ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants

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ALDI UK
Faverdale Industrial Estate
Darlington
County Durham
DL3 0WU

FOODSTORE DEVELOPMENT, HIGH STREET, ROYSTON

ENVIRONMENTAL NOISE IMPACT ASSESSMENT

ACOUSTIC CONSULTANCY REPORT ADT 2017/ENIA2

Revision	Date	Issued By	Revision Notes
-	19 September 2014	Andy Pagett	first issue
-	23 September 2014	Andy Pagett	Minor amendment

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1.0 SUMMARY

The proposal is to construct an Aldi foodstore (use class A1) with associated access, delivery bay, car parking and landscaping, on the land south of High Street, Royston.

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

BS 4142 rating level limits have been proposed for the new fixed plant installations in general accordance with the local authority requirements.

Analysis of noise associated with servicing arrangements shows that the noise impact on surrounding noise sensitive properties should be acceptable with the proposed mitigation.

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 south of High Street, Royston, and is currently disused scrubland following the demolition of the factory which previously occupied the site.

The surrounding area features a mixture of land uses, with the Alexandra Working Mens' Club to the north on the opposite side of High Street, residential properties to the east and south, a school to the south west, residential properties to the west, and a surgery and pharmacy to the north west. The wider surrounding area is predominantly residential. The M1 runs around 4km away to the west.

2.2 Proposed Development

The proposal is for the redevelopment of the site to create an Aldi foodstore with associated access, car parking and landscaping, as indicated on the application drawings.

The Aldi store will be served by a single delivery bay. To mitigate the impact on the proposed new dwellings on the southern boundary it is proposed that a 2m high solid acoustic barrier is constructed along the southern boundary of the car park and delivery bay.

The proposed store opening hours are 08:00 to 22:00 hours Monday to Saturday (including Bank Holidays) and 09:00 to 17:00 hours on Sundays. The proposed delivery period is 07:00 to 23:00 hours via a single delivery bay.

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 principle to be applied from the NPPF are

i. to protect existing residents from noise generated by the development.

2.4 Assessment Criteria

Preliminary discussions have taken place with Steve Bilcliffe of Barnsley Council. 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	houses on north side of High Street	north	20 metres
2	houses east of site	east	<5 metres
3	houses south of the site	south	10 metres
4	houses west of site	west	10 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. Set environmental noise limits for new, fixed plant installations, as described in Section 4.0 below.

iii. Assess the noise impact of the service yard, deliveries, and car parking at the proposed foodstore, as described in Sections 5.0 and 6.0 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:-

2no. 01dB Solo Class 1 Sound Level Meters

2no. 01dB MCE212 ½ inch Microphones with Windshields

Svantek SVAN 971 Class 1 Sound Level Meter

Svantek SV 7052E ½ inch Microphone with Windshield

Norsonic Nor1251 Microphone Calibrator

The sound level meters were 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 15:00 hours on Tuesday 4 March 2014 and 15:00 hours the following day.

Four measurement positions were selected in order to obtain representative measurements of the ambient noise levels in the vicinity of the identified NSA. These are shown on the attached site plan 2017/SP1 and described below:

i. at the front of 44 High Street
ii. at the rear of 44 High Street
iii. towards the middle of the eastern site boundary
iv. in the south east corner of the site

At measurement positions 1 and 2 the measurement microphone was projected approximately 1m from a 1st floor window at the existing house. The noise levels were logged continuously for the duration of the survey period, using the 01dB Solo meters set to log the octave band and dB(A) 100ms short-term L_{eq} for subsequent post processing.

At measurement positions 3 and 4 the microphone was situated on a tripod at a height of approximately 1.2 metres above ground and at least 3.5 metres away from any other acoustically reflective surface. A series of 10 minute spot readings were taken between 15:00 and 16:00 on Tuesday 4 March, using the Svantek meter set to store to 10-minute L_{Aeq}, L_{Amax}, L_{A90}, and octave band L_{eq} spectrum, in order to determine the spatial variation in noise levels around the site.

