



Project: J 06143
Plant Noise Assessment v1.1:
Sainsburys Superstore, Bannister Way,
Haywards Heath, RH16 1DG

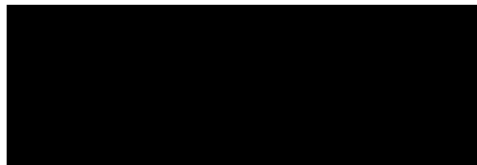
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Client: Sainsbury's

Prepared by: J. Willmott

Signed:



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1. BACKGROUND

- 1.1. The assessment concerns the installation of a new tail lift in the external deliveries area of the site to allow use of double height delivery vehicles.

See APPENDIX 2 - Site Location/Plans.

- 1.2. Sound Planning understands that the following equipment will contribute to the noise emissions from the proposed new activity areas:

- 1 x external goods lift to be installed in the rear delivery yard at the site
- The goods lift servicing double decker delivery vehicles is similar to the lift already present at the site, which has been confirmed with the lift installer
- An acoustic enclosure will be installed around the lift motor which is the primary source of noise generation for the lift.
- The internal deck of the HGV lowers so the lift height required is similar between single deck and double deck delivery vehicles
- The ground surface between the lift and the entrance to the warehouse will be smoothed/levelled to minimise noise from moving stock cages as far as possible.

- 1.3. Sound Planning has been retained to evaluate potential noise impact on the nearest noise sensitive receiver using appropriate methodologies and assessment criteria, and to design a suitable noise mitigation strategy if required.

- 1.4. Jake Willmott is a Member of the Institute of Acoustics (M.I.O.A) having attained appropriate qualifications in acoustics and has seven years' experience undertaking acoustic assessments including significant experience of BS4142 assessments in the context of planning applications.

Jake has attained the following qualifications within the field of acoustics:

- Institute of Acoustics (IOA) Diploma
- Masters Degree - Applied Acoustics (Solent University)

- 1.5. Site and Location:



1.5.1. The site is in an area of mixed commercial and residential use area. See APPENDIX 2 - Site Location/Plans.

1.5.2. The nearest noise sensitive receiver to the proposed plant installation is a residential building approximately 64m from the proposed tail lift location, opposite the deliveries yard entrance on Harlands Road.

See APPENDIX 2 - Site Location/Plans.

1.5.3. Noise currently affecting the site comprises road traffic noise, and some noise from existing operations in the service yard. Periods of time during the noise survey where noise sources in the service yard were not active have been used to determine the typical background noise level.

1.6. Proposed Operation Times:

- Monday – Sunday: 07:00 – 02:45 hours dependant on delivery requirements

2. **ASSESSMENT CRITERIA**

2.1. The plant noise assessment should be carried out in accordance with relevant standards and guidelines in conjunction with National Planning Policy (from the National Planning Policy Framework and the Noise Policy Statement for England), and the requirements of local planning policy as defined by Mid Sussex District Council.

2.2. National Planning Policy Framework

2.2.1. The National Planning Policy Framework (NPPF) was released in March 2012 and last updated in December 2023.

2.2.2. Paragraph 174 of the NPPF states: *‘Planning policies and decisions should contribute to and enhance the natural and local environment by... preventing new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of... noise pollution...’.*

2.2.3. Paragraph 185 of the NPPF states that; *‘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:

- *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 (see Explanatory Note to the Noise Policy Statement for England (DEFRA)).*
- *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*
- *limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.'*

2.2.4. Paragraph 193 of the NPPF states that; *'Planning policies and decisions should ensure that new development⁴ can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.'*

2.2.5. Therefore, the NPPF requires that significant impacts are avoided, adverse impacts be mitigated and reduced to a minimum, and places an obligation on developers to not unduly constrain the operation of existing businesses and other noise sources in the area (the 'agent of change' principle).

2.3. Noise Policy Statement for England (NPSE)

2.3.1. The NPSE requires that developments:

- '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'

2.4. Local Planning Policy (Mid Sussex District Council)



- 2.4.1. Mid Sussex District Council do not have a specific policy relating to tail lifts, however for other noise sources they commonly require that noise levels are at or below 5 dB below the existing background noise level at the nearest noise sensitive premises.
- 2.5. Noise Measurement Protocol - British Standard 7445-1: 2003¹
- 2.5.1. The methods and procedures described in BS 7445 are intended to be applicable to sounds from all sources, individually and in combination, which contribute to the total noise at a site.
- 2.5.2. The aim of the BS 7445 series is to provide authorities with material for the description of noise in community environments. Based on the principles described in this standard, acceptable limits of noise can be specified and compliance with these limits can be controlled.
- 2.5.3. BS 7445 does not specify limits for environmental noise.
- 2.6. BS 4142: 2014+A1: 2019 – Assessment of Impacts
- 2.6.1. 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.
- 2.6.2. Evaluation of Adverse Impact
- 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

