



ACOUSTIC
CONSULTANTS LTD

Noise Impact Assessment

Lidl
Land Off Eastern Way, Melksham

Reference: 11785/MA

Client



Document Control

Version:	Revision Description:	Date:	Author:	Reviewed by:	Approved by:
1.0	First Issue	13/01/2026	Max Allen	Jonas Lopez, MIOA	Blake Lucas, MIOA

The report has been prepared in good faith, with all reasonable skill and care, based on information provided or available at the time of its preparation and within the scope of work agreement with the Client. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above. The report is provided for the sole use of the named Client and is confidential to them and their professional advisors. No responsibility is accepted to other parties.

The report limits itself to addressing solely on the noise, acoustic, and vibration aspects as included in this report. We provide advice only in relation to noise, vibration and acoustics. It is recommended that appropriate expert advice is sought on all the ramifications (e.g. CDM, structural, condensation, fire, legal, etc.) associated with any proposals in this report or as advised and concerning the appointment. It should be noted that noise predictions are based on the current information as we understand it and, on the performances noted in this report. Any modification to these parameters can alter the predicted level. All predictions are in any event subject to a degree of tolerance of normally plus or minus three decibels. If this tolerance is not acceptable, then it would be necessary to consider further measures.

Table of Contents

1.	Introduction	4
2.	Site and Location	5
3.	Planning and Noise	7
4.	Assessment Criteria	11
5.	Baseline Noise Monitoring	13
6.	Plant Noise Predictions	16
7.	Delivery Noise Predictions	24
8.	Summary and Conclusions	36
9.	Appendix 1 – Glossary of Acoustic Terminology	37

1. Introduction

Lidl appointed Acoustic Consultants Ltd to undertake a noise impact assessment for the proposed Lidl food store located on vacant land near Eastern Way, Melksham, SN12 7QS.

This report provides a noise impact assessment of the proposed store plant and delivery operations on the nearest existing noise sensitive receivers (NSRs).

The noise impact assessment is based on the results of an on-site noise survey and noise level predictions using manufacturers plant data, and ACLs library data.

The noise impact assessment has been undertaken in accordance with the guidance in the National Planning Policy Framework (NPPF), Noise Policy Statement for England (NPSE), Planning Practice Guidance (PPG), British Standard 4142:2014+A1:2019 (BS4142), and British Standard 8233:2014 (BS8233).

2. Site and Location

The planned Lidl store is to be located on vacant farmland to the south east of the roundabout connecting Eastern Way and Sandridge Common A3102. The proposed store has residential properties to the west and north east, with the associated plant and deliveries having the potential to affect these dwellings.

The following figures show the site location, the location of the NSRs and the proposed plant location.

Figure 1: Satellite image with site location and NSRs highlighted

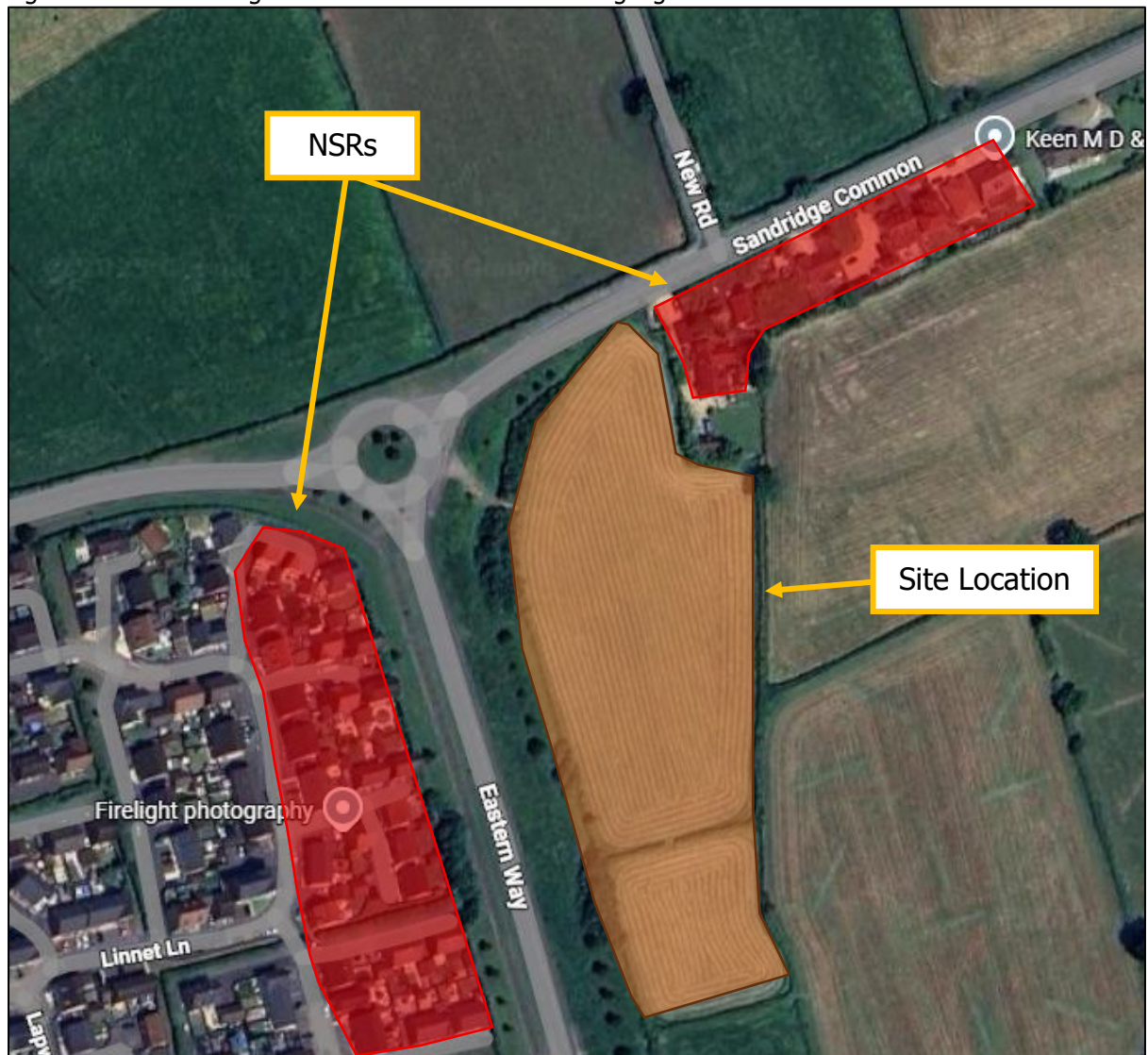
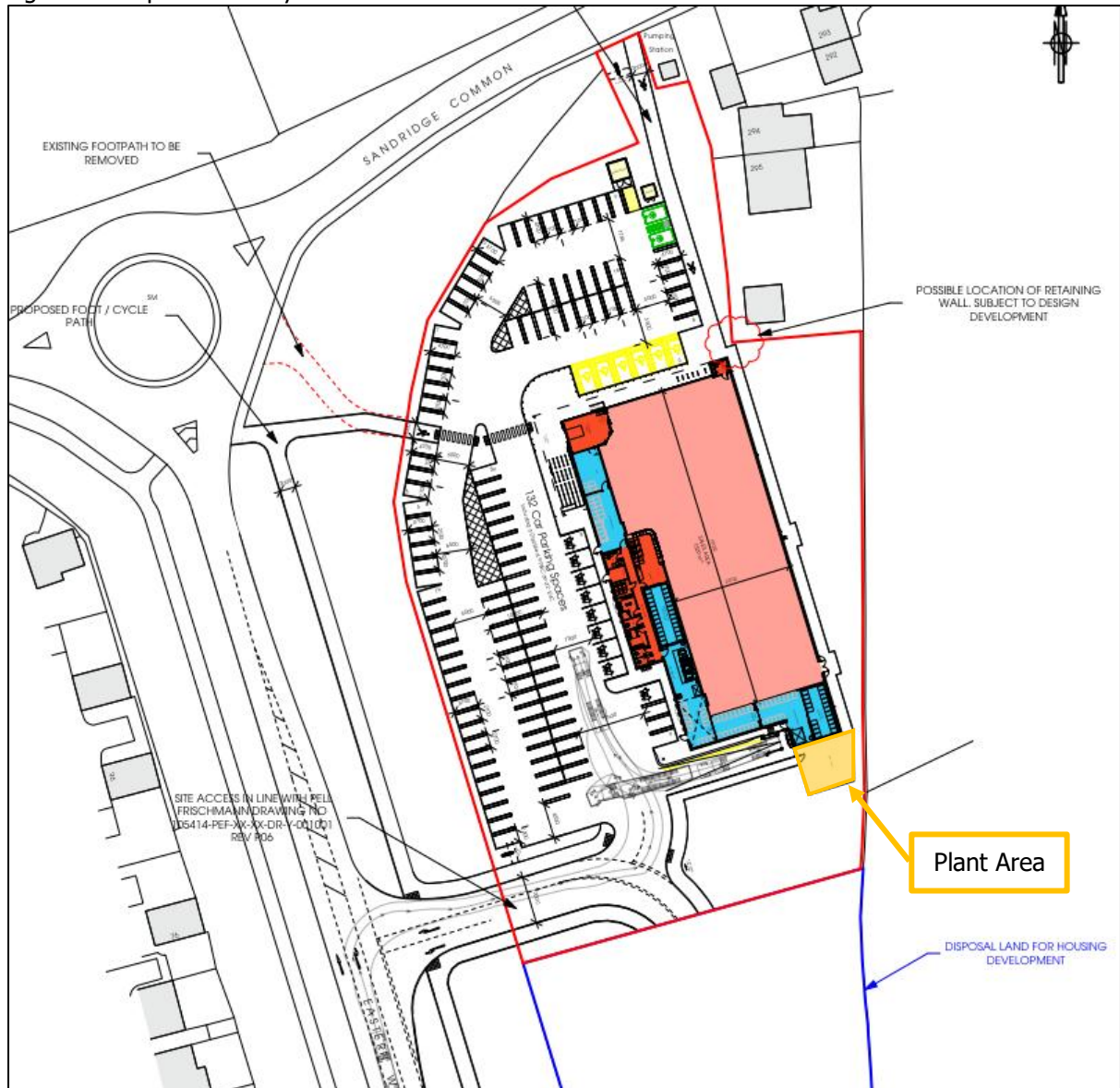


