Noise Impact Assessment

Site Address: Cornwall Road, Smethwick, B66 2JR

Client Name: WRM Ltd.

Project Reference No: NP-011700

Authorisation and Version Control			
Revision	Date	Reported By	Checked By
06	03/03/2025	T. Watkin, MSc, MIOA	S. Chamberlain, MSc, MIOA

Amendment History	
Revision	Summary of Amendments
01	--
02	Introduced a scheme of mitigation to reduce daytime noise impact.
03	Revised the mitigation scheme.
04	Updated mitigation plan included.
05	Mitigation section updated.
06	ELV building updated within model & minor changes to proposal description.

Disclaimer

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

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1. Introduction

NOVA Acoustics Ltd has been commissioned to prepare a noise impact assessment as part of a bespoke Environmental Agency ('EA') permit application ('the application') at land at the Former Darcast Crankshafts Limited Factory, Cornwall Road, Smethwick, B66 2JR ('the site'). The proposed development is a metal recycling facility with associated infrastructure. This report has been compiled to accompany the permit application to be submitted to the EA.

A noise survey has been undertaken to establish the prevailing background and ambient sound levels at the closest Noise Sensitive Receptors ('NSRs'). This report details the existing background and ambient sound climate, and the noise emissions associated with the proposed development. Measures required to mitigate noise impact have been recommended where necessary and assessed in accordance with the relevant performance standards, legislation, policy and guidance. The 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 Environmental Permitting (England and Wales) Regulations 2016 (as amended).
- 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 Background

The site was previously used by Darcast Crankshafts Limited, a manufacturer of shell-moulded cast crankshafts that provided them for automobile, agricultural and other industrial sectors.

The proposed development will comprise the construction and operation of a metal recycling facility at the site. The proposed facility is to be developed in distinct two phases, however, this report focuses on the noise impacts associated with Phase 1 exclusively.

The first phase would involve the creation of a new priority junction off Cornwall Road, which would act as the main operational access / egress. The existing entrance would be retained for use by itinerant merchants (vans / LGVs), staff and visitors to site. It would also involve the installation of concrete hardstanding across the entire site.

The site would be secured through the existing canal boundary wall, existing brick wall and palisade fencing along Rabone Lane and existing / proposed palisade fencing along Cornwall Road and existing palisade fencing along its western boundary.

The following infrastructure would be erected at the site:

- **Shear:** A shear located near to the northern boundary of the site would be installed. The plant would be circa 28m long by 14m wide and extends to a maximum height of 12.5m. The plant would primarily process ferrous material but could equally be used for non-ferrous processing. The shear would be fed material (such as structural steel beams and columns) into the shear box by a material handling crane. Following this the shear would manipulate the material using hydraulic rams to bale the material tightly. Following manipulation, the material would be pushed by the machine through the throat where a large shearing blade would cut the material to the length specified by the operator. The shear would be protected by a steel enclosure.
- **Workshop Building**: A workshop building would be in the southwestern corner of the site. It would be constructed from a steel portal frame clad in metal sheeting. The building would measure circa 30m long by 18m wide and extend to a height of 13m to ridge (12m to eaves). The building would facilitate the maintenance of on-site static and mobile plant.
- **ELV Facility:** An End or Life Vehicle ('ELV') depollution facility would be located on the southern boundary of the site. It would be constructed from a steel portal frame clad in metal sheeting. The building would extend to a height of 5m to ridge (4m to eaves). The facility would be used to receive end-of-life vehicles and depollute them before further processing.
- **Non-Ferrous Building:** A Non-ferrous storage building (material storage building) would be in the northern extent of the site. It would be constructed from a steel portal frame clad in metal sheeting. The building would extend to a height of 5m to ridge (4m to eaves). It would receive and process non-ferrous materials.
- **Site Office and Welfare:** A site office and welfare building would be located within the north-eastern corner of the site. It would be constructed from prefabricated portacabins which would be circa 15m long 12m wide and extend to 9m in height. The building would house welfare and changing facilities on the ground floor, with office / administration above. Two surface mounted weighbridges would be located next to the site offices.
- **Ancillary Infrastructure:** A fire water tank (circa 4m diameter and 10m tall) associated pumphouse and electrical substations would be in the northwestern part of the site. The pumphouse and substations would be small single storey structures.
- **Storage:** To aid the storage of material several 5m high bays would be constructed alongside ISO container loading infrastructure. The latter would enable material to be containerised in preparation for export off-site. Other areas of the site would be occupied by material stockpiles (circa 10m high), ELV and container storage, alongside parking for the fleet of HGVs, RORO skips and separate staff and visitor's car park.
- **Merchant Yard:** the design also includes an itinerant merchant yard; this is an area of the site where small traders and the public can drop material off safely away from HGVs and large mobile plant. Electrical substations and weighbridges will be included.
- **Mobile Plant:** Various items of mobile plant including 3no. 835e cranes and 1no. CAT972 front-end wheeled loader which will move, sort and (un)load waste from/onto HGVs.

