Noise Impact Assessment

Site Address: Mucklow Hill, Halesowen, B63 8DL

Client Name: Oaktree Environmental

Project Reference No: NP-012897

Authorisation and Version Control		
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Amendment History		
Revision	Date	Summary of Amendments
01	27/06/2025	--
02	26/09/2025	Minor alterations to site plans.
03	05/01/2026	Site operating times confirmed & assessment updated accordingly.

Disclaimer

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Delivering sustainable development by promoting good health and well-being through effective management of noise.

Contents

List of Figures

List of Tables

1. Introduction

NOVA Acoustics Ltd has been commissioned to prepare a noise impact assessment for a proposed waste treatment site ('the proposed development') on vacant land adjacent to Mucklow Hill, Halesowen, B63 8DL ('the site').

It is understood that this noise impact assessment is to be submitted as part of an Environment Agency ('EA') permit application ('the Application'). Additionally, the applicant is preparing to submit a planning application to the Local Planning Authority ('LPA') – Dudley Metropolitan Borough Council, of which this noise impact assessment will also accompany.

A noise survey has been undertaken by Oaktree Environmental in Jun 2025 to establish the prevailing acoustic climate at the closest noise sensitive receptors ('NSR'). The findings have been subsequently used to assess the suitability of the site for the desired use. Measures required to mitigate noise impacts from the proposed development have been assessed in accordance with the relevant performance standards, legislation, policy, and guidance.

This noise assessment is necessarily technical in nature; therefore, a glossary of terms is included in Appendix A to assist the reader.

1.1 Standards, Legislation, Policy & Guidance

The following performance standards, legislation, policy, and guidance have been considered to ensure good acoustic design in the assessment:

- The Environment Agency Guidance 'Noise and Vibration Management: Environmental Permits (Jan 2022)'.
- Environmental Agency 'Method Implementation Document ('MID') for BS4142 (2023).
- National Planning Policy Framework (2024).
- Noise Policy Statement for England (2010).
- BS4142:2014+A1:2019 – 'Methods for rating and assessing commercial and industrial sound'.

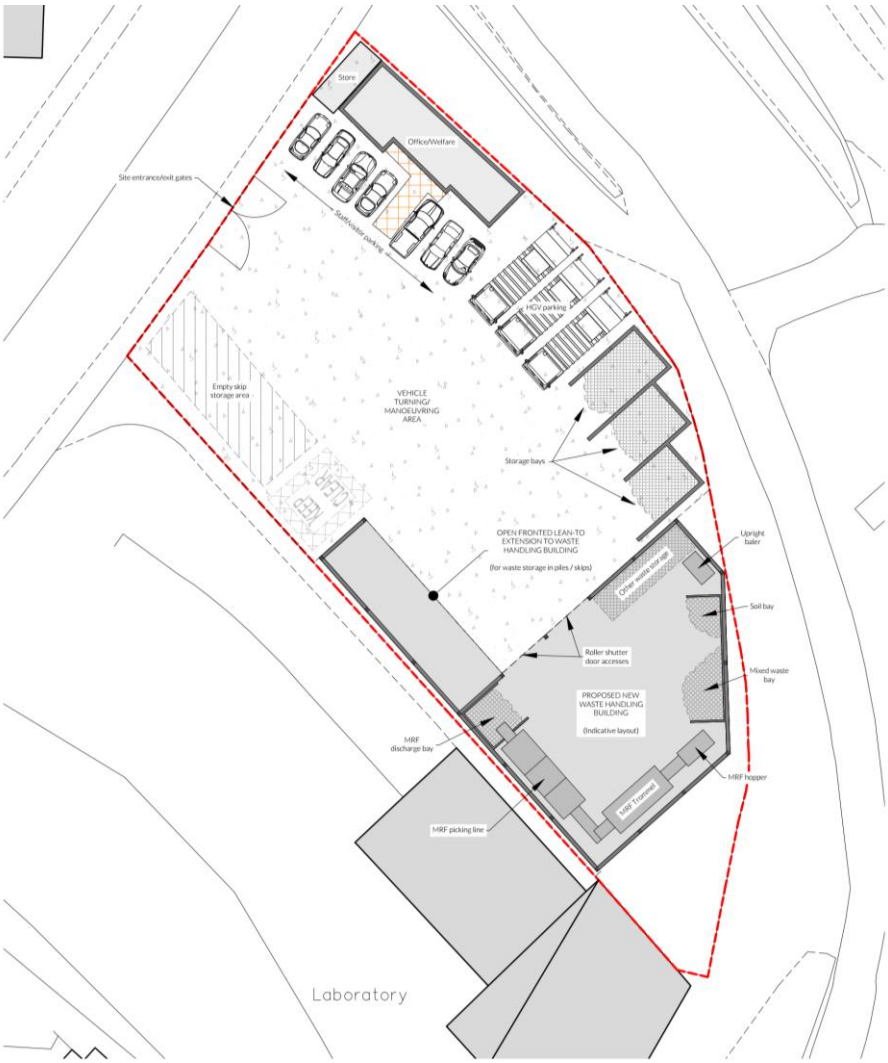
Further information on the legislation can be found in Appendix B.

1.2 Proposed Site Operations

Proposals for the site are the acceptance, storage and treatment of HCI waste.

Additionally, a warehouse building will be erected for the processing of waste receding onto site. The figure below shows the proposed development.

At this stage, the site operating hours are to be 07:30 to 17:00 hours Monday to Saturday, exclusively.



Drawing Ref No. 3490-004-04 from 'Oaktree Environmental'

Figure 1 – Proposed Development

As identified in the above figure, an MRF Trommel with an associated hopper and discharge bay(s) will be located within the waste handling building.

Whilst not identified on the figure, it is understood that an excavator and loading shovel could be operating continuously throughout the site feeding material into and out of the waste building. These will be working between the storage bays that are located externally and internally.

Also located externally there will be an area for staff / visitor and HGV parking and an office / welfare building.

2. Environmental Noise Survey

2.1 Measurement Methodology

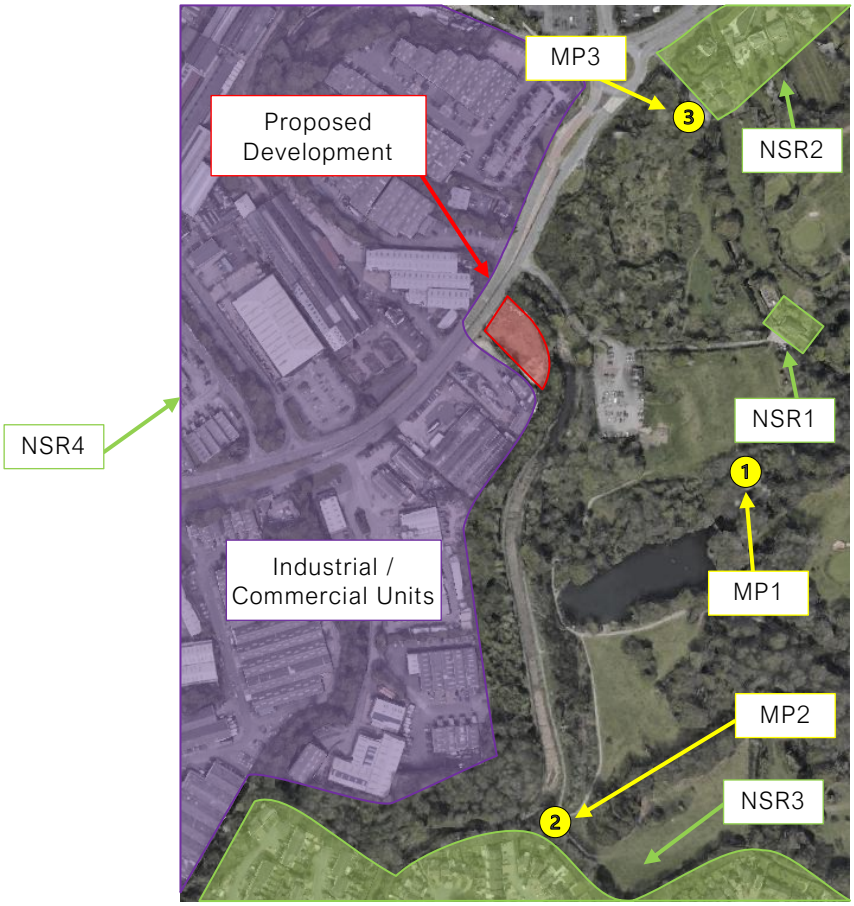
An unattended environmental noise survey was undertaken by Oaktree Environment in 2025. The following table outlines the measurement dates and particulars.

