Noise Impact Assessment

Alston Dairy, Preston

Reference: 50-961-R1-4

Date: December 2023

NOISE IMPACT ASSESSMENT

Alston Dairy,
Preston

Prepared for:

Eden Planning

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EXECUTIVE SUMMARY

BACKGROUND

Site Address	Alston Dairy, Alston Lane, Preston PR3 3BL
National Grid Reference	E 360128, N 435466
Proposed Development	Proposed extension to an existing dairy manufacturing and warehouse facility, including additional parking. A new farm shop including a large customer car park and separate servicing. A new storage building with separate access.
Report Objectives	• To identify, measure and assess the potential impact of the proposed change of use on existing residential receptors in the immediate vicinity of the Site. • To set plant noise limits to protect existing residential receptors from any adverse impact. The report follows current and relevant British Standards in order to provide a robust assessment.

ASSESSMENT

Surveys Completed	An unattended weekday background sound survey in a position considered representative of the closest existing residential receptors to the development has been undertaken.
Assessments	E3P has undertaken detailed 3D noise modelling of all the proposed sources in order to predict noise levels within rear external amenity areas of the closest noise sensitive receptors for the daytime and night-time periods, in accordance with BS 4142:2014+A1:2019, at the closest receptors to the site. The assessment has shown that the predicted the rating levels do not exceed the modal measured background sound level during the daytime or night-time period at the majority of receptors. However, at the receptor R1 an exceedance during the daytime period is predicted. Given that exact detail of fixed plant items are not currently available plant noise limits have been set.
Mitigation Requirements	Acoustic barriers at 2.1 m in height are required to protect external garden areas at R1.

CONCLUSIONS

This assessment has shown that, there should be no adverse impact upon existing residential receptors due to the proposed operations.

As such, noise should not be a determining factor in the determination of the planning application.

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1. INTRODUCTION

1.1. BACKGROUND

E3P were commissioned by Eden Planning to undertake a Noise Impact Assessment for the proposed extension to an existing commercial dairy farm at Alston Lane in Preston, to be referred to hereafter as *'the site'*.

This assessment looks to determine the key noise sources associated with the development and undertake an assessment of any impacts upon existing noise sensitive receptors.

1.2. PROPOSED DEVELOPMENT

The Site is located within an agricultural area with nearby residential properties surrounding. The client seeks to acquire planning for the extension of the existing dairy including for an extension to the main dairy, new farm shop and storage building.

For the purpose of this assessment is assumed that the proposed extension will operate 24/7.

The key sources of sound associated with the development will be, noise break-out from the units, HGV deliveries, car park usage and fixed plant sound.

1.3. LIMITATIONS

Where a noise or vibration survey is required to inform an assessment, E3P will endeavour to ensure that all noise and vibration measurements taken are robust, representative and reliable in order to inform an accurate assessment at the time.

E3P will endeavour to capture all existing and proposed sources of sound and vibration at the time of the surveys and/or assessments. However, should new sources of sound be introduced, existing sources modified/changed, or characteristics of the sound be altered following completion of such, E3P cannot be held accountable for this.

Where mitigation measures are specified in this report, it should be noted that these measures are relative to a specific sound or vibration source, both in terms of the measured sound pressure and vibration level and the character of the sound source. Where either the sound pressure level or the character of the sound varies following completion of the sound survey, E3P cannot be held responsible for any subsequent variations in the proposed mitigation performance, for either absolute levels or frequency content.

2. ASSESSMENT METHODOLOGY

2.1. NATIONAL PLANNING POLICY FRAMEWORK

To prevent unacceptable risks from pollution, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be considered.
The national planning policy framework states that planning policies and decisions should aim to:

- Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development.
- Mitigate and reduce to a minimum, other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions.
- Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established.
- Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

2.2. NATIONAL PLANNING PRACTICE GUIDANCE

Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

Local planning authorities' plan-making and decision-making should take account of the acoustic environment and in doing so consider:

- Whether or not a significant adverse effect is occurring or is likely to occur.
- Whether or not an adverse effect is occurring or is likely to occur.
- Whether or not a good standard of amenity can be achieved.

In line with the explanatory note of the NPSE, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase, where applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

The "observed effect levels" are as follows:

- **Significant observed adverse effect level:** This is the level of noise exposure above which significant adverse effects on health and quality of life occur.
- **Lowest observed adverse effect level:** This is the level of noise exposure above which adverse effects on health and quality of life can be detected.
- **No observed effect level:** This is the level of noise exposure below which no effect at all on health or quality of life can be detected.

Table 2.1 summarises the noise exposure hierarchy, based on the likely average response.