- **HGV Movements:** According to the transport statement, a worst-case scenario of 23no. HGV movements through the site could occur during the daytime, with 10no. movements during the night.

Operations

At this stage it is proposed that the facility would operate 24-hours a day, 7 days a week, however, the expected opening hours for trade and public drop offs/collections are 06:00 – 17:00 Monday to Friday, and 06:00 to 12:00 hours on Saturdays.

In terms of throughput, Phase 1 would have a maximum throughput of 275,000 tonnes per annum ('tpa').

It is anticipated that there would be 30no. employees during the first phase.

The figure blow shows Phase 1 of the proposed development.

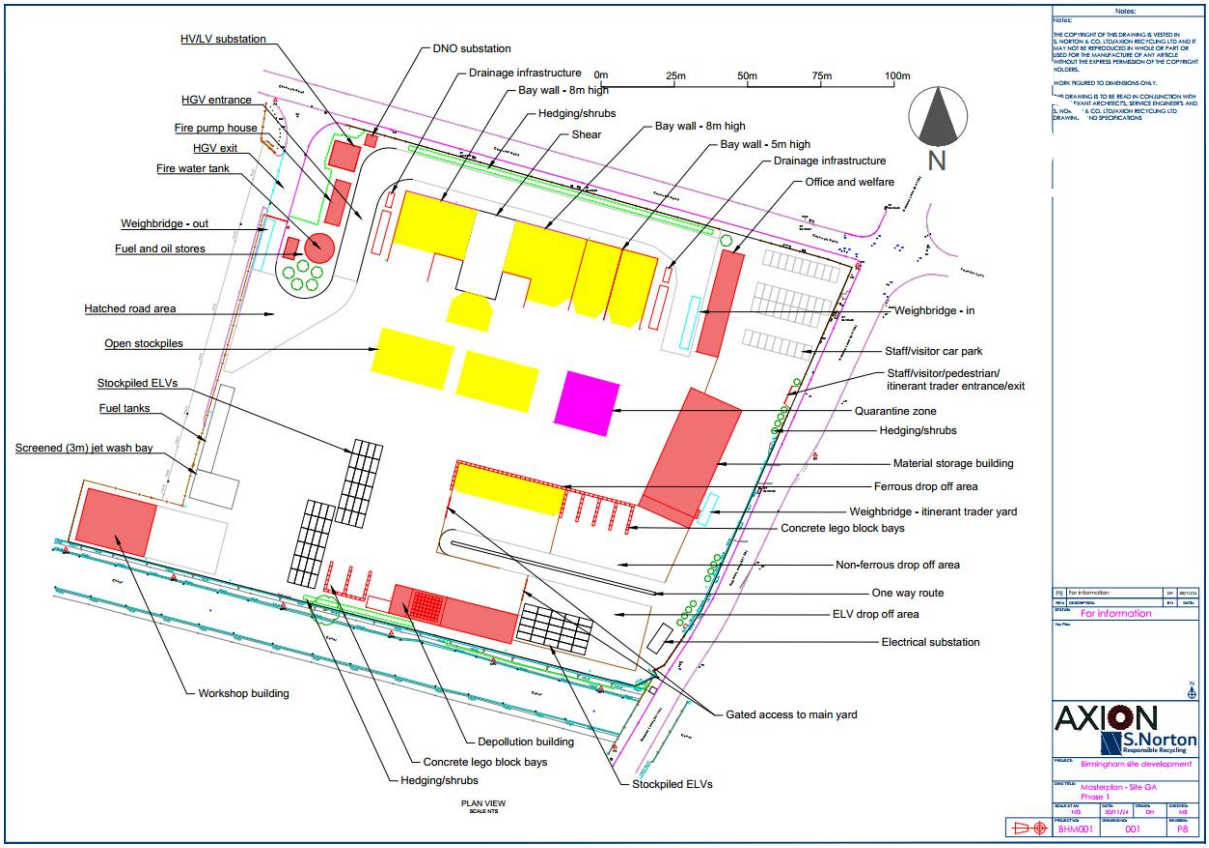

Figure 1 – Proposed Development Layout

2. Environmental Noise Survey

2.1 Measurement Methodology

The following table outlines the measurement dates and particulars. All sound level meters were fitted with a proprietary environmental kit complete with a 130mm diameter windshield suitable for windspeeds up to 8m/s.

A localised weather station was installed at the proposed development in free-field conditions. Any periods of localised adverse weather have been omitted from the dataset used to derive the background sound level baseline. Details regarding the equipment used and the meteorological conditions during the survey are available in Appendix C.

Long-term noise monitoring was conducted in four locations, identified as MP1 to MP4 on Figure 2. These were undertaken to ascertain the ambient and background noise level climate in proximity to nearby NSRs. In all instances, the microphones were approximately 4m above the ground (to avoid interference by the general public) and at least 3.5m from any other large reflective surface under free-field conditions.

