

**Aldi Store, Park Road Trading Estate, Havant
Noise Assessment**





Aldi Store, Park Road Trading Estate, Havant

Noise Assessment

Revision	Date	Notes	Author	Checked	Approved
Ver.2	27/11/2012	Report	NM	KF	ND

**Entran Limited
12 Greenway Farm
Bath Road
Wick
Bristol
BS30 5RL**

**T: 0117 937 4077
www.entranltd.co.uk**



CONTENTS	PAGE
1 Introduction	1
2 Site Description	2
3 Noise Assessment Criteria	3
4 Environmental Noise Measurements	6
5 Noise Assessment	10
6 Conclusions	15
 APPENDIX A – Introduction to noise	 17
APPENDIX B – Full Tabulated Noise Measurement Results	19

1 INTRODUCTION

- 1.1 Entran Ltd has been commissioned by Aldi Stores Ltd to undertake a noise assessment of a proposed extension to permitted delivery hours at its food store located on the Park Road Trading Estate, Havant.
- 1.2 The store is currently permitted to accept deliveries between the hours of 07:00 and 21:00, Monday to Saturdays; and between the hours of 10:00 and 17:00 on Sundays and bank holidays as set out in Condition 18 of Planning Permission PP 04/59412/002 below:

“No deliveries or collections shall be made to the premises in the area to the rear of the retail units (north and west elevations) except between the hours of 0700-2100 on Monday to Saturday and 1000-1700 hours on Sundays and recognised Public Holidays.”
- 1.3 The Applicant's intention is to submit a Section 73 application to vary this planning permission, in order to allow the store to receive deliveries between 05:00 and 21:00 Monday to Saturday and from 09:00 on Sundays, to maintain operational flexibility.
- 1.4 The assessment considers noise from delivery vehicles serving the store, during periods not currently permitted for the acceptance of deliveries, with respect to the existing noise levels in the area.
- 1.5 The assessment methodology contained in the draft *Guidelines for Noise Impact Assessment*, produced by the Institute of Acoustics/Institute of Environmental Assessment Working Party has been adopted for the assessment, in addition to the methodology contained within BS4142: 1997 *Method for rating industrial noise affecting mixed residential and industrial areas*, following consultation with the Environmental Health Department (EHD) of Havant Borough Council (HBC).
- 1.6 This Report is necessarily technical in nature and contains terminology relating to acoustics and noise. Therefore, a glossary together with a brief introduction to the subject of noise has been provided in Appendix A.

2 SITE DESCRIPTION

- 2.1 The store is located on a trading estate, to the west of Park Road North, in the centre of Havant. The area is heavily developed, with a combination of retail, industrial and residential land uses, served by significant, busy transport infrastructure.
- 2.2 The site and location of the loading bay in relation to the closest and most sensitive receptors are identified in Figure 1 below.



Figure 1 – Site Location Plan

- 2.3 The closest and most sensitive receptors to the site in respect of noise are the residential dwellings on Cross Way to the north-west of the store.
- 2.4 The existing noise climate in the area is dominated by road traffic on the local road network, in particular the B2149 Park Road North, being a major arterial route through the area.

3 NOISE ASSESSMENT CRITERIA

Institute of Acoustics/Institute of Environmental Assessment Working Party

- 3.1 The draft *Guidelines for Noise Impact Assessment* produced by the Institute of Acoustics/Institute of Environmental Assessment Working Party have been referenced in relation to the potential change in ambient noise level as a result of the proposed delivery vehicles. The findings of the Working Party are still in draft although they are of some assistance in exercises of this nature. The draft guidelines state that the assessor should set assessment criteria appropriate for the assessment being undertaken.
- 3.2 The criteria below reflect key benchmarks that relate to human perception of sound. A change of 3 dB(A) is generally considered to be the smallest change in broadband noise that is readily perceptible. A 10 dB(A) change in noise represents a doubling or halving of the perceived noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the rating of noise changes.

Table 1 – Impact Scale for Comparison of Future Noise against Existing Noise

Change in Noise Level dB(A)	Subjective Response	Significance
<1	No change	No Impact
1 – 3	Barely perceptible	Minor Impact
3 – 6	Noticeable	Moderate Impact
6 – 10	Up to a doubling or halving in loudness	Substantial Impact
>10	More than a doubling or halving in loudness	Major Impact

- 3.3 The assessment criteria presented in Table 1 has been adopted to assess the impact of any changes in noise levels resulting from deliveries to the store.

British Standard BS 4142: 1997: *Method for rating industrial noise affecting mixed residential and industrial areas.*

- 3.4 BS 4142 sets out a method to assess whether noise from factories, industrial premises or fixed installations and sources of an industrial nature in

commercial premises are likely to give rise to complaints from noise-sensitive receptors in the vicinity.