TABLE 2.1 NOISE EXPOSURE HIERARCHY

PERCEPTION	EXAMPLES OF OUTCOMES	INCREASING EFFECT LEVEL	ACTION
Not Noticeable	No effect.	No observed effect	No specific measures required
Noticeable and Not Intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No observed adverse effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and Intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television, speaking more loudly, or having to close windows for some of the time because of the noise where there is no alternative ventilation. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed adverse effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and Disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion, having to keep windows closed most of the time because of the noise where there is no alternative ventilation. 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 effect	Avoid
Noticeable and Very Disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening, loss of appetite, significant/medically definable harm (auditory and non-auditory).	Unacceptable adverse effect	Prevent

The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any situation. These factors include the following:

- The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day. The adverse effect can also be greater simply because there is less background noise at night.
- For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise can be important.
- The spectral content of the noise and the general character of the noise. The local topology and topography should also be considered along with the existing and, where appropriate, the planned character of the area.

More specific factors to consider when relevant:

- Where applicable, the cumulative impacts of more than one source should be considered along with the extent to which the source of noise is intermittent and of limited duration.
- Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases, a suitable alternative means of ventilation is likely to be necessary.
- If external amenity spaces are an intrinsic part of the overall design, then the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.

2.3. BS 4142: 2014+A1:2019 'METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND'

This standard describes methods for rating and assessing sound of an industrial or commercial nature which includes:

- Sound from industrial and manufacturing processes.
- Sound from fixed installations which comprise mechanical and electrical plant and equipment.
- Sound from the loading and unloading of goods and materials at industrial and / or commercial premises; and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial Site.

The procedure detailed in the standard compares the measured or predicted specific noise level from any of the above with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but rather to quantify what is typical.

The specific noise level also acknowledges the reference time intervals depending upon whether the noise source operates during daytime (1-hour) or night-time (15-minute) periods.

There are several 'penalties' which can be attributed to the specific sound level depending upon the 'acoustic features' of the sound level under investigation as follows:

Tonality

- +2 dB: where the tonality is just perceptible.
- +4 dB: where the tonality is clearly perceptible; and
- +6 dB: where the tonality is highly perceptible.

Impulsivity

- +3 dB: where the impulsivity is just perceptible.
- +6 dB: where the impulsivity is clearly perceptible; and
- +9 dB: where the impulsivity is highly perceptible.

Intermittency

- +3dB: where the intermittency is readily distinctive against the acoustic environment.

In addition to the above, there is a penalty for 'other sound characteristics' of +3 dB where a sound exhibits characteristics that are neither tonal nor impulsive, though are readily distinctive against the acoustic environment. BS 4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.

Assessment of the rating level relative to the background sound level can yield the following commentary:

- Typically, the greater this difference (between the rating level and the background sound level), the greater the magnitude of 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; and
- 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. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

It is common that a Local Planning Authority (LPA) will specify their own criterion and, where this is the case, this criterion will usually take precedence over a simple comparison of the rating level against the background sound level.

3. SURVEY RESULTS

3.1. UNATTENDED BACKGROUND AND AMBIENT SOUND SURVEY

E3P have undertaken an unattended background and ambient sound survey in a position considered representative of the closest receptors located along Preston Road and Pinfold Lane.

The survey was carried out over the following time periods:

- 12:00 Thursday 14th September to 15:00 Monday 18th September 2023.

The following noise measurement position was chosen for the Background Sound Survey:

- Noise Measurement Position 1 (NMP1): Located to the east of the site adjacent to the residential receptor located on Pinfold Lane, this location is also representative of receptors located to the west of the site on Preston Road. The microphone of the sound level meter was set at a height of 1.5 m above ground level and in free-field conditions. Sound sources consisted of road traffic on the local road network and local sources.

During the survey, cattle damaged the meter rendering data after 23:00 on the 15th September unusable. However, the data gathered from 12:00 on the 14th September to 23:00 on the 15th September can be used to establish the representative background. It was not deemed suitable to repeat the survey as it would be likely further damage could be caused to equipment.

Further attended surveys are not required at the amount of data gathered would still be less than that the unattended useable data already captured.

Table 3.1 details the measured hourly background and ambient sound levels.