Additional spot measurements (denoted by 'ST') were undertaken in various locations to ascertain the acoustic climate at the NSRs most exposed to the proposed development site. In all instances the microphone was positioned at 1.5m above local ground level and at least 3.5m from any other large reflective surface in free-field conditions.

Location	Survey Dates	Measurement Particulars
MP1	26/09/24 – 01/10/24	Equipment affixed to a lamppost along Smeaton Avenue.
MP2		Equipment affixed to a lamppost along Earlsmead Road.
MP3	17-22/10/2024	Equipment affixed to a lamppost along Avery Road.
MP4		Equipment affixed to a lamppost adjacent to Bridge and Oakley House (along the footpath).
ST5	17/10/2024	Measurement taken in the centre of the vacant development site.
ST6		Measurement taken in front of the most exposed residential property of NSR1 along Hidden Lock, adjacent to Lewisham Road.
ST7	22/10/2024	Measurement taken at adjacent to no. 155 Queens Head Road.

Table 1 – Measurement Methodology

Figure 2 overleaf, provides detail of the measurement locations as well as the site location and details perataining to the surrounding environment including the position of NSR's. A subsequent close up of the proposed development is presented on Figure 3.

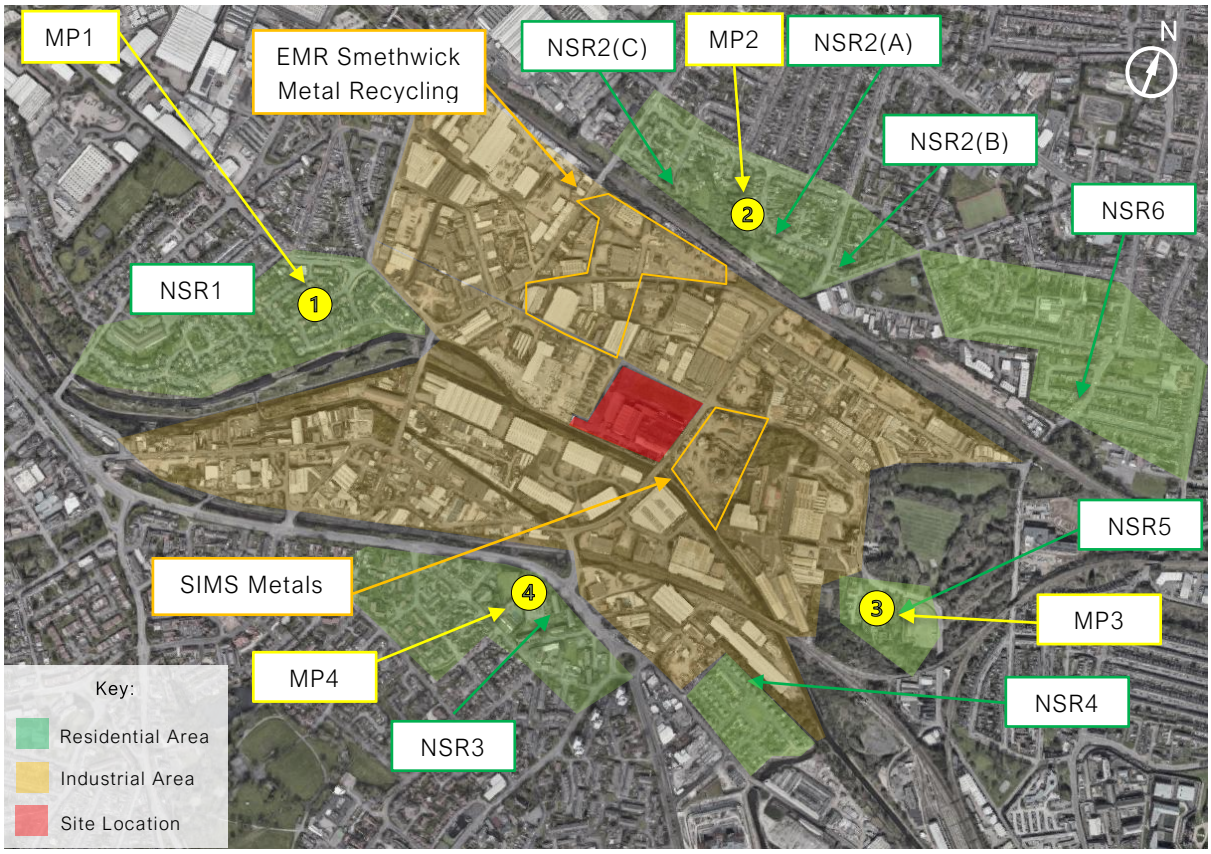

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Figure 2 – Measurement Locations and Site Surroundings

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Figure 3 – Proposed Site Close Up

2.2 Area Description and Context

The site is located circa 4km to the northwest of central Birmingham in the Smethwick area. It is centrally located within a commercial / industrial area (which includes other metal recycling sites). In terms of surroundings:

- Cornwall Road is located immediately to the north, beyond which are a range of commercial and industrial units;
- Rabone Lane (B4136) is located immediately to the east, beyond which is a metal recycling facility and other commercial and industrial units;
- The Birmingham Canal is located immediately to the south (a towpath is located on both sides of the canal), beyond which are several units forming Rabone Park.
- A row of commercial and industrial units are located immediately to the west, beyond which are further commercial and industrial units.

