Road at the roundabout junction with the A635 on the outskirts of Goldthorpe, and is currently agricultural land. The surrounding area is predominantly agricultural, with farm land to the north, southwest and west of the site, a farmhouse with associated outbuildings to the northwest, and a residential estate to the east. Goldthorpe Industrial Estate lies around 350m away to the south, and the A1(M) is some 7 ½ km away to the east.

2.2 Proposed Development

The proposal is for the development of the site to create an Aldi foodstore with associated access, car parking and landscaping, and a small residential development as shown on the application drawings. To mitigate the effects of traffic noise on the proposed residential dwellings, a 3m high acoustic barrier is proposed along the northern boundary of this part of the development.

The proposed store opening hours are 08:00 to 22:00 hours Monday to Saturday. The opening hours on Sunday are yet to be determined but are, at the time of writing, intended to be any 6 hours in line with current trading restrictions, between 10:00 and 18:00 hours.

The proposed delivery period is 07:00 to 23:00 hours Monday to Saturday and 09:00 to 18:00 on Sundays. The store will be served by a single delivery bay receiving up to two deliveries per day. Servicing activities would therefore be on a substantially smaller scale than larger 'big four' supermarkets who usually require several deliveries through the night using larger vehicles.

2.3 Planning Policy

The National Planning Policy Framework (NPPF) sets out the general terms of reference for sustainable development, including noise. Section 123 states that:

Planning policies and decisions should aim to:-

- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development
- mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established and
- identify and protect areas of tranquility which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason

However, neither the NPPF nor the supplementary guidance Noise Policy Statement for England (NPSE) contain any fixed noise criteria, assessment methods or references to established standards such as BS 4142 or BS 8233.

For this development the key principles to be applied from the NPPF are

- i. to ensure that the development provides satisfactory health and quality of life for the new occupants of the residential houses
- ii. to protect existing residents from noise generated by the development.

2.4 Assessment Criteria

Discussions have recently taken place with Steve Bilcliffe of Barnsley Council (Environmental Health) for a similar development, and the following strategy was agreed:

For the new residential dwellings, external noise intrusion should be controlled to the WHO guideline values, that is:

Bedrooms (23:00 – 07:00)	–	30 dB $L_{Aeq,8hours}$
Living rooms (07:00 – 23:00)	–	35 dB $L_{Aeq,16hours}$

For the new foodstore, potential noise sources include:-

- i. noise from new fixed plant installations
- ii. noise from the car park
- iii. noise from the service yard, including delivery vehicle movements

It is understood that the Council's preference is for plant noise emissions to be controlled to a rating level 5 dB(A) below the otherwise prevailing background noise level at the relevant time of operation, following the guidance of BS 4142 : 1997.

2.5 Nearest Noise Sensitive Properties

The various noise sensitive properties in the surrounding area have been categorised into noise sensitive areas (NSA) as described below:

NSA	Location	Direction	Approximate distance from site boundary
1	Proposed Residential Development	east	10 metres
2	Farmhouse off Hollygrove Roundabout	northwest	180 metres

The above NSA represent the closest noise sensitive properties, with others located further from the site and in some cases screened by the intervening buildings. A satisfactory noise impact determined at the defined NSA should, therefore, also apply to other noise sensitive areas.

2.6 Strategy for Noise Impact Assessment

Based on the information in Sections 2.1 to 2.5 above, the strategy for the noise impact assessment has been broken down into the following stages:

- i. Undertake an environmental noise survey to obtain baseline noise data, as described in Section 3.0 below.
- ii. Assess the noise impact of the existing road traffic on the proposed new residential dwellings, as described in Section 4.0 below.
- iii. Set environmental noise limits for new, fixed plant installations, as described in Section 5.0 below.
- iv. Assess the noise impact of the service yard and deliveries, as described in Section 6.0 below
- v. Assess the noise impact of the proposed car park, as described in Section 7.0 below.

2.7 Computer Model

A computer model of the site has been constructed using Datakustik Cadna/A 4.4. Within the model all buildings and barriers have been assumed to be acoustically reflective, with ground absorption taken into account as appropriate. Receiver heights have been assumed to be 1.5m or 4.5m above ground level to account for ground floor (e.g. living room) or 1st floor (e.g. bedroom) windows as appropriate for each assessment. Details of the specific calculation methods and standards used are given in the relevant sections below.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Instrumentation

The environmental noise survey was undertaken using the following instrumentation:-

Svantek SVAN 971 Class 1 Sound Level Meter

Svantek SV 7052E ½ inch Microphone with Windshield

Rion NC-74 Microphone Calibrator

The sound level meter was calibrated at the beginning of the survey period, and the calibration checked at the end. No significant drift occurred.