- 3.5 The procedure contained in BS 4142 for assessing the likelihood of complaint is to compare the measured or predicted noise level from the source in question, the $L_{Aeq,T}$ 'specific noise level', immediately outside the dwelling with the $L_{A90,T}$ background noise level.
- 3.6 Where the noise contains a "*distinguishable discrete continuous note (whine, hiss, screech, hum etc.) or if there are distinct impulses in the noise (bangs, clicks, clatters or thumps), or if the noise is irregular enough to attract attention*" then a correction of +5 dB is added to the specific noise level to obtain the $L_{Ar,Tr}$ 'rating noise level'.
- 3.7 The likelihood of the noise giving rise to complaints is assessed by subtracting the background noise level from the rating noise level. BS 4142 states: "*A difference of around 10 dB or higher indicates that complaints are likely. A difference of around 5 dB is of marginal significance. A difference of -10 dB is a positive indication that complaints are unlikely*".
- 3.8 For the daytime, the assessment is carried out over a reference time period of 1-hour, but at night-time it is carried out over a 5-minute period. The periods associated with day or night are not defined in the Standard, but it states that night, by definition, should cover the times when the general adult population are preparing for sleep or are actually sleeping. In this case it is assumed that day and night is as previously defined in Planning Policy Guidance 24 (PPG24), which defines day and night as 07:00 to 23:00 and 23:00 to 07:00 hours respectively.

Consultation with Havant Borough Council

- 3.9 The Environmental Health Department (EHD) of Havant Borough Council (HBC) has been consulted with regard to their views and policies in relation to the appropriate assessment methodology.
- 3.10 The proposed methodology for assessing the noise arising from the servicing of delivery vehicles, whereby predicted noise levels, using archive source data would be compared against measured ambient and background noise levels,



in order to determine relative increases in ambient level and noise impact in accordance with BS 4142 was agreed.

4 ENVIRONMENTAL NOISE MEASUREMENTS

- 4.1 Existing noise conditions in the vicinity of the site have been determined by an unattended environmental noise survey spanning the night-time period of Friday 14th to Tuesday 18th September 2012.
- 4.2 All noise measurements were undertaken by a consultant certified as competent in environmental noise monitoring, and, in accordance with the principles of BS 7445: 2003: *Description and measurement of environmental noise* and following the guidance given in BS 4142.
- 4.3 All acoustic measurement equipment used during the noise surveys conformed to Type 1 specification of British Standard 61672: 2003: *Electroacoustics. Sound level meters. Part 1 Specifications*. A full inventory of this equipment is shown in Table 2 below:

Table 2: Inventory of Acoustic Measurement Equipment

Item	Make & Model	Serial Number
1 - Sound Level Meter	Rion NL-31	01062701
1 - Microphone	Rion UC53A	31351
1 - Pre-amplifier	Rion NH21	310418
Calibrator	Rion NC-74	34315165

- 4.4 The noise measurement equipment used during the survey was calibrated at the start and end of the measurement period. The calibrator used had itself been calibrated by an accredited calibration laboratory within the twelve months preceding the measurements. No significant drift in calibration was found to have occurred on the sound level meter.
- 4.5 The microphone was fitted with a protective windshield for the measurement, which was carried out under free-field conditions. The weather conditions during the survey were conducive to noise measurement, it being dry with very low wind speeds.
- 4.6 Noise measurements were carried out at a location, representative of the closest receptor to the development. The noise measurement position is identified by an "X" in Figure 2 below.