¹ Description and measurement of environmental noise. Part 1 – Guide to quantities and procedures.



exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

- 2.6.3. Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.
- 2.6.4. The specific sound source level has character corrections applied during the assessment which account for the specific nature of the sound and whether it is more or less likely to be disruptive to the receptor. The available character corrections within the standard are:

Tonality

A correction of up to +6 dB may be applied for a sound which is likely to have discernible tonal elements at the receptor location. Tonality may be assessed via subjective (i.e. perceived on-site) or objective methods, with the subjective method given preference in the standard, where possible. The objective method may be calculated in either 1/3 octave or octave bands based, with the 1/3rd octave calculation given preference in the standard.

Impulsivity

A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of +3 dB for impulsivity which is just perceptible at the noise receptor, +6 dB where it is clearly perceptible, and +9 dB where it is highly perceptible. A reference method is provided in the standard if a subjective assessment is inconclusive or not possible to undertake.

Intermittency

When the specific sound has identifiable on/off conditions a penalty of +3 dB can be applied.

Other sound characteristics

Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of +3 dB can be applied.

3. NOISE SURVEY METHODOLOGY

- 3.1. Sound Planning completed a noise survey at the site between Friday 30th January – Sunday 1st February.



3.2. Equipment/Activity Noise Measurements:

- 3.2.1. Measurements were taken of an existing tail lift at the site which is of the same general type and size as the external lift proposed for installation.
- 3.2.2. Noise emissions from the lift were primarily observed to be from the lift motor which is at ground level adjacent to the lift platform. Noise from the motor was somewhat tonal, and noise from manoeuvring trolleys on the lift platform was somewhat impulsive in character.
- 3.2.3. Each operation of the lift platform took approximately 10 seconds, with the platform being moved up and down by operatives once every 2 minutes.
- 3.2.4. One trolley/cage was loaded during each movement and wheeled by hand into the store's stock area.
- 3.2.5. Sound monitoring equipment (including Class 1 Sound Level Meter with 1/3 octave band analysis) was positioned at 1m distance from the entrance to the tail lift platform and approximately 2m from the lift motor.
- 3.2.6. The sound level meter was positioned 1.5m above ground level and measured all statistical parameters (including L_{eq} and L_{90}).
- 3.2.7. The equipment operatives were advised to perform the activities as close as possible to real life as possible during the test measurements.
- 3.2.8. The sound measurements were undertaken in accordance with BS 7445² and BS 4142.³

3.3. Background Noise Measurements

- 3.3.1. Sound monitoring equipment was installed adjacent to the entrance of the

See APPENDIX 2 – Site Location & APPENDIX 3 – Site Photographs.
- 3.3.2. The background noise measurements were carried out over a weekend period when background levels were be representative of the typical noise environment in the area.

² British Standard 7445-1: 2003 – *Description and measurement of environmental noise.*

³ British Standard 4142: 2014+A1: 2019 – *Method for rating industrial noise affecting mixed residential and industrial areas.*



3.3.3. The measurement location was chosen because the noise environment was subjectively similar to the site boundary of the nearest sensitive receptors and experienced similar background noise levels when activities in the service yard are not underway.

3.3.4. The sound level meter was Class 1 – details provided in 3.3. The microphone was positioned 1.5m above ground level and at least 3.5m from any vertical reflective façade.

3.4. Sound Level Measurement Equipment

Equipment	Make	Model	Class	Serial Number	UKAS Calibration
SLM	Norsonic	NOR140	1	1405819	U47909 (25/05/25)
Field Calibrator	Norsonic	NOR1255	1	125525638	U47907 (24/05/25)

3.5. The Sound Level Meter (SLM) was field calibrated before and after the on-site noise measurements. No deviation was detected (1kHz). UKAS accredited calibration certificates are available on request.

3.6. The noise measurements were undertaken in accordance with BS 7445 and BS 4142.

3.7. Full background noise measurements are provided in APPENDIX 4 – Noise Measurement Data

4. NOISE CALCULATION METHODOLOGY

4.1. The noise level at the nearest external noise sensitive receiver (NSR) will be calculated using the formula:

$$SPL_2 = SPL_1 - 20 \log (r_2/r_1)$$

Where 'r' = radius; SPL = Sound Pressure Level.

4.2. Screening attenuation is based on an estimation of 5 dB attenuation for partial screening with line of sight, and 10 dB attenuation for full screening with no line of sight.

