

# SHARPS REDMORE

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## Report

### The Portway, Porthcawl

Environmental Noise  
Assessment of a proposed  
Aldi store, The Portway,  
Porthcawl

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## **1.0 Introduction**

- 1.1 This report has been updated following consultation comments received from Shared Regulatory Services, Vale of Glamorgan Council. Section 2 of this report provides responses to the EHOs comments.
- 1.2 Sharps Redmore (SR) has been instructed to undertake a noise assessment of a proposed Aldi store at The Portway, Porthcawl. This is an update to the previous report dated 3rd March 2021 and includes an updated noise survey undertaken in 2021.
- 1.3 The proposal would include customer car park provision, a delivery loading bay and fixed plant equipment. The site is bordered to the west by The Portway and by the Eastern Promenade. The closest existing residential properties are to the north in Wellfield Avenue (as indicated at Appendix A). The site to the immediate east is understood to have been allocated for residential development; this future use is considered in this assessment.
- 1.4 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
- 1.5 Section 3 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.
- 1.6 Section 4 of this report presents details of the environmental noise survey undertaken at the site.
- 1.7 The different components of operational noise are considered in sections 4 to 7; the assessment conclusions are contained in section 8.
- 1.8 A guide to the acoustic terminology used within the report is included in Appendix D.

## 2.0 Response to Environmental Health Officer consultation comments

- 2.1 Consultation comment were received from Ms Helen Williams of Shared Regulatory Services, Vale of Glamorgan Council by email, dated 2.7.21.
- 2.2 Following the email, I have spoken to Ms Williams to discuss the issues raised; this updated report is to formally respond to the consultation comments.
- 2.3 Ms Williams wrote:

*“Paragraph 7.1 recommends delivery and trading hours if development was of:*

*Trading: 0800 to 2200 hours*

*Deliveries: 0700 to 2300 hours*

*7.2 then states that if the Aldi development were to come forward before any future residential development on the site to the east, in the context of noise to existing residential properties, there would be no technical noise reason to impose any operating hours restrictions. I know you have said operating hours- do you mean the trading operating hours or does this include deliveries? The reason I am asking is that regardless of whether the future site will go ahead, delivery hours would still have to be restricted due to the low backgrounds level after 10pm in any event (in the change in noise levels assessment, you have assessed this as up to moderate until 10pm and significant after 11pm. Therefore, for existing houses at Wellfield Ave, I would recommend deliveries do not occur after 10pm (regardless of consideration of future occupants), whereas above you have stated 23.00 hours.”*

KM response:

To clarify, my position is that until such time the potential future residential properties to the east of the Aldi site become occupied there is no technical noise reason to formally restrict, through planning condition, the operating hours of the site (either trading or deliveries). In terms of trading hours Aldi stores only trade between 0800 and 2200 hours and so would not trade outside these hours in any event.

With regard to delivery activity noise to existing properties (i.e those to the north in Wellfield Avenue) the key assessment method/criteria, as discussed, when considering delivery activity noise after 2200/2300 and before 0700 hours is the absolute level of noise in the context of the WHO Guidelines for Community Noise. This is because for noise that occurs at night it is the absolute level of noise that is the critical factor in relation to recognised sleep disturbance criteria. During the night time period generally people are inside their properties. Therefore, the outcome of a BS 4142 assessment, which assesses the difference between the external background noise level at the receptor and the external rating level of the specific noise source under consideration, does not reflect the true nature of the noise impact at the receptors. This is confirmed in the scope of BS4142:2014+A1:2019, which states “the methodology set out in Clauses 7, 8, and

*9 of this standard is not intended to be used to assess the extent of the impact at indoor locations”.*

2.4 Ms Williams wrote:

*“7.3 Plant Noise Rating Levels*

*You have recommended the following rating level limits:*

Rating Level Limit	
Day	Night
48 dB	35 dB

*Shared Regulatory Services ask for plant noise to between 5-10dB below existing background levels depending on what the existing noise climate is, whether there is already a lot of development present and what is achievable (clearly at background levels of 25dB between 00.00 and 01.30, which is the case for Wellfield Avenue, it would be unreasonable to request plant noise to be reduced to between 15-20dB). The problem of recommending 35dB for night is that between 00.00 and 01.30, that is 10dB above the existing background and throughout most of the night it is 7-8 dB above. During the day time, the background levels are already high and with existing development and Coney Beach Fair, it would not be desirable to increase background levels further. In addition, between 9 and 11pm, the background levels at Wellfield Avenue range between 30-42dB, so a rating level of 48dB would not be suitable at this time of the evening. Eg between 10 and 11pm, the average background level would be around 34 dB making the rating level at that time of evening of +14dB above background. Having considered the range of background levels and in order to just have two sets of limits, I would recommend that the rating level limits to be applied in this situation is 40 dB between 7am and 10pm and 30dB at all other times as opposed to 48dB and 35dB. With the range of plant and mitigation that is available, these limits should be easily achievable”.*

KM response:

We discussed the difficulty in establishing appropriate plant noise limits in situations such as this where the night time background noise climate falls to 25 dB  $L_{A90}$  for a large part of the night time period.

Setting appropriate plant noise limits in these situations is a balance between protecting amenity and setting reasonably achievable limits for the developer.

To this end, I agree with your suggested fixed plant rating noise level limits of 40 dB between 0700 and 2200 hours and 30 dB at all other times. As discussed, these plant noise limits are to be applied to the existing closest residential properties to the north at Wellfield Avenue, and not at the future residential properties to the east of the site. The following amended planning condition is proposed to secure the above plant rating noise level limits (for the avoidance of doubt, this proposed

condition supersedes the proposed planning condition at paragraph 5.7 of this report).

*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 40 dBA between 0700 and 2300 hours, and 30 dBA at all other times. The sound levels shall be determined by measurement or calculation at the nearest existing noise sensitive premises in Wellfield Avenue. The measurements and assessment shall be made according to BS 4142:2014+A1:2019."*

2.5 Ms Williams wrote:

*"Appendix C.1- Predicted Rating Level Delivery Noise*

*For the calculations you have included 10dB screening for the night time rating levels as well as the day time at all receptors, including LAmax predictions. I know what the 10dB screening is attributed to during the day, but I was wondering what the 10dB screening was attributed to at night at first floor levels for all receptors, including Wellfield Avenue or should the 10dB screening have been excluded from the night time predictions?"*

KM response:

You are correct the 10 dB screening attenuation to the two future receptor locations applied in the calculations at Appendix C1 for night time noise is an error. However, since it is accepted that there will be no deliveries outside of 0700 to 2200 hours once the future dwelling are occupied, this error has no material impact on the assessment outcome.

To this end the predicted delivery activity noise levels at Appendices C1.2 and C1.3 are 10 dB too low, when the screening is removed at both future residential receptors.