All measurements were undertaken under free-field conditions. A 130mm diameter windshield was fitted to each microphone. The equipment was field calibrated before and after the survey, with negligible drift noted.

Location	Survey Dates	Measurement Particulars
MP1 (52.453400, -2.036090)	17-22/01/2025	Equipment mounted on a tripod at 1.5m above ground, approximately 180m away to the south-east of the site.
MP2 (52.450900, -2.038370)		Equipment mounted on a tripod at 1.5m above ground, approximately 360m away to the south of the site.
MP3 (52.455800, -2.036720)		Equipment mounted on a tripod at 1.5m above ground, approximately 185m away to the north-east of the site.

Table 1 – Measurement Particulars

A site location plan is presented below alongisde the position of the nearest noise sensitive receptors (NSR's). The measurement locations and nearby noise sensitive receptors are also presented.



Imagery ©2025 Google, Imagery ©2025 Airbus, Maxar Technologies, Map data ©2025

Figure 2 – Measurement Locations and Site Surroundings

2.2 Context & Subjective Impression

The proposed development site is located on vacant land off Mucklow Hill within a largely industrial / commercial area in Halesowen, to the south-west of Birmingham city centre.

Access to the development is gained directly off Mucklow Hill which will form the north-western boundary of the site. The north-eastern and south-eastern flanks are vacant grassland, and to the east is the Halesowen Golf Club. Further to the south and west of the site are several commercial / industrial units, such as vehicle repair workshops, trade units and offices.

The closest NSRs to the proposed development site are as follows:

- NSR1 (3 & 4 Leasowes Lane) – 2no. residential properties located 185m away to the east of the site.
- NSR2 (1 & 2 Sylvan Green) – 2no. residential properties located 220m away to the north-east of the site.
- NSR3 – Residential estate located 360m away to the south. The nearest row of properties is located off Ladypool Close.

Other NSRs not listed above have been considered in the noise modelling exercise, however, those above were identified as some of the most affected.

The acoustic environment was deemed to be moderate in level and the noise profile was dominated by road traffic noise emissions from the surrounding road network which is confirmed by the diurnal nature of the time history at each measurement location. Occasional commercial / industrial noise was audible from the surrounding businesses.

2.3 Environmental Noise Survey Results – Background Sound Analysis

The 'lowest typical' daytime background sound levels measured across each long-term position have been calculated and are shown below. Background sound levels were derived via statistical analysis of the measured $L_{A90,15min}$ data. Background sound levels were chosen depending on the range and distribution of the recorded $L_{A90,15min}$ sound levels. Full time histories, statistical analysis and weather conditions can be seen in Appendix D.

Description	MP1 $L_{A90,15min}$ (dB)	MP2 $L_{A90,15min}$ (dB)	MP3 $L_{A90,15min}$ (dB)
Day: 07:30 – 17:00 (excluding Sundays)	43	38	50

Table 2 – Background Sound Level Results Summary

Based on a review of the above, the noise climate is broadly similar at MP1 and MP2. Background sound levels increase at MP3 which is due to the line of sight the measurement position had to Mucklow Hill.

3. BS4142 Assessment of Proposed Permit Operations

3.1 Adopted Criteria

A noise impact assessment has been conducted in accordance with BS4142 and where necessary, it is required that any site noise emissions causing significant impact (classed as 'significant adverse impact, dependent on context' in accordance with BS4142) are mitigated to an acceptable level given the context of the site.

Noise emissions causing an 'adverse impact' should be minimised to as low as practicable also considering context; this does not necessarily mean that such adverse effects cannot occur, providing the implementation of appropriate measures (may also be Best Available Techniques ('BAT')) can be "rigorously" demonstrated. Site noise emissions causing 'no impact' to 'low impact' may not require any action over the basic appropriate measures or BAT.

Considering the above, the BS4142 rating sound level at the most affected NSRs shall be controlled to avoid 'significant adverse impact', further measures and BAT shall be considered to minimise any 'adverse impact' with the aim to reduce to 'low impact' where practicable, dependent on the context of the site.

3.2 Noise Modelling Data & Specific Sound Levels

The tables below provide a summary of the specific sound levels that have been used to inform any noise modelling.

Mobile Plant Movements

A summary of all proposed mobile plant movements is shown in the table overleaf. As previously stated, the exact specification of any equipment is not defined at this stage, therefore, reasonable 'worst-case' assumptions have been allowed for.

Please note that the sound power levels for mobile plant pass-bys presented are input values only; the speed and the number of events has been applied within the noise modelling software. The on-time corrections are thought to present a reasonable 'worst-case' scenario.

Where spectrum data is not available from a suitable manufacturer or has not been previously measured by NOVA Acoustics, data within British Standard 5228-1:2009 '*Code of practice for noise and vibration control on construction and open sites – Part 1: Noise' (BS5228)* has been used.

Description	1/1 Octave Frequency Band (Hz, L_W dB)								L_{WA} (dB)	On-Time Correction (per 1-hour)
	63	125	250	500	1k	2k	4k	8k		
15-tonne Excavator (JCB JS145LC) Movement [1]	100	101	97	93	89	86	81	78	95	5no.
16-tonne Excavator (clearing site) [3]	106	98	100	96	95	94	101	93	104	30 (min)
Telehandler Pass-by (JCB 542-70) [1][2]	101	101	97	94	92	90	86	86	98	60no.
Truck/Skip Wagon Pass-by [1]	95	87	86	90	92	87	79	71	94	5no.

Notes:
[1] Taken from noise data measured by NOVA Acoustics, as per NP-011281.
[2] This includes a broadband reversing alarm.
[3] Taken from ref no. 13 in Table C.1 of BS5228.

Table 3 – Sound Power Levels of Mobile Plant

Internal Noise Breakout Emissions

Measurements have previously been carried out within a waste sorting building (NP-011281). The building included the use of a trommel, and shredder permanently located inside, as well as associated belts and a cabin used for the sorting of recycled waste by on-site personnel. Excavators and telehandlers also frequented inside the building during the measurements.

A summary of the ambient noise levels measured within the building are shown below. The noise emissions shown below equate to an average of across the building when the loudest items of plant were operating.

Description	1/1 Octave Frequency Band (Hz, L_{eq} dB)								dBA
	63	125	250	500	1k	2k	4k	8k	
Waste Sorting Building	92	83	86	86	86	83	80	77	90

Table 4 – Predicted Internal Ambient Noise Levels

Based on an internal noise level of 90dB(A), this is deemed to represent a robust assessment and will, therefore, be used to determine noise breakout from the waste sorting building.

The construction details for the building are unknown at this stage. Outlined in the following table is the assumed sound insulation for each building fabric element.

Located externally are storage bays and a 'lean-to' structure. It will be assumed these are constructed from blockwork.