4.2.1. NSR 1 – the enclosure installed around the lift motor provides full screening to the noise sensitive receiver – 10 dB attenuation



- 4.2.2. NSR 1 – the lift and path of travel for the stock cages is located behind the HGV trailer, and behind the lift motor enclosure/screen. Reflective surfaces nearby prevent the level of screening provided from being full, but at least partial screening must be accounted for in the calculation – 5 dB attenuation.
- 4.3. ‘Time On’ corrections will be applied in accordance with methodology laid out in BS 4142: 2014+A1: 2019.

4.3.1. Maximum Operation Time (per hour)

Equipment / Activity	Time On (minutes per hour)	‘Time On’ correction
Tail lift moving up/down	5	-11
Staff manoeuvring trolleys/cages of stock	15	-6

- 4.3.2. In calculating the ‘Time-on’ corrections for the tail lift we note that noise generation from the lift motor occurs for approximately 10 seconds at a time (representing one movement up/down of the lift motor, with up to 30 movements per hour for a total of 5 minutes of operation of the lift in one hour of loading/unloading).
- 4.3.3. In calculating the ‘Time-on’ correction for the movement of stock cages, based on site observations it takes approximately 15 seconds to move a cage of stock between the tail lift and the warehouse entrance. Once inside the warehouse the stock cages do not contribute to external noise emissions at the NSR due to additional distance from the receiver and screening provided by the structure of the warehouse building. The ‘time-on’ correction has been derived based on 2 cages per lift-movement (as outlined above) for a total of 60 cage movements in the one-hour of loading/unloading.
- 4.4. Acoustic Feature Corrections – see 2.6.4. The feature corrections to be applied to the noise sources are as follows:
- 4.4.1. +3 for ‘*tonality*’ for the lift motor
- 4.4.2. +3 for ‘*impulsivity*’ for staff manoeuvring trolleys/cages of stock



- 4.5. The resultant (combined) Rating Level (dB L_{Aeq}) will be compared to the existing background noise levels and evaluated against criteria in BS 4142: 2014+A1: 2019.

5. NOISE MEASUREMENT RESULTS

5.1. Equipment/Activity Noise Level Table

Equipment / Activity	Measured	Residual	Specific	Measured Distance
	dB L_{Aeq}	dB L_{Aeq}	dB L_{Aeq}	(m)
Tail lift moving up/down	69	54	69	2
Staff manoeuvring trolleys/cages of stock	72	54	72	1

5.2. Background Noise Levels – see APPENDIX 2

Periods of time during the noise survey where noise sources in the service yard were not active have been used to determine the typical background noise level.

The typical background noise level has been determined by excluding noise levels which occurred once per day or fewer over the survey period from the dataset as unrepresentative of typical conditions.

Noise Sensitive Receiver	Typical Background noise level – 23:00 - 02:45 for night-time deliveries dB $L_{A90, 15min}$
NSR 1	34



6. NOISE CALCULATION RESULTS

6.1. NSR 1 – Noise Rating Level Calculations

Equipment / Activity	Specific	Distance from Receptor	Distance Attenuation	Time On Correction	Screening Correction	BS 4142 Penalties	Rating
	dB LAeq	m	dB LAeq	dB LAeq	(dB)	(dB)	(dB)
Tail lift moving up/down	69	64	-30	-11	-10	+3	21
Staff manoeuvring trolleys/cages of stock	72	69	-38	-6	-5	+3	26

7. BS4142:2014 ASSESSMENT

7.1. NSR 1– Rating Level – Night-time deliveries 23:00 - 02:45:

Equipment / Activity	Rating	Background Noise Level	Excess	
	(dB)	dB LA90	(dB)	
Tail lift moving up/down	21	34	-13	
Staff manoeuvring trolleys/cages of stock	26	34	-8	
Combined	27	34	-7	Low Impact / Meets Local Authority Criteria

8. NOISE MITIGATION STRATEGY

- 8.1. The predicted rating level at the noise sensitive receiver should be considered to cause 'low impact' in accordance with BS 4142: 2014+A1: 2019.



8.2. The following measures have been included in the design of the proposed installation to reduce noise:

- An enclosure is to be installed with the lift motor to reduce noise output
- The ground surface on the path for stock cages to the warehouse will be smoothed to reduce rattling of the cages
- The tail lift is located such that the structure of the lift, enclosure, and the location of the HGV provide screening between stock cages and the NSR

8.3. No further noise mitigation strategy is required for the installation.

9. CONCLUSIONS

9.1. Sound Planning has carried out an environmental noise impact assessment in accordance with the requirements of BS 4142: 2014+A1: 2019 and BS 7445: 2003.