Table 2.5 below updates/supersedes Table 9 in this report (with the screening removed for the night time period at future receptors A and B). The changes to the predicted levels in Table 9 of this report are shown in red.

**TABLE 2.5: Comparison of predicted Aldi delivery event noise levels with the WHO CNG values**

Noise level	Parameter (dB)					
	L <sub>Aeq T</sub>	L <sub>Amax</sub>	L <sub>Aeq T</sub>	L <sub>Amax</sub>	L <sub>Aeq T</sub>	L <sub>Amax</sub>
Receptor	1 Wellfield Avenue		Future receptor #1		Future receptor #2	
Predicted delivery event noise level day/night <sup>[1]</sup>	36/41	-	44/55	-	40/54	-
Measured delivery peak noise levels Arrival-departure/unload	-	54-55/45	-	61-62/73	-	67-68/64
WHO guideline daytime/night time noise value <sup>[2]</sup>	55/45	60	55/45	60	55/45	60
Comply with WHO day/night time guidelines	YES	YES	YES	YES	YES	YES

<sup>1</sup> Where L<sub>Aeq T</sub> = 1-hour daytime, 15 minutes night time

<sup>2</sup> Where L<sub>Aeq T</sub> = 16-hour daytime and 8-hour night time

The corrected predicted delivery activity noise above do not materially change the recommended delivery hours to the proposed Aldi development at Porthcawl.

### 3.0 Assessment methodology and criteria

#### National Planning Policy

- 3.1 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”.
- 3.2 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.
- 3.3 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

- 3.4 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.



- 3.5 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.
- 3.6 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.
- 3.7 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”	$L_{AeqT} = 55 \text{ dB}$	Serious annoyance, daytime and evening. (Continuous noise, outdoor living areas)
	$L_{AeqT} = 50 \text{ dB}$	Moderate annoyance, daytime and evening. (Continuous noise, outdoor living areas).
	$L_{AeqT} = 35 \text{ dB}$	Moderate annoyance, daytime and evening. (Continuous noise, dwellings, indoors)
	$L_{AeqT} = 30 \text{ dB}$	Sleep disturbance, night-time (indoors)
	$L_{Amax} = 60 \text{ dB}$	Sleep disturbance, windows open at night. (Noise peaks outside bedrooms, external level).
	$L_{Amax} = 45 \text{ dB}$	Sleep disturbance at night (Noise peaks inside bedrooms, internal level)

- 3.8 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.
- 3.9 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

- 3.10 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  $L_{AeqT}$ .
- 3.11 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

- 3.12 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

- 3.13 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”.

3.14 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).

3.15 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;

3.16 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.

## 4.0 Environmental noise survey details

- 4.1 The previous report made use of a noise survey in the vicinity of the proposed Aldi site from November 2010. A new noise survey was undertaken in April 2021, the details of which are presented below.

### 2021 noise survey details

- 4.2 An unattended noise survey was undertaken at the site between Thursday 29th and Friday 30th April 2021. Site visits and extra manned measured 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 existing residential properties to The Portway. The three measurement positions that were used are indicated in Figure 1 below. Location 1 was left overnight to be representative of the noise climate in Wellfield Avenue; whilst locations 2 and 3 were short term attended measurements to be representative of the noise climate in the vicinity of future planned residential development.

**FIGURE 1: Noise measurement locations**



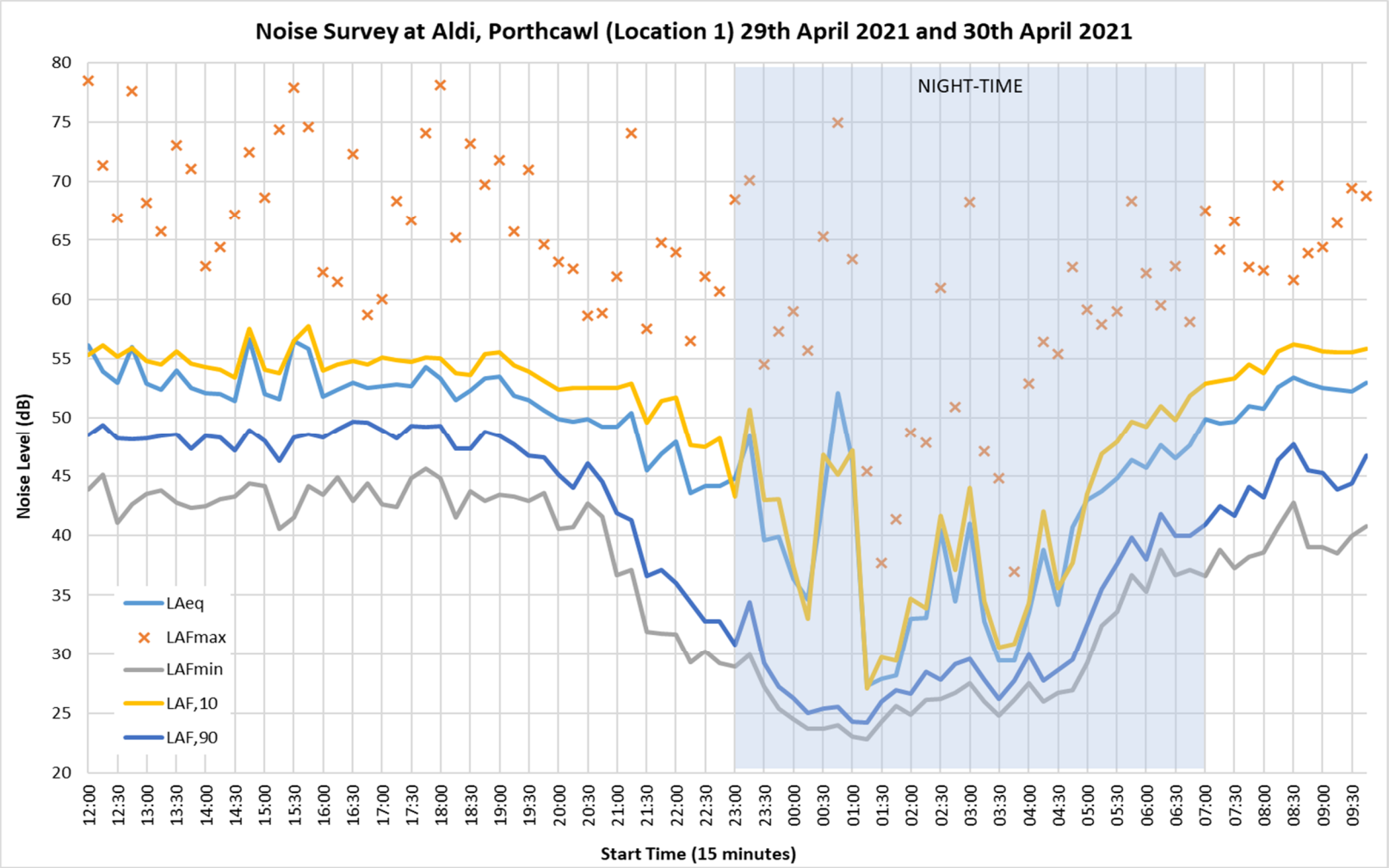
- 4.3 Noise level measurements at location 1 were undertaken using a Norsonic 140 sound level meter fitted with environmental microphone kit. The sound level meter was calibrated before and after the measurements and no drift in calibration signal was observed. At measurement locations 2 and 3 a Norsonic 118 sound level meter was used; this meter too was calibrated before and after each set of measurements and no variation in calibration signal found.
- 4.4 Weather conditions during the survey were cloudy and dry with a light and variable wind (<5m/s). Noise measurements were taken over 15 minutes sample periods in free field conditions at a height of approximately 5 metres above local ground level.
- 4.5 The noise levels measured during the survey were dominated by road traffic sources.
- 4.6 The measured noise levels from location 1 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 at location 1**