Figure 2: Proposed site layout



3. Planning and Noise

3.1. National Planning Policy Framework

The National Planning Policy Framework (NPPF) was published in March 2012 and revised in December 2024. Section 15 entitled 'Conserving and enhancing the natural environment' addresses noise as a requirement of planning. Paragraph 187 states:

"187. Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and."

Paragraph 198 states:

"198. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life*
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation. "*

The document does not prescribe any assessment methodology or criteria to assess the adverse effect of noise and refers you to the NPSE.

3.2. Noise Policy Statement for England

The NPPF refers to the Noise Policy Statement for England (NPSE). This was published in March 2010 and aims to provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion and applies to all forms of noise including environmental noise, neighbour noise and neighbourhood noise.

The NPSE sets out the long term vision of Government noise policy. This long term vision is supported by three noise policy aims as follows:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life."*

The NPSE introduces the concept of "Significant adverse" and "Adverse" impacts of noise which relate to the noise policy aims. These are applied as follows:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

The Noise Policy Statement for England (NPSE) states that noise levels above the Lowest Observed Adverse Effect Level are acceptable in planning where reduced to a minimum.

With regard to where there is potential for noise impact it states the following in relation to the second noise policy aim:

"The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur."

The NPSE does not provide any assessment criteria for the noted effect levels and each case must be considered on its merits.

The NPSE does, however, emphasise that in dealing with noise Local Planning Authorities are required to take a balanced approach in considering the benefits of development as against any adverse effects which arise. Paragraph 2.18 of the NPSE is particularly relevant in this respect and states:

"There is a need to integrate consideration of the economic and social benefits of the activity or policy under examination with proper consideration of the adverse environmental effects, including the impact of noise on health and quality of life. This should avoid noise being treated in isolation in any particular situation, i.e. not focusing solely on the noise impact without taking into account other related factors."

The planning need is outside the scope of noise and acoustics and will need to be addressed by others.

3.3. Planning Practice Guidance, Noise

The Planning Practice Guidance (PPG) on noise referred to here is based on the current version (July 2019) as provided on the Planning Guidance Website. It states that, *"Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment."*

It provides generic guidance on how to determine the noise impact and what factors could be a concern.

It includes the option types to mitigate any adverse effects of noise stating that there are four broad types of mitigation. These are engineering, layout, using planning conditions or obligations and noise insulation.

Paragraph 5 of the PPG provides a table identifying the effect level and examples of effect relating to the impact effect levels provided in the NPSE. The table is duplicated below:

Table 1: PPG Noise – Perception of Effect Levels

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

The table does not provide any objective assessment which equates to the noted effect levels. However, the PPG identifies that where noise is audible, it is not necessarily intrusive. The effect and impact on people are based primarily on the level of noise.

4. Assessment Criteria

The following section identifies guidance which is considered to provide noise criteria equivalent to or below LOAEL described in PPG and NPSE, i.e. *"Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life"*

For industrial and commercial noise, the most relevant guidance is provided within British Standard 4142:2014+A1:2019. The methods described in the British Standard use outdoor sound levels to assess the likely effects of sound upon people who might be inside or outside a dwelling or other premises used for residential purposes.

The principle is that of establishing the 'difference' between the 'rating level' and the 'background sound level'. The 'rating level' is the 'specific sound level' of the source over a period of one hour during the day (07:00 to 23:00 hours) and over a period of 15 minutes during the night (23:00 to 07:00 hours). Clause 9 entitled 'Rating Level' states:

"Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level."

An acoustic character correction should be added to the 'specific sound level' if it exhibits any tonality, impulsivity, other specified characteristics and/or intermittency at the assessment location. The value of the character correction varies dependent on the prominence of the character of the sound source at the assessment location.

In Clause 11 of the Standard, entitled 'Assessment of the Impacts', it states:

"Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (see Clause 8) from the rating level (see Clause 9), and consider the following."

- *Typically, the greater this difference, the greater the magnitude of the impact.*
- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
- *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."*

Based on the initial assessment outcomes of BS4142, and depending on context, it is our opinion that the NOEL, LOAEL and SOAEL levels stated in the Noise Policy Statement for England would generally fall within the following categories when considered in conjunction with the effect levels of the PPG Noise.

Table 2: BS4142 Difference in Relation to Effect Levels

BS4142 Assessment Difference	Corresponding Effect Level*	Action*
≤ -10 dB	No Observed Effect	No specific measures required
-9.9 dB to 0 dB	No Observed Adverse Effect	No specific measures required
	Lowest Observed Adverse Effect Level	
0.1 dB to 5 dB	Observed Adverse Effect	Mitigate and reduce to a minimum
	Significant Observed Adverse Effect Level	
5.1 dB to 10 dB	Significant Observed Adverse Effect	Avoid
≥ 10.1 dB	Unacceptable Adverse Effect	Prevent

* BS4142 states that “where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration”. Therefore, the assessment levels and effect levels above are not definitive and can be modified due to context.

It should be noted that the numerical outcome only represents the initial estimate of impact, as stated in the first paragraph of Clause 11, and that contextual matters should be considered before determining what the potential impact is. This paragraph states:

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. 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.

Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (see Clause [8](#)) from the rating level (see Clause [9](#)).

NOTE 1 More than one assessment might be appropriate.

The second part of Clause 11 sets out three contextual matters that should be taken into account once the initial numerical estimate has been determined. It is important to note that the three listed is not exhaustive and all pertinent factors should be considered.

5. Baseline Noise Monitoring

A partially attended noise monitoring was undertaken at the site between the 12th December 2025 and 15th December 2025 in accordance with British Standard 4142:2014.

5.1. Monitoring Equipment

Sound Pressure Levels were measured using a Class 1 sound level meter with a half-inch condenser microphone, using the 'fast' setting. The equipment is checked regularly using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2017 "General requirements for the competence of testing and calibration laboratories"; in accordance with British Standard EN 10012:2003 "Measurement management systems. Requirements for measurement processes and measuring equipment"; and traceable to the National Standards.

This equipment was checked and calibrated as noted below and the certificates are available for inspection.

Table 3: Equipment used and calibration dates

Equipment Description, Manufacturer & Model	Serial Number	Calibration Date	Calibration Certificate Number
SLM, Sonitus, EM2030	00756	28/07/2025	1512953-1
Pre-Amp, Sonitus	59642	28/07/2025	1512953-1
Microphone, Sonitus, 378B02	309501	28/07/2025	1512953-1

5.2. Weather Conditions

The weather conditions during the survey are given in the table below. The weather conditions across the whole survey are not expected to have had an adverse effect on the measured noise data.

Table 4: Noted weather conditions during attended survey portions

Date	Wind Speed (m/s)	Wind Direction	Temperature (°C)	Precipitation Time (hrs)	Cloud Cover (%)
12/12/25	2-5	S	9	0	50
13/12/25	2-5	SE	5-9	0	0
14/12/25	2-6	S	7-11	0	50
15/12/25	4-6	S	10	0	100

5.3. Monitoring Procedure

The purpose of the survey was to determine the background noise levels at a location representative of the nearest NSRs. The microphone was placed on a tripod 2.5 metres above the ground. The measurements were taken in a free-field location.

The noise climate consisted of road traffic noise from Eastern Way and the nearby roundabout junction of Eastern Way and Sandridge Common (A3102). Some bird call was also perceptible but not dominant over the road traffic noise.

The monitoring location is given in the figure below.

