

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

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From: Gwyn Richards

Reviewer: James Atha

Beacon 62, Cronton Road, Huyton

Assessment of noise egress from predicted HGV movements

This memo presents the results of 3D modelling of HGV movements associated with the proposed development at Beacon 62, Cronton Road, Huyton.

A summary of results is provided below, followed by detailed descriptions of the modelling and the results.

Summary

Three new developments are proposed at Beacon 62 – the Aldi food store, Jaguar Land Rover dealership, and petrol filling station plus two drive-thru restaurants.

We have modelled noise levels from the forecast HGV activities associated with all of these developments, in order to predict noise levels at the nearest residential properties to the development.

The model predicts that:

- the additional noise from arriving and departing HGVs will have a negligible impact on the existing ambient noise levels at the residential properties.
- maximum predicted noise levels due to HGVs' reversing and unloading activities are significantly below the WHO's recommended maximum levels outside nearby residential properties.

These results are for day time and night, and apply when the bund and barrier proposed to the south-west boundary are not in place. As such, the bund and barrier are not required in order to reduce noise egress.

55 Charterhouse Street, London EC1M 6HA

68 Sackville Street, Manchester M1 3NJ

2 Walker Street, Edinburgh EH3 7LA

87 Caroline Street, Birmingham B3 1UP

T: +44 (0)20 7549 3500

T: +44 (0)161 771 2020

T: +44 (0)131 235 2020

T: +44 (0)121 227 5020

post@sandybrown.com

www.sandybrown.com

Sandy Brown Associates LLP

Registered in England & Wales

No. OC 307504

Registered Office: 55 Charterhouse Street, London EC1M 6HA

Existing site

Figure 1 shows the approximate boundaries of the existing site (highlighted in yellow), along with the nearest noise-sensitive premises: a Farmhouse (highlighted in red) and houses on a residential development (highlighted in blue).



Figure 1 Existing site map (courtesy of Google Earth Pro)

There is also a hotel nearby across Cronton Road but this was not raised as a concern by the Local Authority and as such has not previously been considered in the acoustic assessment work.

Proposed development

The site is shown in Figure 2, showing the three areas in which new developments are proposed.

A solid barrier, mounted on an earth bund, is proposed to run along the south-west boundary of the site to provide a visual barrier. Although this will also reduce noise egress to the

residential properties, we have modelled the developments without the bund/barrier in the first instance.

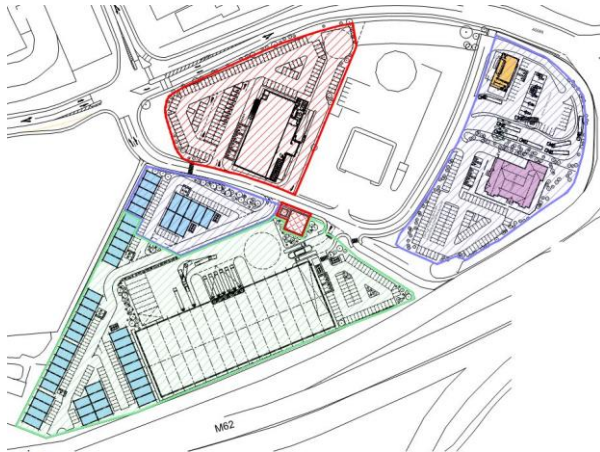


Figure 2 Site plan showing areas (proposed building layouts have been superseded)

A Jaguar Land Rover dealership is proposed to the south-west corner of the site (shown in green in Figure 2). The proposed layout of the JLR dealership is shown in Figure 3. The site comprises one large building with two connected spaces – a showroom to the north of a workshop/garage – with a smaller staff building to the east of the site. Various car parking and car display spaces are shown as coloured rectangles.