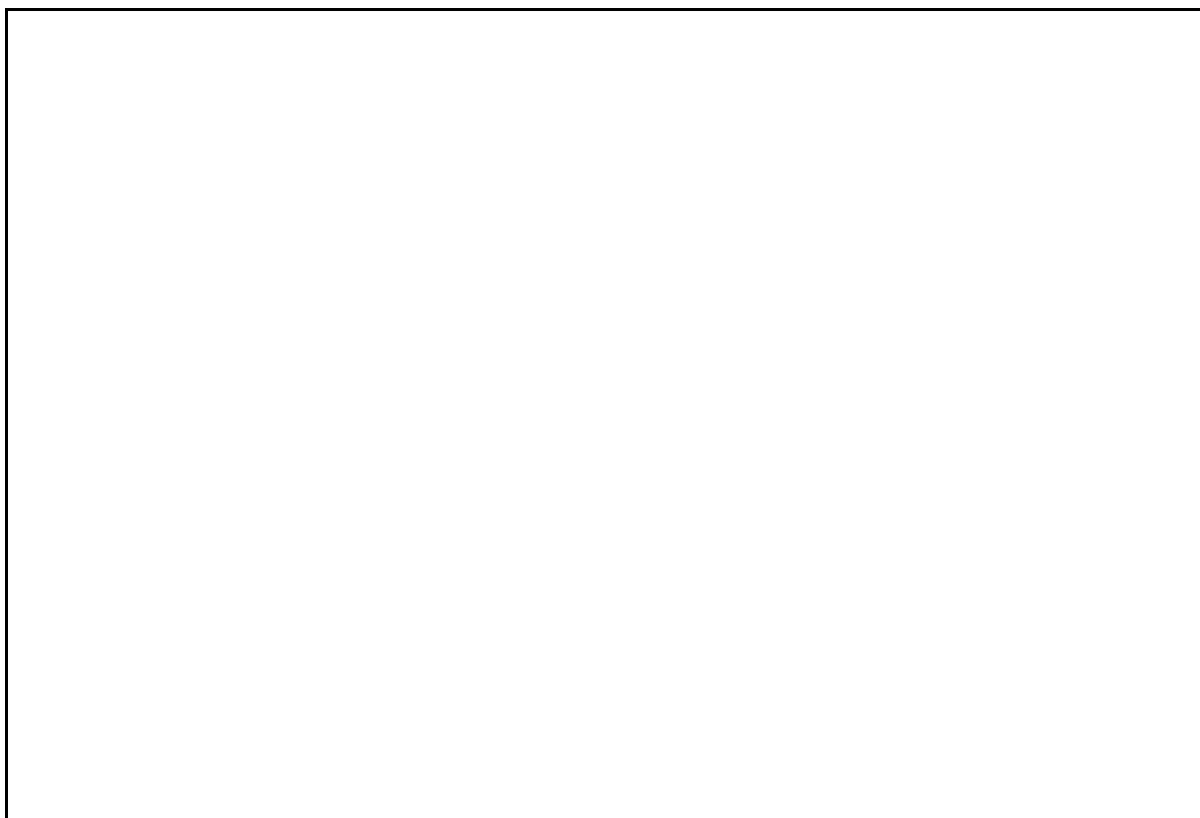


Figure 2 – Noise Monitoring Location

- 4.7 As detailed above, the existing noise climate in the area is dominated by road traffic on the local road network, in particular the B2149 Park Road North, being a major arterial route through the area.
- 4.8 The noise measurement results are summarised in Table 3 below, with full tabulated results presented in Appendix B.

Table 3: Summary of Noise Measurement Results

Location	Period	Noise Level, dB			
		L _{Aeq,T}	L _{A90}	L _{A10}	L _{AFmax}
x	Average (05:00 to 07:00) Midweek/Saturday	56.5	52.1	55.7	82.1
	Lowest 5-minute (05:00 to 07:00) Midweek/Saturday	47.9	46.2	49.2	52.9
	1-hour (09:00 to 10:00) Sunday	63.1	50.4	58.0	83.4

- 4.9 In addition to the measurement of existing noise levels at the closest receptor location to the store, a series of source noise measurements have been utilised, which were carried out during a normal delivery to an Aldi store in

Melksham, on Tuesday 31st August 2010. That store is similar in operational configuration to the food store forming the subject of this assessment.

4.10 Source noise measurements were carried out for the following elements of the delivery.

- HGV arriving
- HGV reversing
- HGV starting and departing
- HGV door opening;
- HGV door slam;
- service bay door opening;
- dock levelling process;
- HGV unloading/loading;
- return dock process; and
- service bay door closing.

4.11 The noise parameters of sound exposure level (SEL), and maxima (L_{AFmax}) were measured for each discreet noise source as appropriate. In the case of the HGV unloading/loading process, where 33 pallets were offloaded and 9 pallets on-loaded, the recorded L_{AFmax} levels have been presented. The results of these measurements are presented in Table 4 below.

Table 4: Summary of Source Noise Measurement Results

Source	Distance	Noise Level, dB	
		L_{AFmax}	SEL
HGV arriving	10 metres	-	77.0
HGV reversing (inc reverse alarm)	10 metres	-	82.0
HGV starting and departing	10 metres	-	76.0
HGV door opening	5 metres	76.5	69.9
HGV door closing	5 metres	87.6	80.6
Service bay door operation	5 metres	60.9	61.7
Dock levelling process	5 metres	89.2	83.2
HGV Pallet Unloading (worst)	2 metres	89.4	98.8
Return dock process	5 metres	86.0	84.4

4.12 The graph represents the measured noise climate just two metres from the level service dock and identifies that during a typical delivery, that impulsive noise maxima events occurred on approximately 40 occasions, which is one per pallet movement, with the remainder being associated with the door opening / closure, or dock leveller movement. Although the maximum



measured L_{AFmax} noise level was 88.8 dB, the average of the 40 loudest events was 85.5 dB.