Date	Time	Noise level dB		
		L <sub>A90</sub> 1 hour	L <sub>A90</sub> 15 mins*	L <sub>Aeq</sub> 1 hour
29.4.21	12:00	48.6		55.0
	13:00	48.1		53.0
	14:00	48.2		53.6
	15:00	47.8		54.5
	16:00	49.2		52.4
	17:00	48.9		53.2
	18:00	48.2		52.7
	19:00	47.4		52.0
	20:00	44.9		49.7
	21:00	39.2		48.4
	22:00	34.0		45.4
	23:00		27.2	44.7
30.4.21	00:00		25.0	46.8
	01:00		24.2	40.4
	02:00		26.6	36.6
	03:00		26.2	36.1
	04:00		27.7	37.8
	05:00		32.5	44.7
	06:00		38.0	46.9
	07:00	42.3		50.1
	08:00	45.7		52.5
	09:00	45.1		52.5

\*Lowest 15-minute sample in each hour

FIGURE 2: Summary of measured noise levels



4.7 The measured noise levels from location 2 are summarised in Table 4 below.

**TABLE 4: Summary of measured noise levels from location 2**

Date	Time	Sound level dB	
		L <sub>A90</sub>	L <sub>Aeq T</sub>
29.4.21	12:17:00	47.7	61.9
	13:00:00	48.4	61.7
	14:00:00	50.5	61.6

4.8 The measured noise levels from location 2 are summarised in Table 4 below.

**TABLE 5: Summary of measured noise levels from location 3**

Date	Time	Sound level dB	
		L <sub>A90</sub>	L <sub>Aeq T</sub>
29.4.21	12:35:00	46.6	53.5
	13:17:00	48.2	52.3
	14:17:00	46.3	51.0
	21:00:00	48.1	54.0
	21:15:00	48.2	55.1
	21:30:00	41.9	52.3
	21:45:00	42.0	53.9



## 5.0 Noise from mechanical services plant

- 5.1 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/rear 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 background sound levels.
- 5.2 The closest existing residential properties to the proposed Aldi fixed plant equipment would be in Wellfield Avenue to the north; in respect of future residential premises, these could be located to the immediate east of the Aldi site.
- 5.3 The objective assessment of plant sound sources in commercial premises should be undertaken in accordance with British Standard 4142:2014+A1:2019. 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.
- 5.4 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').
- 5.5 Hence in relation to the guidance above from BS 4142:2014 there is a technical case to seek to set plant sound limits that match the current typical background sound climate. However, the former 1997 version of BS 4142 contained guidance in the scope to the Standard which states *"For the purposes of this standard, background noise levels below about 30 dB and rating levels below about 35 dB are considered to be very low"*. Therefore in instances where the background noise climate fell below 30 dB, such as is the case here, this offered the opportunity for rating noise levels to match the background noise climate or be limited to 35 dB, whichever is the higher.
- 5.6 The 2021 noise survey indicates typical background noise levels of 48 dB daytime and 27 dB during the night-time. In view of these measured levels and the guidance above, it is proposed that plant rating noise level limits should be set at 48 dB daytime and 35 dB at night.



5.7 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+A1:2019."*

## **6.0 Noise from customer car parking activity**

- 6.1 SR has previously undertaken extensive noise monitoring of Aldi store 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.
- 6.2 Aldi typically trades between 0800 and 2200 hours; customer car parking activity noise is therefore considered in the context of daytime assessment criteria.
- 6.3 The closest proposed car parking spaces are approximately 90 metres from the properties in Wellfield Avenue to the north of the site. The resultant predicted car park activity noise level (during peak trading conditions) at these properties would be 29 dB  $L_{Aeq,1\text{ hour}}$  (based on distance attenuation of  $20 \cdot \log[10/90]$ ) during peak hour trading and 24 dB during off peak trading.
- 6.4 The closest proposed car parking spaces are approximately 67 metres from the proposed residential site to the east of the Aldi site. The resultant predicted car park activity noise level (during peak trading conditions) at the closest future properties would be 32 dB  $L_{Aeq,1\text{ hour}}$  (based on distance attenuation of  $20 \cdot \log[10/67]$ ) during peak hour trading and 27 dB during off peak trading.
- 6.5 This predicted noise levels are 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.

## 7.0 Noise from delivery activity

- 7.1 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 6: Delivery activity - baseline source noise levels (free field)**

Event Noise Level (at 10 metres)					
Arrival		Unloading		Departure	
Duration (mins)	L <sub>Aeq T</sub> (dB)	Duration (mins)	L <sub>Aeq T</sub> (dB)	Duration (mins)	L <sub>Aeq T</sub> (dB)
2	68	45	58	1	67

- 7.2 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.
- 7.3 Table 7 below summarises the predicted ambient (L<sub>Aeq T</sub>) Aldi delivery activity noise levels at 1 Wellfield Avenue, and two assumed future residential receptors on the land to the east of the Aldi site (the full delivery event activity noise levels are included in Appendix C, receptor locations are indicated at Appendix A). The predicted delivery activity noise levels to the future residential properties are based on nominal 10 dB screening attenuation provided by an indicative 3 metre high acoustic grade fence (or equivalent) along the eastern site boundary.