The nearest residential receptors appear to be as follows:

- NSR1 – 1-5 Lewisham Road, approximately 420m to the west.
- NSR2 – a row of detached and semidetached dwellings along Earlsmead Road, approximately 360m to the north.
- NSR3 – residential properties, including 3no. 13-storey apartment blocks across Soho Way (A457), approximately 400m to the south.
- NRS4 – semidetached 2-story dwellings along Argy Way, approximately 400m to the southeast.
- NSR5 – detached 2-story dwellings along Avery Road, approximately 460m to the southeast.
- NSR6 – semidetached 2-story dwellings along Queens Head Road.

2.3 Subjective Impression of Noise Environment

The site is currently vacant and has been for several years. The acoustic climate at the easternmost properties of NSR1 was highly influenced by road traffic noise emissions, however, reversing sirens and forklift/HGV beeping/horn usage was perceptible during lulls in road traffic flow. MP1 is deemed to be a slightly conservative measurement location as the industrial/commercial noise emissions were inaudible at this location.

The acoustic climate at the southernmost properties of NSR2 was dominated by industrial noise emissions emanating primarily from ‘EMR Smethwick Metal Recycling’. The industrial noise emissions included heavy mobile plant movement, bucket scraping, and material drops which were all regular in frequency. The site is understood to operate its offices during the daytime exclusively (Mon to Fri 07:00 – 17:00 & Sat 07:00 – 11:30), however, given the sound levels measured at MP2 it is understood they also operate into the night. MP2 is also deemed slightly conversative as the industrial noise emissions were less perceptible at this location compared to the rear of the properties (south facing facades) that were most exposed.

The noise profile at the northernmost properties of NSR3 was dominated by road traffic noise emissions from Soho Way. Second in nature were occasional mobile plant bucket scraping and impacts that were

clearly perceptible over the residual noise climate; these noise emissions were thought to be emanating from 'SIMS Metal' which lies to the immediate east of the development site.

A private access road prohibited a long-term measurement at NSR4, however, the noise profile during the daytime was considered akin to that of NSR3, albeit the road traffic noise emissions were deemed to be less intense impactful.

The acoustic climate at NSR5 was dominated by distant road traffic noise emissions, with industrial/commercial noise emissions just perceptible at times; these included reversing sirens/beeps from HGVs and forklifts. The noise profile at NSR6 was also dominated by road traffic noise emissions, however, regular train pass-bys also dominated the acoustic climate when present.

2.4 Environmental Noise Survey Results

Long-Term Background Sound Level Analysis

The 'typical' background sound levels measured during the 1-hour daytime and 15-minute night-time periods across each long-term position is presented in the table below. The typical 15-minute daytime background sound levels are also presented in brackets for reference purposes.

Full time histories, statistical analysis and weather conditions can be seen in Appendix C.

Description	Daytime $L_{A90,1hr}$ (dB)	Night-time $L_{A90,15min}$ (dB)
MP1 (NSR1)	48 (46)	37
MP2 (NSR2)	48 (47)	41
MP3 (NSR5)	48 (48)	42
MP4 (NSR3)	54 (54)	46

Table 2 – Background Sound Level Summary

As identified above, typical background sound levels are similar at all survey locations, with the exception of MP2 during the night and MP4 during the day.

Long-Term Residual Sound Level Analysis

Presented in the table below are the range and average residual sound levels ($L_{Aeq,T}$) throughout the entire survey period.

Description	Daytime (dB $L_{Aeq,1hr}$)		Night-time (dB $L_{Aeq,15min}$)	
	Range	Average	Range	Average
MP1 (NSR1)	41 – 59	52	39 – 52	46
MP2 (NSR2)	46 – 63	54	42 – 54	48
MP3 (NSR5)	51 – 62	56	43 – 63	51
MP4 (NSR3)	57 - 68	61	51 – 62	56

Table 3 – Residual Sound Level Summary

As can be seen in the table above, the average daytime residual sound levels are approximately 4dB and 6dB higher than the background sound level at MP1 and MP2 respectively. The night-time residual sound levels are at least 7dB higher than the background sound levels at either of these receptors.

Short-Term Sound Level Results Summary

The following table overleaf outlines the ambient and background sound levels measured during the attended monitoring.