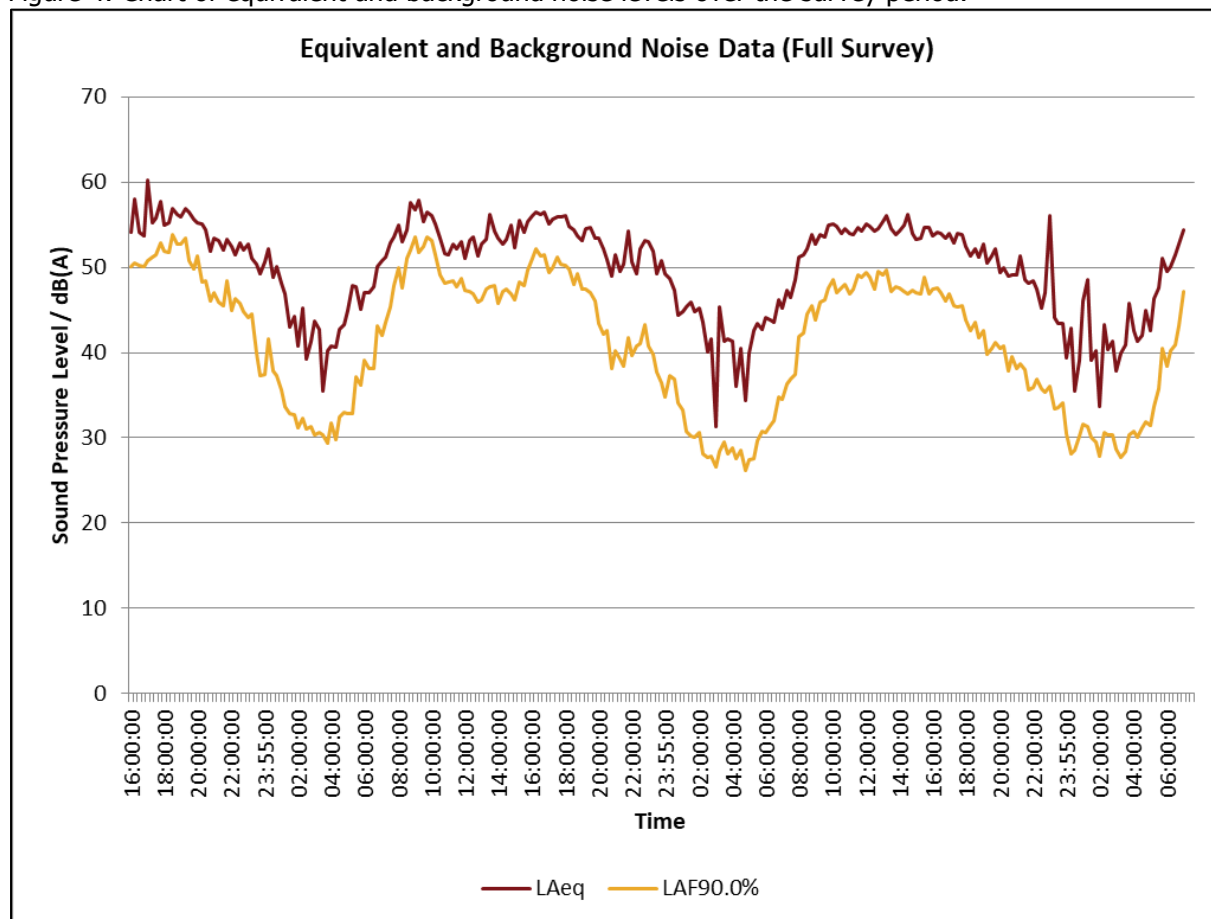
Figure 3: Monitoring location



5.4. Measured Noise Levels

Below is a chart showing the measured equivalent noise level ($L_{Aeq,15min}$) and background noise level ($L_{A90,15min}$) in dB(A) over the time of the survey.

Figure 4: Chart of equivalent and background noise levels over the survey period.



A summary of the equivalent ($L_{Aeq,15min}$) and background ($L_{A90,15min}$) noise levels is given in the table below.

Table 5: Measured range and modal values of the equivalent and background noise levels

Assessment Period	Background Sound Level $L_{A90,T}$ dB		Residual Sound Level $L_{Aeq,T}$ dB	
	Range	Modal	Range	Typical
Daytime (07:00-23:00)	34-54	47	45-60	53
Night-time (23:00-07:00)	26-44	31	31-56	43

As such, we have determined a typical background sound level of 47 dB $L_{A90,15min}$ during the day time and 31 dB $L_{A90,15min}$ during the night time at the nearest NSRs.

6. Plant Noise Predictions

6.1. Proposed Plant

The proposed plant for the food store will be located on the south façade of the building. The table below details the proposed plant units and their sound power levels.

Table 6: Proposed plant models and determined sound power level (dBA)

Plant Type	No.	Operation*	Manufacturers Sound Power Level (dBA)
Dry cooler (Food Refrigeration)	2	Daytime - 100% load	69
		Night-time – 100% load	69
CU- 1 Warehouse (Daikin RXYSQ10TY1)	1	Daytime - 100% load	74
		Night-time - 40% load	61
CU- 2 Back of House (Daikin RXYSQ4TV9)	1	Daytime - 100% load	68
		Night-time - 40% load	62
CU- 4 AHU DX Coil Circuit 1-2 (Daikin RXYLQ12T)	1	Daytime - 100% load	81
		Night-time - 40% load	72
CU- 5 AHU DX Coil Circuit 3-4 (Daikin RXYLQ12T)	1	Daytime - 100% load	81
		Night-time – 40% load	72

The plant has been assessed at 100% load during both the daytime and night time periods as a worst case scenario.

It should be noted that any changes to the schedule, location or layout of the plant will affect the predicted levels at the receiver points around the site and, as such, will need reassessing.

6.2. Plant Predictions

The plant noise emission has been modelled in the noise modelling software Cadna:A by DataKustik. The modelling software calculates sound levels based on the inputted sound emission values, source and receiver locations, and primarily distance, barrier and ground attenuation. Calculations are undertaken using the General Method of Calculation from ISO 9613-2:2024. The parameters within the Cadna:A model are as follows and considered reasonable assumptions:

- The building heights are based on site and google earth observations.
- The order of reflections is 3, and all buildings are reflective.
- The ground across the site is considered to be hard and reflective.
- The predictions are based on the typical Lidl plant noise stated in Section 6.1.
- The predicted noise map is at 1.5m high during the day and 4.5m during the night (dwelling window height).
- Building evaluation level is maximum at the façade.
- The predicted building evaluation levels are free field.

Noise maps of the predicted plant specific sound levels are provided below for the daytime and night time plant operation.

Figure 5: Predicted daytime specific sound level of plant $L_{Aeq,1hour}$ (1.5 metre height)