3.2 Procedure

An environmental noise survey was undertaken between 02:00 and 09:00 hours on Thursday 24 July 2014.

Three measurement positions were selected in order to obtain representative measurements of the ambient noise levels on the site and in the vicinity of the identified NSA. These are shown on the attached site plan 2081/SP1 and described below:

- i. on Barnsley Road, roughly 165 metres from Hollygrove Roundabout (to represent the northern end of NSA1)
- ii. on Hollygrove Roundabout (to represent NSA2)
- iii. on the A635, roughly 165 metres from Hollygrove Roundabout (to represent the southern end of NSA1)

In each case the microphone was set on a tripod at a height of approximately 1.2 metres above the ground and at least 3.5 metres away from any other reflective surface. Measurements were taken hourly over a 10 minute sample period for the duration of the survey, apart from at position 2 between 04:00 hours and 05:00 hours where the measurement was truncated to 4 minutes due to an instrument power failure.

The meter was set to store the octave band and dB(A) 100ms short-term L_{eq} levels for subsequent post processing, and also the summary results.

3.3 Results

The logged L_{Aeq} , L_{Amax} and L_{A90} sound pressure levels for each measurement are presented in the attached table 2081/T1.

Please refer to Appendix A for explanation of the noise units and the A-weighting term used in this report.

3.4 Weather Conditions

For the duration of the survey period the weather was dry and still, with no significant effect on the measured noise levels.

3.5 Description of Existing Noise Climate

At measurement positions 1 and 2 the average (L_{Aeq}) and maximum (L_{Amax}) noise levels were controlled by traffic on Barnsley Road, Hollygrove Roundabout and the A635, while at position 3 the levels were controlled entirely by traffic on the A635.

At the start of the survey the drone of distant traffic from the east controlled the background (L_{A90}) levels at all positions. From 05:00 hours onwards local traffic picked up and controlled the background levels.

4.0 NOISE IMPACT ASSESSMENT (NEW DWELLINGS AFFECTED BY TRAFFIC NOISE)

4.1 Site Noise Levels

When assessing noise levels on the site it must be borne in mind that the noise climate may change in the future. The following discussion is by necessity based on the results of the environmental noise survey described in Section 3.0 above.

The survey data has been used in conjunction with the ISO 9613-2 calculation method built into Cadna/A to predict the day-time $L_{Aeq,16hour}$ and night-time $L_{Aeq,8hour}$ noise levels incident on the proposed dwellings.

Based on the results of the noise survey and Cadna/A modelling the noise levels incident on the proposed dwellings range from 53 to 65 dB $L_{Aeq,16hours}$ during the day at the ground floor living rooms, and 47 to 68 dB $L_{Aeq,8hours}$ during the night at the first floor bedrooms, with the variation according to proximity to the roads and the degree of acoustic screening.

4.2 Noise Design Criteria

The local authority requirement is that external noise intrusion into the proposed new dwellings should be controlled to the WHO guideline values, that is:

Bedrooms (23:00 – 07:00)	–	30 dB $L_{Aeq,8hours}$
Living rooms (07:00 – 23:00)	–	35 dB $L_{Aeq,16hours}$

4.3 External Noise Intrusion

A facade with windows open for ventilation generally provides up to 15 dB(A) noise reduction, and on that basis the internal noise criteria set out in Section 4.2 above would be achieved with windows open provided the incident noise levels are not greater than 50 dB(A) $L_{eq,16hours}$ during the day and 45 dB(A) $L_{eq,8hours}$ at night.

Reference to Section 4.1 above reveals that the incident noise levels exceed these values across the whole site for both the daytime and nighttime periods, which means that the internal noise design criteria cannot be achieved with the windows open. This does not mean that the windows cannot be openable, but merely that an alternative means of ventilation must be provided to obviate the need to open the windows.

Preliminary calculations show that external noise intrusion can readily be controlled with appropriate choice of glazing and trickle ventilators. With the exception of rooms facing Barnsley Road and the A635, the internal noise design criteria should be achievable using standard double glazing (for example, 4/16/4 or 6/12/6 units) and basic (i.e. non-acoustic) trickle ventilators.