3.3 Results

The measured data from positions 1 and 2 has been post-processed to determine the 5-minute L_{Aeq}, L_{Amax} and $L_{A90,}$ which are presented on the attached time history graphs 2017/TH1 and TH2 for positions 1 and 2 respectively.

The logged 10-minute L_{Aeq}, L_{Amax} and L_{A90} from positions 3 and 4 are presented in the attached table 2017/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

As the survey was predominantly unmanned, it is not possible to give a detailed description of the weather forecast for the entire survey period. However, at the beginning and end of the survey and during the manned readings, the weather was dry with no more than a light breeze, with similar conditions forecast for the intervening period.

3.5 Description of Existing Noise Climate

As the survey was predominantly unmanned, it is not possible to give a detailed description of the noise climate for the entire survey period. However, at the beginning and end of the survey and during the manned readings the average (L_{eq}) and maximum (L_{max}) levels were controlled by traffic on High Street, with the background (L_{90}) levels being controlled by more distant traffic on the surrounding road network. In the absence of any other significant nearby noise sources, it is reasonable to conclude that this was the case for the remainder of the survey period.

4.0 NOISE IMPACT ASSESSMENT (NEW FIXED PLANT)

4.1 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.

4.2 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. In addition, 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.

Reference to the attached time history graphs 2017/TH1 and TH2 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 residential properties is therefore proposed.

5.0 NOISE IMPACT ASSESMENT (SERVICING)

5.1 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. A 2m high solid acoustic barrier is proposed along the southern boundary of the car park and delivery 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.

5.2 Predicted Levels

The ISO 9613-2 calculation method in Cadna/A has been used to predict the $L_{eq,T}$ noise levels at the NSA for the principal servicing activities. A 5-minute assessment period has been used in accordance with the guidance of BS 4142 : 1997, with an 'on time' of 5 minutes for the unloading, 1 minute for the manoeuvring process and 5 minutes for the refrigeration unit, and as the deliveries are proposed to take place during the daytime period only, the received points were set at 1.5m above ground level (i.e. living room window level)

Servicing activity	Predicted $L_{eq,5\ mins}$ dB(A) at NSA			
	NSA1	NSA2	NSA3	NSA4
Unloading	13	19	32	28
Manoeuvring into unloading bay (including reversing bleepers)	39	21	43	42
Bulkhead mounted refrigeration unit	34	37	60	53

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

5.2.1 Noise Impact of Unloading Operations

Comparison of the predicted $L_{eq,5mins}$ with the currently prevailing noise levels in the attached time history graphs 2017/TH1 and TH2 reveals that the noise from unloading operations would be similar to the L_{90} in the evening, and below it for the rest of the proposed delivery period.

On this basis, it is reasonable to conclude that the noise impact of the unloading operations themselves should be acceptable.

5.2.2 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 $L_{eq,5mins}$ with the currently prevailing noise levels reveals that the $L_{eq,5mins}$ of a lorry manoeuvring would be below the existing $L_{eq,5mins}$ throughout the proposed delivery period.

On that basis it is reasonable to conclude that the noise of a lorry manoeuvring into the servicing bay should be acceptable.

5.2.3 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_{A90}) levels.

Reference to the currently prevailing noise levels in the attached time history graphs 2017/TH1 and TH2 shows that the noise predicted noise levels ($L_{Aeq,5mins}$) from the refrigeration units exceed the prevailing levels throughout most of the proposed delivery period at NSA2, 3 and 4.

It is therefore suggested that a service yard management strategy should be put in place requiring that refrigeration units are switched off whilst the vehicle is on site.

5.3 Summary of Service Yard Noise / Deliveries

The noise impact of the limited servicing operations associated with the development should be acceptable with the proposed mitigation measures.

6.0 NOISE IMPACT ASSESSMENT (CAR PARK)

6.1 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 one movement per parking space per hour.