Description	1/1 Octave Frequency Band (Hz, $L_{eq,T}$ dB)								Overall (dBA)	$L_{A90,T}$ (dB)
	63	125	250	500	1k	2k	4k	8k		
ST5 – Development Site (17/10/24: 13:16 – 14:01)	72	63	58	51	51	49	44	38	57	55
ST6 – Hidden Lock (17/10/24: 14:09 – 14:43)	68	64	58	56	55	52	46	41	60	52
ST7 – Queens Head Road (22/10/24: 09:03 – 09:33)	69	61	60	59	62	57	48	43	65	51

Table 4 – Attended Monitoring Sound Level Results Summary

As outlined above, background sound levels at ST6 (NSR1 closest to Lewisham Road) and the highest $L_{A90,T}$ measurement taken at MP1 are identical.

The background sound levels recorded at ST7 are broadly in line with those measured at MP3.

Background Sound Level Results Summary – Baseline Data Used in BS4142 Assessments

Based on a review of the above data, the following section outlines the measured background sound levels that have been used as the baseline for the subsequent BS4142 noise assessments.

Description	Background Sound Level ($L_{A90,15min}$ dB)	
	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
NSR1	48	37
NSR2	48	41
NSR3	54	46
NSR4		
NSR5	48	42
NSR6		

Table 5 – Background Sound Level Summary for BS4142 Assessments

3. BS4142 of Proposed Operations

In the following section of the report, the impact from the proposed bespoke permit is assessed.

3.1 Summary of Proposed Operations

Presented in the following table is a summary of the proposed equipment/operations and anticipated 'worst-case' duration/frequency per reference time period in accordance with BS4142.

Equipment/Operations	Daytime (1-hour)	Night-time (15-min)
Shear & 1no. 835e 360 Grab Loading	100%	100%
2no. 835e 360 Grab Waste from HGV Unloads / Loading HGV	100%	100%
1no. CAT972 Front End Wheeled Loader Moving & Sorting Waste	100%	100%
HGV Movements Through Site	23no.	3no.
Non-Ferrous Workshop Noise Breakout	100%	100%
ELV Depollution Building Noise Breakout	100%	100%
Maintenance Workshop Noise Breakout	100%	100%

Table 6 – Summary of Proposed Equipment/Operations Under Assessment

3.2 Adopted Criteria

Based on the above, a noise impact assessment has been requested to accompany the proposed activities. It is proposed that any site noise emissions causing 'significant adverse impact', 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 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 achieve 'low impact' where practicable, again dependent on the context of the site.

3.3 On-Site Measurement Methodology

An existing S Norton facility in Manchester was used to measure all the equipment/processes proposed at the Smethwick site currently under assessment.

For all on-site measurements the following measurement methodology was adhered to:

- All measurements of external noise sources were taken at 1.5m above local ground, in a position found to be most influenced by the generated noise emissions if residual noise could not be corrected for.
- Measurements have been taken at a position where point source propagation is to be expected. Where not possible, measurements at discrete locations around the noise source have been conducted to facilitate calculations in line with ISO 3746:2010. Where the ISO 3746:2010 method could not be adhered to, manufacturers data has been consulted where possible.
- Internal ambient noise measurements were conducted by taking slow moving sweeps at 1.5m to 2m above the floor whilst all typical operations were taking place.
- All measurements were taken using a fast time-weighting and the sound level meter was set to log every 0.1s.
- Measurements were taken in 1/3 octave frequency bands; however, the report details the 1/1 octave band sound levels inputted to the noise modelling software.
- Weather conditions during the surveying were favourable with wind speeds less than 5m/s and no precipitation.

3.4 Specific Sound Levels & Noise Modelling Data

Sound Power Levels of HGV Movements

Please note that the sound power levels presented in the following table are the input values only; the speed and the number of events has been applied within the noise modelling software. Full calculations can be found in Appendix E.

The sound power levels of HGV pass-bys have been obtained from data collected by NOVA Acoustics for a similar development (report ref: NP-011651).

Description	1/1 Octave Frequency Band (Hz, L_W dB)								L_{WA} (dB)
	63	125	250	500	1k	2k	4k	8k	
HGV Pass-by	92	88	89	92	91	89	83	80	95

Table 7 – Sound Power Levels of HGV Pass-by

Sound Power Levels of External Operations

Please note that the sound power levels presented in the following table are the input values only; the on-time corrections have been applied within the SoundPlan noise modelling software.

A summary of the specific sound levels measured from each item of equipment/process can be found in Appendix E.

Description	1/1 Octave Frequency Band (Hz, L_w dB)								L_{WA} (dB)	On-Time
	63	125	250	500	1k	2k	4k	8k		
Shear & 835e Grab Loading[1]	112	109	106	108	106	108	107	102	114	100% (Day & Night)
CAT972 Sorting & Moving Waste[1]	114	117	108	104	104	101	100	98	110	100% (Day & Night)
HGV (un)loading & 835e Grab Sorting/Loading Waste[1]	111	110	106	106	104	105	105	100	112	100% (Day & Night)
RORO Skip Wagon Delivery[2]	88	88	86	89	88	86	80	71	92	100% (Day & Night)
2no. HGVs Idling at Weigh Bridge[3]	98	96	89	86	84	83	80	75	90	100% (Day & Night)

Notes:
[1] Calculated from noise data obtained at existing WRM Ltd facility.
[2] Obtained from measurements conducted by NOVA Acoustics for a similar recycling facility (report ref: 7011FR.
[3] Obtained from measurements conducted by NOVA Acoustics (report ref: NP-011281).