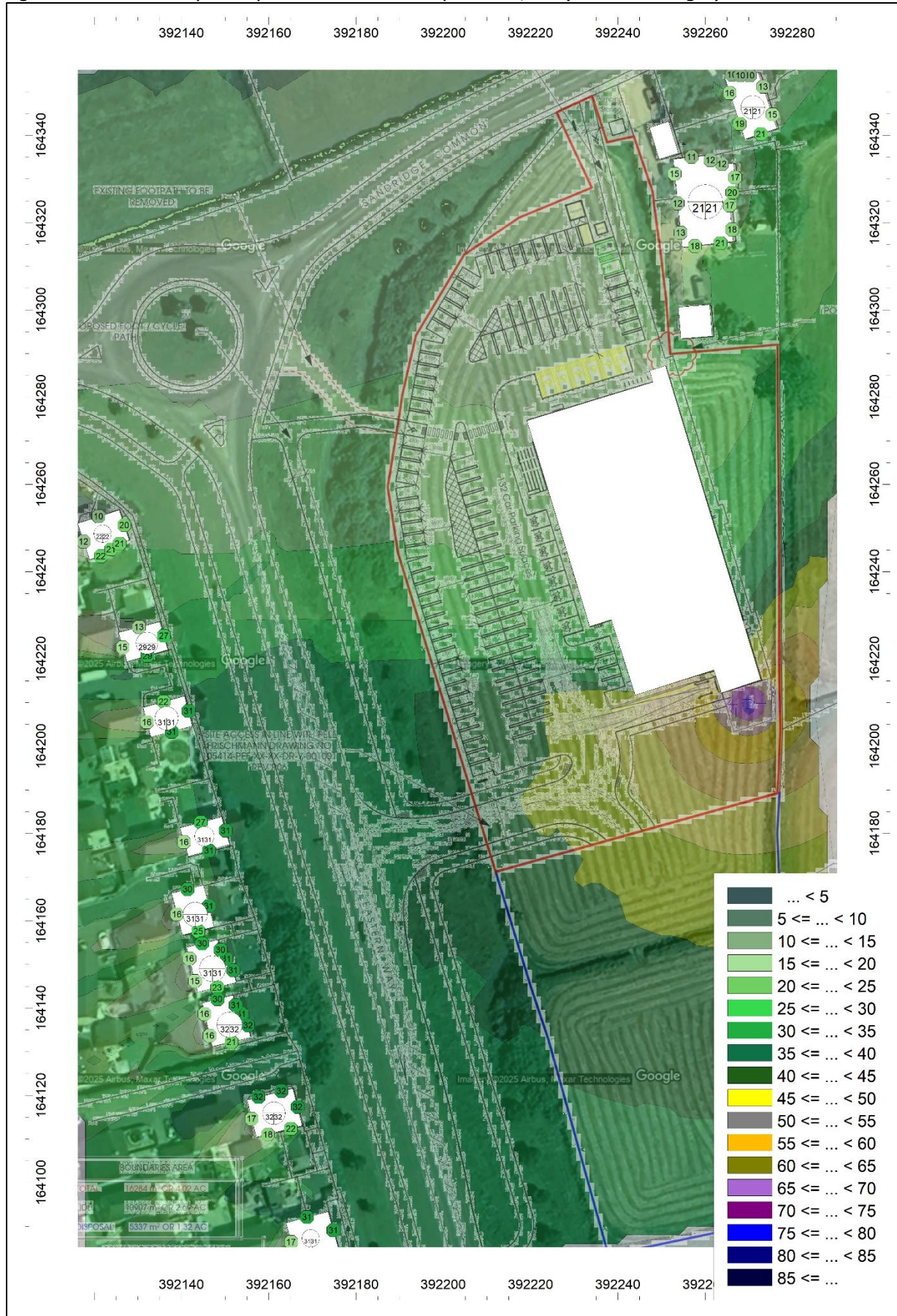
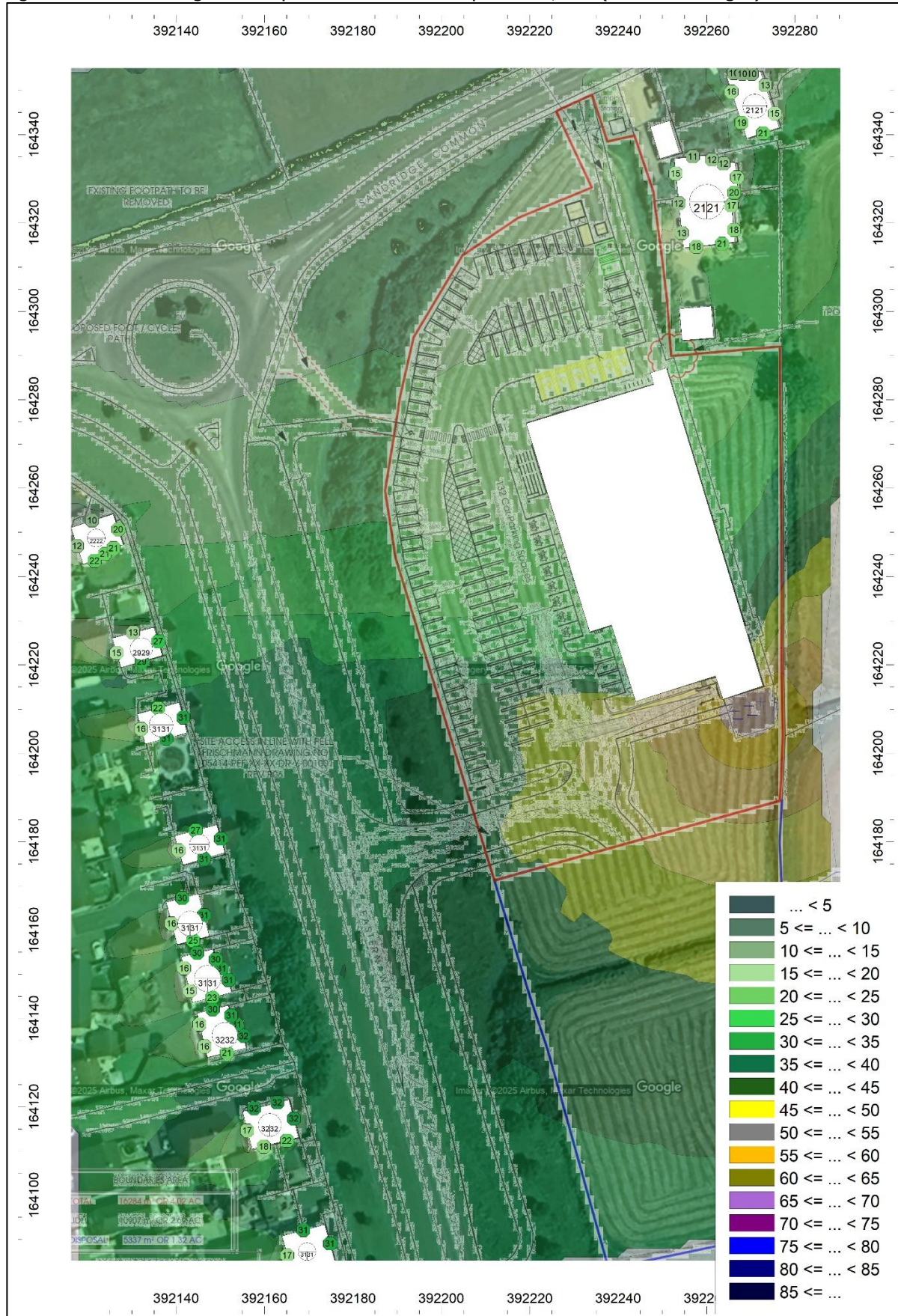


Figure 6: Predicted night time specific sound level of plant $L_{Aeq,15min}$ (4.5 metre height)



6.3. Noise Assessment

A British Standard 4142:2014 assessment has been undertaken at the sensitive receivers on the site.

6.3.1. Background Sound Level

We have determined a typical daytime background sound level of 47 dB $L_{A90(15min)}$ and a night time background of 31 dB $L_{A90(15min)}$ at the nearest NSRs.

6.3.2. Specific Sound Level

The predicted specific sound level of the plant associated with the site at the NSRs is as follows. This is the level with no character corrections applied.

Table 7: Predicted specific sound levels at the NSRs

Parameter	NSR Weast		NSR North	
	Day (07:00 – 23:00)	Night (23:00 – 07:00)	Day (07:00 – 23:00)	Night (23:00 – 07:00)
Cumulative Specific Sound Level	32 dB	32 dB	21 dB	21 dB

6.3.3. Character Corrections

Character corrections should be added to the 'specific sound level' if it exhibits any *tonality, impulsivity, intermittency and/or other specific characteristics* at the assessment location. Based on our site visit and knowledge of such plant units, corrections to be applied are as follows:

- **Tonality** – From our experience of other Lidl sites, their plant is not tonal. However, the supplier and installer should ensure that any tonality is not distinguishable at the noise sensitive receivers in the area. This is supported by long term noise data obtained and analysed on recently constructed Lidl sites.
- **Impulsivity** – Plant of this type is not normally impulsive in nature.
- **Intermittency** – We do not expect that the intermittency of the plant will be distinguishable at the sensitive receivers over the residual noise climate and have not applied correction for intermittency.
- **Other Sound Characteristics** – We do not believe any correction is necessary for other sound characteristics.

6.3.4. Estimate of Impact

Therefore, the British Standard 4142:2014 initial estimate at the most sensitive locations is as follows:

Table 8: BS4142 Initial Estimate

Parameter	Sound Level / dB			
	NSR West		NSR North	
	Day Time	Night Time	Day Time	Night Time
Background Level, $L_{A90,T}$	47	31	47	31
Specific Sound Level, $L_{Aeq,T}$	32		21	
Character Correction	0		0	
Rating Level, $L_{Ar,T}$	32		21	
Excess of rating over background level	-15	+1	-26	-10

This indicates that the cumulative plant noise level will have a low impact when assessed to BS4142:2014+A1:2019 during the daytime and night time periods at both NSR locations.

As the level differences during both the day and night at the Northern NSRs are lower than -10 dB, context will not change the initial assessment outcome.

However, context needs to be considered at the Western NSRs.

6.4. Context

It should be noted that in all instances the context needs to be considered when determining the overall impact. British Standard 4142:2014 states:

"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following."

6.4.1. Absolute Levels

1) Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night. Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse."

With regard to 'absolute levels', the most relevant guidance is British Standard 8233:2014. Section 7.7.2 Table 4 of the British Standard provides internal ambient noise levels for dwellings. The guideline states that internal noise levels should not exceed 30 dB L_{Aeq} (8 hr) at night and 35 dB L_{Aeq} (16 hr) during the day.

The internal level is approximately 15 dB quieter than the external free-field level (as stated by the WHO) allowing for the attenuation of a partially open window. Therefore, based on the predicted rating levels noted above, the internal absolute levels are as follows:

Table 9: Comparison with BS 8233:2014 at worst case receiver

Time	Predicted External Level dB(A)	Open Window Correction dB(A)	Predicted Internal Level dB(A)	Within Criteria?
Day	32	-15	17	YES
Night	32	-15	17	YES

As can be seen from the table above, the plant rating sound level is lower than the British Standard 8233:2014 criteria for daytime and night-time rooms. Therefore, we would consider plant noise to be suitably controlled to the dwellings in the vicinity when absolute levels are considered.

6.4.2. Residual Levels

British Standard 4142:2014 also states:

"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following".

1) The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it."

The typical free field residual sound level is 53 dB $L_{Aeq,15min}$ during the day and 43 dB $L_{Aeq,15min}$ during the night.

The rating level of the plant as modelled above is 32 dB during the day and the night. This falls 21 dBA and 11 dBA below the residual sound level at the NSRs during the day and night, respectively.

