

SHARPS REDMORE

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Report

Mon Bank Road, Newport

Environmental Noise
Assessment of a proposed
Aldi store, Mon Bank Road,
Newport

Prepared by

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Project No 2019612

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Disclaimer

This report has been prepared with all reasonable skill, care and diligence commensurate with an acoustic consultancy practice under the terms and brief agreed with our client at that time. Sharps Redmore provides no duty or responsibility whatsoever to any third party who relies upon its content, recommendations or conclusions.

1.0 Introduction

- 1.1 Sharps Redmore (SR) has been instructed to undertake a noise assessment of a proposed Aldi store at Mon Bank Road, Newport.
- 1.2 The proposal would include customer car park provision, a delivery loading bay and fixed plant equipment. The site is bordered to the south/east by Ffordd Abberley Hall and Mon Bank Road, and the houses beyond, to the north/west by Cardiff Road and a disused railway and industrial/commercial units to the west. The closest residential properties to proposed Aldi are in Ffordd Abberley Hall (as indicated at Appendix A).
- 1.3 The objective of the assessment is to determine how noise that may be generated as a result of the proposed Aldi store would affect residential amenity. Based on experience of similar retail developments, the following main impacts have been identified:
 - Noise from fixed mechanical services plant
 - Noise from servicing activity
 - Noise from trading activity
- 1.4 Section 2 contains a discussion of the available methods of assessment and assessment criteria, and outlines the pre-application comments of the local authority in respect of noise.
- 1.5 Section 3 of this report presents details of the environmental noise survey undertaken at the site.
- 1.6 The different components of operational noise are considered in sections 4 to 6; the assessment conclusions are contained in section 7.
- 1.7 A guide to the acoustic terminology used within the report is included in Appendix D.

2.0 Assessment methodology and criteria

National Planning Policy

- 2.1 Section 6.7.14 of Planning Policy Wales (PPW Revision 10, December 2018) states “Proposed development should be designed wherever possible to prevent adverse effects to amenity, health and the environment but as a minimum to limit or constrain any effects that do occur”.
- 2.2 General guidance on noise for planning applications is still contained in Technical Advice Note (TAN 11), "Noise", issued in October 1997. TAN 11 contains advice in Annex A on the suitable noise limits for residential development near to different types of noise sources such as road traffic, rail traffic, air traffic, or mixed sources.
- 2.3 It is possible to apply objective standards to the assessment of noise and the effect produced by the introduction of a certain noise source may be determined by several methods, as follows:
- i) The effect may be determined by reference to guideline noise values. British Standard (BS) 8233:2014 and World Health Organisation (WHO) “*Guidelines for Community Noise*” contain such guidelines.
 - ii) Alternatively, the impact may be determined by considering the change in noise level that would result from the proposal, in an appropriate noise index for the characteristic of the noise in question. There are various criteria linking change in noise level to effect. This is the method that is suited to, for example, the assessment of noise from road traffic because it is capable of displaying impact to all properties adjacent to a road link irrespective of their distance from the road.
 - iii) Another method is to compare the resultant sound level against the background sound level (L_{A90}) of the area. This is the method employed by BS 4142:2014 to determine the significance of sound impact from sources of industrial and/or commercial nature. The sources that the new standard is intended to assess are sound from industrial and manufacturing processes, sound from fixed plant installations, sound from loading and unloading of goods at industrial and/or commercial premises and the sound from mobile plant and vehicles, such as forklift, train or ship movements.

Guidelines for Community Noise

- 2.4 The WHO “Community Noise Guidelines” (CNG) values are appropriate to what are termed “critical health effects”. This means that the limits are at the lowest noise level that would result in any psychological or physiological effect. They are, as defined by NPSE, set at the Lowest Observed Adverse Effect Level (LOAEL), but do not define the level above which effects are significant (the SOAEL). Compliance with the LOAEL should, therefore, be seen as a robust aim.
- 2.5 In 2018 the WHO published the “Environmental Noise Guidelines for the European Region” (ENGER). The WHO Environmental Noise Guidelines (page 28) explain that

“The current environmental noise guidelines for the European Region supersede the CNG from 1999. Nevertheless, the GDG (Guideline Development Group) recommends that all CNG indoor guideline values and any values not covered by the current guidelines (such as industrial noise and shopping areas) should remain valid”. Hence the CNG remain relevant to this assessment.

2.6 The WHO ENGER brings together the latest research on the effects of specific types of noise on health in relation to transportation noise sources (road, rail and aircraft noise exposure), wind turbines and leisure noise. Hence in direct relation to the specific proposal that this noise assessment considers, the new WHO ENGER are not of material consideration.

2.7 The relevant World Health Organisation (CNG) noise values are summarised in the following table:

TABLE 1: WHO CNG values

Document	Level	Guidance
World Health Organisation “Community Noise 2000”	$L_{AeqT} = 55$ dB	Serious annoyance, daytime and evening. (Continuous noise, outdoor living areas)
	$L_{AeqT} = 50$ dB	Moderate annoyance, daytime and evening. (Continuous noise, outdoor living areas).
	$L_{AeqT} = 35$ dB	Moderate annoyance, daytime and evening. (Continuous noise, dwellings, indoors)
	$L_{AeqT} = 30$ dB	Sleep disturbance, night-time (indoors)
	$L_{Amax} = 60$ dB	Sleep disturbance, windows open at night. (Noise peaks outside bedrooms, external level).
	$L_{Amax} = 45$ dB	Sleep disturbance at night (Noise peaks inside bedrooms, internal level)

2.8 For L_{AeqT} criteria the time base (T) given in the documents is 16 hours for daytime limits and 8 hours for night time limits. When assessing impact, this has the tendency to smooth out the hourly variations in noise level. As such, our calculations are carried out to a 1 hour time base, which is a more stringent assessment than is given in WHO Guidelines for Community Noise.