Table 8 – Sound Power Levels of Equipment/Operations

The existing S Norton facility was inherently active and difficult to obtain isolated measurements or to correct for residual noise from undesired sources. Therefore, the sound power levels presented in the table above are thought to be a 'worst-case' scenario that will inevitably contain a degree of uncertainty.

Industrial Unit Noise Breakout Emissions

Presented in the follow table are the internal ambient noise levels measured at the existing S Norton facility.

Description	1/1 Octave Frequency Band (Hz, L_{eq} dB)								L_{PA} (dB)	On-Time
	63	125	250	500	1k	2k	4k	8k		
Non-Ferrous Stores	73	72	71	70	78	67	63	57	79	100% (Day & Night)
ELV Depollution Building	68	67	65	68	69	70	69	65	76	100% (Day & Night)
Maintenance Workshop	63	68	67	71	78	83	83	80	88	100% (Day & Night)

Table 9 – Internal Ambient Noise Level Summary

All buildings to be installed on-site shall be a steel portal frame construction with insulated steel panels making up the façades and roofing; akin to Kingspan KS1000RW panels, however any panels providing the equivalent sound insulation performance will suffice.

Outlined in the following table is the sound reduction index ('SRI') of Kingspan panels from the manufacturer's datasheets which can be found in Appendix D.

Description	1/1 Octave Frequency Band (Hz, SRI dB)								R_w (dB)
	63	125	250	500	1k	2k	4k	8k	
Insulated Steel Panels	20	18	20	24	20	29	39	47	25

Table 10 – Assumed Sound Reduction of Building Fabric Elements

The following assumptions have also been made:

- All roller shutter doors to the on-site buildings/workshops provide the equivalent R_w sound reduction. An example product would be "FIREROLL ACOUSTIC SERVERY ROLLER SHUTTERS", however, any product meeting the requirements would suffice.
- All roller shutter doors remained closed during noisy operations.
- All ventilation, heating and cooling is provided by mechanical means to facilitate the roller shutter doors remaining closed.

Noise Modelling

The following assumptions have been made within the SoundPlan 9.0 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 entirely acoustically 'hard' surfaces.
- Octave band noise data was used to facilitate noise modelling in accordance with ISO 9613-2. 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 during the night-time, and the centre of gardens during the daytime, depending on which was greater.
- The site and all other buildings and any intervening objects have been modelled according to drawing 'BHM001-P8-Masterplan – Phase 1', with Google Maps and those provided by the LIDAR data.
- All fixed or quasi-mobile operations have been modelled as point source emitters.
- Where more than one dominating noise generating element was present in a noise source, the median point source height was chosen. Where only a single noise generating element was present, or a single element was dominant, the point source height was that of the only or dominant element.
- HGV movements have been modelled as slow-moving point source emitters (line source L_w/m) at 1.5m above the ground. On-times have been calculated based on vehicle speed (4.4 m/s) the number of events per reference time period (23 per 1-hour and 3 per 15-

minutes). The night-time events have been corrected to account for how the software undertakes on-time corrections (multiplied by a factor of 4).

- The sound power levels shown in Tables 7 & 8 have been inputted to the model, and on-time corrections have been applied with SoundPlan.
- There are 3no. CAT972 front shovel emitters representing a single shovel operating for 20-minutes in various locations around the site, totalling a 100% on-time per 1-hour. These have been set at a source height of 2m.
- There are 2no. HGV (un)loading / 360 grab emitters. These have been set at a source height of 3m.
- There is 1no. shear operating and being loaded via a 360-grab emitter. Based on on-site observations, the dominating noise height of the shear was at 2.5m. This has been set as the point source height within the model.
- There is 1no. RORO skip wagon delivery/collection emitter.
- The noise emissions breaking out of the buildings is calculated within SoundPlan (in accordance with BS12354) accounting for the following:
    - The internal ambient noise levels seen in Table 9,
    - The building fabric sound reduction shown in Table 10,
    - A Cd diffusivity term correction of -3dB for noise breakout from solid reflective elements.
- Any building fabric elements are assumed to behave as area noise sources which is calculated within the SoundPlan software considering the formula: $L_W = L_{P1m} + 10*\text{Log}(S)$, where S is the surface area of the building element and L_{P1m} are the external noise levels calculated in accordance with BS12354.

The sound maps showing the specific sound level emissions from the proposed development can be seen in the following figures.