To achieve the internal noise design criteria in the rooms facing Barnsley Road and the A635 (with the benefit of the 3m acoustic barrier along this side of the site), high performance double glazing (e.g. Pilkington R_w 40) and acoustic trickle ventilators (e.g. $D_{n,e,w}$ 39 dB vents) would be required, with the exact specifications to be determined as part of a subsequent full planning application.

5.0 NOISE IMPACT ASSESSMENT (NEW FIXED PLANT)

5.1 Basis of Assessment

At this stage none of the major fixed plant installations have been selected, so it is not possible to undertake a noise impact assessment of specific equipment. Environmental noise limits have therefore been proposed, which can then be used in the future selection of plant and the design of the installations.

5.2 Noise Limits

The local authority preference is that the BS 4142 rating level of new plant should be at least 5 dB(A) below the otherwise prevailing *background* noise level outside any noise sensitive property.

However, BS 4142 : 1997 states that rating levels of less than 35 dB(A) and background levels of less than 30 dB(A) to be very low and outside the scope of the standard.

Reference to the attached table 2081/T1 reveals that night time background levels were as low as 28 dB(A) $L_{90,5mins}$ and a rating level limit of 35 dB(A) outside the existing and new residential properties is therefore proposed. A noise level of 35 dB(A) incident on a building facade with windows open would normally translate to around 20 dB(A) inside the dwelling, which is at or close to inaudibility.

6.0 NOISE IMPACT ASSESSMENT (SERVICING)

6.1 Basis of Assessment

As described in Section 2.2 above, the developer is seeking a servicing period of 07:00 hours to 23:00 hours.

The number of deliveries will be small, usually not more than two a day, with waste collections taking place less frequently. The servicing areas are not large scale, gated service yards of the type used by the 'big four' supermarket operators, but merely an area of the car park set aside for lorries to manoeuvre up to the single loading bay.

Noise emissions from servicing activity is therefore limited to:-

- i. the manoeuvring of the lorry up to the loading bay
- ii. the unloading process itself
- iii. the potential noise from the vehicle mounted refrigeration unit
- iv. waste collections

There is not expected to be any other activity outside the building, with unpacking, sorting, waste compaction and wrapping all taking place internally.

Typical noise data for the principal noise sources associated with servicing operations (sources i) to iii) above) recorded at supermarket service yards is set out in Appendix B.

Noise from waste collections has not been specifically included in the assessment as it occurs relatively infrequently and the noise varies considerably according to the type of waste collected. For most retail developments in noise sensitive locations it would be normal to condition waste collection for non-sensitive day-time hours only.

6.2 Predicted Levels

The ISO 9613-2 calculation method in Cadna/A has been used to predict the $L_{eq,T}$ noise levels at the identified NSA for the principal servicing activities. An 'on time' of 5 minutes for the unloading, the manoeuvring process and for the refrigeration unit has been used, and as the deliveries are proposed to take place during the daytime period only, the receiver points were set at 1.5m above ground level (i.e. living room window level).

The predicted $L_{Aeq,5mins}$ are presented in the following table. It should be noted that it is only the northernmost properties of NSA1 which are likely to be affected by service yard noise, having the least obstructed view of the service yard. Survey data from measurement position 3 is therefore most relevant to NSA1.

Servicing activity	Predicted $L_{eq,5mins}$ dB(A) at NSA	
	NSA1	NSA2
Unloading	36	30
Manoeuvring into unloading bay (including reversing beepers)	37	41
Bulkhead mounted refrigeration unit	47	38

Discussion of the noise impact of each element of servicing operations is set out in the following sections.

6.2.1 Noise Impact of Unloading Operations

Comparison of the predicted $L_{Aeq,5mins}$ with the currently prevailing noise levels in the attached table 2081/T1 reveals that the noise from unloading operations would be below the background ($L_{A90,5mins}$) at NSA1 (position 3) and NSA2 (position 2) during the surveyed daytime hours.

On this basis, it is reasonable to conclude that the noise impact of the unloading operations should not be noticeable and should therefore have no observed adverse effect.

6.2.2 Noise Impact of Lorry Manoeuvring

The noise from a lorry manoeuvring into the unloading bay is a brief, transient activity and should be compared with the existing $L_{eq,T}$ generated by similar transient noise such as local traffic. As the lorry is obviously part of the traffic when using the public highway, the comparison with existing traffic noise is particularly relevant.

Comparison of the predicted $L_{Aeq,5mins}$ with the currently prevailing noise levels reveals that the $L_{Aeq,5mins}$ of a lorry manoeuvring would be well below the existing $L_{Aeq,5mins}$ at each NSA during the surveyed daytime hours.