2.9 The internal CNG values can be converted to an external value by the addition of the attenuation provided by a partially open window of 15 dB.

Changes in noise level

- 2.10 Changes in noise levels of less than 3 dBA are not perceptible under normal conditions and changes of 10 dBA are equivalent to a doubling of loudness. This guidance has been accepted by inspectors, at inquiry, to encompass changes in noise levels in the index L_{AeqT} .
- 2.11 Table 2 below shows the response to changes in noise (known as a semantic scale); this table has been developed from general consensus opinion of acousticians.

TABLE 2: Change in noise level

Change in noise level L_{AeqT} dB	Response	Impact
<3	Imperceptible	None
3 – 5	Perceptible	Slight/moderate
6 – 10	Up to a doubling	Moderate/significant
11 – 15	More than a doubling	Substantial
>15	-	Severe

- 2.12 Where the existing ambient noise level is already above the criteria developed from the various guidance documents, it may be considered unreasonable to adopt such criteria. It would be reasonable, however, given the above statement, to consider criteria which do not exceed the existing noise climate, thus giving rise to an overall 3 dB increase i.e. the minimum perceptible. If it is less than the minimum perceptible it cannot be described as disturbing or to affect the amenity of residents.

Assessment using BS 4142:2014

- 2.13 As outlined, this British Standard enables the significance of sound impact to be determined in relation to industrial and commercial sources. The significance of sound impact is to be determined according to the following summary process:
- Determine the background sound levels, in terms of the index L_{A90} , at the receptor locations of interest.
 - Determine the specific sound level of the source being assessed, in terms of its L_{AeqT} level ($T = 1$ hour for day or 15 minutes for night), at the receptor location of interest.
 - Apply a rating level acoustic feature correction if the source sound has tonal, impulsive, intermittent, or other characteristics which attract attention.

- iv) Compare the rating sound level with the background sound level; the greater the difference between the two, the higher the likelihood of adverse impact.
 - v) A difference (rating – background) of around +10 dB is an indication of significant adverse impact, depending on the context; a difference of +5 dB is an indication of an adverse impact, depending on the context. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending upon context.
 - vi) The intent of the planning system is to ensure that a development does not result in “significant adverse impacts on health and quality of life.” BS 4142:2014 considers that the threshold of significant adverse impact is “a difference around +10 dB or more ... depending upon the context”.
- 2.14 BS 4142:2014 introduces the concept of ‘*context*’ to the process of identifying noise impact. Section 11 of BS 4142:2014 explains “*The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs (our emphasis). An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context” (our emphasis).*”
- 2.15 There are many *context* points to consider when undertaking an assessment of sound impact including:
- The absolute level of sound;
 - The character and level of the specific sound in the context of the existing noise climate; for example is the sound to occur in a location already characterised by similar activities as those proposed?
 - The sensitivity of the receptors;
 - The time and duration that the specific sound is to occur;
 - The conclusions of assessments undertaken using alternative assessment methods, for example WHO guidelines noise values or change in noise level;
- 2.16 It is therefore entirely possible that whilst the numerical outcome of a BS 4142:2014 assessment is indicative of adverse or significant adverse impact, when the proposal is considered in *context* the significance of the impact is reduced to an acceptable level.

3.0 Environmental noise survey details

- 3.1 An unattended noise survey was undertaken at the site between Monday 8th and Tuesday 9th June 2020. Site visits were made periodically during the survey to make observations as to current sources of noise. The purpose of the survey was to establish the existing noise climate in the vicinity of the closest residential properties to the site. A single measurement position was used to be representative of the noise climate at Ffordd Abberley Hall.
- 3.2 The noise measurement position is indicated in Figure 1 below.