As such, we would consider that the noise may be perceptible but would not be dominant above the residual noise climate.

6.5. Summary of Plant Assessment

As can be seen above with the noise impact of the plant compared to the existing noise climate and internal noise levels compared to the relevant adopted guidance, plant noise will have a low impact and be acceptable when assessed to British Standard 4142:2014+A1:2019 during the daytime and night time hours.

We would consider the noise impact of the proposed plant to fall below the Lowest Observed Adverse Effect Level (LOAEL) of the NPSE and PPG and, as such, achieved the aims of the National Planning Policy Framework (NPPF).

7. Delivery Noise Predictions

It is considered appropriate to assess the impact of noise from deliveries in accordance with the methodology of British Standard 4142:2014.

7.1. Summary of Delivery Operations

We understand that the deliveries are contained to an articulated vehicle which includes a refrigeration section with condensing unit. The vehicle arrives on site and reverses up to the loading bay dock. The goods are moved internally from the trailer into the store. The goods are mostly on pallets, and an electric pallet truck is used. The operation takes place internally and the vehicle departs after about one hour.

At this site the vehicle will access and exit the parking area via Eastern Way to the west of the site. The unloading, arrival and departure of the delivery vehicle has the potential to affect the residential receivers around the site.

7.2. Delivery Noise Monitoring

Acoustic Consultants Limited have measured the delivery operation from Lidl food stores over a number of years, at a number of different sites. We have found that the noise level of a delivery operation does not vary significantly from site to site as the process and site conditions are consistent.

The measured noise levels of a typical Lidl delivery operation are as follows; these are free-field levels at a distance of 10 metres. The measured levels include reflections off the store building.

Table 10: Typical delivery operation noise emission

Duration, T (min)	L_{Aeq(T)} dB	Activity at 10m
5	61	HGV Arrive
60	57	HGV Unloading
2	63	HGV Depart

7.3. Noise Modelling

Noise emission prediction calculations have been carried out for the potentially most sensitive locations to delivery noise. The delivery operation has been modelled in the noise modelling software Cadna:A by DataKustik. The parameters within the Cadna:A model are as follows and are considered reasonable assumptions:

- The store height is based on typical Lidl plans
- The existing dwellings are based on site and google earth observations.
- The order of reflections is 3, and all buildings are reflective.
- The ground across the site and surrounding area is considered hard and reflective.
- The front of the delivery bay is considered fully open for the assessment.
- The predictions are based on the measured delivery noise levels above.
- Vehicle movements are based on site layout and reasonable assumptions.
- The predicted noise map is 4.5m high during the night and 1.5m high during the day.
- Building evaluation level is maximum at the façade.
- The predicted building levels are free-field.

Modelling predictions for HGV arrival, unloading of goods, and HGV departure during the daytime and night time periods are provided below.

Figure 7: Daytime noise map of delivery vehicle arrival (L_{Aeq,1hour}, 1.5m height)

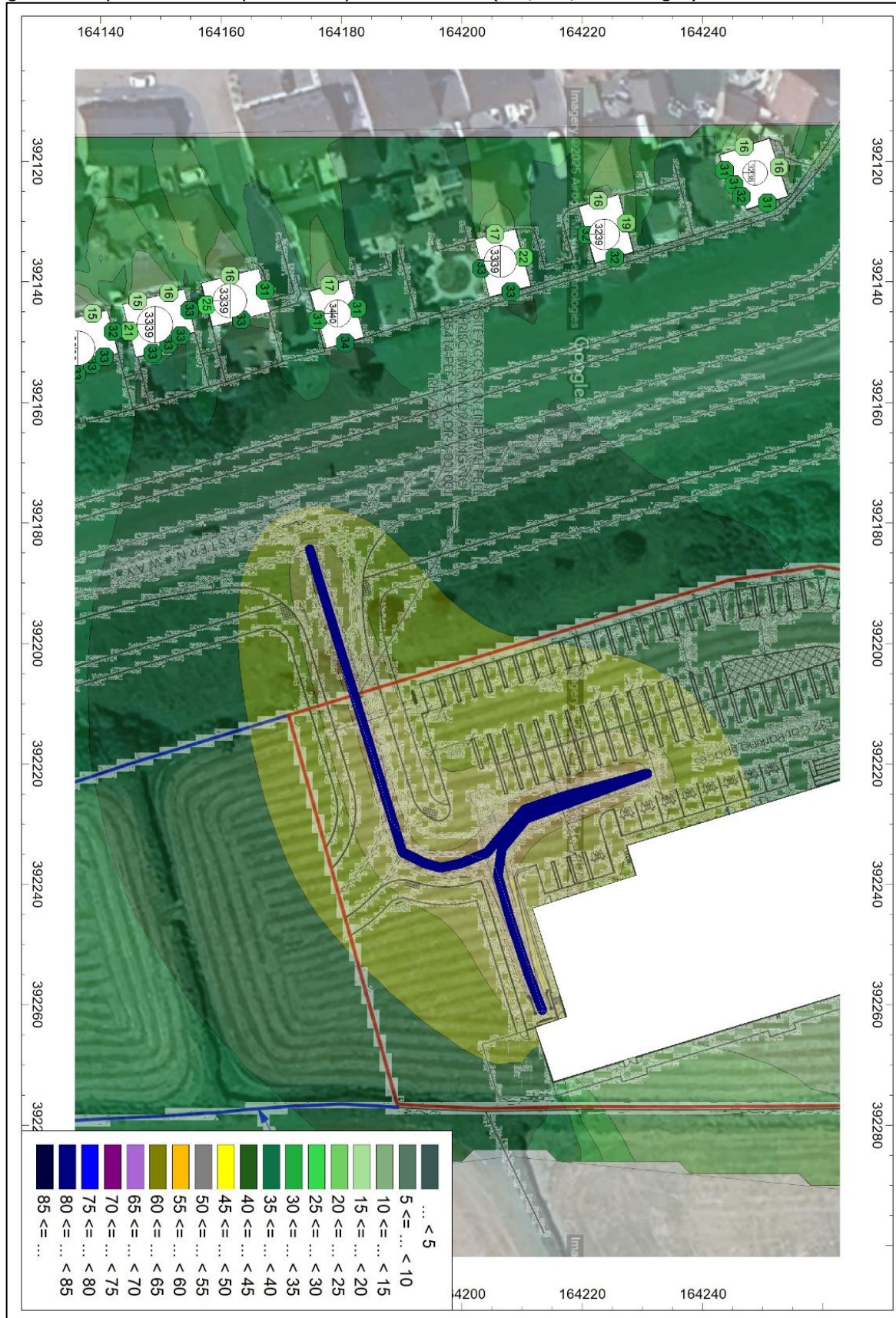


Figure 8: Day time noise map of delivery vehicle departure ($L_{Aeq,1hour}$, 1.5m height)