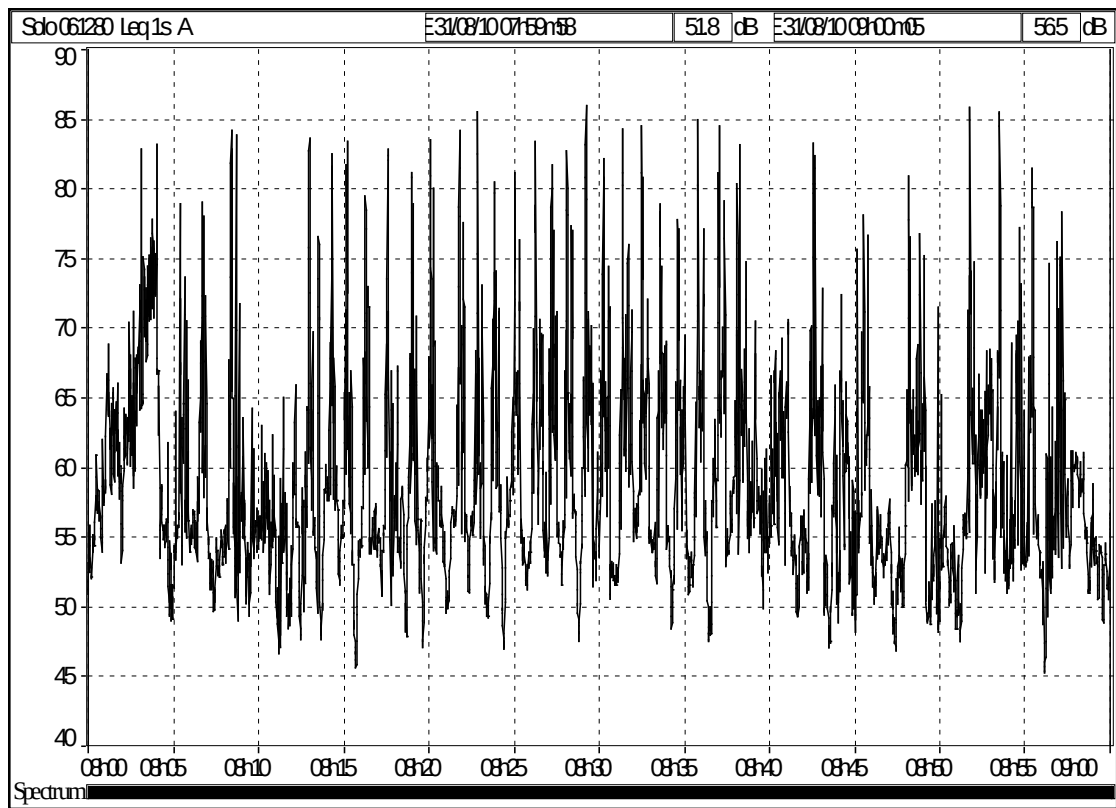


Figure 3 – Source Noise Measurement Time History

5 NOISE ASSESSMENT

Noise Source Data

5.1 The following sources of noise associated with the proposed food store have been identified and are considered in this assessment:

- Delivery vehicles

5.2 In terms of delivery frequency, it is understood that up to one vehicle may arrive during any one hour during the proposed extension period.

5.3 Typical source noise levels for delivery vehicles have been taken from historical measurements, unrelated to this development. The sources measured include a heavy goods vehicle (HGV) performing manoeuvres that are replicated at this site. The source noise levels are presented as sound exposure levels, or SELs in Table 4 of this report.

5.4 To control the potential impact of noise breakout during unloading activities, the store design incorporates a level dock, from within which the vehicle unloading is undertaken.

Delivery Vehicle Assessment

Change in Ambient Noise Level

5.5 The potential increase in ambient noise level at the receptors identified on Figure 2, as a result of delivery vehicles accessing the store during the application period has been considered. The potential effect of a single delivery on the existing ambient noise levels has therefore been considered.

5.6 As the Sunday daytime part of the application period (07:00 to 10:00) covers the daytime period defined in PPG24; the assessment has considered the impact of the activity over a 1-hour period, as set out in the assessment methodology defined in BS 4142

5.7 As the 05:00 to 07:00 application period falls within the night-time period defined in PPG24; the assessment has considered the impact of the activity over a 5-minute period, as set out in the night-time assessment methodology

defined in BS 4142. It is assumed that the delivery vehicles cannot arrive, unload and depart in a five minute period, so the noisiest combination of likely operations is assessed, i.e. HGV arriving, reversing, door open/close and service bay access. As stated, it is assumed that only one vehicle arrives at the store during any five minute period.

- 5.8 The specific noise levels (1-hour daytime, 5-minute night-time) during a typical delivery, at the closest residential receptor on Cross Way, which lies approximately 50 metres from the service bay have been calculated, based on the source noise levels set out in Table 4. This calculation is set out in Table 5 below and considers each source in its particular location of occurrence, with due consideration given to the variation in distance between source and receptor of each discrete activity. Where loading bay activities are substantially screened from the receptor by the built form of the site, or by the physical form of the delivery vehicle itself, a conservative mitigation allowance of -5 dB to -10 dB has been allowed, with the mitigated noise level at receptor shown in brackets.