6.2 Noise Impact Assessment

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

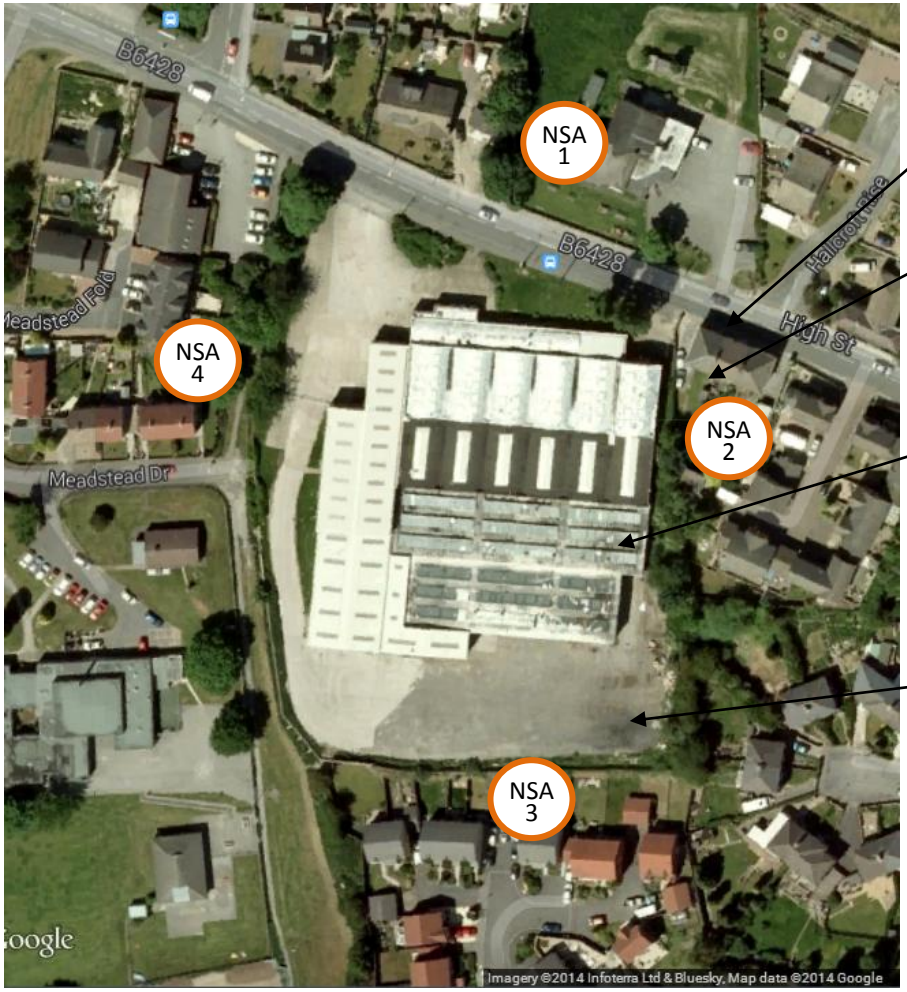
Predicted car parking noise level $L_{eq,1hour}$ dB(A) at NSA			
NSA1	NSA2	NSA3	NSA4
42	44	35	45

A comparison of the predicted levels in the above table with the existing ambient noise levels shows that this worst-case car parking noise would be generally similar to or below the prevailing traffic noise controlled L_{eq} levels during the store opening period.

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 significant.