FIGURE 1: Noise measurement location



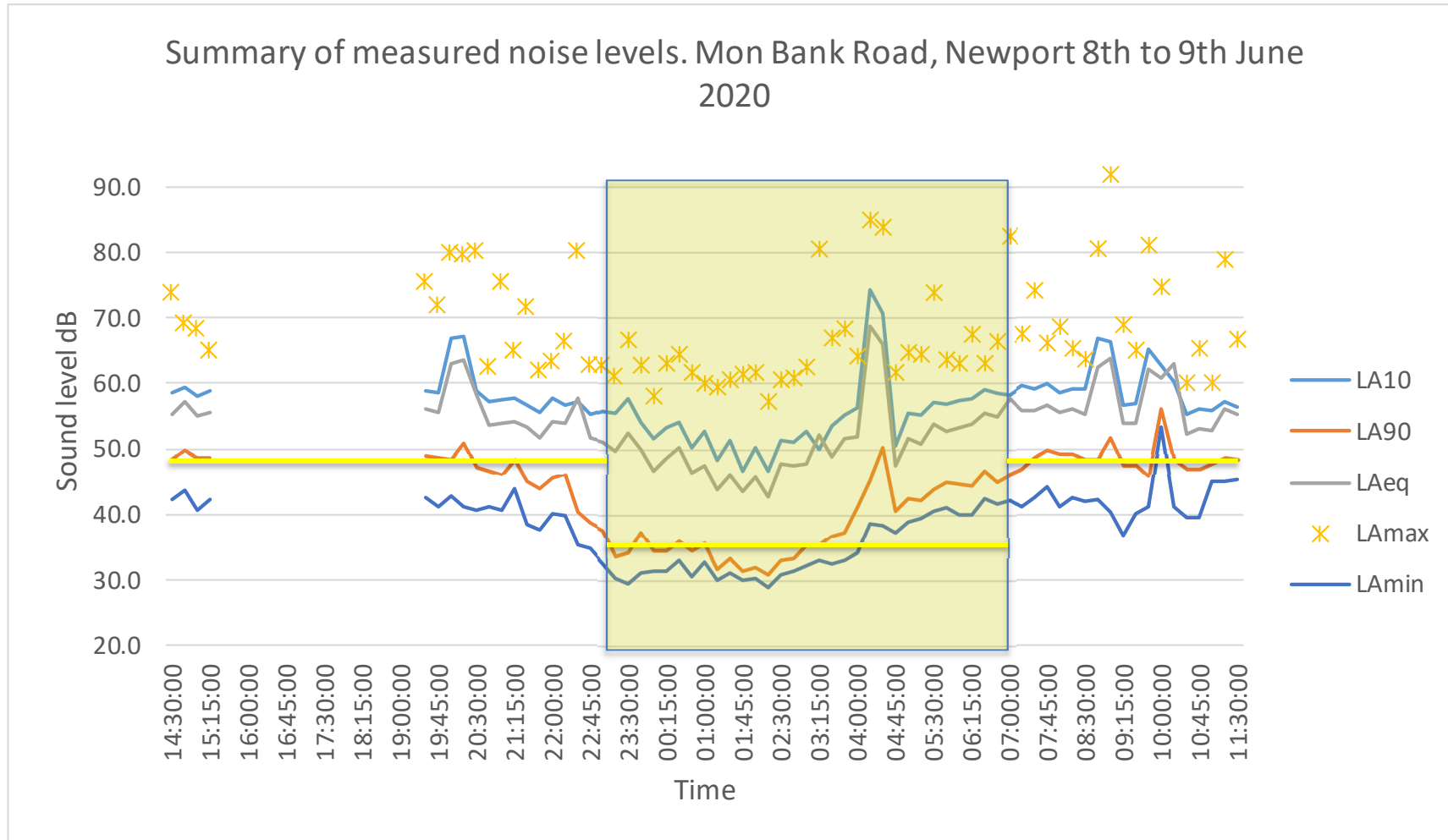
- 3.3 Noise level measurements were undertaken using a Norsonic 118 sound level meter fitted with environmental microphone kit. The sound level meter was calibrated before and after the measurements and no drift in calibration signal was observed.
- 3.4 Weather conditions during the survey were dry and mostly cloudy with temperatures of between 8 and 18°C, with light north to westerly winds. Weather conditions are not considered to have influenced the measured noise levels. Weather details were confirmed using the BBC weather forecast, and based on observations made during the survey.

- 3.5 Noise measurements were taken over 15 minutes sample periods during the survey. The sound level meter microphone at a height of approximately 2 metres above local ground level.
- 3.6 The noise levels measured during the survey were dominated by local road traffic sources.
- 3.7 The measured noise levels are summarised in Table 3 below and Figure 2; the complete noise survey data is presented at Appendix B.

TABLE 3: Summary of measured noise levels

Date	Time	Noise level dB		
		L _{A90} 1 hour	L _{A90} 15 mins *	L _{Aeq} 1 hour
8.6.20	14:00:00	49.1		56.4
	15:00:00	48.7		55.4
	19:00:00	48.9		55.9
	20:00:00	48.4		61.2
	21:00:00	45.9		53.4
	22:00:00	42.8		54.9
	23:00:00			33.8
9.6.20	00:00:00		34.6	48.4
	01:00:00		31.6	45.7
	02:00:00		30.9	46.4
	03:00:00		35.4	50.6
	04:00:00		40.6	64.8
	05:00:00		42.3	52.5
	06:00:00		44.5	54.5
	07:00:00	48.0		56.6
	08:00:00	48.8		58.5
	09:00:00	48.2		60.5
	10:00:00	49.6		59.5
	11:00:00	48.4		55