TABLE 3.1 MEASURED HOURLY BACKGROUND AND AMBIENT SOUND PRESSURE LEVELS

MEASUREMENT START TIME	$L_{Aeq,T}$	$L_{A90,T}$
14/09/2023 12:00	56	49
14/09/2023 13:00	55	48
14/09/2023 14:00	57	51
14/09/2023 15:00	56	51
14/09/2023 16:00	55	50
14/09/2023 17:00	53	48
14/09/2023 18:00	51	40
14/09/2023 19:00	47	38
14/09/2023 20:00	43	34
14/09/2023 21:00	40	32
14/09/2023 22:00	39	32
14/09/2023 23:00	57	35
15/09/2023 00:00	50	34
15/09/2023 01:00	54	37

MEASUREMENT START TIME	$L_{Aeq,T}$	$L_{A90,T}$
15/09/2023 02:00	50	40
15/09/2023 03:00	41	37
15/09/2023 04:00	39	37
15/09/2023 05:00	42	37
15/09/2023 06:00	50	42
15/09/2023 07:00	50	44
15/09/2023 08:00	49	44
15/09/2023 09:00	48	43
15/09/2023 10:00	49	40
15/09/2023 11:00	49	40
15/09/2023 12:00	48	41
15/09/2023 13:00	47	40
15/09/2023 14:00	50	41
15/09/2023 15:00	50	42
15/09/2023 16:00	45	41
15/09/2023 17:00	45	40
15/09/2023 18:00	48	39
15/09/2023 19:00	44	39
15/09/2023 20:00	42	38
15/09/2023 21:00	41	35
15/09/2023 22:00	39	35
15/09/2023 23:00	38	35

Table 3.2 details the measured 15-minute background and ambient sound levels during the night-time period..

TABLE 3.2 MEASURED 15-MINUTE BACKGROUND AND AMBIENT SOUND PRESSURE LEVELS

MEASUREMENT START TIME	$L_{Aeq,T}$	$L_{A90,T}$
14/09/2023 23:00	40	31
14/09/2023 23:15	53	42
14/09/2023 23:30	56	44
14/09/2023 23:45	62	50
15/09/2023 00:00	54	41
15/09/2023 00:15	51	39
15/09/2023 00:30	37	34
15/09/2023 00:45	45	34
15/09/2023 01:00	56	34
15/09/2023 01:15	49	37
15/09/2023 01:30	51	41
15/09/2023 01:45	55	43
15/09/2023 02:00	49	40
15/09/2023 02:15	51	39
15/09/2023 02:30	49	40
15/09/2023 02:45	49	40
15/09/2023 03:00	43	37
15/09/2023 03:15	41	37
15/09/2023 03:30	40	38
15/09/2023 03:45	39	37
15/09/2023 04:00	39	37
15/09/2023 04:15	39	36
15/09/2023 04:30	40	37
15/09/2023 04:45	39	37
15/09/2023 05:00	40	36
15/09/2023 05:15	42	37
15/09/2023 05:30	41	37
15/09/2023 05:45	44	40
15/09/2023 06:00	49	41
15/09/2023 06:15	46	42
15/09/2023 06:30	54	42
15/09/2023 06:45	48	42

The daytime modal background sound level is 40 dB and during the night-time 37 dB. As such, these values are considered the representative background sound level for the surrounding receptors and will be used for the assessment.

During the survey, conditions remained dry and wind speeds rarely exceeded 10 mph. The equipment outlined in Table 3.3 was used for the noise survey.

TABLE 3.3 NOISE MEASUREMENT EQUIPMENT AND CALIBRATION DATES

MEASUREMENT POSITION	EQUIPMENT DESCRIPTION	MANUFACTURER & TYPE NUMBER	SERIAL NUMBER	CALIBRATION DUE DATE
NMP1	Sound Level Meter	01dB Fusion	14616	29/06/2024
	Pre-amplifier	01dB Pre22	20951	
	Microphone	GRAS 40CD	494264	
	Calibrator	Cirrus CR 515	99206	03/08/2024

The sound level meter was field calibrated on site using the above-mentioned calibrator prior to and after noise measurements were taken. No significant drift was witnessed as noted above. Calibration certificates are available upon request.

4. NOISE IMPACT ASSESSMENT

This assessment has made assumptions on the sources of sound relating to the development, to predict the noise level impact on the existing closest residential dwellings during the daytime and night-time periods. To inform a worst-case assessment It is assumed the proposed development will operate 24/7.

With regard to assumptions for the assessment, the following has been considered for the full planning application aspects:

- Ground elevations have been taken as existing by way of a 2 m grid Digital Terrain Model (DTM) which contains public sector information licensed under the Open Government License v3.0.

- The daytime period has been assessed between the hours of 07:00 to 23:00. For the assessment, BS 4142:2014+A1:2019 has been used to determine the likelihood of adverse impact within the garden areas over a reference time period of 1 hour.

- The night-time period has been assessed between the hours of 23:00 to 07:00. For the assessment, BS 4142:2014+A1:2019 has been used to determine the likelihood of adverse impact within at first floor external facades over a reference time period of 15 minutes.

- Noise breakout from the façades of the proposed main extension has been input into the model as vertical area sources. As the end use of this space is currently unknown worst case assumptions of 80 dB inside the unit have been assumed. Given that a minimum sound reduction of 31 dB is expected for a typical commercial building façade, external noise levels at the facades are expected to be, at most, 43 dB radiating from the façade itself.