9.2. The predicted combined noise rating level (BS 4142) of the proposed tail lift and associated loading/unloading activities in the service yard has been compared to the existing background noise level at the nearest noise sensitive receiver.

9.3. The evaluation shows that the predicted noise rating level at the nearest noise sensitive receiver is '**low impact**' in accordance with BS 4142:2014+A1:2019, and the predicted rating level is at least 5 dB below the existing background noise level.

9.4. The installation as proposed therefore meets the requirements of local and national planning policy.



APPENDIX 1

Glossary of Acoustic Terms

The Decibel, dB

The unit used to describe the magnitude of sound is the decibel (dB) and the quantity measured is the sound pressure level. The decibel scale is logarithmic and it ascribes equal values to proportional changes in sound pressure, which is a characteristic of the ear. Use of a logarithmic scale has the added advantage that it compresses the very wide range of sound pressures to which the ear may typically be exposed to a more manageable range of numbers. The threshold of hearing occurs at approximately 0 dB (which corresponds to a reference sound pressure of 2×10^{-5} pascals) and the threshold of pain is around 120 dB. The sound energy radiated by a source can also be expressed in decibels. The sound power is a measure of the total sound energy radiated by a source per second, in watts. The sound power level, L_w is expressed in decibels, referenced to 10^{-12} watts.

Frequency, Hz

Frequency is analogous to musical pitch. It depends upon the rate of vibration of the air molecules that transmit the sound and is measured as the number of cycles per second or Hertz (Hz). The human ear is sensitive to sound in the range 20 Hz to 20,000 Hz (20 kHz). For acoustic engineering purposes, the frequency range is normally divided up into discrete bands. The most commonly used bands are octave bands, in which the upper limiting frequency for any band is twice the lower limiting frequency, and one-third octave bands, in which each octave band is divided into three. The bands are described by their centre frequency value and the ranges which are typically used for building acoustics purposes are 63 Hz to 4 kHz (octave bands) and 100 Hz to 3150 Hz (one-third octave bands).

Noise Rating

The Noise Rating (NR) system is a set of octave band sound pressure level curves used for specifying limiting values for building services noise. The Noise Criteria (NC) and Preferred Noise Criteria (PNC) systems are similar.

A-weighting

The sensitivity of the ear is frequency dependent. Sound level meters are fitted with a weighting network which approximates to this response and allows sound levels to be expressed as an overall single figure value, in dB(A).

Noise Descriptors

Where noise levels vary with time, it is necessary to express the results of a measurement over a period of time in statistical terms. Some commonly used descriptors follow.



- $L_{Aeq, T}$ *The most widely applicable unit is the equivalent continuous A-weighted sound pressure level ($L_{Aeq, T}$). It is an energy average and is defined as the level of a notional sound which (over a defined period of time, T) would deliver the same A-weighted sound energy as the actual fluctuating sound.*
- L_{AE} *Where the overall noise level over a given period is made up of individual noise events, the $L_{Aeq, T}$ can be predicted by measuring the noise of the individual noise events using the sound exposure level, L_{AE} (or SEL or L_{AX}). It is defined as the level that, if maintained constant for a period of one second, would deliver the same A-weighted sound energy as the actual noise event.*
- L_{A1} *The level exceeded for 1% of the time is sometimes used to represent typical noise maxima.*
- L_{A10} *The level exceeded for 10% of the time is often used to describe road traffic noise.*
- L_{A90} *The level exceeded for 90% of the time is normally used to describe background noise.*

Sound Transmission Descriptors

- D_{nT} Standardised level difference
- $D_{nT, w}$ Weighted standardised level difference
- L_1 The average sound pressure level in the source room
- L_2 The average sound pressure level in the receiving room
- T Reverberation time (receiving room)
- T_0 Reference reverberation time = 0.5s
- C_{tr} Adaption spectrum which takes account for low to medium speed road/rail/air traffic; disco music; and factory noise (medium to low frequency noise).
- C Adaptation spectrum which takes account of domestic activities including speech, music, radio and television.

Frequency Analysis

- Octave Band *A band of frequencies the upper limit of which is twice the lower limit. They are known by their centre frequency, e.g., 63, 125, 250, 500, 1000, 2000 Hz...*
- One Third Octave *The logarithmic frequency interval between a lower frequency f_1 , when f_2/f_1 equals $2^{1/3}$ apart. Frequencies include: 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000Hz.*

Sound Transmission in the Open Air

Most sources of sound can be characterised as a single point in space. The sound energy radiated is proportional to the surface area of a sphere centred on the point. The area of a sphere is proportional to the square of the radius, so the sound energy is inversely proportional to the square of the radius. This is the inverse square law.