Table 5: Calculation of Specific Noise Level during Typical Delivery at Receptor

Source	Distance to Source	Noise Level, dB			
		SEL	SEL Sound Power	L _{w,T} Sound Power	L _{Aeq,T} at Receptor
HGV Arriving	10	77.0	105.0	69.4	31.3 (21.3)
HGV Reversing	10	82.0	110.0	74.4	36.3 (26.3)
HGV Door Open	5	69.9	91.9	56.3	17.7 (7.7)
HGV Door Slam	5	80.6	102.6	67.0	28.4 (18.4)
Roller Door Open	5	61.7	83.7	48.1	6.5 (0.0)
Level Dock Open	5	83.2	105.2	69.6	28.0 (18.0)
Unloading Pallets	2	98.8	112.8	77.3	36.2 (26.2)
Level Dock Close	5	84.4	106.4	70.8	29.2 (19.2)
Roller Door Close	5	61.7	83.7	48.1	6.5 (0.0)
HGV Door Open	5	69.9	91.9	56.3	17.7 (7.7)
HGV Door Slam	5	80.6	102.6	67.0	28.4 (18.4)
HGV Departing	10	76.0	104.0	68.4	30.3 (20.3)
Total Daytime					41.4 (31.4)
HGV Arriving*	10	77.0	105.0	80.2	42.1 (37.1)
HGV Reversing*	10	82.0	110.0	85.2	47.1 (42.1)
HGV Door Open*	5	69.9	91.9	67.1	28.5 (23.5)
HGV Door Slam*	5	80.6	102.6	77.8	39.2 (34.2)
Roller Door Open*	5	61.7	83.7	58.9	17.3 (0.0)
Level Dock Open*	5	83.2	105.2	80.4	38.8 (28.8)
Unloading Pallets	2	98.8	112.8	88.0	46.9 (36.9)
Level Dock Close	5	84.4	106.4	81.6	40.0 (30.0)
Roller Door Close	5	61.7	83.7	58.9	17.3 (7.3)
HGV Door Open	5	69.9	91.9	67.1	28.5 (23.5)
HGV Door Slam	5	80.6	102.6	77.8	39.2 (34.2)
HGV Departing	10	76.0	104.0	79.2	41.1 (36.1)
Total Night-time*					49.2 (44.0)
<i>*denotes activities considered in the night-time assessment</i>					

5.9 The likely increase in ambient noise levels at the south-east façade of the closest property on Cross Way and assessment of impact, associated with the scenario described above are presented in Table 6 below.

Table 6: HGV Noise Assessment

Measurement period	Noise Level, dB			
	Specific Noise Level, $L_{Aeq,1-hr}$	Lowest Existing Ambient, $L_{Aeq,T}$	Future Ambient, $L_{Aeq,T}$	Increase
<i>South-east Façade of Cross Way</i>				
1-hour 09:00 to 10:00 Sunday (based on measured ambient noise level)	31.4	63.1	63.1	0.0 (No Impact)
5-minute 05:00 to 07:00 Midweek/Saturday (based on lowest measured ambient noise level)	44.0	47.9	49.4	+1.5 (Minor Impact)

5.10 The assessment identifies that noise from vehicle deliveries during the proposed extension period is unlikely to significantly increase noise levels at the closest sensitive receptors.

5.11 Should a delivery arrive during the quietest assessment period; noise levels at the closest receptor are predicted to increase by up to 1.5 dB(A), assuming that the arrive, reverse and dock preparation activities were completed within a 5-minute period, which would be considered to be of minor impact significance, according to the criteria set out in Table 1.

BS 4142 Assessment

5.12 Although BS 4142 is not intended for assessing noise impacts arising from a single vehicle manoeuvre; it has been previously agreed with HBC to include an assessment in accordance with this standard for completeness on assessments of this type. The assessment in accordance with BS 4142 is presented below.

5.13 The +5 dB acoustic correction has not been applied to noise from this source, as the dominant source of noise generation is the manoeuvring of the delivery vehicle. This is considered to be consistent with the dominant sources of noise present in the area and not deemed to be an industrial noise source in the typical sense, so is not treated in the same way as noise from an irregular static source, such as a fan extract or AHU.

5.14 The results of the BS 4142 noise assessment are shown in Table 7 below. The assessment has been carried out at the closest noise sensitive receptor, with reference to the mean and lowest background noise levels measured during the environmental noise survey.

Table 7: BS 4142 Noise Assessment

Measurement period	Noise Level, dB			
	Specific Noise Level, $L_{Aeq,T}$	Rating Noise Level, $L_{Ar,Tr}$	Background Noise Level $L_{A90,T}$	Excess of $L_{Ar,Tr}$ above $L_{A90,T}$
1-hour 09:00 to 10:00 Sunday (based on measured background noise level)	31.4	31.4	50.4	-19.0
5-minute 05:00 to 07:00 Midweek/Saturday (based on average measured background noise level)	44.0	44.0	52.1	-8.1
5-minute 05:00 to 07:00 Midweek/Saturday (based on lowest measured background noise level)			46.2	-2.2

5.15 Comparison of the results presented in Table 7 above, with the guidance presented in BS 4142, identifies that at the closest noise-sensitive receptor locations, during the proposed extension periods that worst-case operational noise levels arising from the servicing of one delivery vehicle are within the region described as “complaints unlikely”.