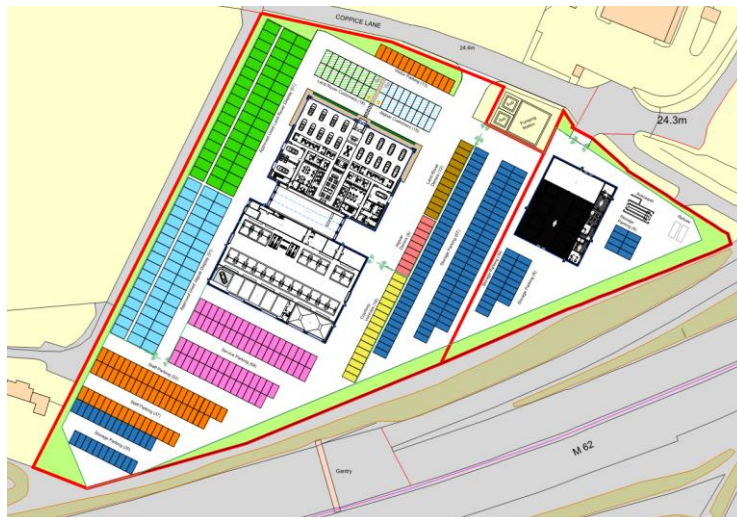


Figure 3 JLR dealership layout (coloured squares are parking spaces)

The north east corner of the site (blue in Figure 2) is to feature a petrol filling station (PFS) and two drive-thru restaurants. The layout is shown in Figure 4.

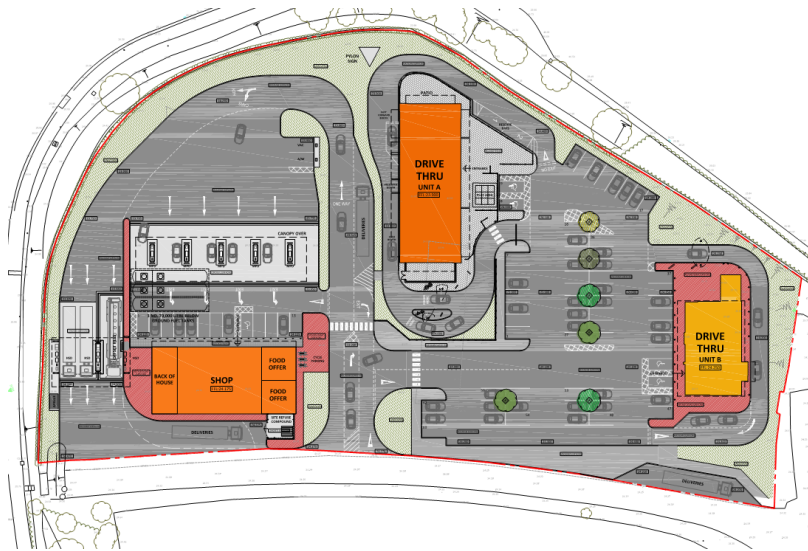


Figure 4 Petrol filling station and drive-thru restaurants

The proposed layout of the north-west corner of the site, featuring an Aldi food store, is shown in Figure 5.

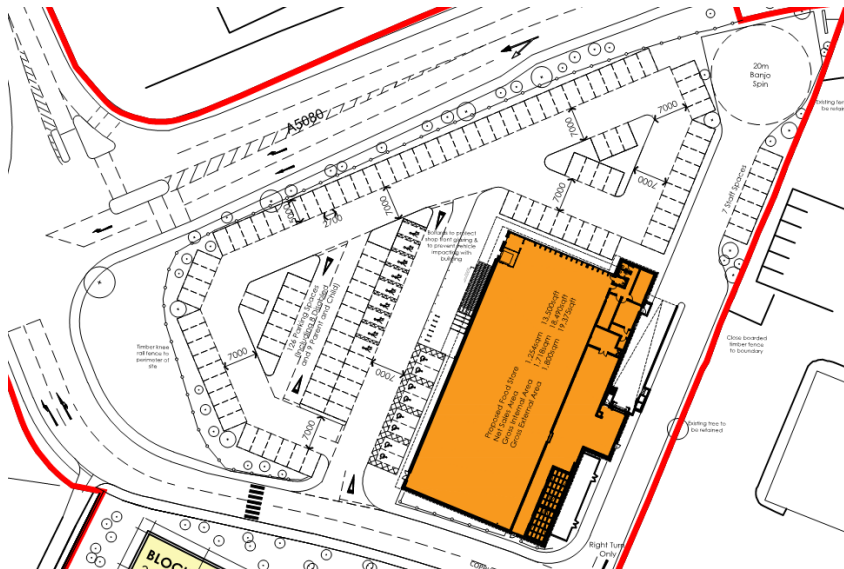


Figure 5 Aldi food store (orange)

Criteria

The following criteria are referred to in this assessment.