In decibel terms, every time the distance from a point source is doubled, the sound pressure level is reduced by 6 dB. Road traffic noise is a notable exception to this rule, as it approximates to a line source, which is represented by the line of the road. The sound energy radiated is inversely proportional to the area of a cylinder centred on the line. In decibel terms, every time the distance from a line source is doubled, the sound pressure level is reduced by 3 dB.

Factors Affecting Sound Transmission in the Open Air

Reflection

When sound waves encounter a hard surface, such as concrete, brickwork, glass, timber or plasterboard, it is reflected from it. As a result, the sound pressure level measured immediately in front of a building façade is approximately 3 dB higher than it would be in the absence of the façade.

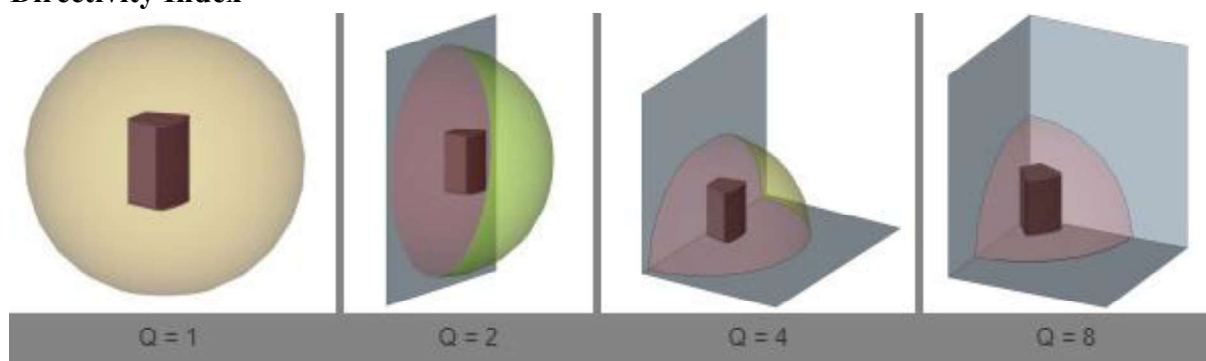
Screening and Diffraction

If a solid screen is introduced between a source and receiver, interrupting the sound path, a reduction in sound level is experienced. This reduction is limited, however, by diffraction of the sound energy at the edges of the screen. Screens can provide valuable noise attenuation however. For example, a timber boarded fence built next to a motorway can reduce noise levels on the land beyond, typically by around 10 dB(A). The best results are obtained when a screen is situated close to the source or close to the receiver.