On this basis, it is reasonable to conclude that the noise impact of the manoeuvring process should not be noticeable and should therefore have no observed adverse effect.

6.2.3 Noise Impact of Refrigeration Unit

As the noise emissions from the refrigeration units are continuous in nature, it is more appropriate to compare them to the prevailing background (L_{90}) levels.

Reference to the currently prevailing noise levels in the attached table 2081/T1 shows that the predicted noise levels ($L_{Aeq,5mins}$) from the refrigeration units would be below the prevailing background noise levels at each NSA.

On that basis, the noise from deliveries should not be noticeable at either NSA and should therefore have no observed adverse effect.

6.3 Summary of Service Yard Noise / Deliveries

The impact on the local noise climate resulting from the limited servicing operations associated with the development should be relatively minor, with no observed adverse effect, particularly as there will usually no more than two deliveries delivery per day.

7.0 NOISE IMPACT ASSESSMENT (CAR PARK)

7.1 Basis of Assessment

There are no widely accepted UK standards for the assessment of noise from car parks, as the noise cannot be categorised as industrial or as free flowing traffic.

In the absence of a relevant British or International Standard for predicting car parking noise, the Bavarian LfU-2007 parking lot function incorporated into Cadna/A noise mapping software has been used to predict $L_{eq,1hour}$ at the NSA.

The peak number of vehicle movements on the car park is assumed to be two movements per parking space per hour.

7.2 Noise Impact Assessment

The computer model predicts the following resultant noise levels at the NSA:

Predicted car parking noise level $L_{eq,1hour}$ dB(A) at NSA	
NSA1	NSA2
41	34

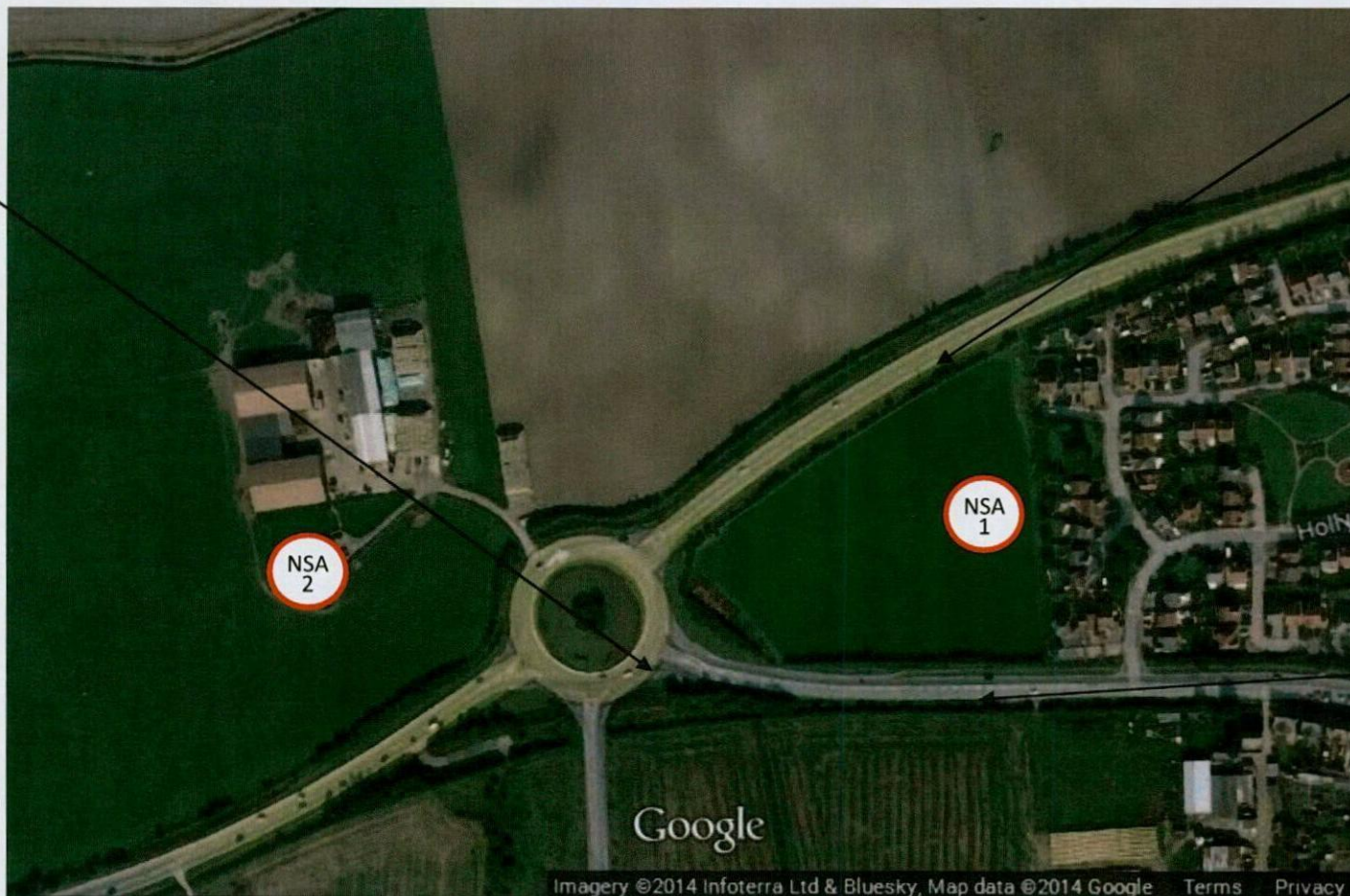
A comparison of the predicted levels in the above table with the surveyed daytime levels shows that this worst-case car parking noise would be well below the prevailing traffic noise controlled L_{eq} levels.