IoA/IEMA Guidelines for Noise Impact Assessment

Significance criteria for assessing the effects of increases in noise levels are presented in Table 1.

Table 1 Significance criteria (Guidelines for noise impact assessment)

Effect category	Increase in noise level (dBA)	Description
Negligible	<1	Noise increase unlikely to be discernable
Minor Adverse	1.0 to 2.9	A slight increase in noise levels may be perceived in affected buildings and outdoor recreational areas
Moderate Adverse	3.0 to 4.9	Increase in noise levels is likely to be noticeable in affected buildings and outdoor recreational areas
Major Adverse	>5	Increase in noise levels is likely to be clearly perceivable and could have a significant impact on the continued use of a building

WHO Community Noise Guideline Values

WHO Community Noise Guideline Values also provides recommended sound levels in specific environments. It recommends that external noise levels do not exceed $L_{Aeq,8hr}$ 45 dB and L_{AFmax} 60 dB outside bedrooms at night with open windows based on minimising the risk of sleep disturbance.

Although WHO guideline values exclude noise associated with industrial workplace, the guidelines are useful for comparison to the predicted noise egress levels and were referenced by the Local Authority.

Basis of assessment

This assessment is based on:

- Site drawings and layouts provided by ICENI Projects on 3 April 2019
- Mode Transport Planning Technical Note *TN08 – Noise assessment HGV Movements*, dated 20 March 2019
- Sandy Brown report 17174-R01-F *Environmental noise survey and assessment report*.

The noise levels used in the model for the HGV movements and activities are provided in Table 2. A speed limit of 5 mph has been applied to the HGVs.

Table 2 Noise levels and Source of noise data

Activity	Sound pressure level	Source of noise data
HGV movements	L_{Aeq} 77 dB at 10 m	BS5228:2009
HGV reversing alarm	L_{Aeq} 75 dB at 10 m L_{Amax} 79 dB at 10 m	Sandy Brown measurement data
Loading	L_{Aeq} 82 dB at 1 m L_{Amax} 112 dB at 1 m	Sandy Brown measurement data

Predicted HGV movements

This section describes the assumptions and the method used to model noise due to HGV movements around the sites.

Predicted movements

The predicted HGV traffic movements used in this assessment are taken from the Mode Transport Planning report.

Table 3 Predicted hourly HGV movements

	Number of HGV movements per hour				
Time	Aldi	Drive-Thru restaurants	Jaguar Land Rover	Petrol filling station	Total
<i>Daytime</i>					
07:00-08:00	2	0	0	8	10
08:00-09:00	0	0	0	6	6
09:00-10:00	0	0	0	6	6
10:00-11:00	2	2	0	4	8
11:00-12:00	2	0	0	8	10
12:00-13:00	0	0	0	8	8
13:00-14:00	0	0	0	11	11
14:00-15:00	0	0	0	11	11
15:00-16:00	0	0	0	16	16
16:00-17:00	2	2	0	6	10
17:00-18:00	0	0	0	7	7
18:00-19:00	2	0	2	3	7
19:00-20:00	0	0	2	3	5
20:00-21:00	0	0	0	4	4
21:00-22:00	0	0	0	1	1
22:00-23:00	2	0	0	0	2
<i>Night time</i>					
23:00-00:00	0	0	0	1	1
00:00-01:00	0	0	0	4	4

Time	Number of HGV movements per hour				Total
	Aldi	Drive-Thru restaurants	Jaguar Land Rover	Petrol filling station	
01:00-02:00	0	0	0	0	0
02:00-03:00	2	0	0	0	2
03:00-04:00	0	0	0	3	3
04:00-05:00	0	0	0	1	1
05:00-06:00	0	0	0	4	4
06:00-07:00	0	0	0	9	9

3D model

We have predicted noise levels across the site and at the nearest noise-sensitive premises, based on the worst-case scenario using the data reproduced in Table 3:

- During the daytime, the worst case scenario is 2 HGV movements each for JLR, Aldi and the drive-thru restaurants, and 16 for the PFS.
- At night, the worst case is 9 HGV movements for the PFS, and 2 for Aldi.