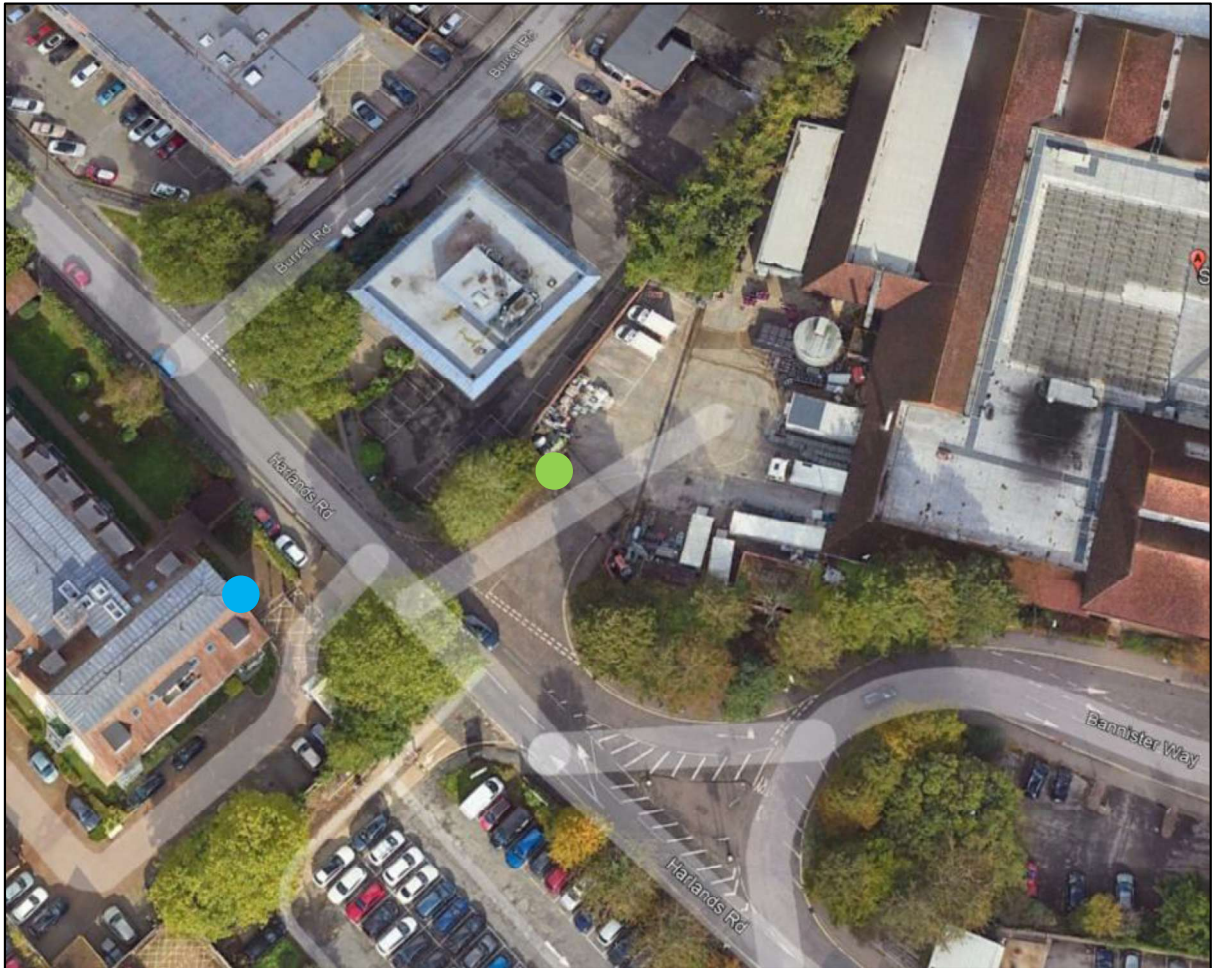
Meteorological Effects

Temperature and wind gradients affect noise transmission, especially over large distances. The wind effects range from increasing the level by typically 2 dB downwind, to reducing it by typically 10 dB upwind – or even more in extreme conditions. Temperature and wind gradient are variable and difficult to predict.

Directivity Index



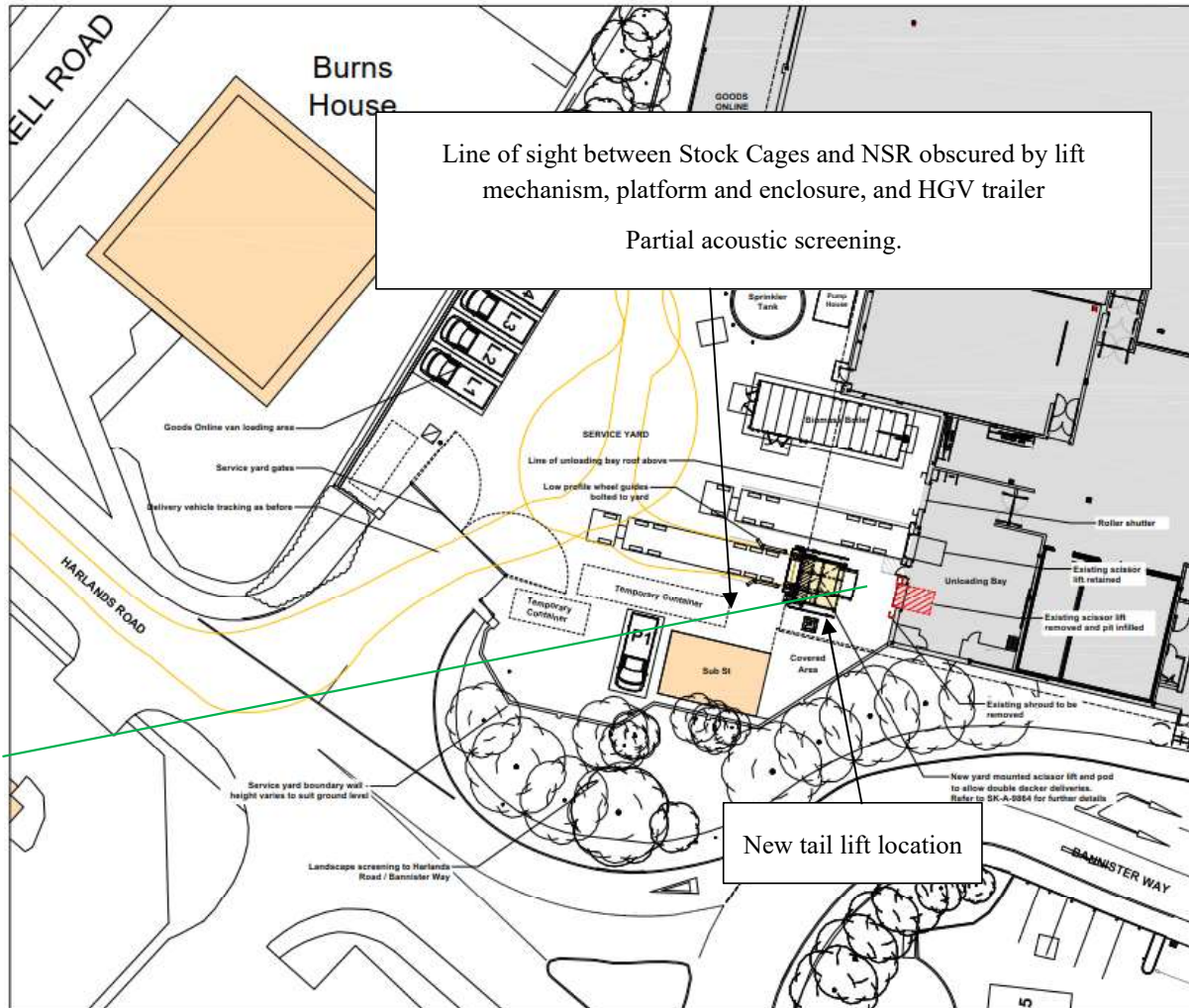
APPENDIX 2
Site Location/Plans
Google Earth



