

Technical Memorandum

To: Mark Warrior (Warrior Developments), Gary Rafferty (Lidl)
From: Mike Potts (Echo Acoustics)
CC: Gary Swarbrick (ELG Planning), Graham Wrightson (Wrightson Associates)
Date: 11 January 2022
Re: Update of noise assessment for former Goldthorpe Primary School, High Street, Goldthorpe, Barnsley, S63 9NQ

This technical memorandum has been prepared by Mike Potts of Echo Acoustics; Mr Potts is a Member of the Institute of Acoustics (MIOA) and is an acoustic Consultant with over 20 years' experience in environmental noise assessment, within both regulatory and private industry roles at a senior level, and including experience in the provision of Expert Witness evidence at Public Inquiry.

Introduction

This assessment provides an update on the previous noise assessment report¹ for this site, taking into account a change of layout and proposed change of delivery hours, to accompany the submission of a new planning application.

The site is subject to a planning permission (reference: 2019/0518) enabling the "*Erection of a 1,394 sq.m (gross) retail unit (Use Class A1) with access, car parking, hard and soft landscaping, trolley bays, electricity substation and associated works*", for which the previous report¹ was prepared.

A subsequent S.73 application for the variation of Condition 8 (Opening Hours) of planning permission 2019/0518 was approved on 1st October 2020 (LPA Ref. 2020/0765) and the extant consent allows for:

- Deliveries between the hours of 09:00 to 17:00 Mondays to Fridays, 09:00 to 13:00pm on Saturdays and at no time on Sundays or Bank Holidays.
- Operational hours of 08:00 to 22:00 Mondays to Saturdays and 10:00 to 17:00 on Sundays and Bank Holidays.

It is now proposed that the site will be utilised by Lidl as a food-store, with a different layout and different opening hours. Consequently, a fresh planning application is to be submitted.

¹ Echo Acoustics, April 2019 "*Development of former Goldthorpe School site: Noise Assessment*"

Previous report

The previous report included data from a noise measurement survey undertaken at the positions presented in Figure 1.

Figure 1: 2019 noise measurement locations



The data from that survey are presented in Table 1.

Table 1: 2019 noise measurement data

Location	Time	Elapsed time	Measured noise	
			L _{A90}	L _{Aeq}
1	13:15	15:00	39.8	47.7
	13:30	15:00	39.7	47.4
	13:45	15:00	41.2	47.4
	14:00	15:00	40.8	48.7
	14:15	15:00	40.6	52.1
	14:30	15:00	40.0	48.8
	14:45	15:00	39.6	43.5
	15:00	15:00	39.4	43.2
		Median:	39.9	48.1
	21:00	15:00	38.3	43.8
	21:15	15:00	36.7	40.3
	21:30	15:00	36.7	40.9
	21:45	15:00	35.9	39.5
	22:00	15:00	34.6	39.5
	22:15	15:00	35.5	40.2
	22:30	15:00	34.6	40.5
	22:45	15:00	34.1	38.7
		Median:	35.7	40.7
2	13:15	15:00	44.5	49.8
	13:31	15:00	45.5	49.4
	14:30	15:00	46.5	50.4
		Median:	45.5	49.9
	21:00	15:00	43.0	48.6
	21:15	15:00	42.0	47.7
	21:30	15:00	42.0	49.8
	21:45	15:00	40.5	46.8
	22:00	15:00	38.0	45.8
	22:15	15:00	38.5	46.4
	22:30	15:00	36.5	44.9
	22:45	15:00	36.5	44.5
		Median:	39.5	47.2
3	13:48	11:17	48.5	56.4
	14:00	15:00	47.5	54.7
	15:00	15:00	47.5	55.4
	15:15	08:51	49.5	55.6
		Median:	48.0	55.6

The previous assessment was based on a store layout with the delivery area located to the rear of the store, as indicated in Figure 2.

Figure 2: Previous store layout



This gave rise to a potentially significant adverse noise impact for the residents of the bungalows on Market Street. Consequently, mitigation was proposed through the provision of a 2.5 metre-high noise barrier along the rear garden boundaries of the bungalows and around the service yard, additionally protecting the rear of 5a and 5b Barnsley Road.

The location of fixed cooling plant equipment for the store had not been decided and the previous report recommended that *“as a purely precautionary measure, in order to prevent adverse noise effects, it is recommended that these units be mounted at ground level on the northern side of the building, facing Barnsley Road”*.