**TABLE 7: Predicted Aldi delivery activity noise levels**

Receptor	Predicted noise level dB L <sub>Aeq 1</sub> hour
1 Wellfield Avenue	36
Future residential receptor #1	44
Future residential receptor #2	40

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

**TABLE 8: 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	
1 Wellfield Avenue	-12 to +3	+3 to +17	Indicative of between low and significant adverse impact*
Future receptor #1	0 to +15	+12 to +26	Indicative of between low and significant adverse impact*
Future receptor #2	-6 to +9	+7 to +21	Indicative of between low and significant adverse impact*

\*Depending on the 'context

- 7.5 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).
- 7.6 The BS 4142 assessment at Appendix C2 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 9: Comparison of predicted Aldi delivery event noise levels with the WHO CNG values**

Noise level	Parameter (dB)					
	L <sub>Aeq T</sub>	L <sub>Amax</sub>	L <sub>Aeq T</sub>	L <sub>Amax</sub>	L <sub>Aeq T</sub>	L <sub>Amax</sub>
Receptor	1 Wellfield Avenue		Future receptor #1		Future receptor #2	
Predicted delivery event noise level day/night <sup>[1]</sup>	36/41	-	44/45	-	40/44	-
Measured delivery peak noise levels Arrival-departure/unload	-	54-55/45	-	51-52/63	-	57-58/54
WHO guideline daytime/night time noise value <sup>[2]</sup>	55/45	60	55/45	60	55/45	60
Comply with WHO day/night time guidelines	YES	YES	YES	NO	YES	YES

<sup>1</sup> Where L<sub>Aeq T</sub> = 1-hour daytime, 15 minutes night time

<sup>2</sup> Where L<sub>Aeq T</sub> = 16-hour daytime and 8-hour night time

- 7.7 Predicted Aldi delivery event noise level complies with the WHO CNG daytime and night time values at the closest existing residential property. However, delivery activity noise to the future residential receptors would exceed the night time guideline values.
- 7.8 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 10: Change in noise level**

Receptor	Date	Time	Noise level $L_{Aeq,T}^*$				Noise impact
			Existing noise climate	Predicted delivery activity noise	Overall existing + predicted	Change in level	
1 Wellfield Avenue	29.4.21	12:00	48.6	36.0	48.8	0.2	Low
		13:00	48.1	36.0	48.4	0.3	Low
		14:00	48.2	36.0	48.5	0.3	Low
		15:00	47.8	36.0	48.1	0.3	Low
		16:00	49.2	36.0	49.4	0.3	Low
		17:00	48.9	36.0	49.1	0.2	Low
		18:00	48.2	36.0	48.4	0.2	Low
		19:00	47.4	36.0	47.7	0.4	Low
		20:00	44.9	36.0	45.4	0.5	Low
		21:00	39.2	36.0	40.9	1.7	Low
		22:00	34.0	36.0	38.1	4.1	Slight / moderate
		23:00	27.2	36.0	36.5	9.3	Moderate / significant
	30.4.21	00:00	25.0	36.0	36.3	11.3	Substantial
		01:00	24.2	36.0	36.3	12.1	Substantial
		02:00	26.6	36.0	36.5	9.9	Moderate / significant
		03:00	26.2	36.0	36.4	10.2	Moderate / significant
		04:00	27.7	36.0	36.6	8.9	Moderate / significant
		05:00	32.5	36.0	37.6	5.1	Slight / moderate
		06:00	38.0	36.0	40.1	2.1	Low
		07:00	42.3	36.0	43.2	0.9	Low
		08:00	45.7	36.0	46.1	0.4	Low
		09:00	45.1	36.0	45.6	0.5	Low
Future receptor #1	29.4.21	12:00	48.6	44.0	49.9	1.3	Low
		13:00	48.1	44.0	49.5	1.4	Low
		14:00	48.2	44.0	49.6	1.4	Low
		15:00	47.8	44.0	49.3	1.5	Low
		16:00	49.2	44.0	50.3	1.2	Low
		17:00	48.9	44.0	50.1	1.2	Low
		18:00	48.2	44.0	49.6	1.4	Low
		19:00	47.4	44.0	49.0	1.7	Low
		20:00	44.9	44.0	47.5	2.6	Low
		21:00	39.2	44.0	45.2	6.0	Moderate / significant
		22:00	34.0	44.0	44.4	10.4	Moderate / significant
		23:00	27.2	44.0	44.1	16.9	Severe
	30.4.21	00:00	25.0	44.0	44.1	19.1	Severe
		01:00	24.2	44.0	44.0	17.5	Severe
		02:00	26.6	44.0	44.1	17.5	Severe
		03:00	26.2	44.0	44.1	17.9	Severe
		04:00	27.7	44.0	44.1	16.4	Severe
		05:00	32.5	44.0	44.3	11.8	Substantial
		06:00	38.0	44.0	45.0	7.0	Moderate / significant
		07:00	42.3	44.0	46.2	3.9	Slight / moderate
		08:00	45.7	44.0	47.9	2.2	Low
		09:00	45.1	44.0	47.6	2.5	Low
Future receptor #2	29.4.21	12:00	48.6	40.0	49.1	0.5	Low
		13:00	48.1	40.0	48.7	0.6	Low
		14:00	48.2	40.0	48.8	0.6	Low
		15:00	47.8	40.0	48.5	0.7	Low
		16:00	49.2	40.0	49.6	0.5	Low
		17:00	48.9	40.0	49.4	0.5	Low
		18:00	48.2	40.0	48.8	0.6	Low
		19:00	47.4	40.0	48.1	0.8	Low
		20:00	44.9	40.0	46.1	1.2	Low
		21:00	39.2	40.0	42.6	3.4	Slight / moderate
		22:00	34.0	40.0	41.0	7.0	Moderate / significant
		23:00	27.2	40.0	40.2	13.0	Substantial
	30.4.21	00:00	25.0	40.0	40.1	15.1	Severe
		01:00	24.2	40.0	40.1	15.9	Severe
		02:00	26.6	40.0	40.2	13.6	Substantial
		03:00	26.2	40.0	40.2	14.0	Substantial
		04:00	27.7	40.0	40.2	12.5	Substantial
		05:00	32.5	40.0	40.7	8.2	Moderate / significant
		06:00	38.0	40.0	42.1	4.1	Slight / moderate
		07:00	42.3	40.0	44.3	2.0	Low
		08:00	45.7	40.0	46.7	1.0	Low
		09:00	45.1	40.0	46.3	1.2	Low

- 7.9 The impact classification in the context of change in noise level for Aldi delivery activity occurring during the daytime is considered to be low for 1 Wellfield Avenue; for Future receptor #1 it is low between 08:00 – 21:00 hours and for Future receptor #2 is low between 07:00 – 20:00 hours.
- 7.10 Overall when considering the outcomes of all three assessment methods, it is concluded that Aldi deliveries could be made on an unrestricted basis until the future residential development to the east of the service yard is occupied. Once the future residential development is occupied deliveries may need to be restricted to 0700 to 2300 hours, depending on the level of mitigation integrated and installed within the residential development to protect it against noise intrusion from Aldi activity.

## 8.0 Assessment conclusions

- 8.1 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

- 8.2 However, if the Aldi development were to come forward before any future residential development on the site to the east, in the context of noise to existing residential properties, there would be no technical noise reason to impose any operating hours restrictions.
- 8.3 Fixed plant equipment can be designed such that the suggested criteria in the table below are achieved at the nearest (existing or future) noise sensitive properties.