Description	1/1 Octave Frequency Band (Hz, SRI dB)								Rw (dB)
	63	125	250	500	1k	2k	4k	8k	
AWP/60 with no lining or insulation (Wall)	12	16	19	23	26	22	39	39	25
KS1000 RW/30 with no lining or insulation (Roof)	8	17	20	23	23	23	41	41	25

Table 5 – Assumed Sound Insulation of Building Fabric Elements

3.3 Noise Modelling

The following assumptions have been made within the SoundPlan 9.1 noise modelling software:

- To accurately model the land surrounding the Site, the topographical data has been taken from the EA's 'National LIDAR Programme' on the DEFRA Data Services Platform.
- For the purpose of the assessment, the ground between the source and receivers is considered to be a mixture of acoustically 'hard' and 'soft' surfaces that have been modelled according to the ground type.
- Octave band noise data was used to facilitate noise modelling in accordance with ISO 9613-2 (2024). ISO 9613-2 assumes a 'downwind' model to the NSRs.
- The sound map grid height has been set to 1.5m, however, the noise levels used in the assessment has been taken from the most exposed point of each façade.
- The site and all other buildings and any intervening objects have been modelled according to measurements taken on-site, with Google Maps and those provided by the LIDAR data. The office building has been robustly modelled at 3m tall; however, 5m has been proposed.
- The sound power levels presented in Table 3 have been inputted.
- All mobile sources have been modelled as slow-moving point source emitters (line source $L_{W/m}$) and on-times have been calculated based on vehicle speed (2.2 m/s), the number of events per reference time period.
- The following source heights have been used:
    - Excavators – 1.5m
    - Telehandler – 1.5m
    - Truck/wagon movements – 1m
- The number of truck/wagon arrivals is unknown. A figure of 5 arriving per hour will be used which assumes that each vehicle will be on-site for less than a 15-minute period. This is deemed to be sufficiently robust.
- A 1m high stone wall runs across the front entrance of the site. This has been modelled as 0.75m high, for robustness.
- The waste building height is unknown, however, a reasonable height of 7m has been assumed. The roller shutter door is assumed to be 5m wide, 5m tall and open for 100% of the time.
- The noise emissions breaking out of the building have been calculated in according with BS12354 within SoundPlan assuming:
    - The internal ambient noise levels shown in Table 4.
    - The assumed sound reduction values shown in Table 5.

- Cd corrections of -3dB from solid elements, and 0dB from any openings.

The sound map showing the specific sound level emissions from the site can be seen in the following figure.

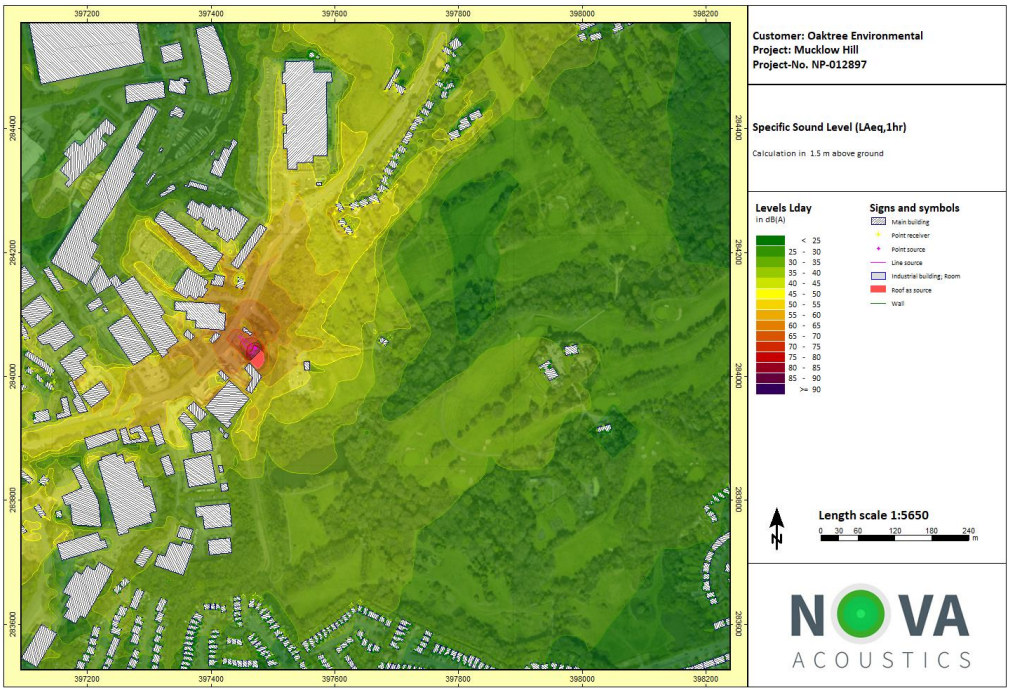


Figure 3 – Specific Sound Level Map

3.4 BS4142 Noise Impact Assessment

The BS4142 noise impact assessments are conducted at the most affected NSRs in the following tables.

Description	NSR			
	1	2	3	4
Specific Sound Level ($L_{Aeq,1hr}$)	40	50	34	44
Acoustic Feature Correction	+3[1]	+5[2]	+3[1]	+3[1]
Rating Sound Level ($L_{Ar,Tr}$)	43	55	37	47
Background Sound Level ($L_{A90,15min}$)	43	50	38	50
Exceedance of L_{A90}	0	+5	-1	-3
Initial BS4142 Assessment Outcome	LI	AI	LI	LI

Notes:
[1] A +3dB penalty has been applied to account for the on-site equipment being impulsive and 'just perceptible' at the receptor.
[2] A +3dB penalty has been applied to account for the on-site equipment being impulsive and 'just perceptible' at the receptor. A further +2dB penalty has been applied for a 'just perceptible' low frequency hum, primarily due to the external mobile plant and breakout from the open door to the waste building.
AI = Adverse impact, dependant on context.
LowAI = A low likelihood of adverse impact, dependent on context.
LI = Low impact, dependant on context.

Table 6 – BS4142 Noise Impact Assessment

Following a review of the noise modelling results, it is apparent that the excavator operation and waste building noise breakout from the open roller shutter door dominates the specific sound levels predicted at NSRs 1 & 2.

In terms of the excavator operating, by assuming this is continuously operating for 30 minutes externally within a worst case 1-hour, this is also deemed to be sufficiently robust.

In line with NPSE and NPPF, the noise impact is deemed above a 'Lowest Observed Adverse Effect Level' at NSR2, with impact no greater than a 'No Observed Adverse Effect Level' ('NOAEL') at all other NSRs.

In light of the LOAEL at NSR2, it is recommended that good acoustic design measures are implemented to reduce the predicted noise impact.

3.5 Recommendations and Mitigation Measures

To reduce the predicted noise impact, the following is advised.

Best Available Techniques (BAT)

The assessment has assumed pre-BAT scenarios. It is likely that further reductions in the specific sound levels can be achieved through BAT that are not quantifiable at this stage. This would include (but not be limited to):

- Fitting all mobile plant with exhaust silencers or replacing existing ones with enhanced exhaust silencers. These are known to reduce mobile plant noise emissions by up to 5dB(A).
- Selecting newer and quieter mobile plant models.
- Stored skips should be located around the noisy operations in order to provide a degree of acoustic shielding.
- Drops heights should be reduced where practicable; this would include excavator operations.

Best Practicable Means (BPM) – Physical Control Measures

To further ensure that the noise impact can be reduced, it is advised that a 5m tall acoustic screen be erected along the northeastern site boundary; this is shown overleaf.

The screen should have a minimum surface mass of 15kg/m^2 and not contain any holes or gaps.

For the purpose of the assessment a concrete based wall has been assumed, however, any product meeting the requirements would suffice.