- Deliveries to the new farm shop and to the Dairy have been assumed during both the daytime and night-time periods. E3P have used previously measured data taken from similar operations at similar sites. These have been used to inform the assessment. Typically, there will be no more than one delivery per hour. A sound power level of 77 dB for delivery unloading and loading operations and the refrigeration unit associated with the HGV has been derived from previously measured data.

- Fixed plant items are proposed for the new farm shop. However, at this time details are not available as to the exact items to be installed on site. As such E3P have used data for a previous site of a similar nature. A sound power level of 62 dB has been used to represent the dry coolers that may be the likely fixed plant item to be installed. This are assumed to run continuously. No plant item locations are detailed for the proposed main extension to the building and as such limits will be set for any further plant items in section 4.3 of this report.

- Car & HGV parking sound associated with the site, both the staff and visitor's car parks, has been inputted as an area source with daytime levels generated based on the car park being 100% full during the day and 25% full during the night-time to inform a worst-case assessment. The proposed storage building has been assumed to receive 5 HGVs deliveries within each period. This can be considered worst case.

For the BS 4142:2014 assessments, penalties are applied to the specific sound level to provide the rating level. These penalties relate to the acoustic features of the sound source. Given that the receptors are subject to delivery sound from existing dairy, acoustic penalties do not need to be considered as the proposed site would not be the introduction of a new noise source, as such no penalties are applied.

4.1. DAYTIME ASSESSMENT

Table 4.1 details the resultant rating level with external amenity areas at each receptor, output from the model. The grid noise map can be seen in Figure 2 of Appendix II and details the locations of the assessed receptors.

The modal measured background sound level during the daytime periods have been used for each corresponding receptor. This informs a worst-case assessment. Levels correspond to worst case garden noise levels.

TABLE 4.1 BS 4142:2014+A1:2019 ASSESSMENT - DAYTIME

RECEPTOR	CALCULATED RATING LEVEL IN EXTERNAL AMENITY AREA, $L_{A,r}$ (dB)	MODAL MEASURED BACKGROUND SOUND LEVEL, $L_{A90,1hr}$ (dB)	CRITERION, $L_{A90} = L_{A,r}$ (dB)	DIFFERENCE +/- (dB)
R1 – Pinfold Lane	46	40	40	**+6**
R2 – 242 Preston Road	34			-6
R3 – 246 Preston Road	21			-19
R4 – 248 Preston Road	21			-19
R5 – receptor on Preston Road immediate south of the site	34			-6

Table 4.2 indicates that the predicted rating level does not exceed the existing typical background sound level during daytime periods at the majority of residential receptor's external amenity areas.

However, at R1 the background sound level is exceeded by 6 dB.

As such, mitigation measures are required. Details on the required mitigation are given in Section 5.

4.2. NIGHT-TIME ASSESSMENT

Table 4.2 details the resultant rating level with external first floor facade at each receptor, output from the model. The grid noise map can be seen in Figure 3 of Appendix II and details the locations of the assessed receptors.

The modal measured background sound level during the night-time period has been used for each corresponding receptor. This informs a worst-case assessment. Levels correspond to worst external façade levels.

TABLE 4.2 BS 4142:2014+A1:2019 ASSESSMENT – NIGHT-TIME

RECEPTOR	CALCULATED RATING LEVEL IN EXTERNAL AMENITY AREA, $L_{A,r}$ (dB)	MODAL MEASURED BACKGROUND SOUND LEVEL, $L_{A90,1hr}$ (dB)	CRITERION, $L_{A90} = L_{A,r}$ (dB)	DIFFERENCE +/- (dB)
R1 – Pinfold Lane	22	37	37	-15
R2 – 242 Preston Road	28			-9
R3 – 246 Preston Road	28			-9
R4 – 248 Preston Road	29			-8
R5 – receptor on Preston Road immediate south of the site	34			-3

Table 4.2 indicates that the predicted rating level does not exceed the existing typical background sound level during night-time periods at the closest residential receptor's worst affected external façade.

As such, mitigation measures are not required.

4.2.1. MAXIMUM NOISE LEVEL ASSESSMENT AT NIGHT

When considering instantaneous maximum noise levels, E3P has considered the impact of car park usage, specifically a car door slam, at the closest car parking space to the respective receptors at night.

As such, E3P has used library source data to inform the Table below for door slams. The closest space to each respective receptor is used. A criterion level of 60 dB $L_{Amax,fast}$ is used externally to the façade as detailed in WHO Guidelines.