**TABLE 11: Proposed plant rating noise limits**

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

- 8.4 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+A1:2019."

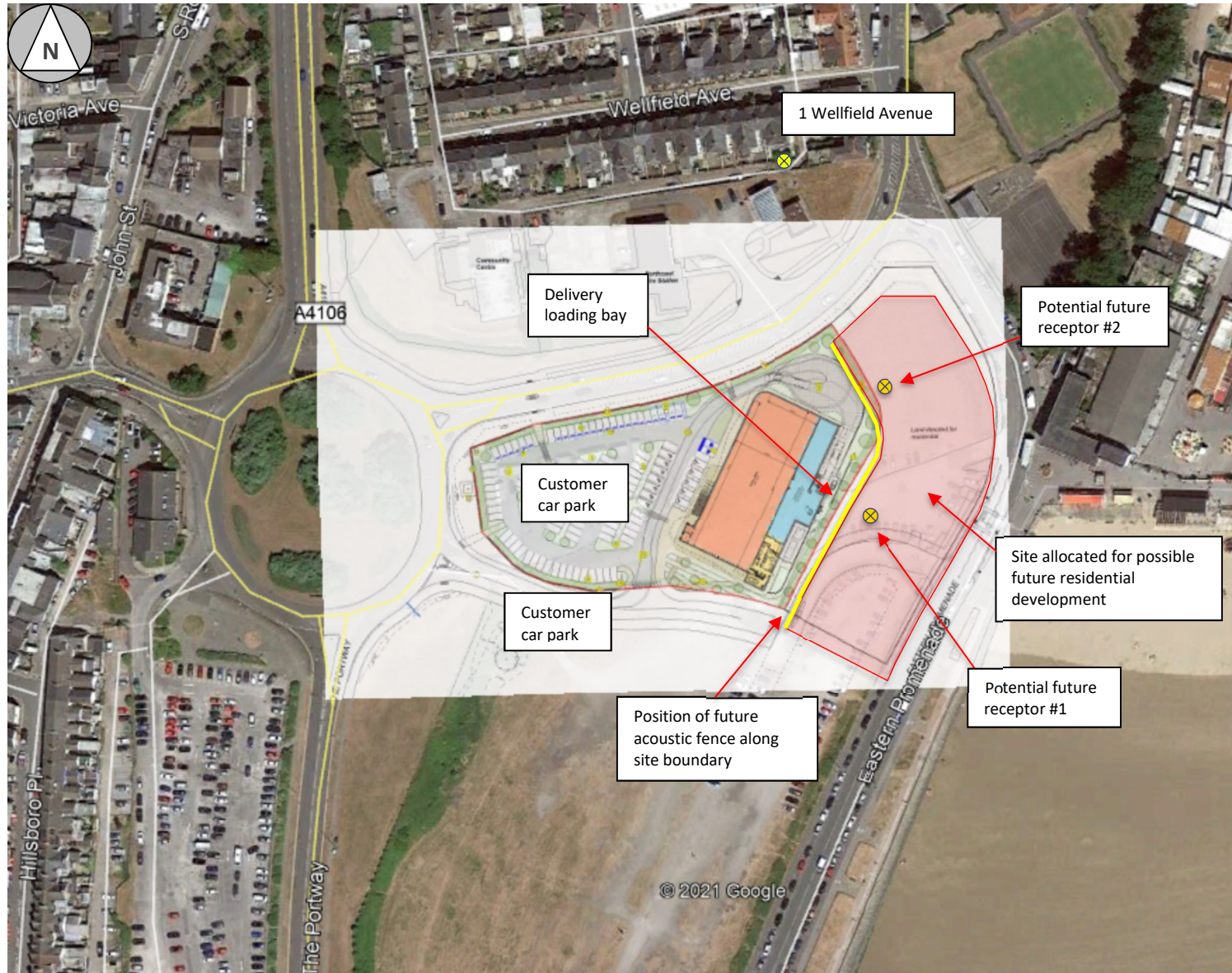
- 8.5 In summary, based on a thorough assessment against objective standards, noise associated with the proposed development would comply with the objectives of PPW to *"prevent adverse effects to amenity, health and the environment..."*.



## **APPENDIX A**

### **SITE LOCATION PLAN**

## Appendix A: Site location plan



## **APPENDIX B**

### **NOISE SURVEY RESULTS**

**Appendix B1****Title: Noise survey results****Aldi Porthcrawl, Location 1**

Date	Sample start time	Noise Parameter - dB				
		L <sub>A10</sub>	L <sub>A90</sub>	L <sub>Aeq</sub>	L <sub>AFmax</sub>	L <sub>AFmin</sub>
29.4.21	12:00:00	55.3	48.5	56.1	78.5	43.9
	12:15:00	56.1	49.4	53.9	71.4	45.1
	12:30:00	55.2	48.2	53.0	66.9	41.1
	12:45:00	55.9	48.1	56.0	77.6	42.6
	13:00:00	54.8	48.2	52.9	68.2	43.5
	13:15:00	54.5	48.4	52.4	65.7	43.8
	13:30:00	55.6	48.6	54.0	73.1	42.8
	13:45:00	54.6	47.3	52.5	71.1	42.3
	14:00:00	54.3	48.4	52.1	62.8	42.5
	14:15:00	54.1	48.3	52.0	64.4	43.1
	14:30:00	53.4	47.2	51.4	67.2	43.3
	14:45:00	57.5	48.9	56.6	72.5	44.4
	15:00:00	54.1	48.0	52.0	68.7	44.2
	15:15:00	53.8	46.3	51.6	74.4	40.6
	15:30:00	56.5	48.3	56.5	77.9	41.5
	15:45:00	57.7	48.6	55.8	74.6	44.2
	16:00:00	54.0	48.3	51.8	62.3	43.4
	16:15:00	54.5	49.0	52.4	61.5	44.9
	16:30:00	54.8	49.7	53.0	72.3	42.9
	16:45:00	54.5	49.6	52.5	58.7	44.4
	17:00:00	55.1	48.9	52.7	60.0	42.6
	17:15:00	54.9	48.2	52.8	68.4	42.4
	17:30:00	54.7	49.3	52.7	66.7	44.8
	17:45:00	55.1	49.2	54.3	74.1	45.6
	18:00:00	55.0	49.3	53.3	78.1	44.8
	18:15:00	53.8	47.3	51.5	65.2	41.5
	18:30:00	53.6	47.3	52.3	73.2	43.7
	18:45:00	55.4	48.8	53.3	69.8	42.9
	19:00:00	55.5	48.4	53.5	71.8	43.4
	19:15:00	54.4	47.7	51.9	65.7	43.3
	19:30:00	53.9	46.7	51.5	71.0	42.9
	19:45:00	53.1	46.6	50.6	64.6	43.6
	20:00:00	52.4	45.1	49.9	63.2	40.6
	20:15:00	52.5	44.0	49.7	62.6	40.7
	20:30:00	52.5	46.1	49.9	58.6	42.7
	20:45:00	52.5	44.5	49.2	58.8	41.6
	21:00:00	52.5	41.9	49.2	61.9	36.7
	21:15:00	52.9	41.3	50.4	74.1	37.1
	21:30:00	49.6	36.6	45.5	57.5	31.9
	21:45:00	51.4	37.1	46.9	64.8	31.8
	22:00:00	51.7	36.0	47.9	64.0	31.7
	22:15:00	47.6	34.4	43.6	56.5	29.3
	22:30:00	47.5	32.8	44.2	61.9	30.2
	22:45:00	48.2	32.8	44.2	60.7	29.2
	23:00:00	43.3	30.8	44.8	68.5	28.9
	23:15:00	50.7	34.4	48.4	70.1	29.9
	23:30:00	43.0	29.2	39.6	54.5	27.2
	23:45:00	43.1	27.2	39.9	57.3	25.4