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Notes

Description

Site plan showing noise monitoring locations and NSA

Project

Foodstore Development, High Street, Royston

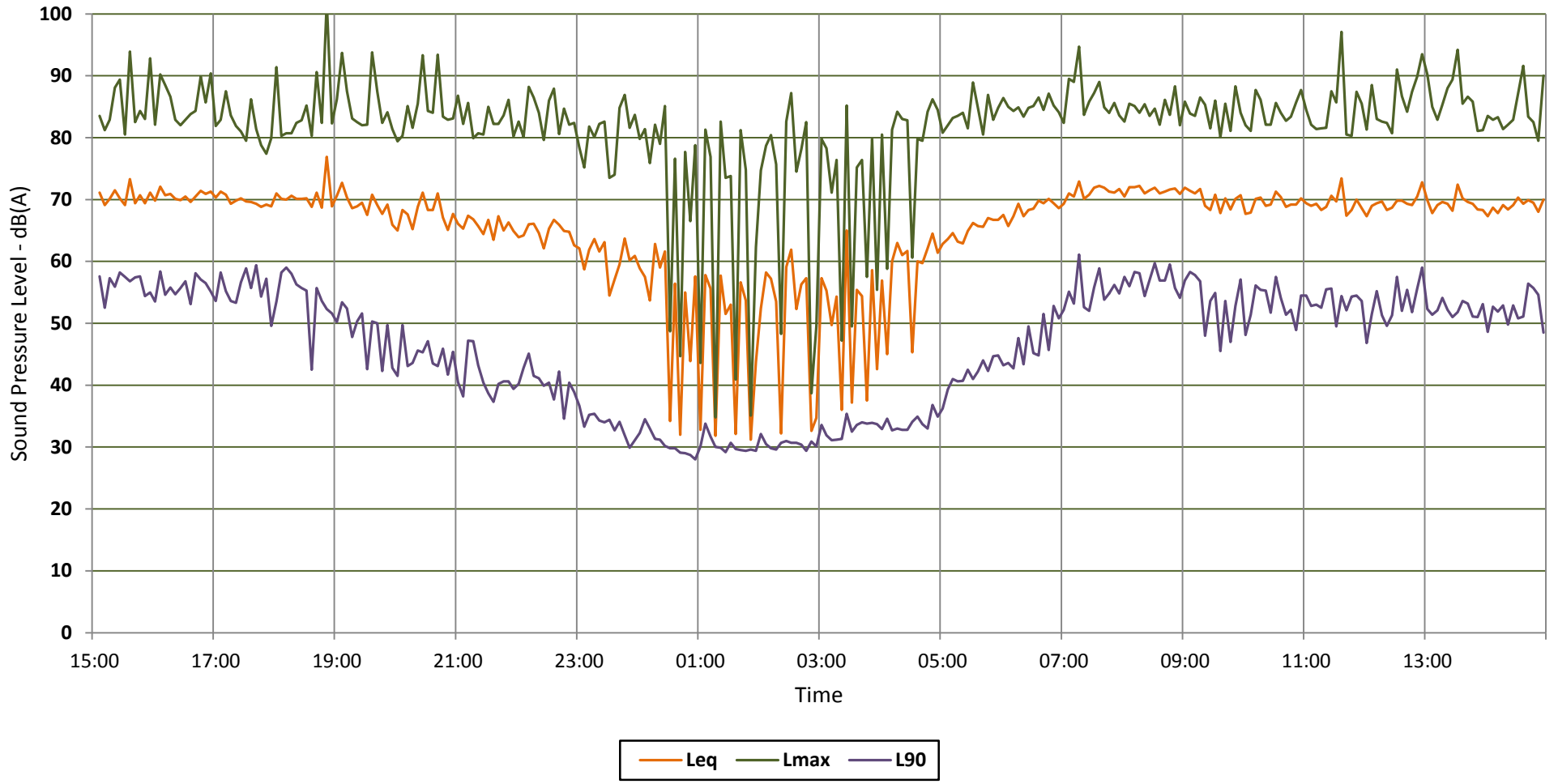
Survey Date

4th to 5th March 2014

Drawing No.