Key:

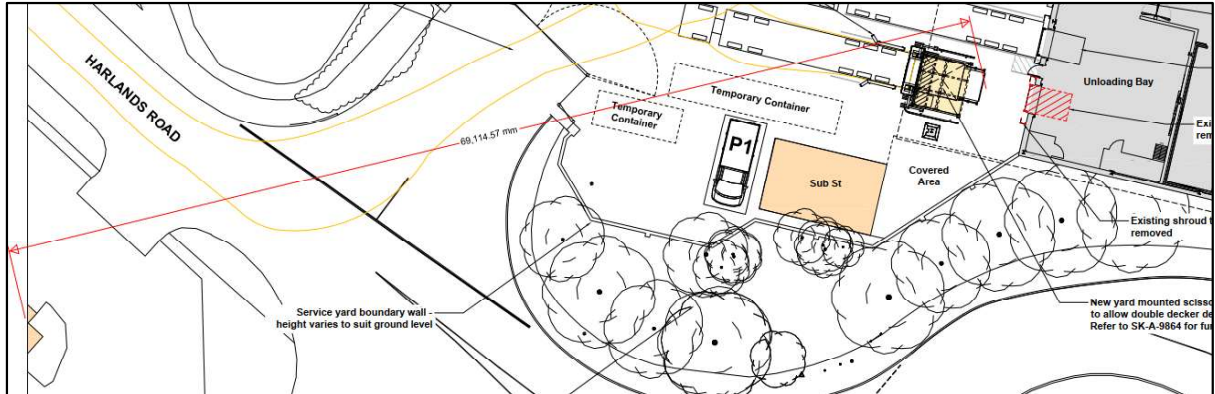
-  NSR 1 – Residential Property
-  Noise Monitoring Position (MP1)