Images from the model are provided in Figure 6 (daytime) and Figure 7 (night time). The dark patterns (showing where the highest noise levels are) indicate the HGV traffic routes we have assumed for this assessment, based on the road and building layouts.

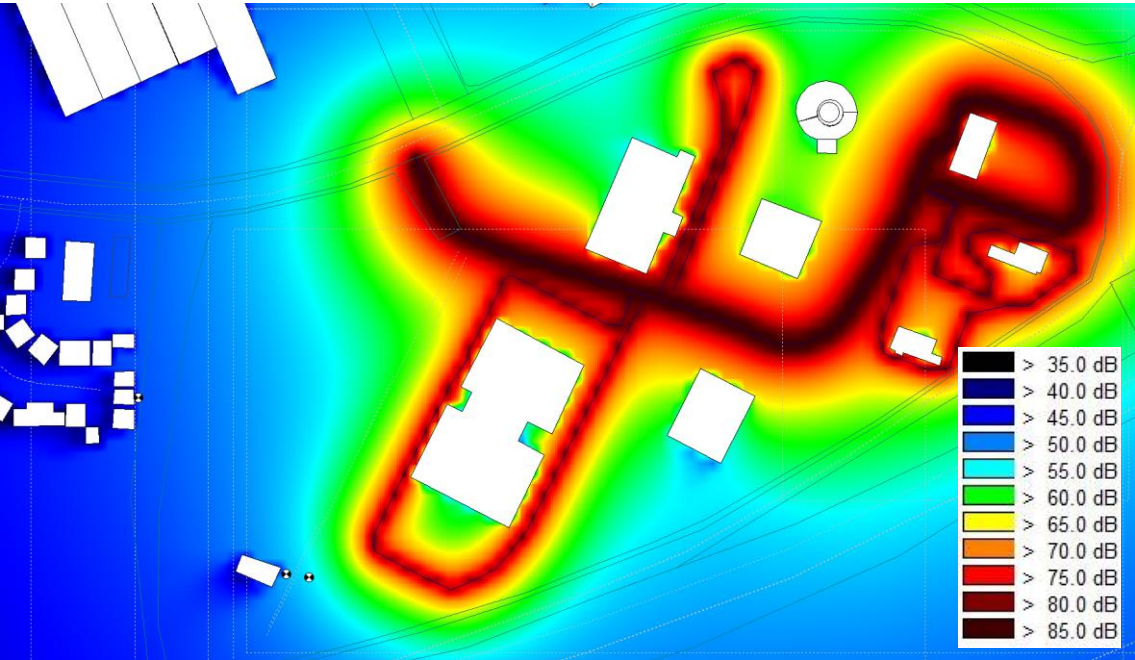


Figure 6 3D model predicted noise contour maps for HGV movement during daytime

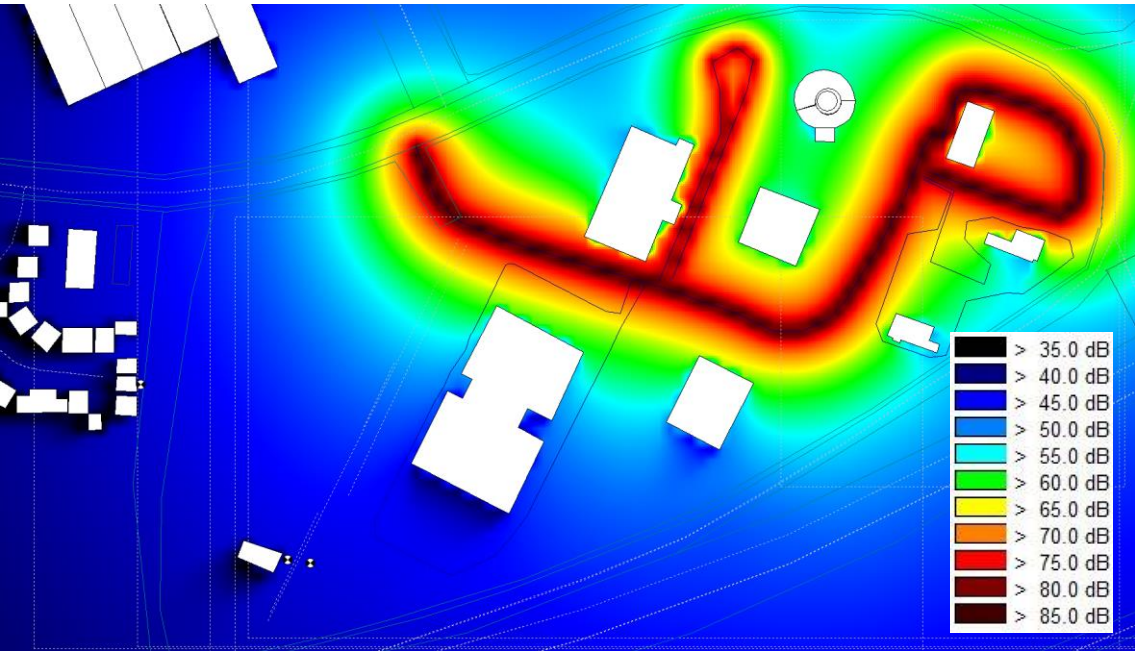


Figure 7 3D model predicted noise contour maps for HGV movement during night time

Results

The predicted noise levels outside the nearest residential premises from day and night time HGV movement models are given in Table 4. These are all at least 6 dB below the existing noise levels at each location.

Table 4 Predicted noise levels at nearest noise sensitive premises from proposed activities

	Predicted sound pressure levels from modelling	
	Farm house	Sevenoak Grove
Day time (07:00 -23:00)	L_{Aeq} 56 dB	L_{Aeq} 53 dB
Night time (23:00 – 07:00)	L_{Aeq} 47 dB	L_{Aeq} 47 dB

An assessment of significance of impact based on the predicted noise levels from the HGV movements is provided in Table 5 based on the existing ambient noise levels measured during the survey (see Sandy Brown report 17174-R01-F) and the criteria given above.

Table 5 Assessment of significance on noise impact

Noise sensitive receptor	Predicted change in ambient noise level L_{Aeq} (dB)		Significance of impact	
	Day	Night	Day	Night
Farmhouse	< 1 dB	< 1 dB	Negligible	Negligible
Sevenoak Grove	< 1 dB	< 1 dB	Negligible	Negligible

The predicted noise levels during the daytime and at night, indicate that the significance of impact is negligible outside the nearby residential premises for both daytime and night time periods.

Maxima at night due to HGV reversing alarms

Noise modelling has also been carried out to predict the maximum noise levels associated with HGV reversing alarms outside the nearby residential premises.

No night time deliveries to JLR or the Drive-Thrus are proposed.

Deliveries to the petrol filling station

It is assumed that HGV movements associated with the PFS are primarily due to HGVs refuelling during journeys to and from other locations. However, in case any night time deliveries are made to the PFS, reversing noise from HGVs has been modelled. An image of the model is given in Figure 8.