If this proved not to be possible and they were to be installed at the rear of the food store, it was recommended that *“they should be specified and designed to achieve a rating noise level 5 dB below the median evening 90th percentile level of 35.7 dB L_{A90} at location 1 (rear of bungalows), namely a rating level of 30.7 dB $L_{A,Tf}$ ”*.

Current proposals

The current proposals, also for a food store, include a different site layout (Figure 3), with deliveries to the front of the store and plant equipment located to the rear (east) of the store.

Figure 3: Current indicative layout



The proposed hours of operation are between 07:00 and 23:00 from Monday to Saturday and on Bank Holidays, and between 10:00 to 17:00 on Sundays.

Proposed delivery times are between 06:00 to midnight from Monday to Saturday and on Bank Holidays, and between 08:00 and 18:00 on Sundays.

The design of the service bay including a graded loading dock/ramp and manually-operated dock levellers, negating the need for the use of tail lifts and metal roll cages being wheeled across the yard area.

The previous assessment determined that the general operation of the store, including the slow movement of vehicles in the car park area, is not likely to give rise to any significant off-site noise impacts in this busy urban location; noise from the existing, surrounding commercial uses, mixed domestic noise and vehicle noise creates a highly variable, at times, significantly elevated, prevailing noise environment. This determination is considered to be valid and this aspect is not assessed further in this report.

Methodology

The assessment makes reference to the previously calculated noise levels, but updated to amend an error in the original calculation² and to allow for assessment of delivery noise to different noise sensitive receptors to those previously assessed, including assessment of impacts early on a Sunday morning based on recently gathered measurement data.

Guidance:

Assessment of the effects of commercial noise in potentially noise-sensitive receptors is undertaken with reference to the guidance contained in British Standard (BS) 4142: 2014 +A1: 2019 *Methods for rating and assessing industrial and commercial sound*. This is an updated version of the standard used in the previous report.

This provides a method for determining the sound arising from an industrial or commercial site, defined as the site's 'specific' sound level (dB L_{Aeq}) to which is added a correction for tonal, impulsive or intermittent elements, to provide the site's 'rating' sound level (dB $L_{A,r,Tr}$). The rating sound level is then compared with the 'background' sound level (dB L_{A90} or 90th percentile) as measured or calculated outside a building, usually a residential property or other noise sensitive receptor.

The standard applies a 'penalty' to tonal, impulsive and intermittent sounds, as separate entities. The simplest method is a subjective assessment with a sliding scale of up to +6 dB for tonal sound, up to +9 dB for impulsive sound and +3 dB for intermittency. The objective methods provided only allow for the assessment of tonal sound.

The standard indicates significance of sound effects according to varying degrees of "adverse impact": a difference between the 'background' level and the commercial/industrial 'rating' level of +10 dB "*is likely to be an indication of a significant adverse impact, depending on the context*" whilst "*a difference of around +5dB is likely to be an indication of an adverse impact, depending on the context*" and 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 having a low impact, depending on the context*".

The Standard includes a specific requirement that assessments should take account of "context" in determining the significance of any predicted impact, which is critical in providing a reasoned and pragmatic assessment, avoiding rigid adherence to limit values at the exclusion of any other considerations

2021 Survey:

A noise measurement survey was undertaken on Sunday 14 November 2021, between the hours of 08:15 and 10:06, at Position 2 of the 2019 survey. Data recorded were 15-minute samples of the ambient (L_{Aeq}) and background (L_{A90}) sound.

The survey utilised a Bruell & Kjaer 2260 Class 1 (IEC 61672) integrating, averaging sound level meter, mounted on a tripod with the microphone at a height of 1.5 metres above local ground level. The meter was field-calibrated before and after the survey and no significant variation in calibration tone was observed.

The weather at the time of the survey was cool with dry roads and negligible wind; light drizzle started to fall at 10:00.

² An error in the previous calculation of delivery activity sound level, given as 76 dB L_{Aeq} , has been corrected and is now 67 dB L_{Aeq} (without the addition of any character corrections).

Data and assumptions:

The previous median background sound levels at Position 2 were:

- **45.5 dB L_{A90}** during the weekday (13:15 to 14:45) (ambient sound level 49.9 dB L_{Aeq})
- **39.5 dB L_{A90}** during the weekday late evening (21:00 to 23:00) (ambient sound level 47.2 dB L_{Aeq}).