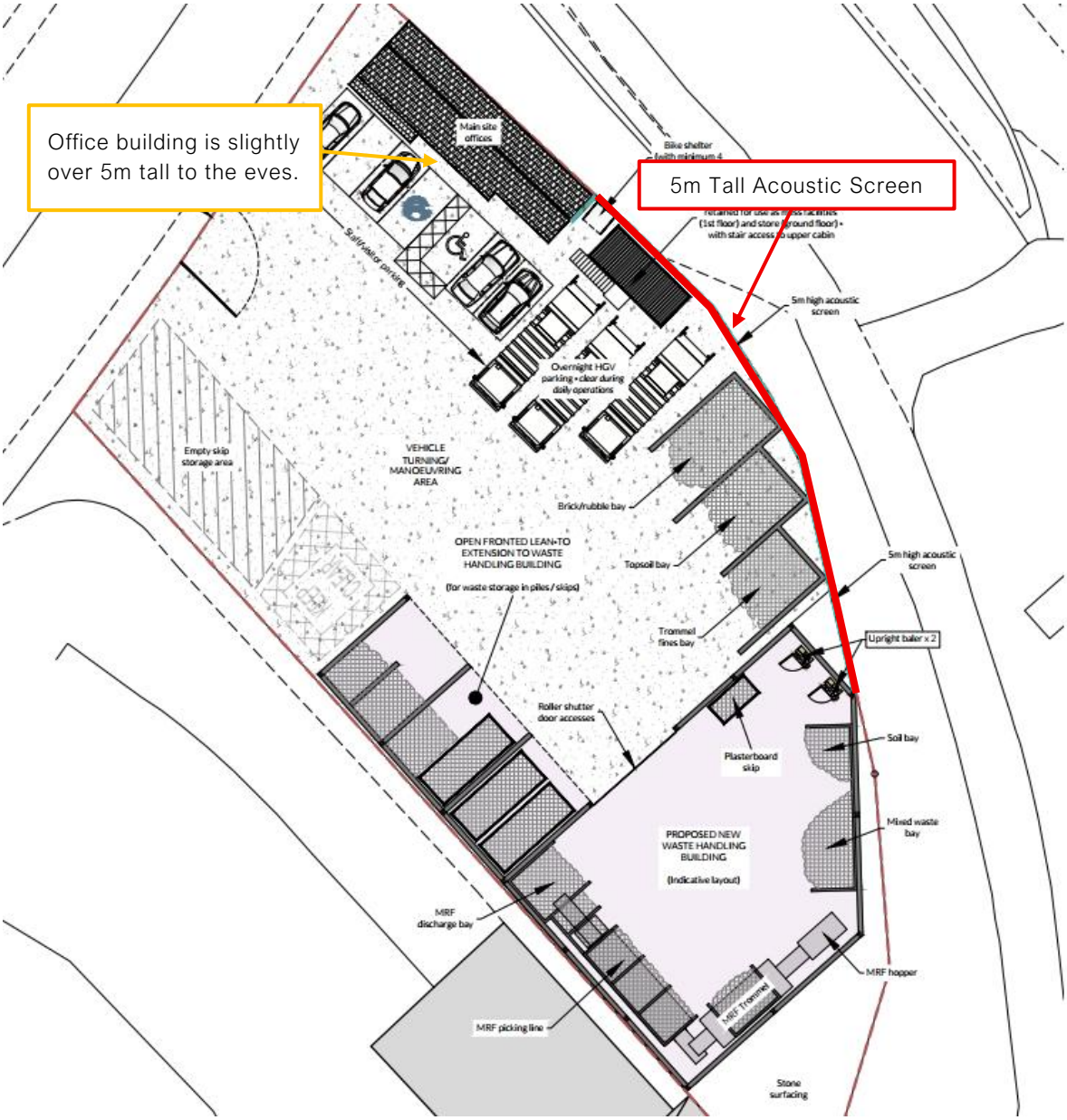


Figure 4 – Proposed Acoustic Screen Location

Revised BS4142 Assessment

The figure below shows the specific sound level map considering the proposed acoustic screen.

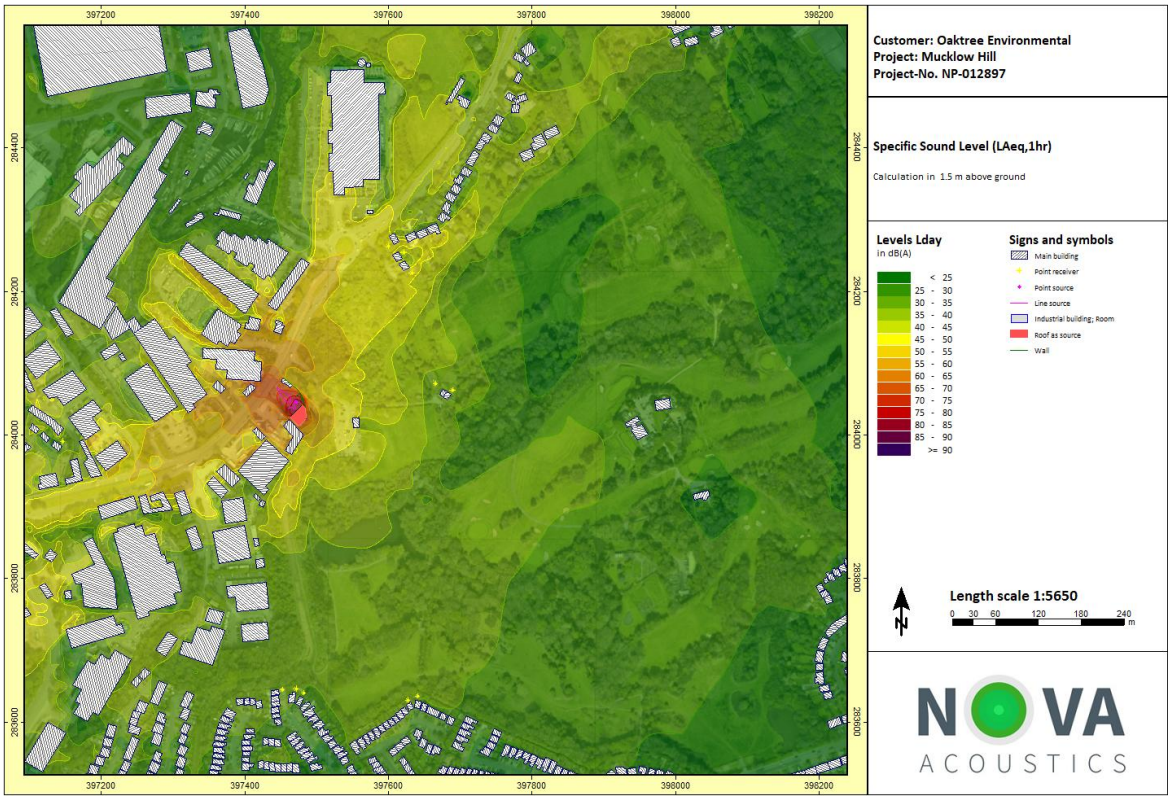


Figure 5 – Revised Specific Sound Level Map

Shown in the table below is a revised BS4142 assessment considering the proposed acoustic screen.

Description	NSR			
	1	2	3	4
Specific Sound Level ($L_{Aeq,1hr}$)	37	48	34	44
Acoustic Feature Correction	+3[1]	+5[2]	+3[1]	+3[1]
Rating Sound Level ($L_{Ar,Tr}$)	40	53	37	47
Background Sound Level ($L_{A90,15min}$)	43	50	38	50
Exceedance of L_{A90}	-3	+3	-1	-3
Initial BS4142 Assessment Outcome	LI	LowAI	LI	LI

Notes:
[1] A +3dB penalty has been applied to account for the on-site equipment being impulsive and 'just perceptible' at the receptor.
[2] A +3dB penalty has been applied to account for the on-site equipment being impulsive and 'just perceptible' at the receptor. A further +2dB penalty has been applied for a 'just perceptible' low frequency hum, primarily due to the external mobile plant and breakout from the open door to the waste building.
AI = Adverse impact, dependant on context.
LowAI = A low likelihood of adverse impact, dependent on context.
LI = Low impact, dependant on context.

Table 7 – Revised BS4142 Noise Impact Assessment

As can be seen in the revised BS4142 assessment, the rating sound level has been reduced by 2dB and 3dB at NSR2 and NSR1, respectively.

The 'worst-case' BS4142 noise impact would be a low likelihood of 'adverse impact, dependant on context' at NSR2, with 'low impact, dependant on context' at all other NSRs.

It should again be noted that the assessments have assumed reasonable worst-case pre-BAT scenarios. Furthermore, the internal ambient noise levels predicted within the waste sorting building are considered robust given the scale of the site.

Given that the noise impact predicted at NSR2 is dominated by the open roller shutter door noise breakout emissions, it is likely that with careful consideration for equipment selection and a scheme of reverberant sound energy control inside the building, noise impact reductions of up to 6dB are possible.

It is also possible that the uncertainty within assessment methodology has resulted in a slight overestimation of the predicted noise impact.

It is important to note that the proposed development is situated within a predominantly commercial/industrial area, where the existing noise climate is already influenced by similar industrial activities. As such, it is reasonable to assume a degree of community acclimatisation to this type of noise sources.

In light of the above, it is possible that 'adverse impact' in line with BS4142 could be avoided. Nonetheless, the noise impact detailed in this report is equates to a low likelihood of 'adverse impact' at NSR2, and 'low impact' at all other NSRs in accordance with BS4142.