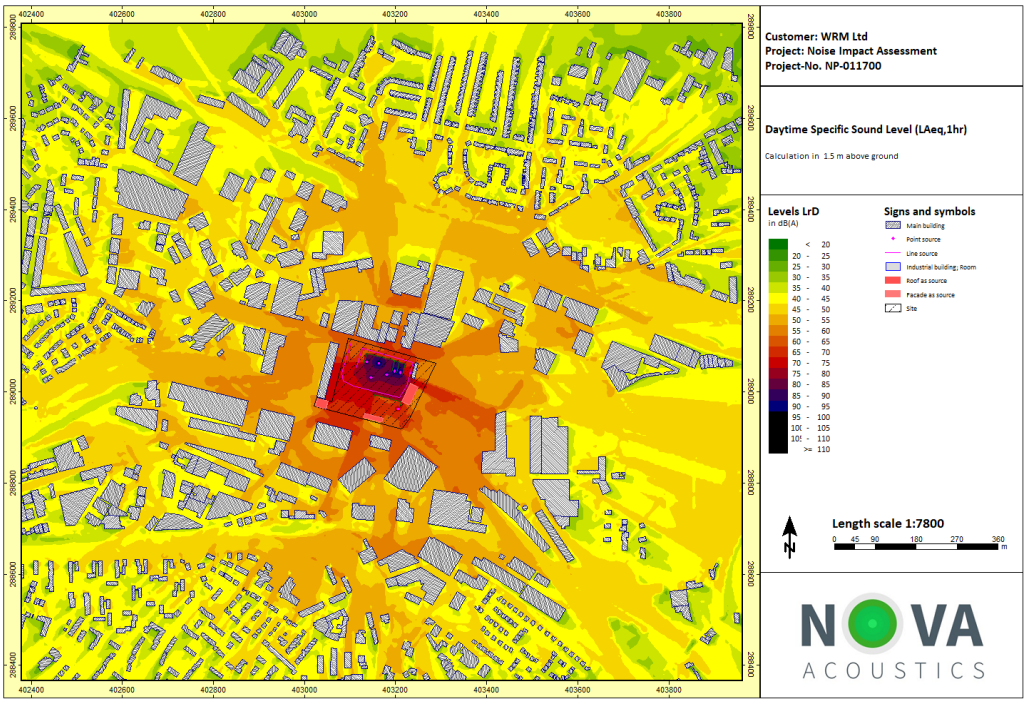


Figure 4 – Specific Sound Level Map (Daytime Operations 07:00 – 23:00)

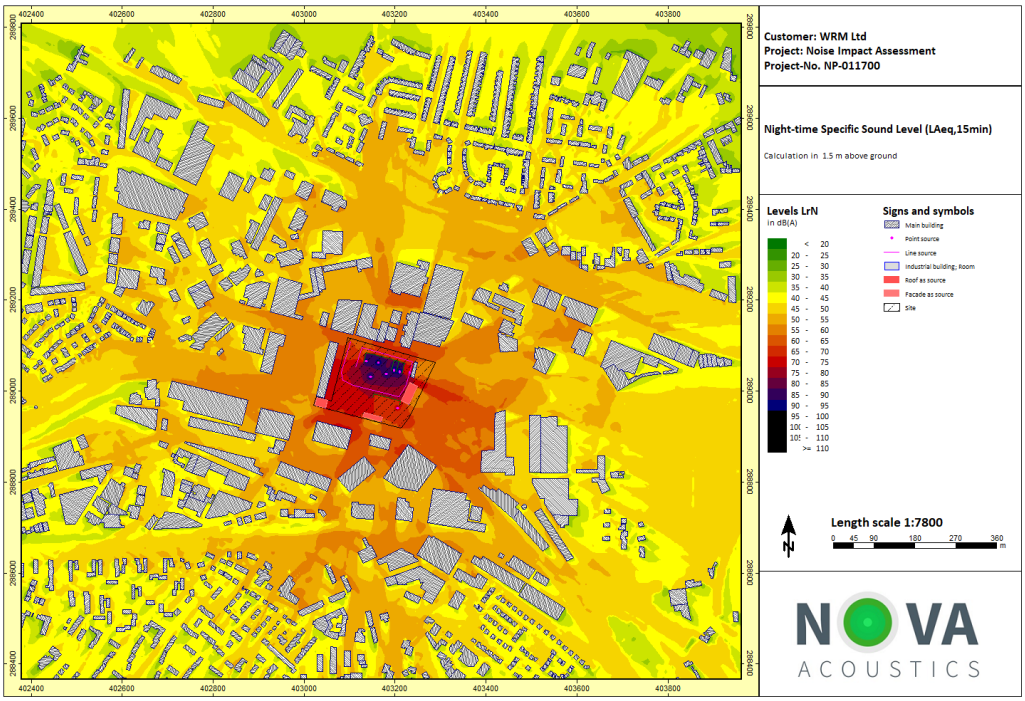


Figure 5 – Specific Sound Level Map (Night-time Operations 23:00 – 07:00)

3.5 BS4142 Noise Impact Assessment Criteria

The criteria that will be applied to the BS4142 assessment outcomes will be based on the table below. Please note that these are indicative at this stage and require a review of the 'contextual' nature of the site when compared to the background sound level. This is subsequently discussed after the BS4142 assessment.