TABLE 4.3 MAXIMUM NOISE LEVEL ASSESSMENT – CAR PARK USAGE

RECEPTOR	SOURCE	MEASURED MAXIMUM NOISE LEVEL, $L_{Amax,fast}$ (dB)	DISTANCE TO RECEPTOR (m)	CALCULATED EXTERNAL MAXIMUM NOISE LEVEL, $L_{Amax,fast}$ (dB)	WHO GUIDELINES EXTERNAL NOISE LEVEL CRITERION, $L_{Amax,fast}$ (dB)	DIFFERENCE, +/- (dB)
Preston Road	Door slam	75 dB at 2 m	25	53	60	-7

As shown in the Table, predicted maximum noise levels achieve the required external criterion outside of bedroom windows at the closest receptor to the car park associated with the proposed development.

4.3. PROPOSED FIXED PLANT

At the time of submission, details of proposed fixed plant items were unknown. As such, the following recommendations have been made:

- Any fixed plant items should be located within the site and not located at facades which face noise sensitive receptors.
- The resultant rating level from the cumulative impact of all proposed fixed plant items must not exceed the existing background sound levels, accounting for the above proposed noise levels, at the closest receptors.

It would also be prudent to consider the frequency content of any installed fixed plant items. As such, any fixed plant items installed as part of the development, should not exceed the below criterion when measured or predicted outside the closest habitable room window. A correction of 13 dB is applied to all frequencies to allow for the attenuation achieved by the open window.

TABLE 4.4 PROPOSED PLANT LIMITS

FREQUENCY (Hz)	31.5	63	125	250	500	1k	2k	4k	8k
NR30 (dB)	76	59	48	40	34	30	27	25	23
Open Window (dB)	13	13	13	13	13	13	13	13	13
Allowable external noise level due to proposed fixed plant	**89**	**72**	**61**	**53**	**47**	**43**	**40**	**38**	**36**

Where octave band data is not available, as a minimum, the rating level from the plant should be no more than 43 dB at the closest habitable room window so as to achieve 30 dB internally with an open window.

5. MITIGATION AND DISCUSSION

The previous section determined that sound levels in garden areas associated with R1 would have potential to cause adverse impact. As such, an additional grid noise map, Figure 4, has been run to determine the required barrier heights.

As such, the following barrier is required to achieve noise levels at or below the background sound level:

- 2.1 m high.

The barriers can be of wooden fence or brick wall construction but must be free from holes, sealed at the base and have a minimum mass of 10 kg/m^2. Figure 4 shows the location of these barriers.

6. CONCLUSION AND RECOMMENDATIONS

E3P were commissioned by Eden Planning to undertake a Noise Impact Assessment for the proposed extension to an existing dairy at Alston Lane in Preston.

This assessment looked to determine the key noise sources associated with the development and undertake an assessment of any impacts upon existing noise sensitive receptors.

Unattended background and ambient sound survey has been undertaken in order to capture worst case baseline noise levels at the closest receptors.

E3P has undertaken detailed 3D noise modelling of all the proposed sources in order to predict noise levels within rear external amenity areas and external facades of the closest noise sensitive receptors for the daytime and night-time periods, in accordance with BS 4142:2014+A1:2019, at the closest receptors to the site.

The assessment has shown that the predicted the rating level do not exceed the modal measured background sound level during the daytime or night-time periods at the majority of receptors. However at the receptor R1 mitigation measures in the form of acoustic barriers at a height of 2.1 m are required to protect external garden areas during the daytime.

Given that exact details are not currently available, plant noise limits have been set.

This assessment has shown that, with the proposed site in operation, there should be no adverse impact upon existing residential receptor.

As such, noise should not be a determining factor in the determination of the planning application.

END OF REPORT

APPENDIX I
GLOSSARY OF ACOUSTIC TERMINOLOGY

NOISE

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source. The most widely used weighting mechanism that best corresponds to the response of the human ear is the "A"-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq}, L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective but, as a general guide, a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions. An indication of the range of sound levels commonly found in the environment is given in the following table.

TABLE A1 TYPICAL SOUND PRESSURE LEVELS

SOUND PRESSURE LEVEL	LOCATION/EXAMPLE
0	Threshold of hearing
20–30	Quiet bedroom at night
30–40	Living room during the day
40–50	Typical office
50–60	Inside a car
60–70	Typical high street
70–90	Inside a factory
100–110	Burglar alarm at 1 m away
110–130	Jet aircraft on take off
140	Threshold of pain

ACOUSTIC TERMINOLOGY

TABLE A2 TERMINOLOGY

DESCRIPTOR	EXPLANATION
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2E-05 Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. "A" weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq, T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} is the maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the "fast" sound level meter response.
L_{10} and L_{90}	If a non-steady noise is to be described, it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the "average maximum level". Similarly, L_{90} is the "average minimum level" and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and away from buildings.
Fast	A time weighting used in the root-mean-square section of a sound level meter with a 125-millisecond time constant.
Slow	A time weighting used in the root-mean-square section of a sound level meter with a 1000-millisecond time constant.