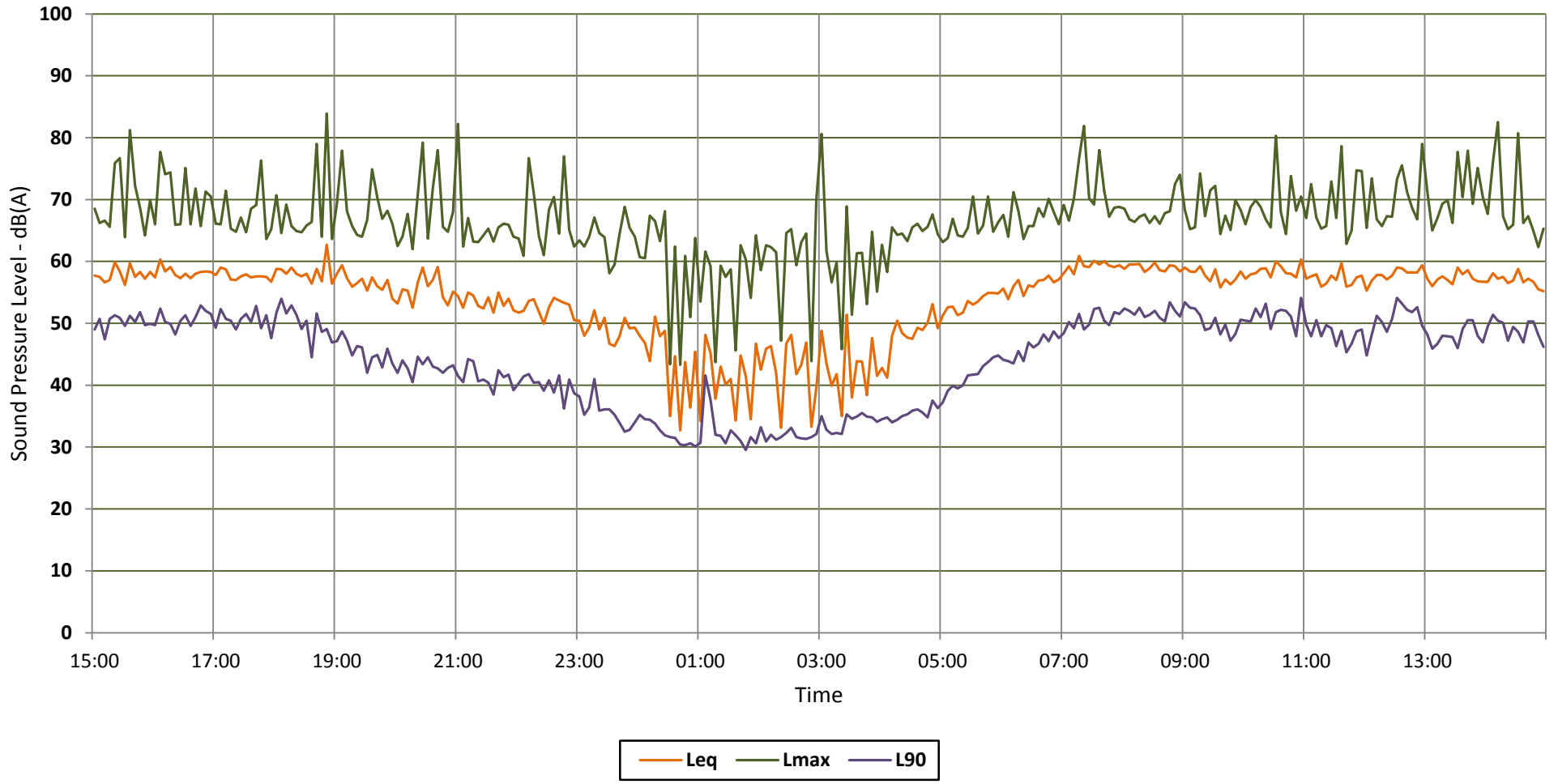
2017/SP1

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Notes	Description	
	Time History Graph - Measurement Position 1	
	Project	
	Foodstore Development, High Street, Royston	
	Survey Date	**Drawing No.**
	4th to 5th March 2014	2017/TH1

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Notes	**Description** Time History Graph - Measurement Position 2	
	Project Foodstore Development, High Street, Royston	
	Survey Date 4th to 5th March 2014	**Drawing No.** 2017/TH2

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SURVEY RESULTS

Position	Start time	$L_{Aeq, 10mins}$ dB	L_{Amax} dB	L_{A90} dB
3	15:15	50	74	43
	15:38	48	69	43
4	15:27	47	64	43
	15:49	48	61	43

TABLE 2017/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	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**