5.16 Although little weight should be given to this part of the assessment, due to the technical inapplicability of BS 4142 to the assessment of a single vehicle manoeuvre; it does identify that noise impacts arising from vehicle servicing during the application period are predicted to be minor at nearby noise-sensitive properties.

6 CONCLUSIONS

6.1 Entran Ltd has been commissioned by Aldi Stores Ltd to undertake a noise assessment of a proposed extension to permitted delivery hours at its food store located on the Park Road Trading Estate, Havant.

6.2 The store is currently permitted to accept deliveries between the hours of 07:00 and 21:00, Monday to Saturdays; and between the hours of 10:00 and 17:00 on Sundays and bank holidays as set out in Condition 18 of Planning Permission PP 04/59412/002 below:

“No deliveries or collections shall be made to the premises in the area to the rear of the retail units (north and west elevations) except between the hours of 0700-2100 on Monday to Saturday and 1000-1700 hours on Sundays and recognised Public Holidays.”

6.3 The Applicant's intention is to submit a Section 73 application to vary this planning permission, in order to allow the store to receive deliveries between 05:00 and 21:00 Monday to Saturday and from 09:00 on Sundays, to maintain operational flexibility.

6.4 The assessment considers noise from delivery vehicles serving the store, during periods not currently permitted for the acceptance of deliveries, with respect to the existing noise levels in the area.

6.5 The assessment methodology contained in the draft *Guidelines for Noise Impact Assessment*, produced by the Institute of Acoustics/Institute of Environmental Assessment Working Party has been adopted for the assessment, in addition to the methodology contained within BS4142: 1997 *Method for rating industrial noise affecting mixed residential and industrial areas*, following consultation with the Environmental Health Department (EHD) of Havant Borough Council (HBC).

6.6 The assessment is based upon environmental noise measurements undertaken at a location representative of the closest noise-sensitive receptors in the vicinity of the site.

- 6.7 The assessment has been undertaken on a robust basis; considering the impact upon the ambient noise climate of likely worst case delivery manoeuvres within a 1-hour daytime and 5-minute early morning assessment period, while making conservative allowances for screening offered by intervening structures.
- 6.8 The assessment has shown, that on this basis, noise impacts are not predicted to be significant at nearby noise-sensitive receptors, as a result of deliveries arriving at the store during the application period.
- 6.9 The assessment has also identified that noise impacts would be categorised as “*complaints unlikely*” in accordance with BS 4142 methodology.
- 6.10 On this basis, it is therefore considered that noise need not present a material constraint to the granting of planning permission to permit deliveries to the store from 05:00 Monday to Saturday and from 09:00 on Sundays.

APPENDIX A – INTRODUCTION TO NOISE

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB.

The ear is less sensitive to some frequencies than to others. The A-weighting scale is used to approximate the frequency response of the ear. Levels weighted using this scale are commonly identified by the notation dB(A).

A noise impact on a community is deemed to occur when a new noise is introduced that is out of character with the area, or when a significant increase above the pre-existing ambient noise level occurs. For levels of noise that vary with time, it is necessary to employ a statistical index that allows for this variation. These statistical indices are expressed as the sound level that is exceeded for a percentage of the time period of interest.

In the UK, traffic noise is measured as the L_{A10} , the noise level exceeded for 10% of the measurement period. The L_{A90} is the level exceeded for 90% of the time and has been adopted to represent the background noise level in the absence of discrete events. An alternative way of assessing the time varying noise levels is to use the equivalent continuous sound level, L_{Aeq} . This is a notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound.

To put these quantities into context, where a receiver is predominantly affected by continuous flows of road traffic, a doubling or halving of the flows would result in a just perceptible change of 3dB, while an increase of more than 25%, or a decrease of more than 20%, in traffic flows represent changes of 1dB in traffic noise levels (assuming no alteration in the mix of traffic or flow speeds).

Note that the time constant and the period of the noise measurement should be specified. For example, BS 4142 specifies background noise measurement periods of 1 hour during the day and 5 minutes during the night. The noise levels are

commonly symbolised as $A_{90}(1\text{hour})$ and $L_{A90}(5\text{mins})$. The noise measurement should be recorded using a 'FAST' time response equivalent to 0.125 ms.