APPENDIX II
FIGURES

Figure 1 - Noise Measurement Positions

Project:
Alston Dairy, Preston

Project-No:
50-961

Client:
Eden Planning

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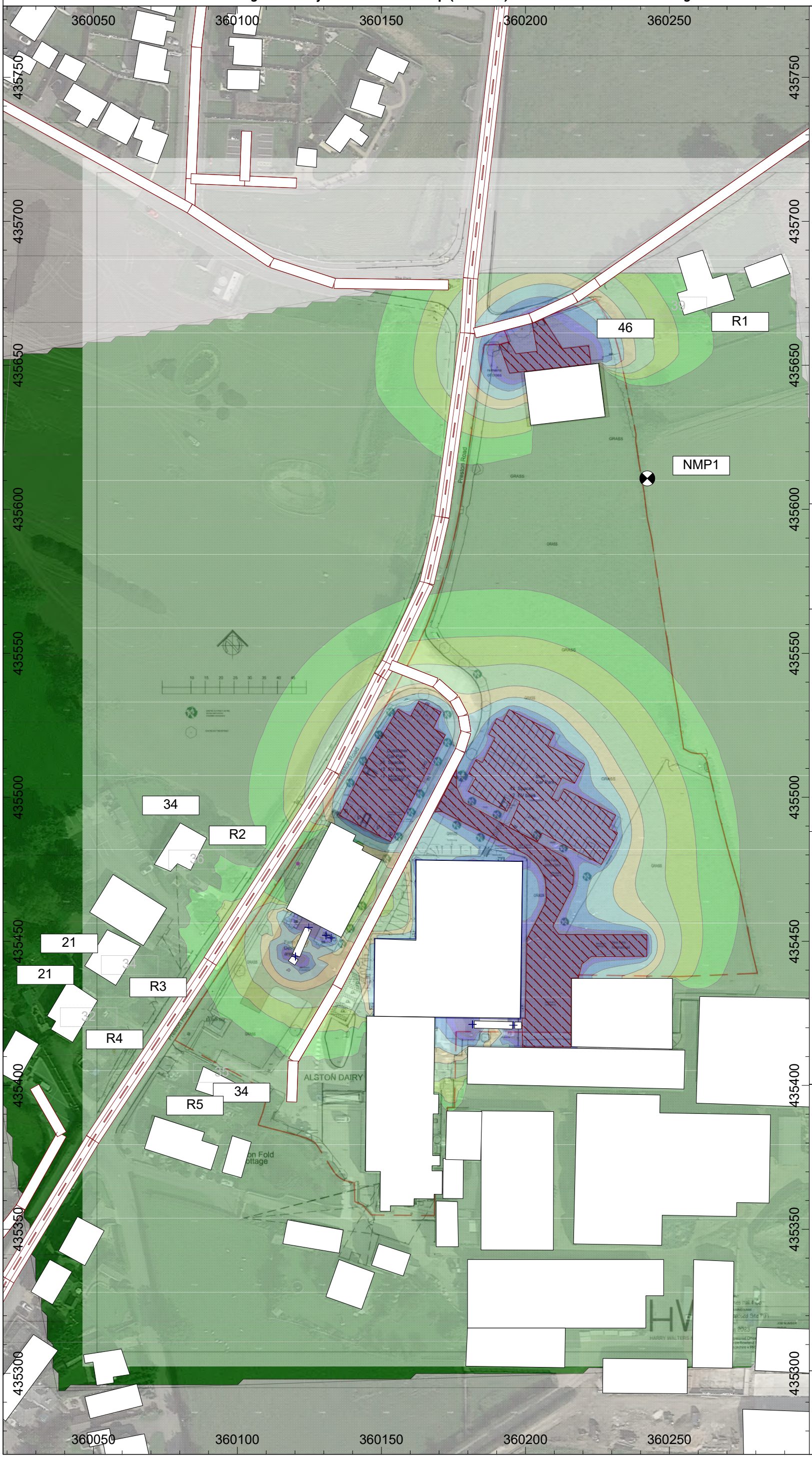
Project Engineer: Scott Boughton
Date: 4/12/2023

Figure 2 - Daytime Grid Noise Map (BS 4142) - Calculation at 1.5 m above ground level



Project:
Alston Dairy, Preston

Project-No:
50-961

Client:
Eden Planning

Daytime Noise Level, LAr (dB)

- ... <= 38
- 38 < ... <= 40
- 40 < ... <= 42
- 42 < ... <= 45
- 45 < ... <= 48
- 48 < ... <= 50
- 50 < ... <= 52
- 52 < ... <= 55
- 55 < ...