FIGURE 2: Summary of measured noise levels



4.0 Noise from mechanical services plant

- 4.1 The precise details of the fixed plant equipment for the proposed Aldi store are to be finalised, however, the fixed plant is likely to comprise of a mixture of refrigeration and ventilation equipment. The site layout plan indicates that the refrigeration plant equipment would be located on the east side of the store building. It is appropriate to seek to set plant noise limits that could be secured through imposition of a suitably worded planning condition, based on the survey of background sound levels.
- 4.2 The closest residential properties to the proposed Aldi fixed plant equipment would be in Ffordd Abberley Hall to the east.
- 4.3 The objective assessment of plant sound sources in commercial premises should be undertaken in accordance with British Standard 4142:2014. This Standard enables the resultant sound levels from new plant equipment to be compared against the existing background sound level (L_{A90}) of an area to assess the impact.
- 4.4 In terms of seeking to set appropriate plant rating sound limits, the advice in BS 4142:2014 is that *"The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source of having a low impact, depending on the context"* (clause 11, note 'd').
- 4.5 Hence in relation to the guidance above from BS 4142:2014 there is a robust technical case to seek to set plant sound limits that match the current typical background sound climate. This approach would lead to plant rating sound levels of 48 dB daytime and 35 dB at night.
- 4.6 The following planning condition is recommended to secure the above criteria:

"No fixed plant and/or machinery shall come into operation until details of the fixed plant and machinery serving the development hereby permitted, and any mitigation measures to achieve this condition, are submitted to and approved in writing by the local planning authority. The rating level of the sound emitted from the site shall not exceed 48 dBA between 0700 and 2300 hours and 35 dBA at all other times. The sound levels shall be determined by measurement or calculation at the nearest noise sensitive premises. The measurements and assessment shall be made according to BS 4142:2014."

5.0 Noise from customer car parking activity

- 5.1 SR has previously undertaken extensive noise monitoring of retail park car parks; at 10 metres from the boundary of a busy car park measured noise levels are 48 dB $L_{Aeq,1hr}$ (free field) have been found. During off peak trading periods, car park source noise levels can be approximately 5 dB lower.
- 5.2 Aldi typically trades between 0800 and 2200 hours; customer car parking activity noise is therefore considered in the context of daytime assessment criteria.
- 5.3 The closest proposed car parking spaces are approximately 14 metres from the properties in Ffordd Abberley Hall. The resultant predicted car park activity noise level (during peak trading conditions) at these properties would be 45 dB $L_{Aeq,1\text{ hour}}$ (based on distance attenuation of $20 \cdot \log[10/14]$ during peak hour trading and 40 dB during off peak trading. This predicted noise level is well below both the WHO CNG and the existing ambient and background noise climates. It is therefore considered that noise associated with Aldi store trading between 0800 and 2200 hours would avoid significant adverse impact.

6.0 Noise from delivery activity

6.1 Noise levels of the different components of service activity have been measured at other Aldi stores, and the following maximum levels have been recorded.

TABLE 4: Delivery activity - baseline source noise levels (free field)

Event Noise Level (at 10 metres)					
Arrival		Unloading		Departure	
Duration (mins)	L _{Aeq T} (dB)	Duration (mins)	L _{Aeq T} (dB)	Duration (mins)	L _{Aeq T} (dB)
1	69	45	58	0.5	67

6.2 All these sound levels are representative at 10 metres and are measured with the microphone in free field, away from any reflecting surfaces. The levels stated are realistic worst case noise levels from a large collection of sample measurements and include all typical delivery activity noise (including reversing alarms, movement of goods, refrigeration units). Typically Aldi have two daily deliveries.

6.3 Table 5 below summarises the predicted ambient (L_{Aeq T}) Aldi delivery activity noise levels at 22 Ffordd Abberley Hall (the full delivery event activity noise levels are included in Appendix C1). This calculation assumes that the delivery loading area is screened by a 2 metre high boundary fence (in the location indicated at Appendix A).

TABLE 5: Predicted Aldi delivery activity noise levels

Receptor	Predicted noise level dB L _{Aeq 1 hour}
22 Ffordd Abberley Hall	40

6.4 An assessment of Aldi delivery activity noise levels using the methodology in BS 4142:2014 is presented in Appendix C3. The table below summarises the comparison of the predicted delivery rating level and background noise climate.

TABLE 6: Summary of BS 4142:2014 assessment of Aldi delivery activity noise

Receptor	Excess of rating level over background level dB		BS 4142 guidance
	Day	Night	
22 Ffordd Aberley Hall	-3	-	Indicative of low impact*

*Depending on the 'context

- 6.5 Section 11 of BS 4142:2014 explains “*The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs*” (my emphasis). *An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context*” (my emphasis).
- 6.6 The BS 4142 assessment at Appendix C3 summarises the key contextual considerations in this instance. The first is how the predicted Aldi delivery activity noise levels compare to the WHO CNG values; the table below shows this comparison.

TABLE 7: Comparison of predicted Aldi delivery event noise levels with the WHO CNG values

Receptor	Noise level dB L_{AeqT}
	22 Ffordd Abberley Hall
Predicted delivery event noise level ^[1]	40
WHO CNG daytime value ^[2]	50-55
Comply with WHO CNG daytime values	YES

Notes

[1] Where $L_{AeqT} = 1$ hour

[2] Where $L_{AeqT} = 16$ hours daytime

- 6.7 Predicted Aldi delivery event noise level complies with the WHO CNG daytime values.
- 6.8 The second key contextual consideration is how the predicted Aldi delivery activity noise levels compare to the existing ambient noise climate to consider the change in noise level.