**Appendix B2****Title: Noise survey results****Aldi Porthcrawl, Location 1**

Date	Sample start time	Noise Parameter - dB				
		L <sub>A10</sub>	L <sub>A90</sub>	L <sub>Aeq</sub>	L <sub>AFmax</sub>	L <sub>AFmin</sub>
30.4.21	00:00:00	37.4	26.3	36.4	59.0	24.5
	00:15:00	33.0	25.0	34.6	55.7	23.7
	00:30:00	46.8	25.4	43.3	65.3	23.7
	00:45:00	45.1	25.5	52.1	75.0	24.0
	01:00:00	47.2	24.3	46.2	63.4	23.0
	01:15:00	27.1	24.2	27.3	45.4	22.8
	01:30:00	29.7	26.0	27.9	37.7	24.3
	01:45:00	29.4	26.9	28.2	41.4	25.6
	02:00:00	34.7	26.6	33.0	48.7	24.9
	02:15:00	33.9	28.5	33.1	47.8	26.1
	02:30:00	41.7	27.8	40.5	61.0	26.2
	02:45:00	37.1	29.1	34.5	50.9	26.7
	03:00:00	44.0	29.6	41.0	68.3	27.5
	03:15:00	34.5	27.8	32.8	47.1	26.0
	03:30:00	30.6	26.2	29.4	44.8	24.8
	03:45:00	30.9	27.7	29.4	37.0	26.1
	04:00:00	34.3	29.9	33.5	52.9	27.5
	04:15:00	42.0	27.7	38.8	56.4	26.0
	04:30:00	35.6	28.6	34.2	55.4	26.7
	04:45:00	37.7	29.5	40.7	62.7	26.9
	05:00:00	43.5	32.5	43.0	59.1	29.2
	05:15:00	46.9	35.5	43.7	57.9	32.4
	05:30:00	47.9	37.6	44.8	59.0	33.6
	05:45:00	49.7	39.8	46.4	68.4	36.7
	06:00:00	49.2	38.0	45.7	62.2	35.3
	06:15:00	51.0	41.8	47.6	59.5	38.8
	06:30:00	49.8	40.0	46.5	62.8	36.7
	06:45:00	51.9	40	47.6	58.1	37.1
	07:00:00	52.9	40.9	49.9	67.6	36.6
	07:15:00	53.1	42.5	49.5	64.2	38.8
	07:30:00	53.3	41.7	49.7	66.6	37.3
	07:45:00	54.5	44.1	51.0	62.7	38.2
	08:00:00	53.8	43.2	50.8	62.4	38.6
	08:15:00	55.6	46.4	52.6	69.7	40.7
	08:30:00	56.2	47.7	53.4	61.6	42.8
	08:45:00	56.0	45.5	52.9	63.9	39.0
	09:00:00	55.6	45.3	52.5	64.4	39.0
	09:15:00	55.5	43.9	52.4	66.5	38.5
	09:30:00	55.5	44.4	52.2	69.5	40.0
	09:45:00	55.8	46.7	53.0	68.8	40.8

**Aldi Porthcrawl noise measurement Location 2**

Date	Sample start time	Noise Parameter - dB				
		L <sub>A10</sub>	L <sub>A90</sub>	L <sub>Aeq</sub>	L <sub>AFmax</sub>	L <sub>AFmin</sub>
30.4.21	12:17:00	65.2	47.7	61.9	82.4	41.1
	13:00:00	65.1	48.4	61.7	79.6	42.3
	14:00:00	65.4	50.5	61.6	73.3	43.4

**Aldi Porthcrawl noise measurement Location 3**

Date	Sample start time	Noise Parameter - dB				
		L <sub>A10</sub>	L <sub>A90</sub>	L <sub>Aeq</sub>	L <sub>AFmax</sub>	L <sub>AFmin</sub>
30.4.21	12:35:00	55.6	46.6	53.5	75.6	42.5
	13:17:00	54.8	48.2	52.3	67.1	43.5
	14:17:00	52.5	46.3	51.0	71.0	43.7
	21:00:00	55.6	48.1	54.0	71.0	43.3
	21:15:00	57.6	48.2	55.1	74.6	44.1
	21:30:00	55.1	41.9	52.3	71.1	37.7
	21:45:00	53.5	42.0	53.9	80.0	37.2

## **APPENDIX C**

### **PREDICTED DELIVERY EVENT NOISE LEVELS AND BS 4142 ASSESSMENT**

## Appendix C1: Predicted Aldi delivery activity noise levels

### APPENDIX C1.1

Assessment project: Aldi Porthcawl	Delivery component		
	Arrival	Unloading	Departure
Delivery noise activity - predicted ambient noise levels (L <sub>Aeq T</sub> ) *			
Closest residential property address:	1 Wellfield Avenue		
Source noise level at 10 metres dB L <sub>Aeq T</sub>	68	58	67
Time - minutes	2	45	1
Distance between noise source and residential property in metres	85	120	85
Screening attenuation dB	0	10	0
Convert to 1 hour - dB	-14.8	-1.2	-17.8
Convert to 15 mins - dB	-8.8	-0.3	-
Distance attenuation correction - dB	-18.6	-21.6	-18.6
Activity dB L <sub>Aeq 1 hr</sub>	34.6 dB	25.2 dB	30.6 dB
Activity dB L <sub>Aeq 15 mins</sub>	40.7 dB	26.1 dB	-
Rating level correction	0 dB	0 dB	3 dB
Resultant daytime rating level dB L <sub>Ar, Tr</sub>	34.6 dB	25.2 dB	33.6 dB
Resultant nighttime rating level dB L <sub>Ar, Tr</sub>	40.7 dB	26.1 dB	-
Overall delivery activity noise (arrival, unloading, departure) dB L <sub>Aeq 1 hr</sub>	36 dB		
Overall delivery activity noise ( arrival + unloading) dB L <sub>Aeq 15 mins</sub>	41 dB		
Rating level dB L <sub>Aeq 1 hr</sub>	37 dB		
Rating level dB L <sub>Aeq 15 mins</sub>	41 dB		
Delivery noise activity - predicted peak noise levels (L <sub>Amax</sub> )			
Source noise level at 10 metres dB L <sub>Amax</sub>	73	77	74
Distance between noise source and residential property in metres	85	120	85
Screening attenuation dB	0	10	0
Distance attenuation correction - dB	-18.6	-21.6	-18.6
Peak noise level dB L <sub>Amax</sub>	54 dB	45 dB	55 dB