Table A1: Glossary of Terms

Term	Definition
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10} (s_1/s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is $20\mu\text{Pa}$.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period T. L_{max} is sometimes used for the assessment of occasional loud noises, 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.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. L_{90} can be considered to be the "average minimum" noise level and is often used to describe the background noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ($L_{Aeq,T}$).
Residual Noise Level	The ambient noise remaining at a given position in a given situation when specified sources are suppressed to a degree such that they do not contribute to the ambient noise level ($L_{Aeq,T}$)
Specific Noise Level	The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source (the noise source under investigation) over a given time interval ($L_{Aeq,T}$)
Rating Noise Level	The specific noise level plus any adjustment for the characteristic features of the noise ($L_{Ar,Tr}$).



APPENDIX B – FULL TABULATED NOISE MEASUREMENT RESULTS

Table B1: Full –Tabulated Noise Measurement Results

Start Time	Noise Level, dB			
	L _{Aeq,5-minute}	L _{A90}	L _{A10}	L _{AFmax}
Midweek/Saturday				
15/09/2012 05:00	47.9	46.3	49.2	52.9
15/09/2012 05:05	48.7	46.2	50.4	53.5
15/09/2012 05:10	49.6	46.9	51.8	56.4
15/09/2012 05:15	49.2	47.3	50.7	54.4
15/09/2012 05:20	49.0	47.4	50.9	53.9
15/09/2012 05:25	50.7	48.7	52.3	56.1
15/09/2012 05:30	52.6	49.4	54.7	59.5
15/09/2012 05:35	52.5	50.4	54.2	61.5
15/09/2012 05:40	52.8	50.5	54.6	59.7
15/09/2012 05:45	51.9	50.3	53.1	56.8
15/09/2012 05:50	50.8	49.3	52.1	55.8
15/09/2012 05:55	51.4	49.2	52.7	67.3
15/09/2012 06:00	51.1	49.9	52.2	55.3
15/09/2012 06:05	52.1	50.6	53.4	56.3
15/09/2012 06:10	52.4	50.7	53.7	56.7
15/09/2012 06:15	54.7	52.0	55.5	73.5
15/09/2012 06:20	55.4	53.0	57.2	61.0
15/09/2012 06:25	55.7	53.4	57.4	60.6
15/09/2012 06:30	56.9	54.7	58.8	62.5
15/09/2012 06:35	55.4	53.6	57.0	59.9
15/09/2012 06:40	57.0	55.4	58.3	63.3
15/09/2012 06:45	57.8	56.4	59.0	61.8
15/09/2012 06:50	56.7	55.4	57.7	60.0
15/09/2012 06:55	56.4	55.1	57.4	66.8
17/09/2012 05:00	49.8	47.9	51.6	55.0
17/09/2012 05:05	49.7	47.9	51.1	56.3
17/09/2012 05:10	51.3	49.7	52.5	56.4
17/09/2012 05:15	51.1	49.2	52.9	56.0
17/09/2012 05:20	52.3	50.3	53.9	57.4
17/09/2012 05:25	51.5	50.0	52.8	55.4
17/09/2012 05:30	52.6	51.1	54.2	56.4
17/09/2012 05:35	53.0	51.4	54.3	57.4
17/09/2012 05:40	54.6	53.0	55.8	58.6
17/09/2012 05:45	53.9	52.1	55.5	63.3
17/09/2012 05:50	53.8	52.0	55.2	58.4
17/09/2012 05:55	54.7	53.5	55.7	58.0
17/09/2012 06:00	55.4	53.9	56.8	60.3
17/09/2012 06:05	55.5	54.2	56.5	61.4
17/09/2012 06:10	67.2	54.5	71.2	74.4
17/09/2012 06:15	57.0	54.9	58.4	72.1
17/09/2012 06:20	64.9	55.5	68.5	77.5
17/09/2012 06:25	57.5	55.6	58.7	70.4
17/09/2012 06:30	58.2	56.3	59.4	71.1
17/09/2012 06:35	58.2	56.2	59.2	73.5