TABLE 8: Change in noise level

Receptor	Date	Time	Noise level $L_{Aeq 1\text{ hour}}$				Noise impact
			Existing noise climate	Predicted Aldi delivery activity noise	Overall existing + predicted	Change in level	
22 Ffordd Abberley Hall	8.6.20	14:00:00	56.4	40.0	56.5	0.1	None
		15:00:00	55.4	40.0	55.5	0.1	None
		19:00:00	55.9	40.0	56.0	0.1	None
		20:00:00	61.2	40.0	61.2	0.0	None
		21:00:00	53.4	40.0	53.6	0.2	None
		22:00:00	54.9	40.0	55.0	0.1	None
	9.6.20	07:00:00	56.6	40.0	56.7	0.1	None
		08:00:00	58.5	40.0	58.6	0.1	None
		09:00:00	60.5	40.0	60.5	0.0	None
		10:00:00	59.5	40.0	59.5	0.0	None
		11:00:00	55.0	40.0	55.1	0.1	None

- 6.9 The impact classification in the context of change in noise level for Aldi delivery activity occurring during the daytime is considered to be low.
- 6.10 Overall when considering the outcomes of all three assessment methods, it is concluded that Aldi deliveries could be made between 0700 and 2300 hours without associated noise giving rise to significant adverse impact.

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7.0 Assessment conclusions

- 7.1 Having undertaken this assessment against objective criteria, it is concluded that the development could proceed without the likelihood of noise from subsequent operations giving rise to significant adverse impact, on the basis of the following operating hours:

Trading: 0800 to 2200 hours

Deliveries: 0700 to 2300 hours

- 7.2 Fixed plant equipment can be designed such that the suggested criteria in the table below are achieved at the nearest noise sensitive properties in Ffordd Abberley Hall.

TABLE 9: Proposed plant rating noise limits

Rating level limits (dB)	
Daytime	Night time
48 dB	35 dB

- 7.3 The following planning condition is recommended to secure the above criteria:

"No fixed plant and/or machinery shall come into operation until details of the fixed plant and machinery serving the development hereby permitted, and any mitigation measures to achieve this condition, are submitted to and approved in writing by the local planning authority. The rating level of the sound emitted from the site shall not exceed 48 dBA between 0700 and 2300 hours and 35 dBA at all other times. The sound levels shall be determined by measurement or calculation at the nearest noise sensitive premises. The measurements and assessment shall be made according to BS 4142:2014."

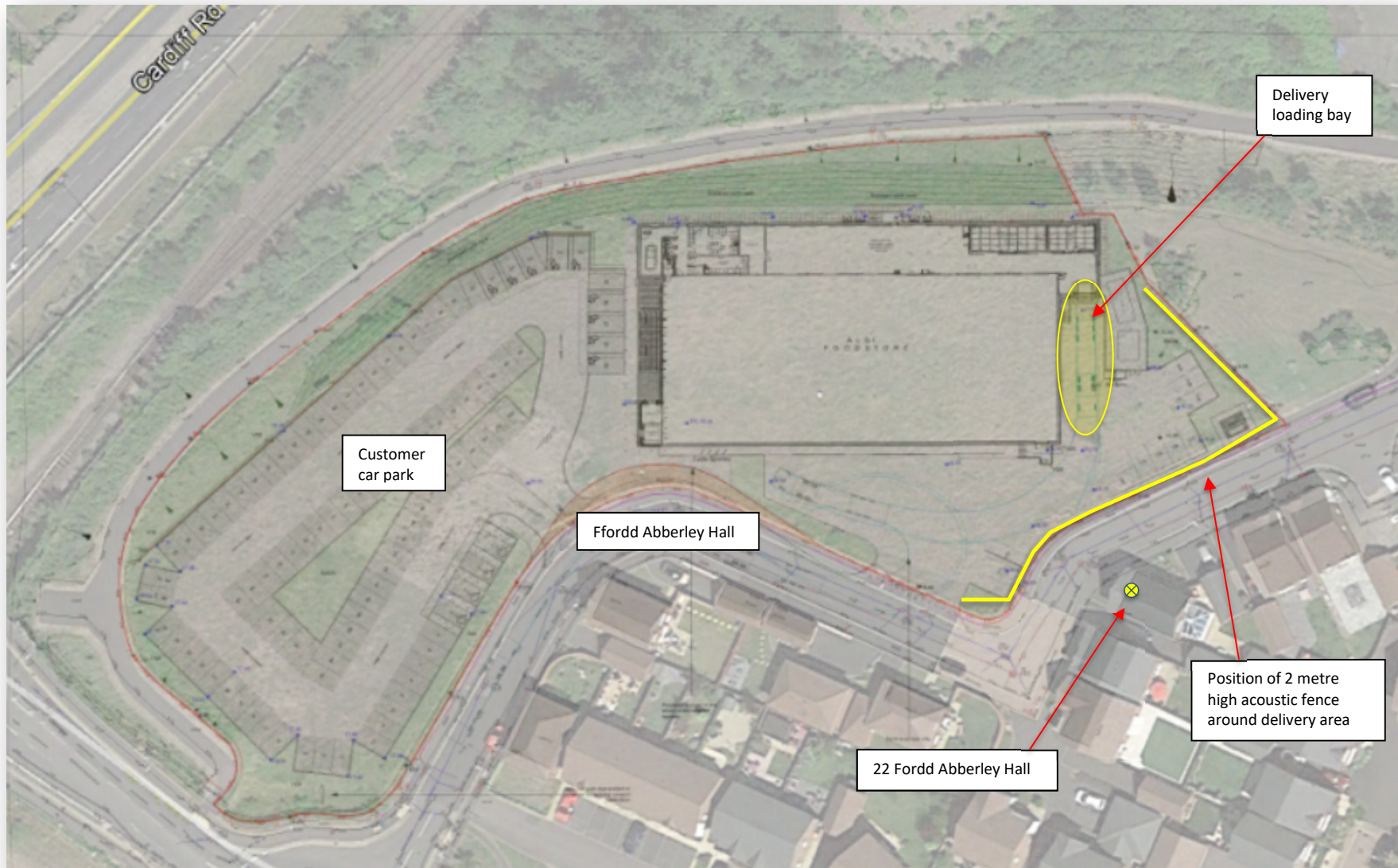
- 7.4 In summary, based on a thorough assessment against objective standards, noise associated with the proposed development would comply with the objectives of PPW to *"prevent adverse effects to amenity, health and the environment..."*.