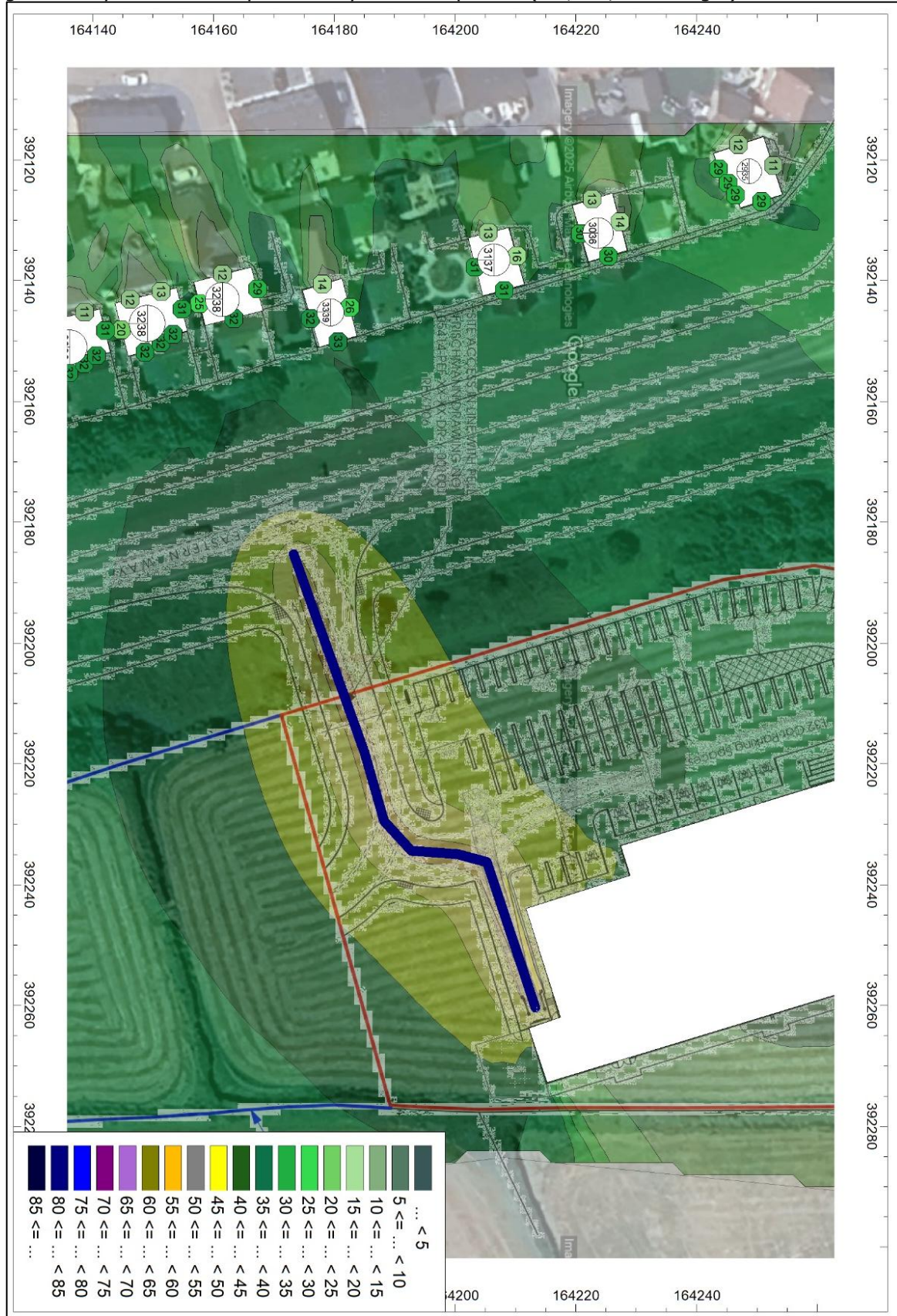


Figure 9: Night time noise map of delivery vehicle arrival (LAeq,15mins, 4.5m height)

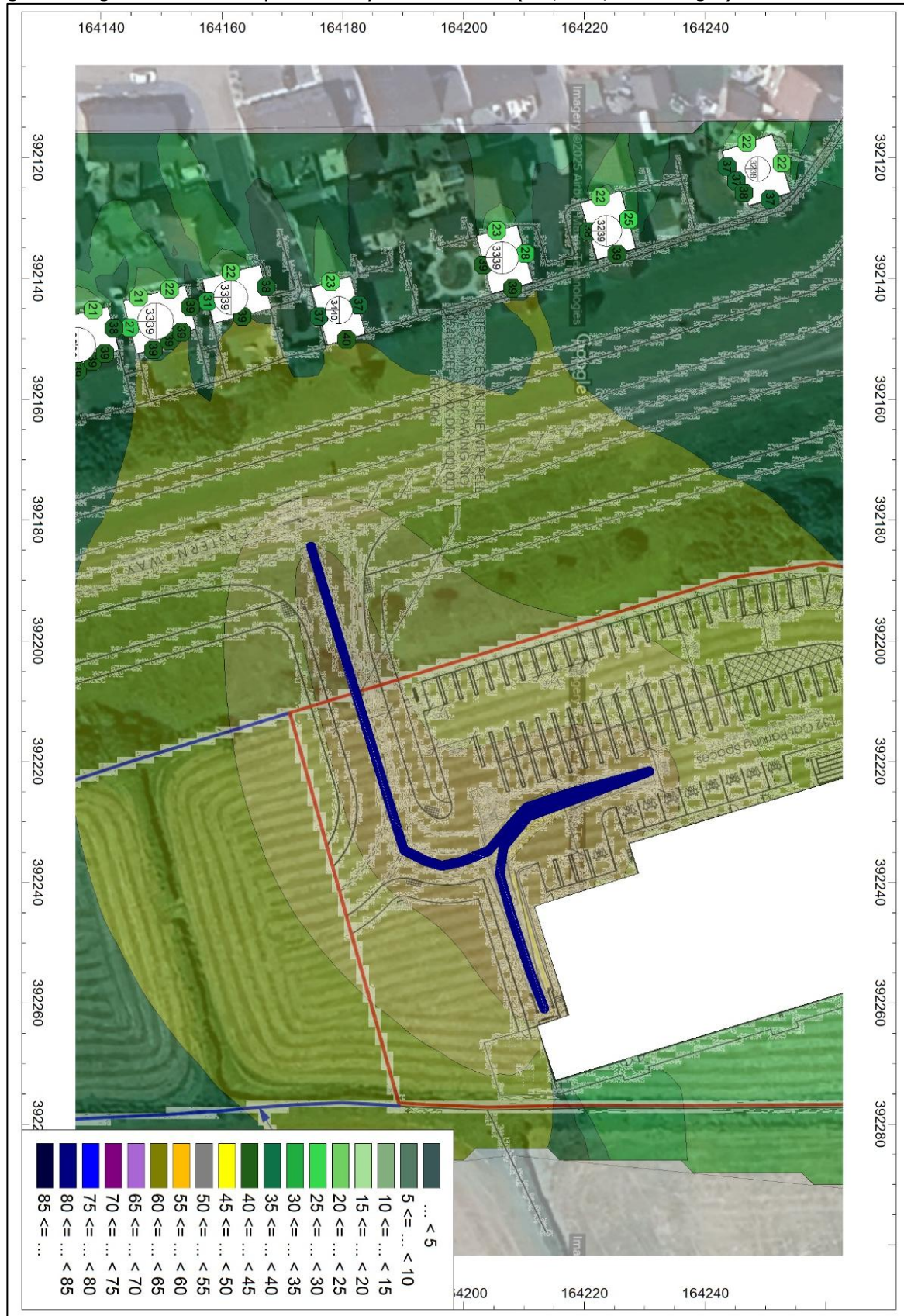


Figure 10: Night time noise map of delivery vehicle departure (L_{Aeq,15mins}, 4.5m height)