### APPENDIX C1.2

Assessment project: Aldi Porthcawl	Delivery component		
	Arrival	Unloading	Departure
Delivery noise activity - predicted ambient noise levels (L <sub>Aeq T</sub> ) *			
Closest residential property address:	Future residential receptor #1		
Source noise level at 10 metres dB LAeq T	68	58	67
Time - minutes	2	45	1
Distance between noise source and residential property in metres	40	15	40
Screening attenuation dB	10	10	10
Convert to 1 hour - dB	-14.8	-1.2	-17.8
Convert to 15 mins - dB	-8.8	-0.3	-
Distance attenuation correction - dB	-12.0	-3.5	-12.0
Activity dB LAeq 1 hr	31.2 dB	43.2 dB	27.2 dB
Activity dB LAeq 15 mins	37.2 dB	44.2 dB	-
Rating level correction	0 dB	6 dB	3 dB
Resultant daytime rating level dB LAr, Tr	31.2 dB	49.2 dB	30.2 dB
Resultant nighttime rating level dB LAr, Tr	37.2 dB	50.2 dB	-
Overall delivery activity noise (arrival, unloading, departure) dB LAeq 1 hr	44 dB		
Overall delivery activity noise ( arrival + unloading) dB LAeq 15 mins	45 dB		
Rating level dB LAeq 1 hr	49 dB		
Rating level dB LAeq 15 mins	50 dB		
Delivery noise activity - predicted peak noise levels (LAmax)			
Source noise level at 10 metres dB LAmax	73	77	74
Distance between noise source and residential property in metres	40	15	40
Screening attenuation dB	10	10	10
Distance attenuation correction - dB	-12.0	-3.5	-12.0
Peak noise level dB LAmax	51 dB	63 dB	52 dB

### APPENDIX C1.3

Assessment project: Aldi Porthcawl	Delivery component		
	Arrival	Unloading	Departure
Delivery noise activity - predicted ambient noise levels (L <sub>Aeq T</sub> ) *			
Closest residential property address:	Future residential receptor #2		
Source noise level at 10 metres dB LAeq T	68	58	67
Time - minutes	2	45	1
Distance between noise source and residential property in metres	20	47	20
Screening attenuation dB	10	10	10
Convert to 1 hour - dB	-14.8	-1.2	-17.8
Convert to 15 mins - dB	-8.8	-0.3	-
Distance attenuation correction - dB	-6.0	-13.4	-6.0
Activity dB LAeq 1 hr	37.2 dB	33.3 dB	33.2 dB
Activity dB LAeq 15 mins	43.2 dB	34.3 dB	-
Rating level correction	0 dB	6 dB	3 dB
Resultant daytime rating level dB L <sub>Ar</sub> , Tr	37.2 dB	39.3 dB	36.2 dB
Resultant nighttime rating level dB L <sub>Ar</sub> , Tr	43.2 dB	40.3 dB	-
Overall delivery activity noise (arrival, unloading, departure) dB LAeq 1 hr	40 dB		
Overall delivery activity noise ( arrival + unloading) dB LAeq 15 mins	44 dB		
Rating level dB LAeq 1 hr	43 dB		
Rating level dB LAeq 15 mins	45 dB		
Delivery noise activity - predicted peak noise levels (L <sub>Amax</sub> )			
Source noise level at 10 metres dB L <sub>amax</sub>	73	77	74
Distance between noise source and residential property in metres	20	47	20
Screening attenuation dB	10	10	10
Distance attenuation correction - dB	-6.0	-13.4	-6.0
Peak noise level dB L <sub>Amax</sub>	57 dB	54 dB	58 dB



## Appendix C2: BS 4142 assessment

## APPENDIX C2.1

Results	Time period																						Relevant clause	Commentary
	29.4.21											30.4.21												
	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00		
Receptor	1 Wellfield Avenue																							
Background sound level dB (L <sub>A90</sub> )	48.6	48.1	48.2	47.8	49.2	48.9	48.2	47.4	44.9	39.2	34.0	27.2	25.0	24.2	26.6	26.2	27.7	32.5	38.0	42.3	45.7	45.1	8.1, 8.1.3	For daytime the background sound level is the L <sub>A90 1hour</sub> value, and night time L <sub>A90 15 minute</sub> value, these are the lowest measured levels from the survey
Specific sound level - predicted delivery event noise level	36 dB	36 dB	36 dB	36 dB	36 dB	36 dB	36 dB	36 dB	36 dB	36 dB	36 dB	41 dB	41 dB	41 dB	41 dB	41 dB	41 dB	41 dB	41 dB	36 dB	36 dB	36 dB		Predicted delivery activity noise level is L <sub>Aeq 15 minute</sub> for nighttime and L <sub>Aeq 1 hour</sub> for daytime
Acoustic feature correction (applied in delivery calc sheet)	rating level corection 0 dB																					9.2	No rating level correction applied	
Rating level	37 dB	37 dB	37 dB	37 dB	37 dB	37 dB	37 dB	37 dB	37 dB	37 dB	37 dB	41 dB	41 dB	41 dB	41 dB	41 dB	41 dB	41 dB	41 dB	37 dB	37 dB	37 dB	9.2	
Background sound level	49 dB	48 dB	48 dB	48 dB	49 dB	49 dB	48 dB	47 dB	45 dB	39 dB	34 dB	27 dB	25 dB	24 dB	27 dB	26 dB	28 dB	33 dB	38 dB	42 dB	46 dB	45 dB	8.1	
Excess of rating level over background level	-12	-11	-11	-11	-12	-12	-11	-10	-8	-2	+3	+14	+16	+17	+14	+15	+13	+9	+3	-5	-9	-8	11	
Assessment is indicative of low impact	Relevant clause 11 The context is: 1. Predicted delivery event noise levels (L <sub>Aeq 1 hour</sub> ) are below the WHO Community Noise daytime and night time guideline values 2. The predicted delivery event noise levels are below the existing daytime and night time ambient noise climate 3. In consideration of noise impact that may occur during the early morning period, the difference between an external rating noise level and the existing (external) background noise level does not best represent the true impact. This is because people are generally inside properties at this time sleeping. Therefore the key noise impact indicator is the absolute level of noise in relation to sleep disturbance criteria, such as those contained in the WHO CNG.																							
Uncertainty of the assessment	Relevant clause 10 Weather conditions at the time the noise measurements were taken were good such that meteorological conditions are not considered to have influenced the measured background noise climate The excess of the rating level over the background sound level is between -12 dB and +17 dB.																							