APPENDIX A

SITE LOCATION PLAN

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Appendix A: Site location plan



APPENDIX B

NOISE SURVEY RESULTS

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Measurement location: Opposite properties in Ffordd Abberley Hall

Date	Sample start time	Noise Parameter - dB					
		L _{A10}	L _{A90}	L _{Aeq}	L _{Amax}	L _{Amin}	
8.6.20	14:30:00	58.6	48.3	55.3	74.0	42.2	
	14:45:00	59.5	49.8	57.3	69.3	43.8	
	15:00:00	58.1	48.7	55.1	68.3	40.7	
	15:15:00	58.8	48.6	55.7	65.0	42.2	
	19:30:00	59.0	49.0	56.2	75.6	42.5	
	19:45:00	58.5	48.8	55.6	72.1	41.2	
	20:00:00	66.8	48.3	62.9	80.1	43.0	
	20:15:00	67.2	51.0	63.7	79.7	41.2	
	20:30:00	59.0	47.3	58.4	80.4	40.6	
	20:45:00	57.2	46.8	53.7	62.6	41.3	
	21:00:00	57.4	46.2	54.0	75.5	40.7	
	21:15:00	57.9	48.3	54.2	65.2	44.0	
	21:30:00	56.7	45.1	53.4	71.6	38.6	
	21:45:00	55.6	44.1	51.8	62.0	37.6	
	22:00:00	57.9	45.6	54.3	63.4	40.2	
	22:15:00	56.8	46.3	53.8	66.4	39.9	
	22:30:00	57.2	40.4	57.7	80.3	35.3	
	22:45:00	55.4	38.8	51.6	62.8	34.9	
	23:00:00	55.9	37.5	51.2	62.9	32.8	
	23:15:00	55.5	33.8	49.7	61.3	30.4	
	23:30:00	57.9	34.3	52.6	66.8	29.6	
	23:45:00	54.2	37.3	50.1	63.0	31.2	
	9.6.20	00:00:00	51.6	34.6	46.8	58.3	31.6
		00:15:00	53.4	34.7	48.8	63.3	31.5
00:30:00		54.3	35.9	50.4	64.5	33.1	
00:45:00		50.4	34.6	46.6	61.8	30.8	
01:00:00		52.8	35.7	47.6	60.1	33.0	
01:15:00		48.4	31.8	44.0	59.7	30.1	
01:30:00		51.3	33.6	46.3	60.6	31.3	
01:45:00		46.8	31.6	43.7	61.4	30.2	
02:00:00		50.2	32.0	45.8	61.8	30.5	
02:15:00		46.7	30.9	42.8	57.3	29.1	
02:30:00		51.5	33.2	47.9	60.8	31.0	
02:45:00		51.1	33.5	47.5	61.0	31.6	
03:00:00		52.8	35.4	47.8	62.6	32.5	
03:15:00		50.0	35.4	52.4	80.5	33.3	
03:30:00		53.6	36.8	49.0	66.9	32.8	
03:45:00		55.3	37.4	51.7	68.3	33.2	
04:00:00		56.4	41.2	52.0	64.4	34.3	
04:15:00		74.3	45.3	68.9	85.1	38.8	
04:30:00		70.7	50.4	66.0	83.9	38.5	
04:45:00		50.7	40.6	47.5	61.8	37.3	
05:00:00		55.7	42.6	51.6	64.9	38.9	
05:15:00		55.4	42.3	50.9	64.5	39.7	
05:30:00		57.1	44.1	53.9	74.0	40.7	
05:45:00		56.9	45.2	52.9	63.7	41.3	
06:00:00	57.5	44.8	53.4	63.2	40.0		
06:15:00	57.8	44.5	53.9	67.6	40.0		
06:30:00	59.1	46.7	55.5	63.2	42.6		
06:45:00	58.6	45.0	54.9	66.6	41.9		
07:00:00	58.4	46.2	57.8	82.5	42.2		