The noise impacts in line with the NPSE and NPPF are deemed a LOAEL at NSR2 and NOAEL at all other NSRs. It is stated that at NOAEL, *"noise can be heard, but does not cause any change in behaviour, attitude or other physiological response"*. In addition, noise at this level *"can slightly affect the acoustic character of the area but not such that there is a change in the quality of life".*

4. Limitations and Uncertainty

The impact assessment has been prepared in accordance with appropriate on-site methodology. All measurements were taken with a 130mm diameter windshield fitted that is effective up to 8m/s according to manufacturer's data.

The calculations using SoundPlan 9.1 conform to ISO 9613 that has an uncertainty reported as ±3.0 dB. ISO9613 assumes a downwind model output that will tend overestimate actual noise propagation from source to receptor locations; the calculated levels are therefore based on worst-case scenarios.

The 'uncertainty budget' has been derived using the methodology outlined in 'Uncertainties in Noise Measurement' procedure by Kerry and Craven (Craven, N.J., Kerry, G. 2007. '*Uncertainties in Noise Measurement'. University of Salford).* This document requires an uncertainty budget to be calculated based on the following approach:

1. Define the half value (for example, 3 for ±3.0 dB) of each source of uncertainty,
2. Apply a correction for the standard uncertainty for a rectangular distribution (x / √3) for each source of uncertainty,
3. Add together the values found in Point 2, above, for all uncertainties,
4. Take the square root to find the combined uncertainty,
5. Multiply by 2 to calculate the expanded uncertainty to 95% confidence.

The following table outlines the total expanded uncertainty.

Measurement Uncertainty			
Description	**Accuracy**	**Variance**	**Comments**
Instrumentation Accuracy	±0.1 dB	0.1/√3 = **0.1 dB**	Minimised by use of calibrated traceable instrument.
Use of Wind Shield	±0.2 dB	0.2/√3 = **0.1 dB**	Prevents local wind effects, all meters collecting data used wind shields.
Background Sound Level	±1.5 dB	1.5/√3 = **0.9 dB**	Background sound level uncertainty may exist.
Measurement Uncertainty	Total Variance = **1.1 dB**	Total Uncertainty: √2.1 = **1.0 dB**	
Modelling Uncertainty			
Description	**Accuracy**	**Variance**	**Comments**
Measurement of Sources to Receptors	±3m (closest receptor 189m)	20*Log(186/189) = -0.1 20*Log)(192/189) = +0.1 Difference = 0.2 dB 0.2/√3 = **0.1 dB**	Minimised by use of model based on accuracy of maps.
Air Absorption	Temp range considered to be -5◦C to +20◦C	Results for 9◦C = 0.003639 dB/m Results for -5◦C = 0.006381 dB/m Results for 20◦C = 0.004978 dB/m Variance = 0.002704 dB/m Over 163m this is 0.4 dB 0.4/√3 = **0.2 dB**	Assumed 101.3 kPa, variable temp (worst absorption temp for air), 70% relative humidity, no precipitation.
Modelling Uncertainty	±3.0 dB	3/√3 = **1.7 dB**	Stated model uncertainty due to Para. 9 of ISO 9613, Table 4.
Modelling Uncertainty	Total Variance = **2.0 dB**	Total Uncertainty: √2.0 = **1.4 dB**	
Combined Uncertainty	Total Variance = **3.1 dB**	Total Uncertainty = √3.1 = 1.8 dB Expanded to 95% confidence = 1.8 * 2 = **3.6 dB**	

Table 8 – Expanded Uncertainty of Measurement and Modelling

The table above shows an expanded uncertainty of up to 3.6dB. Given the 'worst-case' conditions the noise modelling software accounts for, it is likely that the results presented in this report are an overestimate of the actual level of impact.

5. Conclusion and Action Plan

The site has been assessed against the requirements of BS4142 and the EA's policies and guidance, and a mitigation scheme has been provided to reduce the noise impact from the site.

The BS4142 noise impact assessment of the proposed operations has indicated that 'adverse impact' is likely to occur at the most affected NSRs. Due to the significance of the exceedances over the background sound levels, the wider context is not thought to play a significant role in offsetting these impacts. As such, the noise impacts would be classed as 'Lowest Observed Adverse Effect Level' ('LOAEL') when assessed in accordance with the NPSE and NPPF at NSR2. NOAEL is anticipated at all other NSRs.

A scheme of BAT and mitigation measures has been recommended. Provided the measures are fully implemented the 'worst-case' BS4142 noise impact would be a low likelihood of 'adverse impact, dependant on context' at NSR2, with 'low impact, dependant on context' at all other NSRs.

The assessments have assumed reasonable worst-case pre-BAT scenarios. Furthermore, the internal ambient noise levels predicted within the waste sorting building are considered robust given the scale of the site.

Given that the noise impact predicted at NSR2 is dominated by the open roller shutter door noise breakout emissions, it is likely that with careful consideration for equipment selection and a scheme of reverberant sound energy control inside the building, impact reductions of up to 6dB are possible.

It is also possible that the uncertainty within assessment methodology has resulted in a slight overestimation of the predicted noise impact.

It is important to note that the proposed development is situated within a predominantly commercial/industrial area, where the existing noise climate is already influenced by similar industrial activities. As such, it is reasonable to assume a degree of community acclimatisation to this type of noise source.

In light of the context, the noise impact detailed in this report is equates to a low likelihood of 'adverse impact' at NSR2, and 'low impact' at all other NSRs in accordance with BS4142.

The noise impacts in line with the NPSE and NPPF are deemed a LOAEL at NSR2 and NOAEL at all other NSRs. It is stated that at NOAEL, *"noise can be heard, but does not cause any change in behaviour, attitude or other physiological response"*. In addition, noise at this level *"can slightly affect the acoustic character of the area but not such that there is a change in the quality of life".*

The following 'Action Plan' is outlined to ensure the design considerations and specifications from this report are duly implemented:

- The BAT and mitigation measures outlined Section 3.5 should be implemented in full and retained throughout the lifetime of the development.
- The standalone Noise Management Plan ('NMP') provided separately should be implemented and continuously reviewed.

The findings of this report will require written approval from the Environment Agency prior to the approval of the application.

Appendix A – Acoustic Terminology

A-weighted sound pressure level, L_{pA}	Quantity of A-weighted sound pressure given by the following formula in decibels (dBA). $L_{pA} = 10 \log_{10} (pA/p_0)^2$. Where: pA is the A-weighted sound pressure in pascals (Pa) and $p0$ is the reference sound pressure (20 µPa)
Background Sound	Underlying level of sound over a period, T, which might in part be an indication of relative quietness at a given location
Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$	Value of the A-weighted sound pressure level in decibels (dB) of a continuous, steady sound that, within a specified time interval, T, has the same mean-squared sound pressure as the sound under consideration that varies with time
Facade level	Sound pressure level 1 m in front of the facade
Free-field level	Sound pressure level away from reflecting surfaces
Indoor ambient noise	Noise in a given situation at a given time, usually composed of noise from many sources, inside and outside the building, but excluding noise from activities of the occupants
Noise Criteria	Numerical indices used to define design goals in a given space
Noise Rating (NR)	Graphical method for rating a noise by comparing the noise spectrum with a family of noise rating curves
Octave Band	Band of frequencies in which the upper limit of the band is twice the frequency of the lower limit
Percentile Level, $L_{AN,T}$	A-weighted sound pressure level obtained using time-weighting “F”, which is exceeded for N% of a specified time interval
Rating Level, $L_{Ar,Tr}$	Equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise
Reverberation time, T	Time that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped
Sound Pressure, p	root-mean-square value of the variation in air pressure, measured in pascals (Pa) above and below atmospheric pressure, caused by the sound
Sound Pressure Level, L_p	Quantity of sound pressure, in decibels (dB), given by the formula: $L_p = 10\log_{10}(p/p_0)^{2.}$ Where: p is the root-mean-square sound pressure in pascals (Pa) and $p0$ is the reference sound pressure (20 µPa)
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

Appendix B – Standards, Legislation, Policy, and Guidance

This report is to be primarily based on the following standards, legislation, policy and guidance.