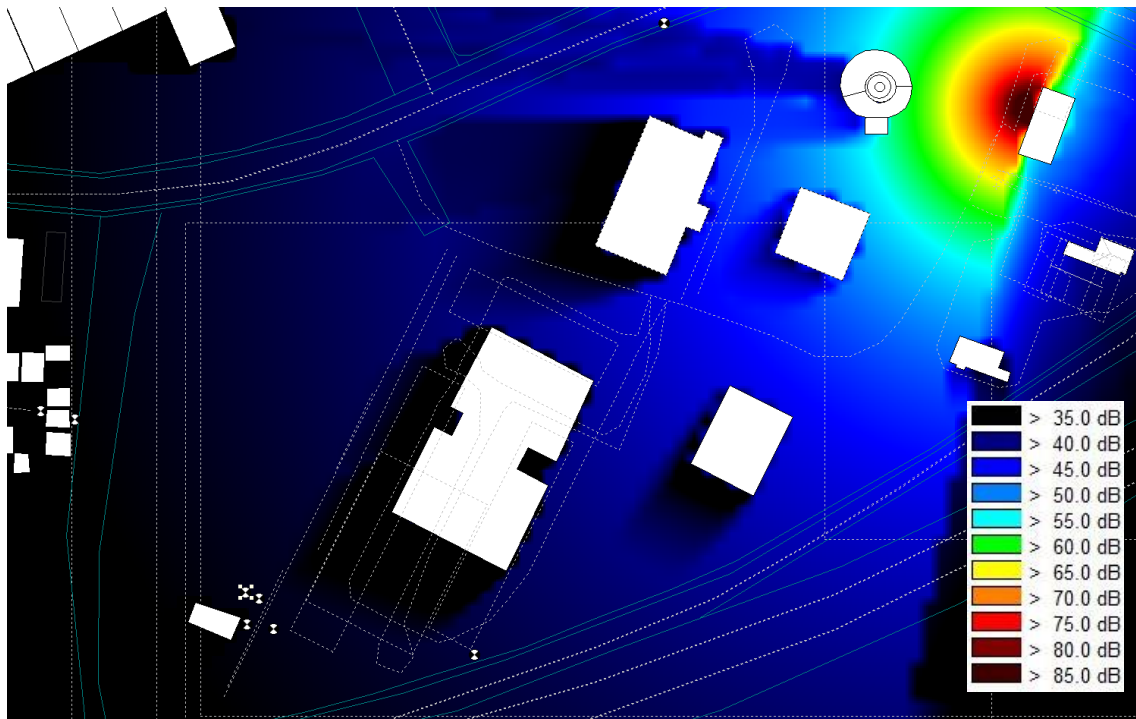


Figure 8 3D model predicted noise contour maps for HGV reversing alarms at the petrol filling station

The predicted levels due to HGV reversing alarms at the PFS are $L_{A_{fmax}}$ 40 dB at the farmhouse and $L_{A_{fmax}}$ 41 dB outside the residential dwellings on Sevenoak Grove.

The predicted noise levels are significantly below the $L_{A_{fmax}} \leq 60$ dB maxima at night criterion advised by WHO and are not expected to cause disturbance.

Deliveries to Aldi

A similar exercise was carried out for HGV reversing alarms delivering to Aldi at night. An image of the model is in Figure 9. The predicted levels were $L_{A_{fmax}}$ 43 dB at the farmhouse and $L_{A_{fmax}}$ 36 dB at the Sevenoaks properties – both significantly below that WHO maximum and therefore not expected to cause disturbance.