17/09/2012 06:40	60.9	56.2	60.1	77.4
17/09/2012 06:45	60.8	56.5	60.5	82.1
17/09/2012 06:50	59.0	56.8	59.7	74.7
17/09/2012 06:55	59.3	57.0	59.7	76.9
18/09/2012 05:00	49.0	47.1	50.8	53.4
18/09/2012 05:05	49.4	47.6	51.0	54.4
18/09/2012 05:10	49.9	47.6	51.5	57.7
18/09/2012 05:15	50.6	48.8	52.3	56.9
18/09/2012 05:20	50.8	48.8	52.3	55.3
18/09/2012 05:25	50.9	48.3	53.2	55.4
18/09/2012 05:30	51.8	50.0	53.2	55.8
18/09/2012 05:35	52.5	50.9	54.2	57.6
18/09/2012 05:40	53.0	51.3	54.7	58.2
18/09/2012 05:45	52.9	51.5	54.1	58.7
18/09/2012 05:50	52.6	51.1	53.9	58.7
18/09/2012 05:55	53.1	51.7	54.3	56.4
18/09/2012 06:00	53.8	52.4	54.9	57.3
18/09/2012 06:05	54.7	53.2	56.0	58.9
18/09/2012 06:10	55.7	54.4	56.9	58.9
18/09/2012 06:15	55.4	54.1	56.6	59.4
18/09/2012 06:20	56.0	54.3	57.3	60.7
18/09/2012 06:25	56.7	55.0	58.1	60.1
18/09/2012 06:30	56.9	55.7	58.0	59.8
18/09/2012 06:35	56.9	55.6	58.1	63.8
18/09/2012 06:40	56.9	55.5	58.0	67.9
18/09/2012 06:45	56.3	55.0	57.4	60.1
18/09/2012 06:50	56.9	55.9	57.9	60.4
18/09/2012 06:55	63.2	56.4	66.6	80.9
Sunday				
16/09/2012 05:00	45.4	44.2	46.5	50.9
16/09/2012 05:05	44.9	44.1	45.7	50.0
16/09/2012 05:10	46.3	44.1	47.8	53.3
16/09/2012 05:15	47.2	45.5	48.7	56.0
16/09/2012 05:20	46.7	45.4	47.8	51.5
16/09/2012 05:25	47.6	45.6	49.3	52.5
16/09/2012 05:30	51.1	48.3	53.3	63.7
16/09/2012 05:35	48.5	46.6	49.8	52.6
16/09/2012 05:40	49.1	46.8	50.6	55.9
16/09/2012 05:45	49.4	46.8	52.4	55.7
16/09/2012 05:50	50.7	45.8	54.7	61.9
16/09/2012 05:55	51.7	49.4	53.5	58.3
16/09/2012 06:00	53.2	51.5	55.1	60.7
16/09/2012 06:05	51.3	47.8	54.4	59.8
16/09/2012 06:10	51.2	47.4	52.5	63.5
16/09/2012 06:15	49.5	47.7	51.1	55.4
16/09/2012 06:20	51.1	47.6	51.5	68.0
16/09/2012 06:25	50.3	48.4	51.8	57.0
16/09/2012 06:30	50.0	47.9	51.5	55.4
16/09/2012 06:35	50.2	48.1	51.3	63.8
16/09/2012 06:40	50.8	48.6	52.7	58.4
16/09/2012 06:45	51.0	48.7	52.5	61.0
16/09/2012 06:50	51.4	49.7	52.8	61.4
16/09/2012 06:55	51.2	49.2	52.6	65.8



16/09/2012 07:00	52.8	48.9	53.8	64.7
16/09/2012 07:05	68.1	50.3	72.9	82.0
16/09/2012 07:10	54.7	50.8	55.0	72.7
16/09/2012 07:15	53.0	50.3	53.8	69.5
16/09/2012 07:20	56.2	51.9	57.1	77.6
16/09/2012 07:25	54.9	50.9	55.5	74.7
16/09/2012 07:30	57.6	50.6	55.8	77.2
16/09/2012 07:35	56.6	50.0	55.1	78.1
16/09/2012 07:40	58.8	50.5	62.1	75.4
16/09/2012 07:45	63.1	50.5	66.9	80.8
16/09/2012 07:50	63.2	50.3	62.4	86.1
16/09/2012 07:55	53.6	49.7	55.2	69.7
16/09/2012 08:00	54.7	49.5	56.0	69.7
16/09/2012 08:05	53.6	49.3	54.4	72.5
16/09/2012 08:10	54.0	49.5	55.3	72.2
16/09/2012 08:15	55.3	49.0	56.2	75.3
16/09/2012 08:20	54.7	49.0	54.7	72.8
16/09/2012 08:25	53.9	49.1	54.0	75.6
16/09/2012 08:30	54.4	47.6	55.2	73.9
16/09/2012 08:35	56.4	47.3	55.5	75.5
16/09/2012 08:40	54.3	47.2	51.9	77.5
16/09/2012 08:45	55.9	47.9	52.9	82.9
16/09/2012 08:50	53.9	48.0	53.2	79.8
16/09/2012 08:55	57.6	48.9	54.4	85.6
16/09/2012 09:00	55.7	48.3	52.2	83.4
16/09/2012 09:05	54.5	50.5	55.3	72.3
16/09/2012 09:10	54.6	50.9	56.3	67.2
16/09/2012 09:15	53.3	50.3	53.8	72.0
16/09/2012 09:20	57.7	50.2	61.4	74.3
16/09/2012 09:25	53.1	50.2	54.0	70.2
16/09/2012 09:30	56.1	48.7	53.9	83.4
16/09/2012 09:35	52.8	50.0	55.6	62.9
16/09/2012 09:40	52.2	50.8	53.4	61.4
16/09/2012 09:45	54.0	52.1	55.2	70.2
16/09/2012 09:50	72.8	51.8	76.0	79.2
16/09/2012 09:55	64.2	51.4	68.9	80.8