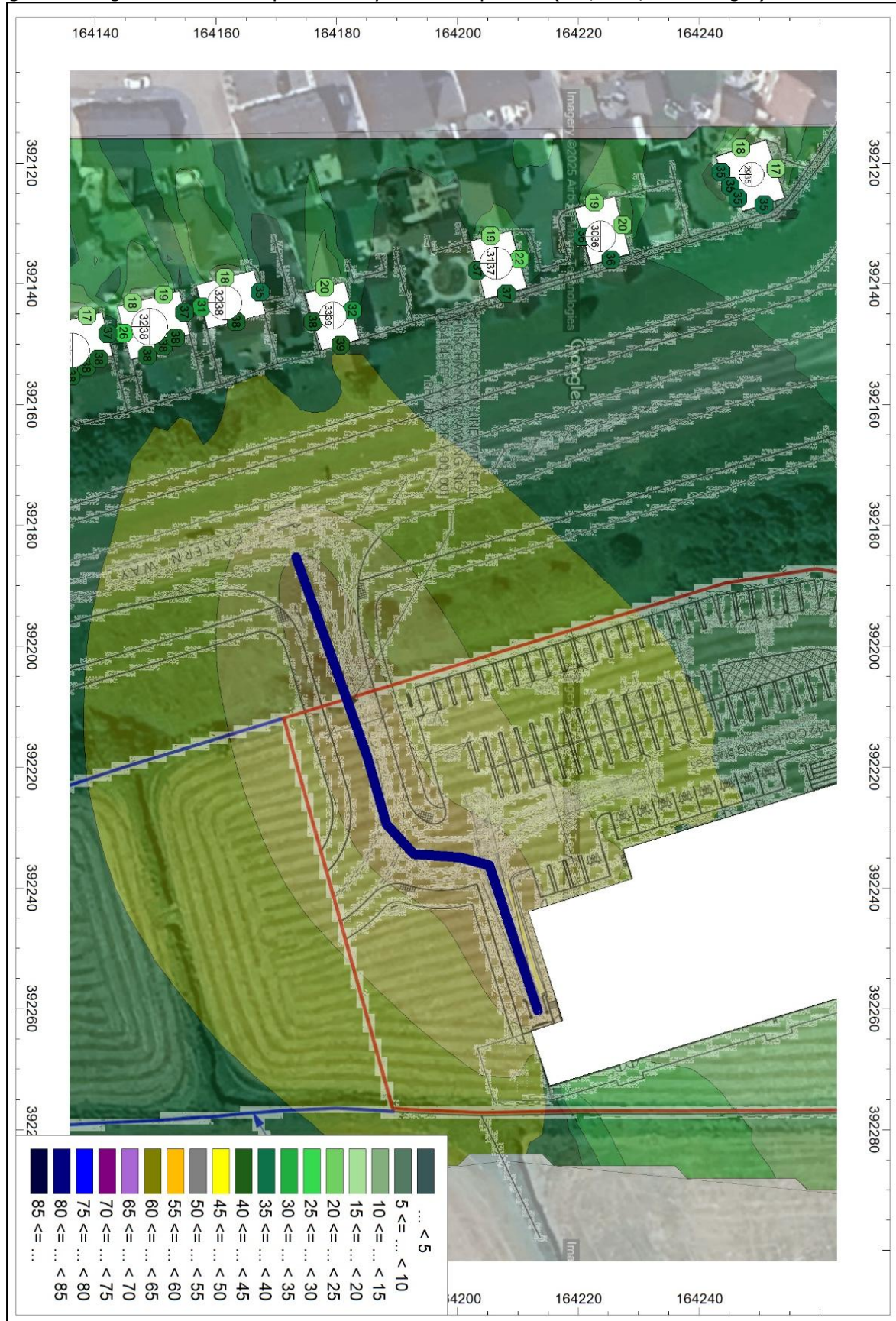
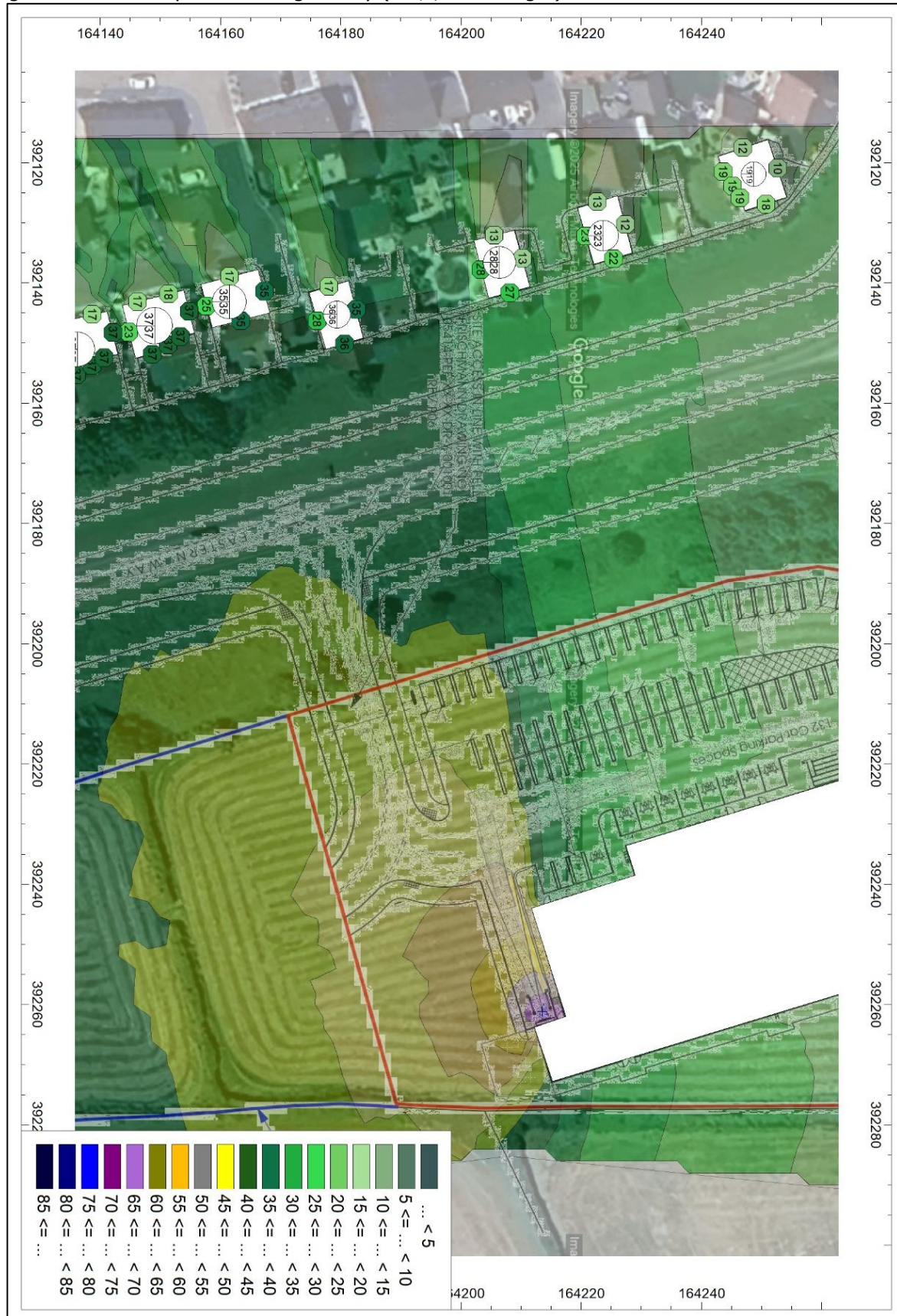


Figure 11: Noise map of unloading activity ($L_{Aeq,T}$, 4.5m height)



7.4. Noise Assessment

A British Standard 4142:2014+A1:2019 assessment has been undertaken at the sensitive receivers on the site.

7.4.1. Background Sound Level

We have determined a typical day time background sound level of 47 dB $L_{A90(15min)}$ and a night time background of 31 dB $L_{A90(15min)}$ at the nearest NSRs.

7.4.2. Specific Sound Level

The predicted specific sound levels of the delivery operations (including vehicle movements and unloading) at the worst affected NSRs are as follows. This is the level with no character corrections applied.

Table 11: Predicted Specific Sound Level, $L_{Aeq,T}$

Parameter	Worst Case NSR (West)	
	Day (07:00 – 23:00)	Night (23:00 – 07:00)
Arrival	34	40
Unloading	37	
Departure	33	-
Cumulative Specific Sound Level	40	42

The cumulative levels (arrive and unloading activity over the 15-minute assessment period during the night; arrival, unloading and departure over the one-hour assessment period during the day) are considered in this assessment.

7.4.3. Character Corrections

Character corrections should be added to the 'specific sound level' if it exhibits any *impulsivity, tonality, intermittency and/or other specific characteristics* at the assessment location. The character corrections are as follows.

Impulsivity – Impulsivity has been calculated based on our measurements of unloading noise on food store sites, the residual level at the noise sensitive receivers and the methodology of Annex E of British Standard 4142:2014.

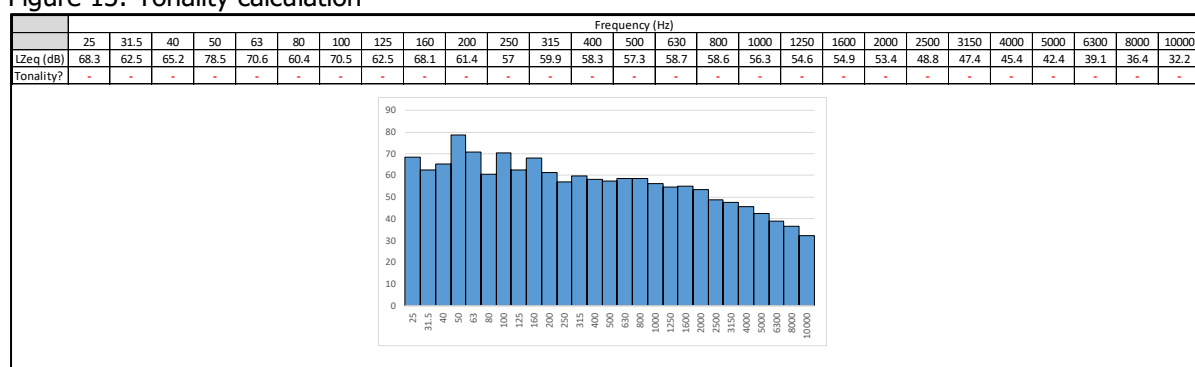
Based on the predicted maximum noise level of the unloading operation only (i.e. no vehicle movements, as vehicle movements are not considered impulsive) at the worst-case dwellings and the typical residual noise levels at the site, the following correction applies:

Figure 12: Impulsivity correction at worst case NSR

Day Unloading Specific Level	37	
Night Unloading Specific Level	37	
	West Daytime	West Night Time
Predicted LAFmax at NSR	55	55
Residual at NSR	53	43
Predicted Prominence $P = 3\text{Log}(\text{onset rate}) + 2\text{Log}(\text{level change})$		
Onset Rate at NSR = (LAFmax - Residual)/Onset time	7	40
Level Change at NSR = LAFmax - Residual	2	12
Prominence	3	7
BS4142:2014+A1:2019 Impulsivity correction	0	4

Tonality – We do not consider a character correction is necessary for tonality. The BS4142 tonality calculation is shown below for the Diesel Fridge 10m at a food store RDC. The fridges would be the source of any significant tone from a refrigerated HGV. As can be seen there is no tonality present, and a character correction is not required.

Figure 13: Tonality calculation



It should be noted that on most food store deliveries, the diesel fridges do not operate when an HGV arrives as the ambient temperature of the trailer is sufficiently cooled at the RDC and on transport.

Intermittency and Other Sound Characteristics – We do not believe any correction is necessary for intermittency or other sound characteristics.

7.4.4. Estimate of Impact

Therefore, the British Standard 4142:2014 initial estimate of impact is as follows:

Table 12: BS4142 Initial estimate of impact due to delivery noise

Parameter	Sound Level / dB	
	NSR West	
	Day Time	Night Time
Background Level, $L_{A90,T}$	47	31
Specific Sound Level, $L_{Aeq,T}$	40	42
Character Correction	0	+4
Rating Level, $L_{Ar,T}$	40	46
Excess of rating over background level	-7	+15

When assessed to British Standard 4142:2014, the initial estimate indicates that the delivery noise will result in a low impact at the nearby NSRs during the daytime hours (07:00-23:00) and a likely significant adverse impact during the night time period (23:00-07:00).