B.1 – National Planning Policy Framework (2024)

Government policy on noise is set out in the National Planning Policy Framework (NPPF), updated in 2024. This replaced all earlier guidance on noise and places an emphasis on sustainability. In section 15, Conserving and enhancing the natural and local environment, paragraph 187e, it states:

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;

Paragraph 198 states:

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 impact 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.*

B.2 – Noise Policy Statement for England (2010)

Paragraph 198 of the NPPF also refers to advice on adverse effects of noise given in the Noise Policy Statement for England (NPSE). This document sets out a policy vision to:

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

To achieve this vision the Statement identifies the following three aims:

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

6. Avoid significant adverse impacts on health and quality of life;
7. Mitigate and minimise adverse impacts on health and quality of life;
8. Where possible, contribute to the improvement of health and quality of life.

In achieving these aims the document introduces significance criteria as follows:

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur. It is stated that "significant adverse effects on health and quality of life should be avoided while also considering the guiding principles of sustainable development".

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected. It is stated that the second aim above lies somewhere between LOAEL and SOAEL and requires that: "all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also considering the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur."

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. This can be related to the third aim above, which seeks: "where possible, positively to improve health and quality of life through the pro-active management of noise while also considering the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim."

This is further expanded using the updated "Noise Exposure Hierarchy Table" which includes an additional level of impact referred to as the 'No Observed Adverse Effect Level' ('NOAEL'). It is stated that at this level: *"noise can be heard, but does not cause any change in behaviour, attitude or other physiological response"*. In addition, noise at this level *"can slightly affect the acoustic character of the area but not such that there is a change in the quality of life".*

The NPSE recognises that it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations and provides no guidance as to how these criteria should be interpreted. It is clear, however, that there is no requirement to achieve noise levels where there are no observable adverse impacts but that reasonable and practicable steps to reduce adverse noise impacts should be taken in the context of sustainable development and ensure a balance between noise sensitive and the need for noise generating developments.

Any scheme of noise mitigation outlined in this report will, therefore, aim to abide by the above principles of the NPPF and NPSE whilst recognizing the constraints of the site.

B.3 – BS4142:2014+A1:2019 – 'Methods for rating and assessing industrial and commercial sound'

Overview

BS4142:2014 sets out a method to assess the likely effect of sound from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises, on people who might be inside or outside a dwelling or premises used for residential purposes in the vicinity.

The procedure contained in BS4142:2014 for assessing the effect of sound on residential receptors is to compare the measured or predicted sound level from the source in question, the $L_{Aeq,T}$ 'specific sound level', immediately outside the dwelling with the $L_{A90,T}$ background sound level.

Where the sound contains a tonality, impulsivity, intermittency and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific sound level to obtain the $L_{Ar,Tr}$ 'rating sound level'. A correction to include the consideration of a level of uncertainty in sound measurements, data and calculations can also be applied when necessary.

Rating Penalty

Section 9 of BS4142:2014 describes how the rating sound level should be derived from the specific sound level, by deriving a rating penalty.

BS4142:2014 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. This can be approached in three ways:

a) subjective method;
b) objective method for tonality;
c) reference method."

Due to the nature of the development the subjective method has been adopted to derive the rating sound level from the specific sound level. This is discussed in Section 9.2 of BS4142:2014, which states:

"Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed. Correct the specific sound level if a tone, impulse or other characteristics occurs, or is expected to be present, for new or modified sound sources."

BS4142:2014 defines four characteristics that should be considered when deriving a rating penalty, namely; tonality; impulsivity; intermittency; and other sound characteristics, which are defined as:

a) Tonality

A rating penalty of +2 dB is applicable for a tone which is "just perceptible", +4 dB where a tone is "clearly perceptible", and +6 dB where a tone is "highly perceptible".

b) Impulsivity

A rating penalty of +3 dB is applicable for impulsivity which is "just perceptible", +6 dB where it is "clearly perceptible", and +9 dB where it is "highly perceptible".

c) Other Sound Characteristics

BS4142:2014 states that where "the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distance against the residual acoustic environment, a penalty of +3 dB can be applied."

d) Intermittency

BS4142:2014 states that when the "specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time … if the intermittency is readily distinctive against the residual acoustic environment, a penalty of +3 dB can be applied."

Background Sound Level

The background sound level is the underlying level of sound over a period, T, and is indicative of the relative quietness at a given location. It does not reflect the occurrence of transient and/or higher sound level events and is generally governed by continuous or semi-continuous sounds.

To ensure the background sound level values used within the assessment are reliable and suitably represent both the particular circumstance and periods of interest, efforts have been made to quantify a 'typical' background sound level for a given period. The purpose has not been to simply select the lowest measured value. Diurnal patterns have also been considered as they can have a major influence on background sound levels, for example, the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night time period for sleep purposes.

Since the intention is to determine a background sound level in the absence of the specific sound that is under consideration, it is necessary to understand that the background sound level can in some circumstances legitimately include industrial and/or commercial sounds that are present as separate to the specific sound.

Assessment of Impact

BS4142:2014 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 estimation of the impact of the specific sound can be obtained by the difference of the rating sound level and the background sound level and considering the following:

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

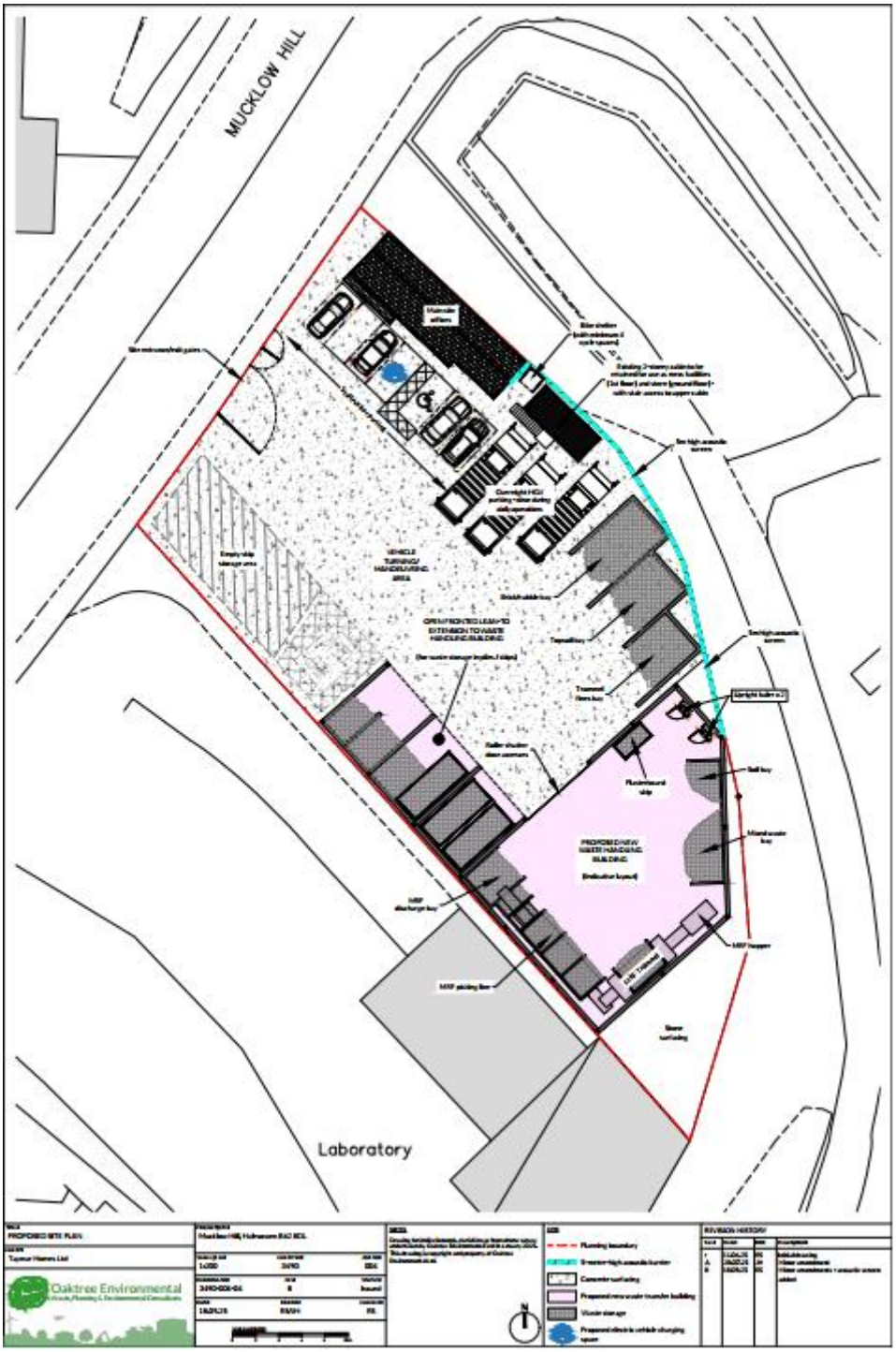
Interpreting the guidance given in BS4142:2014, with consideration of the guidance given in the NPSE and NPPG Noise, an estimation of the impact of the rating sound is summarised in the following text:

13. A rating sound level that is +10 dB above the background sound level is likely to be an indication of a Significant Observed Adverse Effect Level;

14. A rating sound level that is +5 dB above the background sound level is likely to be an indication of a Lowest Observed Adverse Effect Level;
15. The lower the rating sound 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 sound level does not exceed the background sound level, this is an indication of the specific sound source having a negligible impact and would therefore classified as No Observed Adverse Effect Level.