The latest measurement data are presented in Table 2.

Table 2: 2021 measurement data at Position 2

Time	Duration (mins)	Measured noise (dB)	
		L_{A90}	L_{Aeq}
08:15	15	47.9	54.0
08:30		48.3	54.7
08:45		50.0	57.2
09:00		49.5	55.3
09:15		49.3	53.7
09:36		49.9	56.6
09:51		50.2	54.8
	Median:	49.5	

Delivery activity sound was based on measurement of a delivery to Lidl store in Cheadle, Stockport on Monday 20 December 2021. The recorded sound levels were:

- Delivery vehicle (heavy goods vehicle) arrival, **60.1 dB L_{Aeq} at 23 metres.**
- Delivery off-loading, taking approximately 60 minutes from arrival to completion, **71.0 dB L_{Aeq} at 6.3 metres from the delivery ramp** of the vehicle.

The nearest noise sensitive receptors for delivery vehicle arrival and off-loading vehicle will be the rear facades of 42 and 44 Market Street, approximately 10 metres away.

The distance between the measurement position and the delivery vehicle arrival and delivery activity positions (23 metres and 6.3 metres, respectively), is different to the distance between the delivery dock and the receptor façade at the site at Goldthorpe (10 metres). The measurement data, therefore, require a distance-correction, assuming a 'point-source' of sound; it was calculated that the delivery arrival sound level, at 10 metres, would be **67.3 dB L_{Aeq}** and the delivery off-loading sound level would be **67.0 dB L_{Aeq}** .

The delivery operation involves the vehicle reversing up to a graded loading dock with a metal ramp which is manually lowered onto the rear lip of the vehicle trailer-bed. Goods are taken out of the delivery vehicle, and empty containers placed back onto the vehicle, using an electric pallet truck. As the pallet truck passes over the loading ramp it creates an impulsive sound for which it was deemed appropriate to add a +3 dB 'character correction'. This produces a 'rating noise level' of **70.0 dB $L_{Ar, Tr}$** for deliveries.

Assessment

Delivery vehicle arrival and off-loading:

The assessment, based on a layout incorporating the delivery area to the rear (east) of the food-store, calculated the noise from delivery vehicle arrival to be:

- 67.3 dB $L_{A_r,Tr}$ (at 10 metres).
- 57.8 dB $L_{A_r,Tr}$ (at 30 metres).

relative to daytime and night time background noise levels of :

- 39.9 dB L_{A90} during the day time and 35.7 dB L_{A90} at night, at Position 1 to the east of the store.
- 45.5 dB L_{A90} during the day time and 39.5 dB L_{A90} during the night time, at Position 2.

It is surprising to note that, at 49.5 dB L_{A90} , the Sunday morning background sound level recorded at Position 2 in November 2021 is higher than the 2019 measurement of weekday noise.

It was noted, during the 2021 survey, that there was a significant volume of traffic on the roads adjacent the site including numerous light and heavy delivery vehicles, a lot of motorbikes and occasional cars with modified exhaust systems.

The BS 4142 calculation for a weekday day time and weekday night delivery, using the 2019 background measurement data, and Sunday morning delivery, using the 2021 background measurement data, calculated at the rear façade of 42 and 44 Market Street, is presented in Table 3.

Table 3: BS 4142 calculations

Weekday day time	
<i>Delivery vehicle arrival</i>	
Background SPL (dB L_{A90}) [2019 Position 2]	45.5
Receptor SPL (dB L_{Aeq})	67.3
Character correction (dB)	0
Rating sound level (dB $L_{A_r,Tr}$)	67.3
Excess rating over background (dB)	+21.8
<i>Delivery vehicle off-loading</i>	
Background SPL (dB L_{A90}) [2019 Position 2]	45.5
Receptor equipment SPL (dB L_{Aeq})	67.0
Character correction (dB)	+3 for impulsivity
Rating sound level (dB $L_{A_r,Tr}$)	70.0
Excess rating over background (dB)	+24.5
Weekday night	
<i>Delivery vehicle arrival</i>	
Background SPL (dB L_{A90}) [2019 Position 2]	39.5
Receptor equipment SPL (dB L_{Aeq})	67.3
Character correction (dB)	0
Rating sound level (dB $L_{A_r,Tr}$)	67.3
Excess rating over background (dB)	+27.8
<i>Delivery vehicle off-loading</i>	
Background SPL (dB L_{A90}) [2019 Position 2]	39.5