Noise Map Objects

- Point Source
- vert. Area Source
- Road
- Parking Lot
- Building
- Barrier
- Receiver
- Calculation Area

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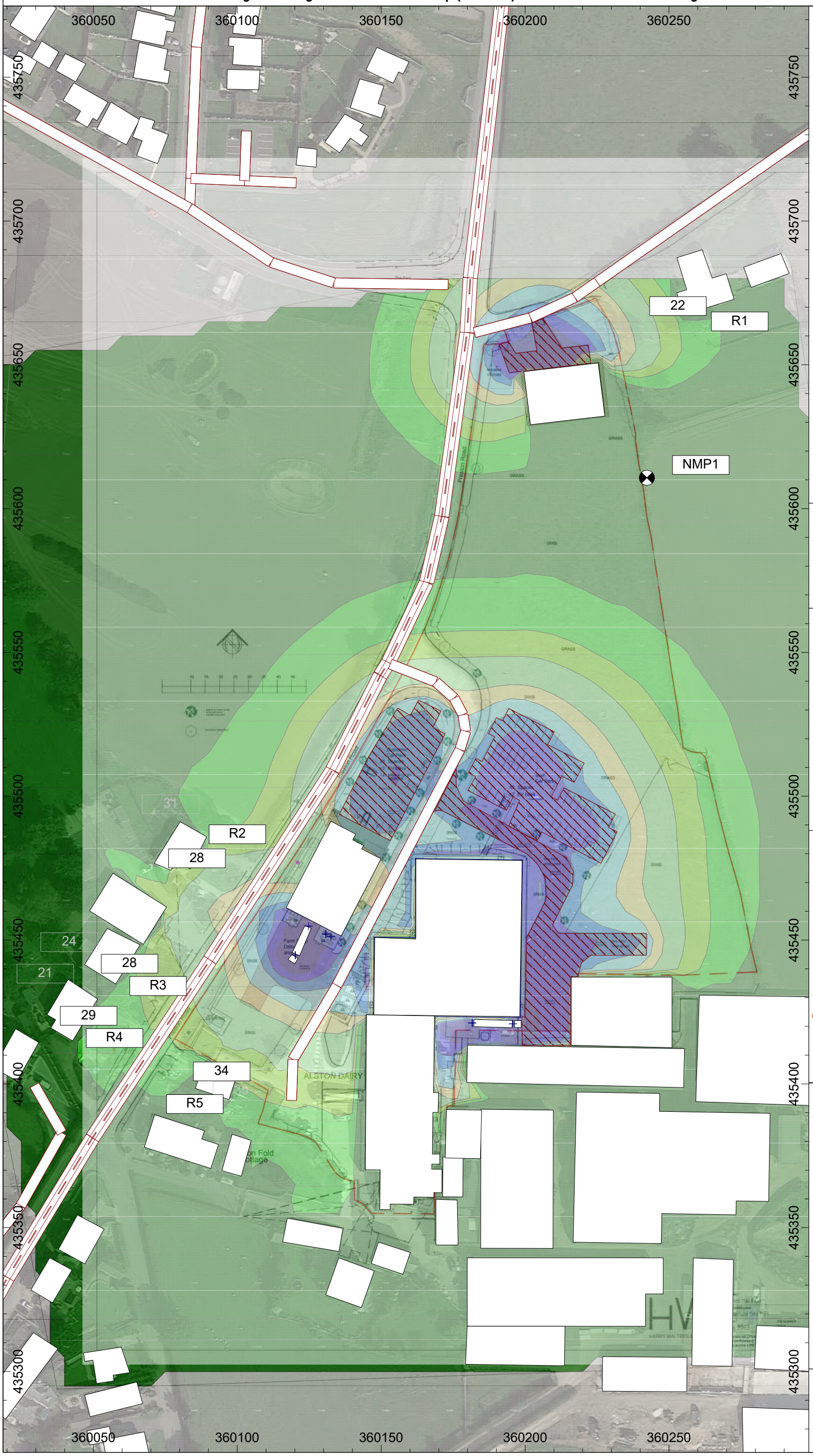
Project Engineer: Scott Boughton
Date: 4/12/2023

Figure 3 - Night-time Grid Noise Map (BS 4142) - Calculation at 4.5 m above ground level



Project:
Alston Dairy, Preston

Project-No:
50-961

Client:
Eden Planning

Night-time Noise Level, LAr (dB)

- ... <= 32
- 32 < ... <= 35
- 35 < ... <= 38
- 38 < ... <= 40
- 40 < ... <= 42
- 42 < ... <= 45
- 45 < ... <= 48
- 48 < ... <= 50
- 50 < ...