During the daytime, the assessment is carried out over a reference time period of 1-hour. The periods associated with day or night, for the purposes of the Standard, are 07.00 to 23.00 and 23.00 to 07.00, respectively.

Appendix C – Location Plans



Appendix D – Environmental Survey

D.1 – Time History Noise Data

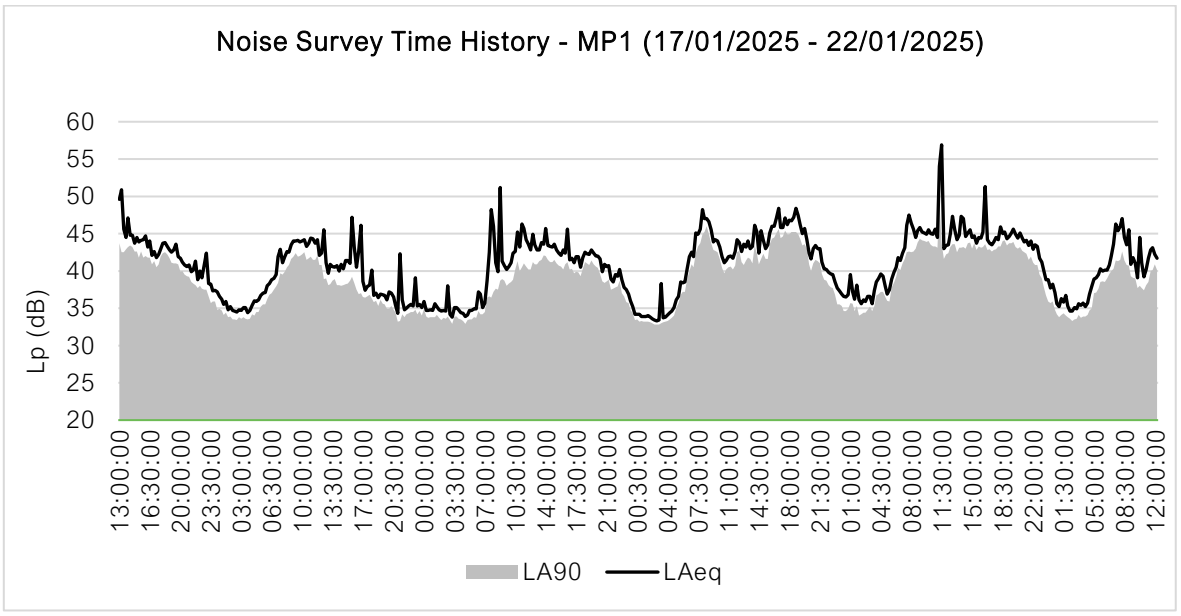


Figure 6 – MP1 Noise Survey Time History

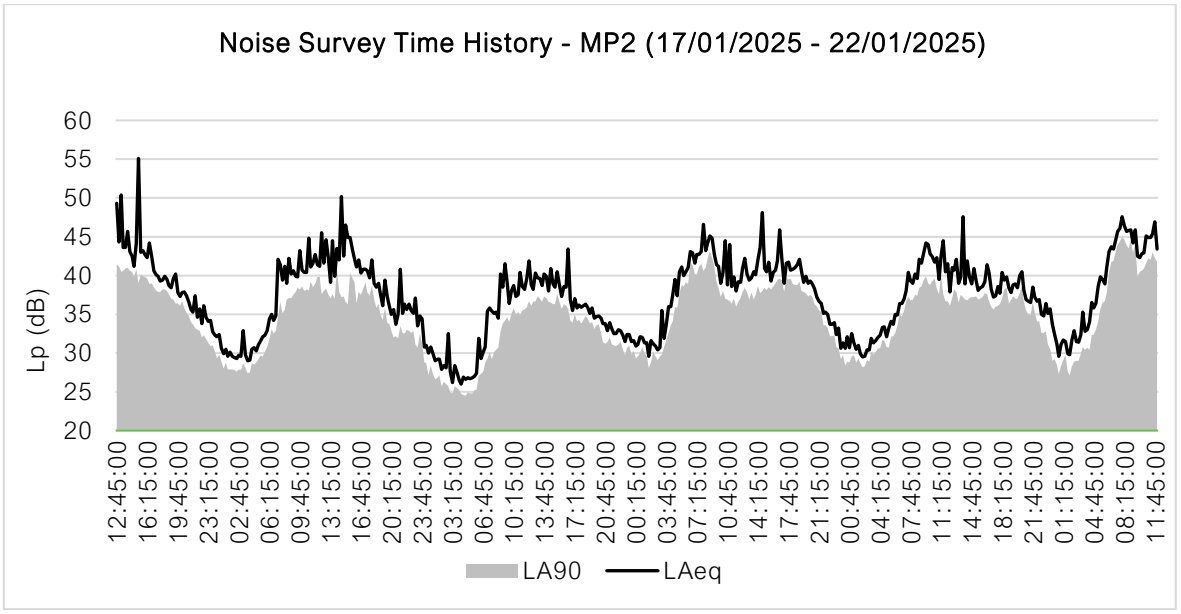


Figure 7 – MP2 Noise Survey Time History

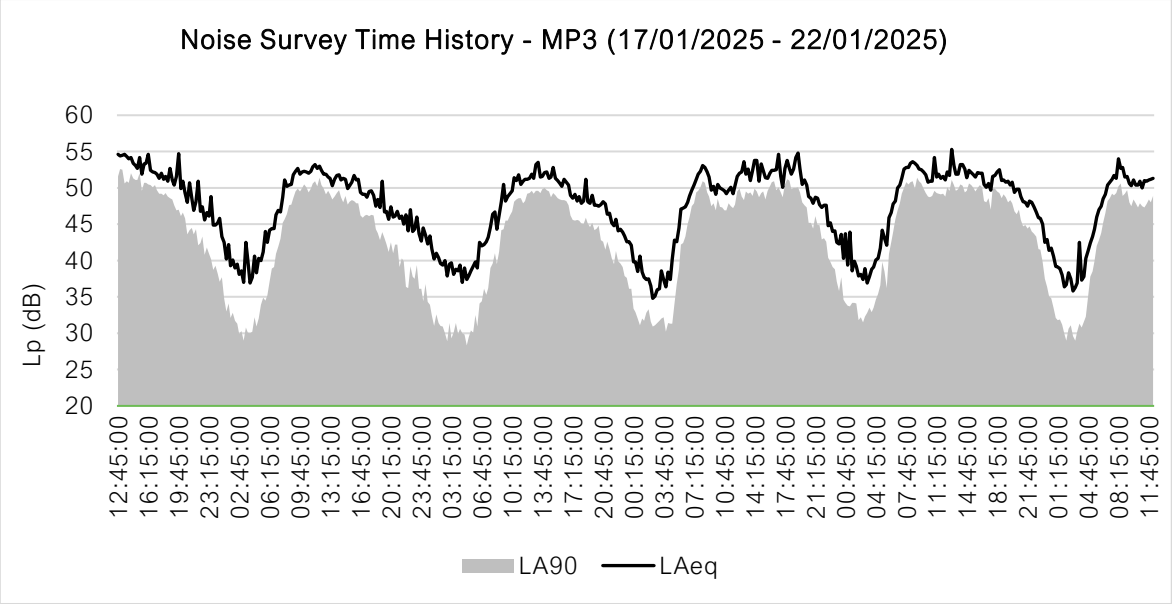


Figure 8 – MP3 Noise Survey Time History

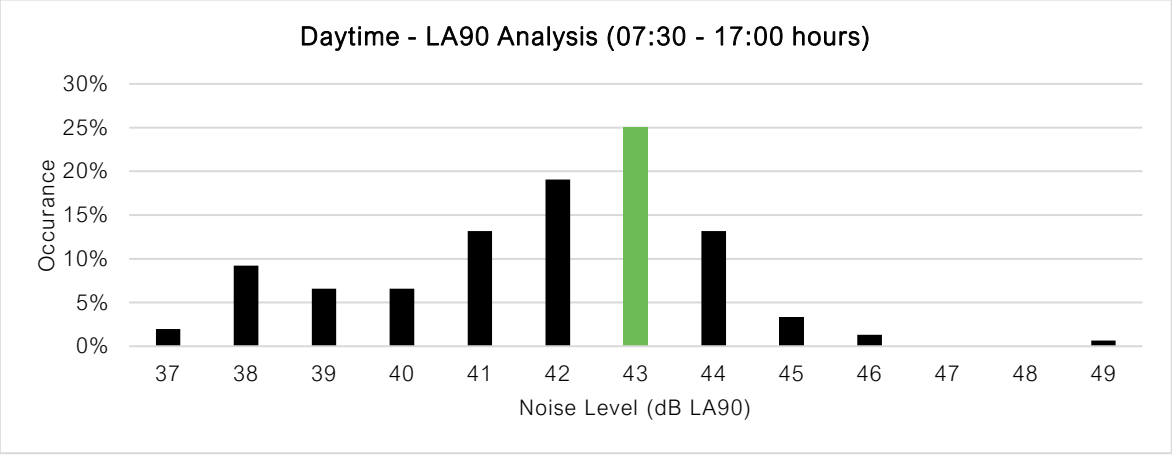


Figure 9 – MP1 Noise Survey Background Sound Level Histogram

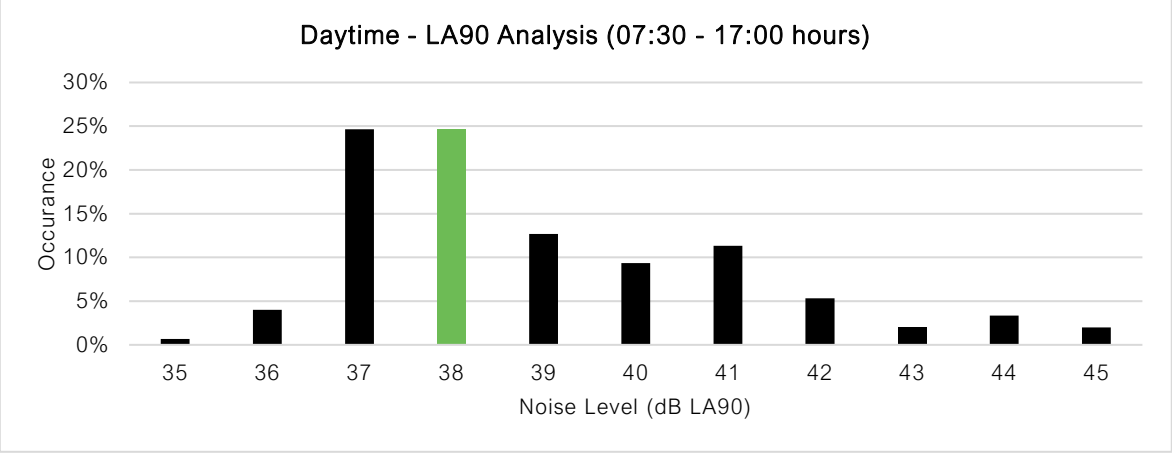


Figure 10 – MP2 Noise Survey Background Sound Level Histogram

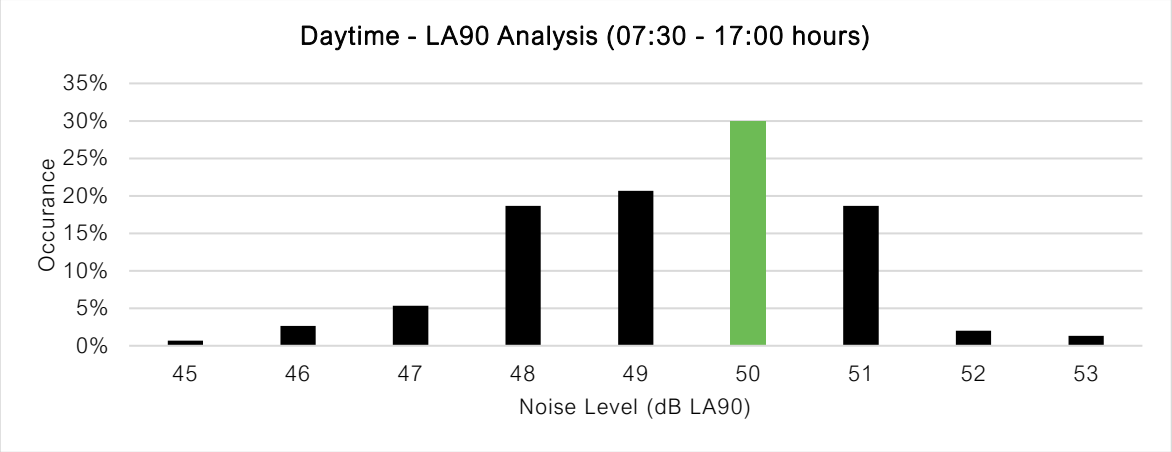


Figure 11 – MP3 Noise Survey Background Sound Level Histogram

D.2 – Surveying Equipment

Piece of Equipment	Serial No.	Calibration Deviation
01dB Fusion Class 1 Sound Level Meter	12038	≤0.1
01dB CAL31 Calibrator	87280	
01dB Fusion Class 1 Sound Level Meter	12586	≤0.1
01dB CAL31 Calibrator	92222	
01dB Fusion Class 1 Sound Level Meter	11755	≤0.1
01dB CAL31 Calibrator	84086	

Table 9 – Surveying Equipment

All equipment used during the survey was field calibrated at the start and end of the measurement period with a negligible deviation. All sound level meters are calibrated every 24 months, and all calibrators are calibrated every 12 months, by a third-party calibration laboratory. All microphones were fitted with a protective windshield for the entire measurements period. Calibration certificates can be provided upon request.