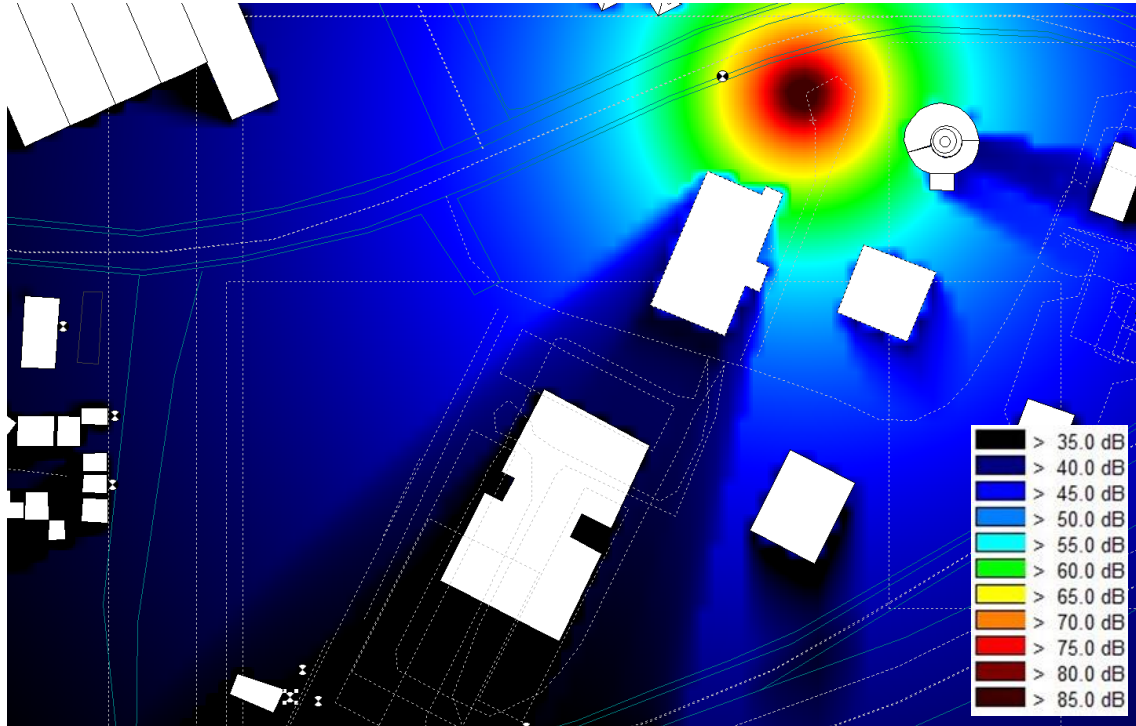


Figure 9 3D model predicted noise contour maps for HGV reversing alarms at Aldi

Maxima at night due to external loading activities

Noise modelling has also been carried out to predict the maximum noise levels associated with HGV loading activities to Aldi and the PFS, using the same method as for the reversing alarms to obtain predicted $L_{A_{\text{fmax}}}$ (dB) noise levels at nearby noise-sensitive premises.

Deliveries to the petrol filling station

An image of the PFS model is given in in Figure 10. The predicted maximum levels associated with HGV external loading activities at the PFS are $L_{A_{\text{fmax}}}$ 50 dB at the farmhouse and $L_{A_{\text{fmax}}}$ 49 dB at residential dwellings on Sevenoak Grove.

The predicted noise levels are significantly below the $L_{A_{\text{fmax}}} \leq 60$ dB maxima at night criterion advised by WHO and are not expected to cause disturbance.