Noise Map Objects

- Point Source
- vert. Area Source
- Road
- Parking Lot
- Building
- Barrier
- Receiver
- Calculation Area

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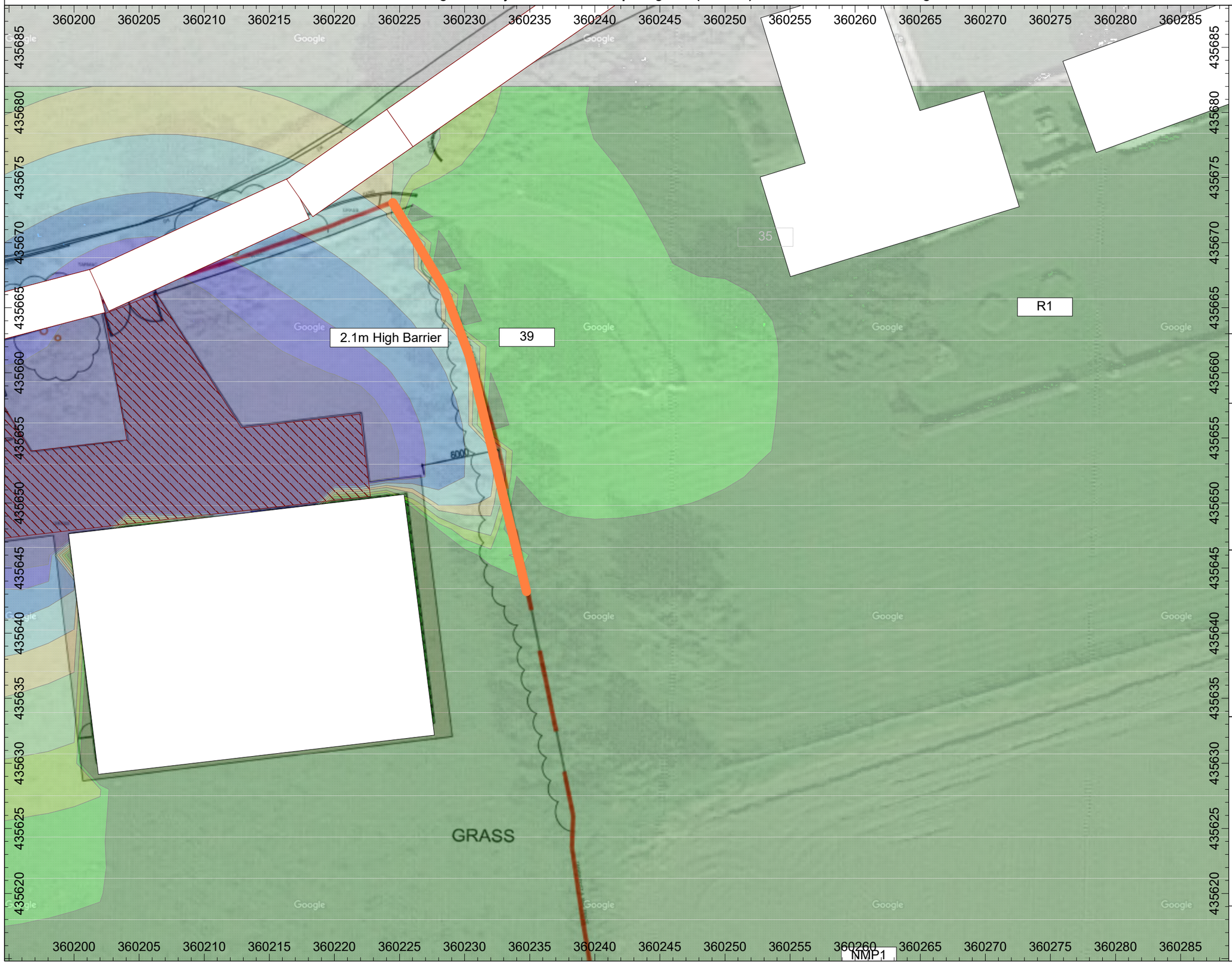
Project Engineer: Scott Boughton
Date: 4/12/2023

Figure 4 - Daytime Grid Noise Map Mitigation (BS 4142) - Calculation at 1.5 m above ground level



Project:
Alston Dairy, Preston

Project-No:
50-961

Client:
Eden Planning

Daytime Noise Level, LAr (dB)

- ... <= 38
- 38 < ... <= 40
- 40 < ... <= 42
- 42 < ... <= 45
- 45 < ... <= 48
- 48 < ... <= 50
- 50 < ... <= 52
- 52 < ... <= 55
- 55 < ...

Noise Map Objects

- Point Source
- vert. Area Source
- Road
- Parking Lot
- Building
- Barrier
- Receiver
- Calculation Area

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Project Engineer: Scott Boughton
Date: 4/12/2023