D.3 – Meteorological Conditions

As the environmental noise survey was carried out over a long un-manned period no localised records of weather conditions were taken. However, all measurements have been compared with met office weather data of the area, specifically the closest weather station, and the data from the weather station is outlined in the table below. When reviewing the time history of the noise measurements, any scenarios that were considered potentially to be affected by the local weather conditions have been omitted.

The analysis of the noise data includes statistical and percentile analysis and review of minimum and maximum values, which aids in the preclusion of any periods of undesirable weather conditions. The weather conditions were deemed suitable for the measurement of environmental noise in accordance with BS7445 Description and Measurement of Environmental Noise. The table below presents the average temperature, wind speed and rainfall range for each 24-hour period during the entire measurement.

Weather Conditions – Halesowen (Approx. 2.2km W of Site)				
Time Period	Air Temp (°C)	Rainfall (mm/h)	Prevailing Wind Direction	Wind Speed (m/s)
17/06/25: 00:00 – 23:59	12.1 – 23.8	0.0	ESE	0.0 – 0.8
18/06/25: 00:00 – 23:59	12.9 – 26.9	0.0	SSE	0.0 – 0.5
19/06/25: 00:00 – 23:59	11.9 – 29.3	0.0	ESE	0.0 – 0.4
20/06/25: 00:00 – 23:59	6.9 – 28.7	0.0	NE	0.0 – 1.3
21/06/25: 00:00 – 23:59	17.2 – 29.2	0.0	E	0.0 – 1.3
22/06/25: 00:00 – 12:30	15.0 – 20.8	0.0	ENE	0.0 – 1.4

Table 10 – Survey Weather Conditions


NOVA
ACOUSTICS