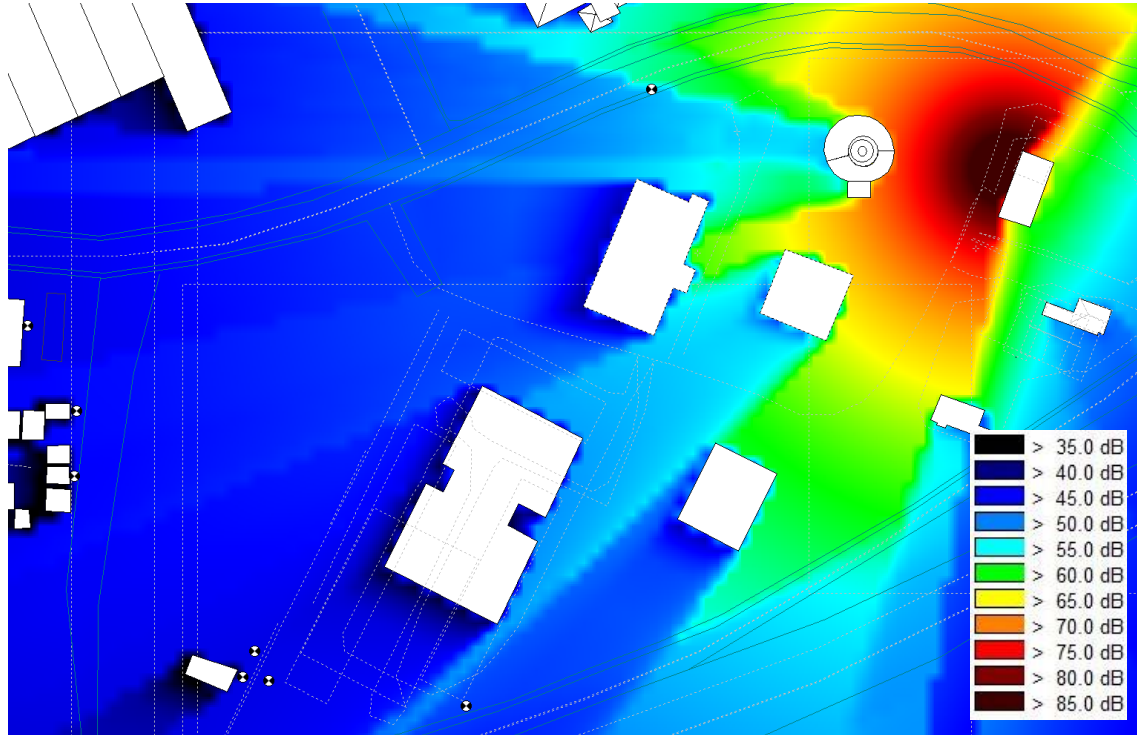


Figure 10 3D model predicted noise contour maps for HGVs external loading at PFS ($L_{A_{fmax}}$ dB)

An image of the Aldi model is given in Figure 11. The predicted maximum levels associated with HGV external loading activities at the petrol filling station are $L_{A_{fmax}}$ 56 dB at the farmhouse and $L_{A_{fmax}}$ 51 dB at residential dwellings on Sevenoak Grove.

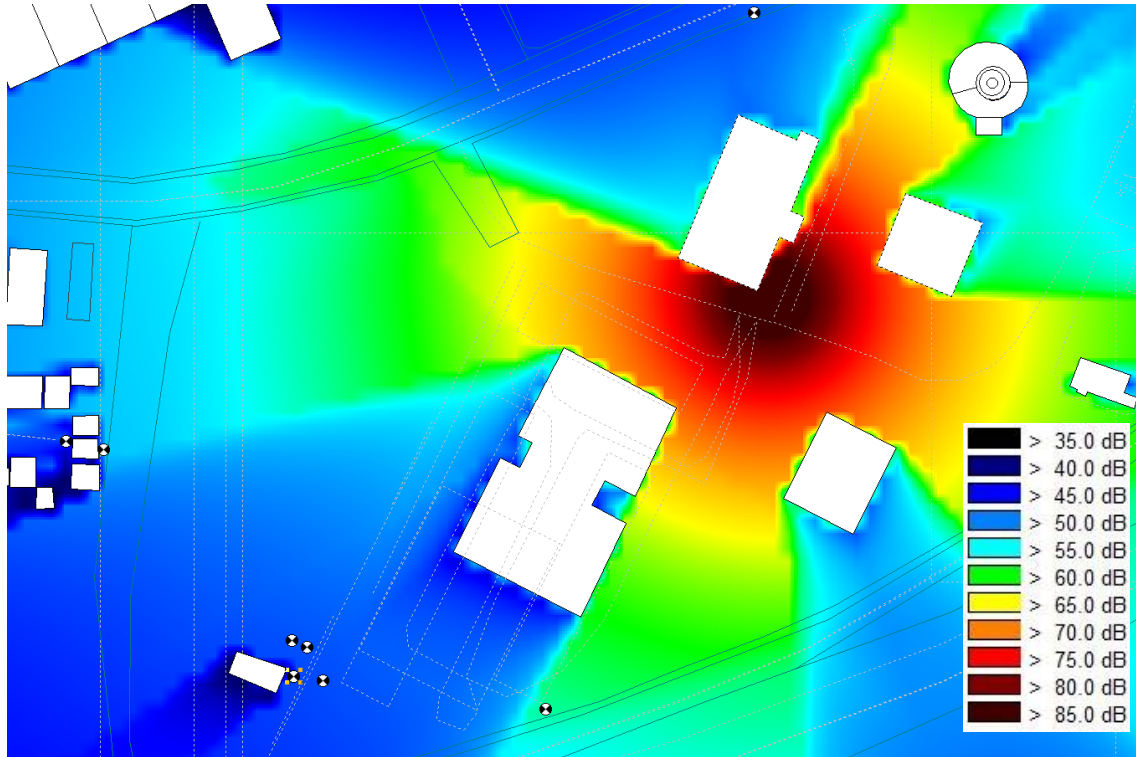


Figure 11 3D model predicted noise contour maps for HGV external loading at Aldi ($L_{A_{fmax}}$ dB)