On that basis it is reasonable to conclude that the noise impact of the car park on the nearby noise sensitive properties should not be noticeable and so should have no observed adverse effect.

Edward Barnett

FOR ACOUSTIC DESIGN TECHNOLOGY

Measurement
position 2



Measurement
position 3

Measurement
position 1

Notes

Description

Site plan showing noise monitoring locations

Project

Foodstore and Residential Development, Goldthorpe, Barnsley

Survey Date

24th July 2014

Drawing No.

2081/SP1



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SURVEY RESULTS

Time period	Sound pressure level / dB(A)								
	Position 1			Position 2			Position 3		
	L _{eq}	L _{max}	L ₉₀	L _{eq}	L _{max}	L ₉₀	L _{eq}	L _{max}	L ₉₀
02:00 - 03:00	56	83	31	61	79	36	62	88	28
03:00 - 04:00	54	79	32	57	74	34	68	91	35
04:00 - 05:00	61	86	31	58	72	41	72	91	42
05:00 - 06:00	67	87	48	61	78	45	77	92	56
06:00 - 07:00	70	85	53	69	83	58	78	93	50
07:00 - 08:00	73	97	56	69	80	56	81	93	57
08:00 - 09:00	73	86	58	70	81	62	80	93	62

TABLE 2081/T1

APPENDIX A

The annoyance produced by noise is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and any variations in its level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

dB(A) The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the 'A' weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average person. It is also possible to calculate the 'A' weighted noise level by applying certain corrections to an un-weighted spectrum. The measured or calculated 'A' weighted noise level is known as the dB(A) level.

When the noise being measured has a variable amplitude, such as traffic noise, it is necessary to qualify the basic dB(A) unit. This may be done using a statistical index L_n dB(A), where n is an integer between 1 and 99, and is the percentage of the sample time for which the stated dB(A) level is exceeded. In defining the use of the index, both the value of n and the length of the sample period must be stated.

L_{10} L_{10} , being the dB(A) level exceeded for 10% of the time, has been shown to be a good indicator for traffic noise intrusion, and is used in assessing the effect of traffic noise on residential or commercial premises.

L_{90} L_{90} is the dB(A) level exceeded for 90% of the time, and is used as a measure of background noise level, as it excludes the effects of occasional transient levels, such as individual passing cars or aircraft.

In addition to the statistical noise indices defined above, the following noise units are also used to define variable amplitude noise sources:

L_{eq} The L_{eq} is defined as the notional steady sound pressure level which, over a stated period of time, would contain the same amount of acoustical energy as the actual fluctuating sound measured over the same period - i.e.: it is a measure of the "average" noise level

L_{max} The L_{max} is the maximum sound pressure level recorded over the measurement period.

APPENDIX B

Service Yard Noise Data

Noise data: $L_{eq,T}$ at 5m									
	63	125	250	500	1k	2k	4k	8k	dB(A)
'Carrier Vector' bulkhead mounted vehicle refrigeration unit (source at 3.75m height)	79	70	68	66	63	65	61	54	70
Unloading - lorry backed up to rubber surrounds (source at 2m height)	69	63	60	57	54	54	53	46	61
HGV manoeuvring with reversing bleeper active (source at 1.25m height)	80	73	71	69	68	65	67	48	74