Site Location/Plans

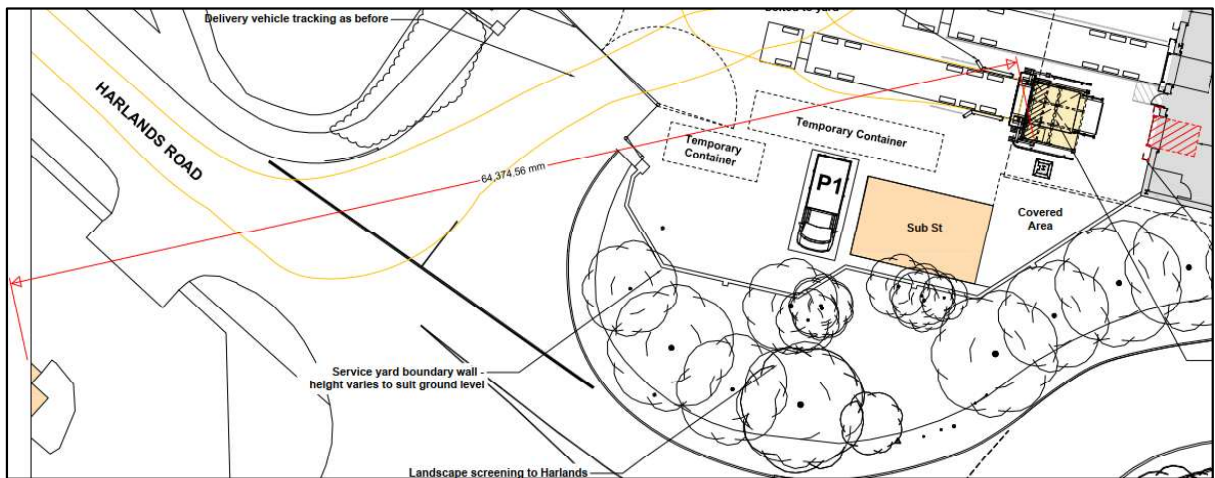


Site Location/Plans

NSR Distance – Stock Cage Movements – 69m



NSR Distance – Goods Lift – 64m



APPENDIX 3

Photographs



***Tail Lift Measurement Position – similar lift motor model to proposed installation
(confirmed by lift installer)***

Photographs



Background Noise Measurement Position

Photographs



Example of Lift Motor Enclosure (provided by lift motor installer)

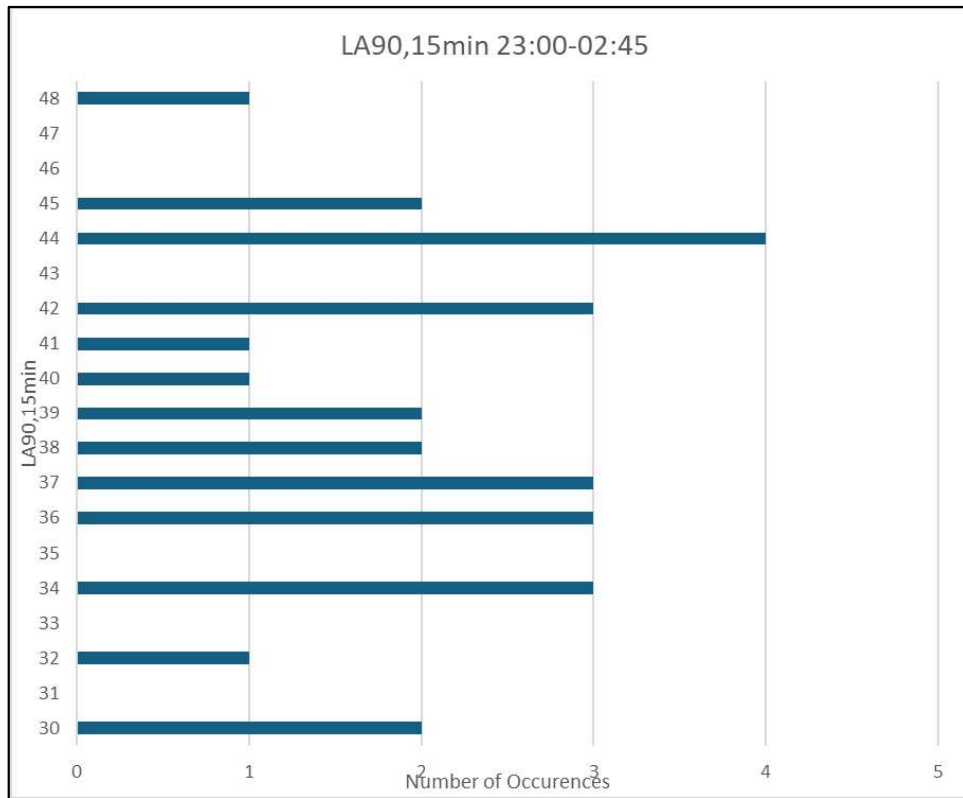


APPENDIX 4

Noise Measurement Data



Background Noise Level Analysis





APPENDIX 6

Levels of Uncertainty

Category	Notes
Complexity of Sound Source	<i>Tail lift being installed in external service yard</i>
Complexity of Acoustic Environment (Residual)	<i>Residual environment is shielded from nearby noise sources and controlled by road traffic noise.</i>
Level of Residual Sound (including Specific)	<i>Level of residual sound is low compared to specific sound levels</i>
Measurement Location	<i>Representative of closest receptor</i>
Distance Between Sound Source & Measurement Position	<i>1m for manoeuvring stock, 2m for lift motor</i>
Number of Measurements Taken	<i>Weekend period</i>
Measurement Time Intervals	<i>15-minute measurements</i>
Range of Times	<i>Includes quietest likely times of proposed operation</i>
Range of Suitable Weather Conditions	<i>1 measurement period – Suitable weather conditions</i>
Measurement Method/Practitioners	<i>1 measurement period (Jake Willmott) measurements taken in line with BS7445</i>
Level of Rounding	<i>Rounded to nearest DP; 0.5 rounded up</i>
Instrumentation	<i>Class 1 SLM (suitable)</i>