Receptor equipment SPL (dB L _{Aeq})	67.0
Character correction (dB)	+3 for impulsivity
Rating sound level (dB L _{A_r,Tr})	70.0
Excess rating over background (dB)	+30.5
Sunday morning	
<i>Delivery vehicle arrival</i>	
Background SPL (dB L _{A90}) [2021 Position 2]	49.5
Receptor equipment SPL (dB L _{Aeq})	67.3
Character correction (dB)	0
Rating sound level (dB L _{A_r,Tr})	67.3
Excess rating over background (dB)	+17.8
<i>Delivery vehicle off-loading</i>	
Background SPL (dB L _{A90}) [2021 Position 2]	49.5
Receptor equipment SPL (dB L _{Aeq})	67.0
Character correction (dB)	+3 for impulsivity
Rating sound level (dB L _{A_r,Tr})	70.0
Excess rating over background (dB)	+20.5

The results of the BS 4142 assessment show that the calculated delivery activity sound levels are “*likely to be an indication of a significant adverse impact, depending on the context*”, at all times. This partly due to the proximity of the rear of the bungalow to the delivery area.

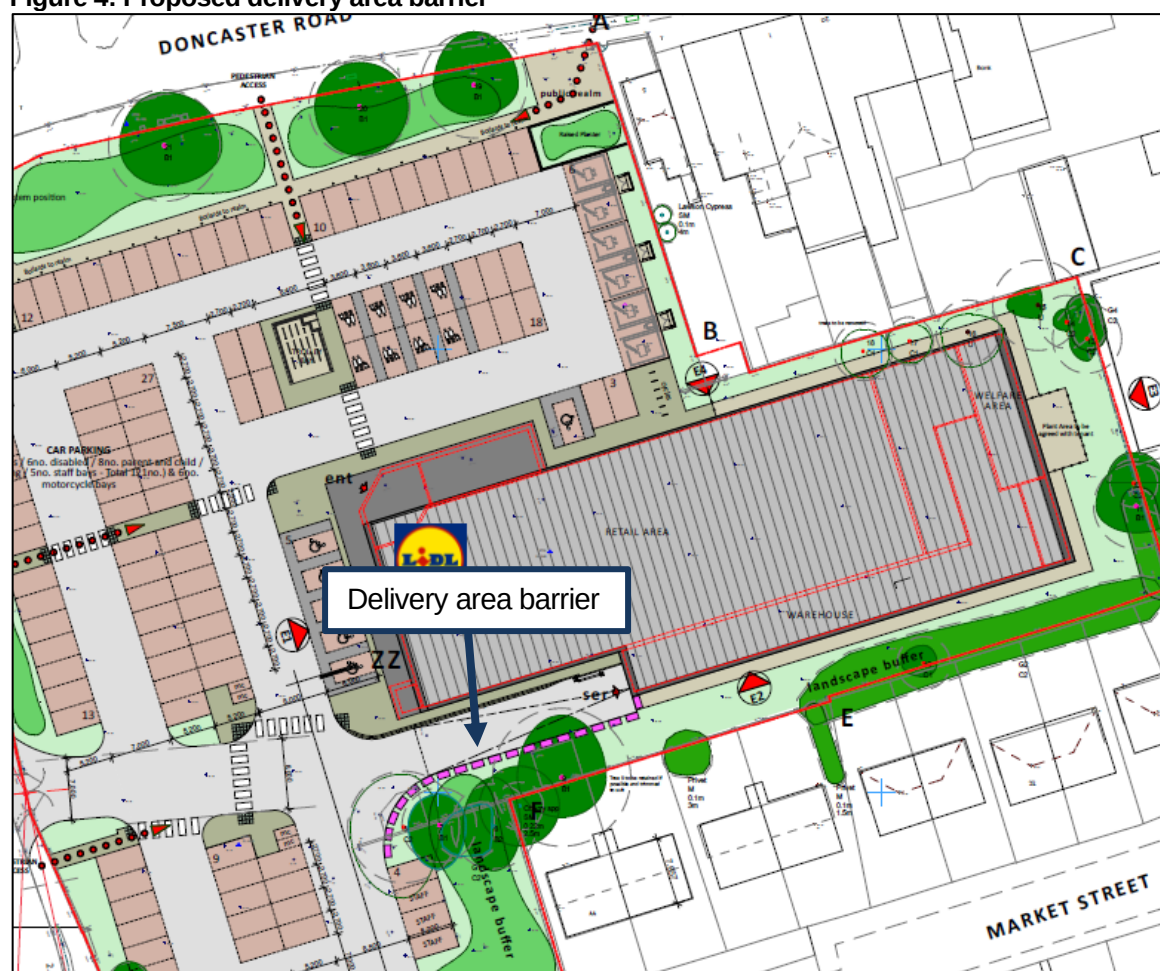
The context is that this is a busy urban setting with a significant volume of traffic using the local road network at all times of the day and night. Additionally, there will only be 1 to 2 deliveries per day, each lasting only 45 minutes, so these are limited, short-term events.