Measurement location: Opposite properties in Ffordd Abberley Hall

Date	Sample start time	Noise Parameter - dB				
		L _{A10}	L _{A90}	L _{Aeq}	L _{Amax}	L _{Amin}
9.6.20	07:15:00	59.6	47.1	55.9	67.5	41.2
	07:30:00	59.1	48.8	55.8	74.2	42.7
	07:45:00	60.0	49.9	56.6	66.2	44.3
	08:00:00	58.6	49.2	55.6	68.8	41.2
	08:15:00	59.3	49.1	56.2	65.5	42.7
	08:30:00	59.2	48.3	55.3	63.8	42.1
	08:45:00	66.8	48.5	62.4	80.6	42.3
	09:00:00	66.4	51.6	63.8	92.0	40.3
	09:15:00	56.8	47.6	53.8	68.9	36.7
	09:30:00	57.0	47.7	53.9	65.0	40.1
	09:45:00	65.3	46.0	62.1	81.0	41.1
	10:00:00	62.8	56.2	60.9	74.8	53.4
	10:15:00	60.2	48.3	62.9	96.7	41.3
	10:30:00	55.4	47.1	52.4	60.2	39.6
	10:45:00	56.2	46.9	53.2	65.4	39.7
	11:00:00	55.9	47.9	52.9	60.2	45.0
	11:15:00	57.3	48.8	56.1	78.9	45.2
11:30:00	56.5	48.5	55.3	66.8	45.3	

APPENDIX C

PREDICTED DELIVERY EVENT NOISE LEVELS AND BS 4142 ASSESSMENT

Draft

Appendix C1: Predicted Aldi delivery activity noise levels

Assessment project: Proposed Aldi store, Abbey Road, Neath	Delivery component		
	Arrival	Unloading	Departure
Aldi delivery noise activity - predicted ambient noise levels ($L_{Aeq,T}$)*			
Closest residential property address:	22 Ffordd Abberley Hall		
Source noise level at 10 metres $L_{Aeq,T}$	69	58	67
Time - minutes	1	45	0.5
Distance between noise source and residential property in metres	24	40	24
Screening attenuation dB	8	7	8
Convert to 1 hour - dB	-17.8	-1.2	-20.8
Distance attenuation correction - dB	-7.6	-12.0	-7.6
Activity $L_{Aeq,1\text{ hr}}$	35.6 dB	37.7 dB	30.6 dB
Rating level correction	0 dB	6 dB	0 dB
Resultant daytime rating level $L_{Aeq,Tr}$	35.6 dB	43.7 dB	30.6 dB
Overall delivery activity noise (arrival, unloading, departure) $L_{Aeq,1\text{ hr}}$	40 dB		
Rating level dB $L_{Aeq,1\text{ hr}}$	45 dB		

*Where T = 1 hour for comparison with WHO guidelines and daytime BS 4142 assessment

Appendix C2.1		BASIC BARRIER ATTENUATION (based on Maekawa or CRTN)							
Receptor:	22 Ffordd Abberley Hall								
Project:	Aldi Mon Bank Road, Newport								
Source:	Delivery activity: arrival/departure				Receiver:	22 Ffordd Abberley Hall			
Source Height	Barrier Height				Receiver Height				
Source-to-Barrier Distance				Receiver-to-Barrier Distance					
Source-to-Barrier Distance		10.0 m		Source Height		1.0 m			
Receiver-to-Barrier Distance		14.0 m		Receiver Height		1.5 m			
Barrier Height		2.0 m		boundary fence					
Path difference =		0.054 m							
Frequency - Hz	63	125	250	500	1K	2K	4K	8K	CRTN
Attenuation - dB	5.3	5.8	6.6	7.9	9.7	11.9	14.5	17.2	8.3 dBA

Appendix C2.2

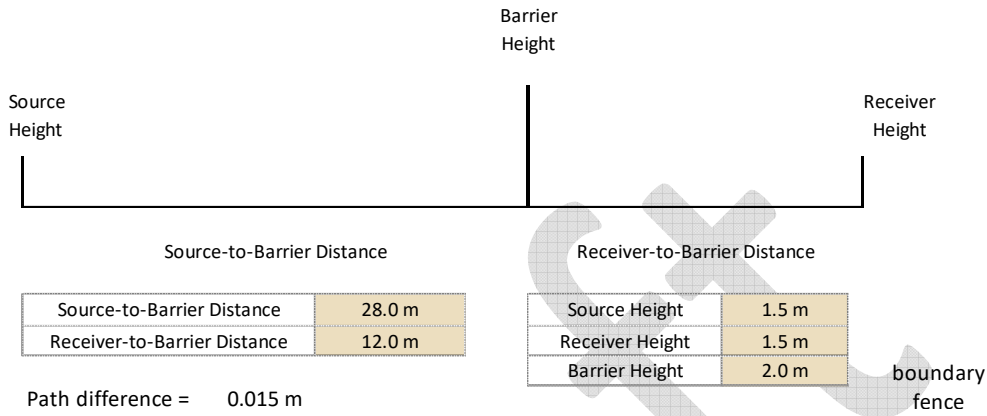
BASIC BARRIER ATTENUATION

(based on Maekawa or CRTN)

Receptor: **22 Ffordd Abberley Hall**
 Project: **Aldi Mon Bank Road, Newport**

Source: **Delivery activity:
unloading**

Receiver: **22 Ffordd Abberley Hall**



Frequency - Hz	63	125	250	500	1K	2K	4K	8K	CRTN
Attenuation - dB	4.9	5.1	5.4	5.9	6.8	8.1	10.0	12.3	6.8 dBA