## APPENDIX C2.2

Results	Time period																						Relevant clause	Commentary
	29.4.21												30.4.21											
	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00		
Receptor	Future receptor #1																							
Background sound level dB (L <sub>A90</sub> )	48.55	48.13	48.2	47.8	49.2	48.9	48.2	47.4	44.9	39.2	34.0	27.2	25.0	24.2	26.6	26.2	27.7	32.5	38.0	42.3	45.7	45.1	8.1, 8.1.3	For daytime the background sound level is the L <sub>A90 1 hour</sub> value, and night time L <sub>A90 15 minute</sub> value, these are the lowest measured levels from the survey
Specific sound level - predicted delivery event noise level	44 dB	44 dB	44 dB	44 dB	44 dB	44 dB	44 dB	44 dB	44 dB	44 dB	44 dB	45 dB	45 dB	45 dB	45 dB	45 dB	45 dB	45 dB	44 dB	44 dB	44 dB	44 dB		Predicted delivery activity noise level is L <sub>Aeq 15 minute</sub> for nighttime and L <sub>Aeq 1 hour</sub> for daytime
Acoustic feature correction (applied in delivery calc sheet)	rating level corection +6 dB																						9.2	rating level corection of +6 dB is applied within delivery calculation to unloading activty for clearly perceptible impulsivity
Rating level	49 dB	49 dB	49 dB	49 dB	49 dB	49 dB	49 dB	49 dB	49 dB	49 dB	50 dB	50 dB	50 dB	50 dB	50 dB	50 dB	50 dB	50 dB	49 dB	49 dB	49 dB	49 dB	9.2	
Background sound level	49 dB	48 dB	48 dB	48 dB	49 dB	49 dB	48 dB	47 dB	45 dB	39 dB	34 dB	27 dB	25 dB	24 dB	27 dB	26 dB	28 dB	33 dB	38 dB	42 dB	46 dB	45 dB	8.1	
Excess of rating level over background level	+0	+1	+1	+1	-0	+0	+1	+2	+4	+10	+15	+23	+25	+26	+23	+24	+22	+18	+12	+7	+3	+4	11	
Assessment is indicative of between low and significant adverse impact	<b>Relevant clause 11</b> The context is: 1. Predicted delivery event noise levels (L <sub>Aeq 1 hour</sub> ) are below the WHO Community Noise daytime guideline values 2. The predicted delivery event noise levels are below the existing daytime ambient noise climate 3. In consideration of noise impact that may occur during the early morning period, the difference between an external rating noise level and the existing (external) background noise level does not best represent the true impact. This is because people are generally inside properties at this time sleeping. Therefore the key noise impact indicator is the absolute level of noise in relation to sleep disturbance criteria, such as those contained in the WHO CNG.																							
Uncertainty of the assessment	<b>Relevant clause 10</b> Weather conditions at the time the noise measurements were taken were good such that meteorological conditions are not considered to have influenced the measured background noise climate The excess of the rating level over the background sound level is between 0 dB and +26 dB.																							

## APPENDIX C2.3

Results	Time period																								Relevant clause	Commentary
	29.4.21												30.4.21													
	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00				
Receptor	Future receptor #2																									
Background sound level dB (L <sub>A90</sub> )	48.55	48.13	48.2	47.8	49.2	48.9	48.2	47.4	44.9	39.2	34.0	27.2	25.0	24.2	26.6	26.2	27.7	32.5	38.0	42.3	45.7	45.1	8.1, 8.1.3	For daytime the background sound level is the L <sub>A90 1hour</sub> value, and night time L <sub>A90 15 minute</sub> value, these are the lowest measured levels from the survey		
Specific sound level - predicted delivery event noise level	40 dB	40 dB	40 dB	40 dB	40 dB	40 dB	40 dB	40 dB	40 dB	40 dB	40 dB	44 dB	44 dB	44 dB	44 dB	44 dB	44 dB	44 dB	44 dB	40 dB	40 dB	40 dB		Predicted delivery activity noise level is L <sub>Aeq 15 minute</sub> for nighttime and L <sub>Aeq 1 hour</sub> for daytime		
Acoustic feature correction (applied in delivery calc sheet)	rating level corection +6 dB																					9.2	rating level corection of +6 dB is applied within delivery calculation to unloading activity for clearly perceptible impulsivity			
Rating level	43 dB	43 dB	43 dB	43 dB	43 dB	43 dB	43 dB	43 dB	43 dB	43 dB	43 dB	45 dB	45 dB	45 dB	45 dB	45 dB	45 dB	45 dB	43 dB	43 dB	43 dB	9.2				
Background sound level	49 dB	48 dB	48 dB	48 dB	49 dB	49 dB	48 dB	47 dB	45 dB	39 dB	34 dB	27 dB	25 dB	24 dB	27 dB	26 dB	28 dB	33 dB	38 dB	42 dB	46 dB	45 dB	8.1			
Excess of rating level over background level	-6	-5	-5	-5	-6	-6	-5	-4	-2	+4	+9	+18	+20	+21	+18	+19	+17	+13	+7	+1	-3	-2	11			
Assessment is indicative of between low and adverse impact	<b>Relevant clause 11</b> The context is: 1. Predicted delivery event noise levels (L <sub>Aeq 1 hour</sub> ) are below the WHO Community Noise daytime guideline values 2. The predicted delivery event noise levels are below the existing daytime ambient noise climate 3. In consideration of noise impact that may occur during the early morning period, the difference between an external rating noise level and the existing (external) background noise level does not best represent the true impact. This is because people are generally inside properties at this time sleeping. Therefore the key noise impact indicator is the absolute level of noise in relation to sleep disturbance criteria, such as those contained in the WHO CNG.																									
Uncertainty of the assessment	<b>Relevant clause 10</b> Weather conditions at the time the noise measurements were taken were good such that meteorological conditions are not considered to have influenced the measured background noise climate The excess of the rating level over the background sound level is between -6 dB and +21 dB.																									

## **APPENDIX D**

### **ACOUSTIC TERMINOLOGY**

## 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 dB + 50 dB = 53 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 =  $20 \log$  (ratio of distances), e.g. for a noise level of 60 dB at ten metres, the corresponding level at 160 metres is:

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