It should be noted that the numerical outcome above only represents the initial estimate of impact, as stated in the first paragraph of Clause 11, and that contextual matters should be considered before determining what the impact will be.

7.5. Context

7.5.1. Absolute Levels

British Standard 4142:2014 states:

"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following.

"1) The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low. Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night. Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse. "

With regard to 'absolute levels', the most relevant guidance is British Standard 8233:2014.

Section 7.7.2 Table 4 of the British Standard provides internal ambient noise levels for dwellings from noise sources 'without a specific character' and are based on existing guidelines issued by the World Health Organisation in 1999. We would advise the rating level is considered to allow for the character of the source.

The guideline states that noise levels should not exceed 35 dB $L_{Aeq(16hr)}$ within living rooms during the daytime and 30 dB $L_{Aeq(8hr)}$ within bedrooms.

As the delivery has character, the level with a character correction (rating level) should be considered (to the L_{Aeq} only) to allow for the fact it is not anonymous noise.

In addition, time correction from a short term L_{Aeq} to long-term 16 hr or 8 hr level is not considered representative of the overall impact and therefore no time correction is applied. This is a worse case impact.

The internal level is approximately 15 dB(A) quieter than the external free-field level (as stated by the WHO) allowing for the attenuation of a partially open window.

Therefore, based on the above, the worst-case absolute level assessment is as follows.

Table 13: Absolute internal level assessment

Parameter	Predicted Level dB L_{Ar}	Open Window Correction dB(A)	Predicted Internal Level dB(A)	Within BS8233 Criteria?
Day (07:00-23:00)	40	-15	25	YES
Night (23:00-07:00)	46		31	NO

As can be seen from the table above, the delivery rating sound level is within the BS8233:2014 criteria during daytime hours at existing worst affected NSRs. Therefore, we would consider delivery noise to be of a low impact at all noise-sensitive receivers when compared to the absolute level criteria during daytime period.

During the night time period the rating sound level falls 1 dB above the criteria set out in BS8233:2014. Therefore, we would consider delivery noise to be of adverse impact when compared to the absolute level criteria.

7.5.2. Residual Levels

British Standard 4142:2014 also states:

"The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound."

Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it."

We have compared the residual noise climate, i.e. the ambient sound at the assessment location when the specific sound source (deliveries) is suppressed to such a degree that it does not contribute to the ambient sound, to the specific sound level (delivery noise) and rating level (delivery noise level with character correction applied).

This is summarised below:

Table 14: Comparison to residual sound levels

Parameter	Day (07:00-23:00)	Night (23:00-07:00)
Typical Residual Sound Level dB $L_{Aeq}(15min)$	53	43
Rating Sound Level dB $L_{Ar}(1hour/15min)$	40	46
Difference	-13	+3

As can be seen above, the rating sound level is 15 dB below the typical residual sound level at the nearest NSR's during the daytime hours and 3 dB above during the night time hours.

We would consider the noise source will not result in an incongruous sound by comparison to the baseline residual climate during the day time hours and is therefore acceptable during the day time period.

During the night time period the delivery noise may be perceptible above the existing noise climate.

7.6. Summary of Delivery Assessment

From the assessment it can be concluded that noise from the proposed unloading and vehicle movements associated with deliveries to the proposed Lidl food store during the day time hours (07:00-23:00) would result in a low impact at the NSRs when assessed to BS4142.

When context is considered in terms of absolute noise levels and comparing the existing residual sound levels, unloading and vehicle arrival during night time hours (07:00-23:00) would result in an adverse to significant adverse impact at the NSRs. For this reason, deliveries should be limited to the daytime period only.

We would consider the noise impact of deliveries to fall below the Lowest Observed Adverse Effect Level (LOAEL) of the PPG and NPSE and, as such, achieves the aims of the National Planning Policy Framework (NPPF), when limited as noted above, to the daytime period.

8. Summary and Conclusions

Lidl appointed Acoustic Consultant Limited to undertake a noise impact assessment for the proposed Lidl food store on land off Eastern Way, Melksham, SN12 7QS.

This report provides a noise assessment of plant and delivery operations on the nearby noise sensitive receivers around the site.

The noise impact assessment has been undertaken in accordance with the guidance in the National Planning Policy Framework (NPPF), Noise Policy Statement for England (NPSE), Planning Practice Guidance (PPG) and British Standard 4142:2014+A1:2019 (BS4142).

A Cadna:A computer noise model was built for the proposed plant and delivery operations, with the predicted levels compared to measured background noise levels.

When comparing the noise impact of the plant against the measured background noise levels at the nearest NSRs, plant noise will have a low impact and will be acceptable when assessed to British Standard 4142:2014+A1:2019.

From the delivery operations assessment deliveries should be limited to the daytime period only. Deliveries during the daytime will be of low impact when assessed to BS4142:2014+A1:2019. The impact of noise from deliveries during the daytime period falls below the Lowest Observed Adverse Effect Level (LOAEL) of the PPG and NPSE.

With the above considered, the proposals are expected to meet the aims of the NPPF and are deemed acceptable in terms of noise.

9. Appendix 1 – Glossary of Acoustic Terminology

A-weighted sound pressure p_A – value of overall sound pressure, measured in pascals (Pa), after the electrical signal derived from a microphone has been passed through an A-weighting network.

A-weighted sound pressure level, L_{pA} – quantity of A-weighted sound pressure given by the following formula in decibels (dBA)

$$L_{pA} = 10 \log_{10} (p_A/p_0)^2$$

where:

p_A is the A-weighted sound pressure in pascals (Pa);
 p_0 is the reference sound pressure (20 μ Pa)

Background sound level, $L_{A90,T}$ – A-weighted sound pressure level that is exceeded by the residual sound assessment location for 90% of a given time interval, T, measured using weighting F and quoted to the nearest whole number of decibels

Break-in - noise transmission into a structure from outside.

Decibel (dB) – The decibel is the unit used to quantify sound pressure levels. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). Therefore, a logarithmic scale is used to describe sound pressure levels and also sound intensity and power levels. The logarithms are taken to base 10. Hence an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in the sound pressure level (measured in Pascals). Subjectively, this increase would correspond to a doubling of the perceived loudness of sound.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$ – value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T = t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation:

$$L_{Aeq,T} = 10 \log_{10} \left\{ (1/T) \int_{t_1}^{t_2} [p_A(t)^2 / p_0^2] dt \right\} \quad (1)$$

where:

p_0 is the reference sound pressure (20 μ Pa); and

$p_A(t)$ is the instantaneous A-weighted sound pressure (Pa) at time t

NOTE The equivalent continuous A-weighted sound pressure level is quoted to the nearest whole number of decibels.

Facade level – sound pressure level 1 m in front of the façade. Facade level measurements of L_{pA} are typically 1 dB to 3 dB higher than corresponding free-field measurements because of the reflection from the facade.

Free-field level – sound pressure level away from reflecting surfaces. Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e. not 3.5 m from the reflecting surface in the direction of the source).

Octave and Third Octave Bands – The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz and is generally more sensitive to medium and high frequencies than to low frequencies within the range. There are many methods of describing the frequency content of a noise. The most common methods split the frequency range into defined bands, in which the mid-frequency is used as the band descriptor and in the case of octave bands is double that of the band lower. For example, two adjacent octave bands are 250 Hz and 500 Hz. Third octave bands provide a fine resolution by dividing each octave band into three bands. For example, third octave bands would be 160 Hz, 250 Hz, 315 Hz for the same 250 Hz octave band.

Sound pressure level – Sound pressure level is stated on many of the charts. It is the amplitude of the acoustic pressure fluctuations in a sound wave, fundamentally measured in Pascals (Pa), typically from 20 micro-Pascals to 100 Pascals, but commonly simplified onto the decibel scale.

Sound reduction index, R – laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.

Specific sound level, $L_s = L_{Aeq,T_r}$ – equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r .

Structure-borne noise – audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements.

Rating level, L_{A,r,T_r} – Specific sound level plus any adjustment for the characteristic features of the sound.

Reverberation Time, T – The reverberation time is defined as the time taken for a noise level in an enclosed space to decay by 60 dB from a steady level once the noise source has stopped. It is measured in seconds. Often a 60 dB decay cannot be measured so the reverberation time is measured over a lesser range and corrected back to the time for a 60 dB drop assuming a constant decay rate. Common parameters are T20 (time taken for a 20 dB decay multiplied by three) and T30 (time taken for a 30 dB decay multiplied by two).

Vibration Dose Value, VDV – measure of the total vibration experienced over a specified period of time.

Estimated Vibration Dose Value, $eVDV$ – estimation of the total vibration experienced over a specified period of time. This is usually based on the number of events and shortened measurement data.

Weighted sound reduction index, R_w – Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies. The weighted sound reduction index is used to characterize the insulation of a material or product that has been measured in a laboratory (see BS EN ISO 717-1).



ACOUSTIC
CONSULTANTS LTD

Head Office: 194 West Street, Bedminster, Bristol, BS3 3NB
T: 0117 986 2956

www.acoustic-ltd.co.uk

Registered Office: 194 West St, Bristol, BS3 3NB Registered No: 8544901