Appendix C3: Daytime assessment of Aldi delivery activity noise using BS 4142:2014

Results	Time period	Relevant clause	Commentary
	Daytime		
Receptor	22 Ffordd Abberley Hall		
Background sound level dB (L_{A90})	48 dB	8.1, 8.1.3	For daytime the background sound level is the typical $L_{A90\ 1\text{hour}}$ value (levels from measurement location A)
Predicted delivery event specific noise level	40 dB		Predicted delivery activity noise level is $L_{Aeq\ 1\ \text{hour}}$ for daytime.
Acoustic feature correction	+6 dB	9.2	A rating level correction for clearly perceptible impulsivity (+6 dB) from unloading activity has been applied
Rating level	45 dB	9.2	
Background sound level	48 dB	8.1 8.1.3	
Excess of rating level over background level	-3	11	
Assessment is indicative of between low impact	Relevant clause 11 The context is: 1. Predicted delivery event noise levels are below the WHO daytime CNG values 2. Predicted delivery event noise levels are well below the existing daytime ambient noise climate		
Uncertainty of the assessment	Relevant clause 10 The delivery activity source noise levels have been measured across a large number of Aldi sites, and have been found to be consistent		
	Weather conditions during the survey were good and as such are not considered to have influenced the measured background noise climate		
	The excess of the rating level over the background sound level is -3 dB, in this instance the uncertainty of the measurement is unlikely to have any significance to the outcome of the assessment.		

APPENDIX D

ACOUSTIC TERMINOLOGY

Draft

Acoustic Terminology

D1 Noise, defined as unwanted sound, is measured in units of decibels, dB. The range of audible sounds is from 0 dB to 140 dB. Two equal sources of sound, if added together will result in an increase in level of 3 dB, i.e. $50 \text{ dB} + 50 \text{ dB} = 53 \text{ dB}$. Increases in continuous sound are perceived in the following manner:

1 dB increase - barely perceptible.

3 dB increase - just noticeable.

10 dB increase - perceived as twice as loud.

D2 Frequency (or pitch) of sound is measured in units of Hertz. 1 Hertz (Hz) = 1 cycle/second. The range of frequencies audible to the human ear is around 20Hz to 18000Hz (or 18kHz). The capability of a person to hear higher frequencies will reduce with age. The ear is more sensitive to medium frequency than high or low frequencies.

D3 To take account of the varying sensitivity of people to different frequencies a weighting scale has been universally adopted called "A-weighting". The measuring equipment has the ability automatically to weight (or filter) a sound to this A scale so that the sound level it measures best correlates to the subjective response of a person. The unit of measurement thus becomes dBA (decibel, A-weighted).

D4 The second important characteristic of sound is amplitude or level. Two units are used to express level, a) sound power level - L_w and b) sound pressure level - L_p . Sound power level is an inherent property of a source whilst sound pressure level is dependent on surroundings/distance/directivity, etc. The sound level that is measured on a meter is the sound pressure level, L_p .

D5 External sound levels are rarely steady but rise or fall in response to the activity in the area - cars, voices, planes, birdsong, etc. A person's subjective response to different noises has been found to vary dependent on the type and temporal distribution of a particular type of noise. A set of statistical indices have been developed for the subjective response to these different noise sources.

D6 The main noise indices in use in the UK are:

L_{A90} : The sound level (in dBA) exceeded for 90% of the time. This level gives an indication of the sound level during the quieter periods of time in any given sample. It is used to describe the "background sound level" of an area.

L_{Aeq} : The equivalent continuous sound level in dBA. This unit may be described as "the notional steady noise level that would provide, over a period, the same energy as the intermittent noise". In other words, the energy average level. This unit is now used to measure a wide variety of different types of noise of an industrial or commercial nature, as well as aircraft and trains.

L_{A10} : The sound level (in dBA) exceeded for 10% of the time. This level gives an indication of the sound level during the noisier periods of time in any given

sample. It has been used over many years to measure and assess road traffic noise.

L_{AMAX} : The maximum level of sound measured in any given period. This unit is used to measure and assess transient noises, i.e. gun shots, individual vehicles, etc.

- D7 The sound energy of a transient event may be described by a term SEL - Sound Exposure Level. This is the L_{Aeq} level normalised to one second. That is the constant level in dBA which lasting for one second has the same amount of acoustic energy as a given A weighted noise event lasting for a period of time. The use of this unit allows the prediction of the L_{Aeq} level over any period and for any number of events using the equation;

$$L_{AeqT} = SEL + 10 \log n - 10 \log T \text{ dB.}$$

Where

n = Number of events in time period T.

T = Total sample period in seconds.

- D8 In the open, known as free field, sound attenuates at a rate of 6 dB per each doubling of distance. This is known as geometric spreading or sometimes referred to as the Inverse Square Law. As noise is measured on a Logarithmic scale, this attenuation in distance = $20 \text{ Log} (\text{ratio of distances})$, e.g. for a noise level of 60 dB at ten metres, the corresponding level at 160 metres is:

$$60 - 20 \text{ Log } \frac{160}{10} = 60 - 24 = 36 \text{ dB.}$$