Mitigation will be required to minimise the potential for adverse impacts: the previous assessment recommended the provision of a 2.5 metre-high acoustic barrier along the entire site boundary at the rear of the bungalows and to the rear of 5a and 5b Barnsley Road.

The relocation of the delivery area means that a much less extensive barrier will be required, located along the southern edge of the delivery yard, close to the source of the noise. This barrier will 2.5 metres in height and will be an ‘absorptive’ barrier i.e. with sound absorbing material placed along the delivery yard side of the barrier, with no gaps or loose panels where it meets the building. It will extend around the curve of the car park area immediately adjacent the delivery area in to attenuate the noise arising from the arrival, manoeuvring and reversing of delivery vehicles.

The extent of the barrier is presented in Figure 4.

Figure 4: Proposed delivery area barrier



In addition to the barrier, further noise reductions will be achieved through the implementation of the Servicing Management Plan prepared by Bryan G Hall³, Consulting Civil & Transportation Planning Engineers

Plant equipment noise:

The previous assessment of plant equipment noise determined that any plant equipment to be installed should achieve a 'rating' sound level no greater than 30.7 dB $L_{A,T,r}$ at the nearest residential property. This determination remains valid for this assessment.

This will be best achieved by enclosing the plant equipment with acoustic screening.

As the plant equipment has not yet been specified, this mitigation measure can best be enforced through the provision of a suitably worded planning condition.

Improvements in ambient noise situation:

The previous assessment noted that the construction of the food-store will provide a significant improvement on the ambient noise situation for the majority of the bungalows on Market Street, by physical screening the rear facades of the properties from existing road noise. This determination remains valid.

³ Bryan G Hall (January 2022) *Lidl Foodstore, Doncaster Road, Goldthorpe: Servicing Management Plan* (document reference: 21-437-001.02)

Conclusion

An assessment has been undertaken to determine the potential noise effects, on properties adjacent to the proposed Lidl food-store on the site of the former Goldthorpe Primary School, West Yorkshire.

The assessment has shown that:

1. As previously determined (2019), the noise associated with general operation of the store and including slow-moving vehicles in the car park is unlikely to have a significant effect in this busy town-centre location.
2. The calculated sound levels associated with deliveries, are *“likely to be an indication of a significant adverse impact, depending on the context”*, at all times. This partly due to the proximity of the rear of the bungalow to the delivery area. Mitigation will be provided through the provision of a 2.5 metre-high noise barrier (Figure 4) along the edge of the delivery yard and the implementation of a Servicing Management Plan.
3. The assessment suggests that, beyond the occasional disturbance associated with deliveries, the construction of the store may improve the noise situation at the rear of the bungalows on Market Street, by screening traffic and general urban noise from High Street and Barnsley Road.
4. Fixed plant equipment, operating during store opening hours only, has yet to be specified but it is currently proposed that this will be installed at the rear (eastern) side of the store. In order to prevent disturbance to local residents in the adjacent bungalows, it is recommended that the plant equipment must achieve a rating sound level of 30.7 dB $L_{A,T,r}$ at the rear facades of adjacent bungalows.

In conclusion, it is considered that the proposals for operation of the store may give rise to limited short-duration disturbance for local residents adjacent to the site but would also improve the situation the noise situation for these properties for the majority of the time.

With the provision of the recommended control measures, the assessment concludes that the development can be suitably integrated into the local environment and that noise need not be a reason for refusal of planning permission.