Description	Exceedance Levels			
Exceedance of Background (L_{A90})	<0	0 - 4	5 - 9	10+
BS 4142 Initial Assessment Outcome	Low Impact to 'Negligible Impact	Low Impact / Low Likelihood of Adverse Impact	Adverse Impact	Significant Adverse Impact

Table 11 – BS4142 Initial Noise Impact Criteria

3.6 BS4142 Noise Impact Assessment of Proposed Operations

The BS4142 noise impact assessments are conducted at the most affected NSRs in the following table. To provide a 'robust' assessment the specific sound levels are taken from the most exposed point of the façades or the centre of gardens (during the daytime only), depending on which is higher.

Description	NSR					
	1	2	3	4	5	6
BS4142 Noise Impact Assessment – Daytime (07:00 – 23:00)						
Specific Sound Level ($L_{Aeq,1hr}$)	51	54	53	50	46	47
Acoustic Feature Correction	+3[1]	0[4]	0[4]	+3[1]	+3[1]	+3[1]
Rating Sound Level ($L_{Ar,Tr}$)	54	54	53	53	49	50
Background Sound Level ($L_{A90,1hr}$)	48	48	54	54	48	48
Exceedance of L_{A90}	+6	+6	-1	-1	+1	+2
BS4142 Noise Impact Assessment – Night-time (23:00 – 07:00)						
Specific Sound Level ($L_{Aeq,15min}$)	52	55	54	52	48	47
Acoustic Feature Correction	+6[3]	+6[3]	+6[3]	+3[1]	+3[1]	+3[1]
Rating Sound Level ($L_{Ar,Tr}$)	58	61	60	55	51	50
Background Sound Level ($L_{A90,15min}$)	37	41	46	46	42	42
Exceedance of L_{A90}	+21	+20	+14	+9	+9	+8

Notes:

[1] *A +3dB penalty has been applied to account for just perceptible impulsivity from metal waste sorting and loading, although the acoustic characteristics are generally in keeping with the area.*

[2] *No penalty has been applied due to the absolute specific sound level relative the background sound and that the acoustic features are generally in keeping with the area.*

[3] *A +6dB penalty has been applied to account for clearly perceptible impulsivity as during the night-time the acoustic features are not generally in keeping with the residual noise climate.*

[4] *No penalty has been applied as the acoustic features are generally in keeping with the area and they are not thought to be anymore perceptible than currently present.*

Table 12 – BS4142 Noise Impact Assessment of Proposed Operations

Based on a comparison of the above BS4142 assessment with the criteria in Table 11, Table 12 indicates that during the daytime there is risk of an 'adverse impact' at NSRs 1 & 2, a low likelihood of 'adverse impact' at NSRs 5 & 6 and 'low impact' at NSRs 3 & 4; all dependent on context.

It should be noted, however, that the impacts are thought to be conservatively based on 'worst-case' assumptions with regards to both background sound levels and specific sound levels. Notwithstanding this, it has been agreed to reduce the daytime adverse noise impacts by as much as practicable.

During the night, the noise impacts are predicted to be much greater, particularly at NSRs 1, 2 & 3. The noise impacts at these NSRs are predicted as a 'significant adverse impact' in accordance with BS4142. Primarily due to the exceedances over the background sound levels and the intrusive nature of the expected acoustic features, the noise impacts would be classed at a 'Significant Observed Adverse Effect Level' ('SOAEL') in line with the NPSE and NPPF.

The predicted noise impacts at NSR4 to NSR6 are an 'adverse impact' in accordance with BS4142. Considering the wider context of the site, the noise impacts are classed as 'Lowest Observed Adverse Effect Level' ('LOAEL') to SOAEL in line with the NPSE and NPPF.

Given the margin by which the rating sound levels exceed the relevant background sound levels, any uncertainty within the calculations is not thought to have an effect on the assessment outcome. Considering the above, it is necessary to implement a scheme of mitigation measures to reduce the night-time noise impacts.

4. Proposed Mitigation Measures

4.1 Proposed Mitigation

Presented in the following section are thought to be most cost-effective and practicable noise control solutions for the site out of all the proposed measures.

To reduce the predicted noise impact, the following mitigation measures have been agreed:

- During the night-time (23:00 – 07:00) there should be no:
  - HGV (un)loading with the 835e 360 grabs,
  - Shear operations and associated 360 grab loading,
  - CAT972 front shovel operations.
- Whilst HGV/RORO movements would not be required during the night-time, they have been included for 'robustness'.
- The 5m tall sections of bay walls must be increased to 7m in height.
- The 8m tall section of bay wall should be increased to 10m in height.
- As shown in the figure below, an extension to the 10m tall section of steel wall must be erected.
- The height extensions to the steel walls could be constructed from any material providing it contains no holes or gaps (including the join to the steel wall below), and have a minimum surface mass of 15kg/m^2.
- The materials storage building has been removed as these operations will take place within the workshop.

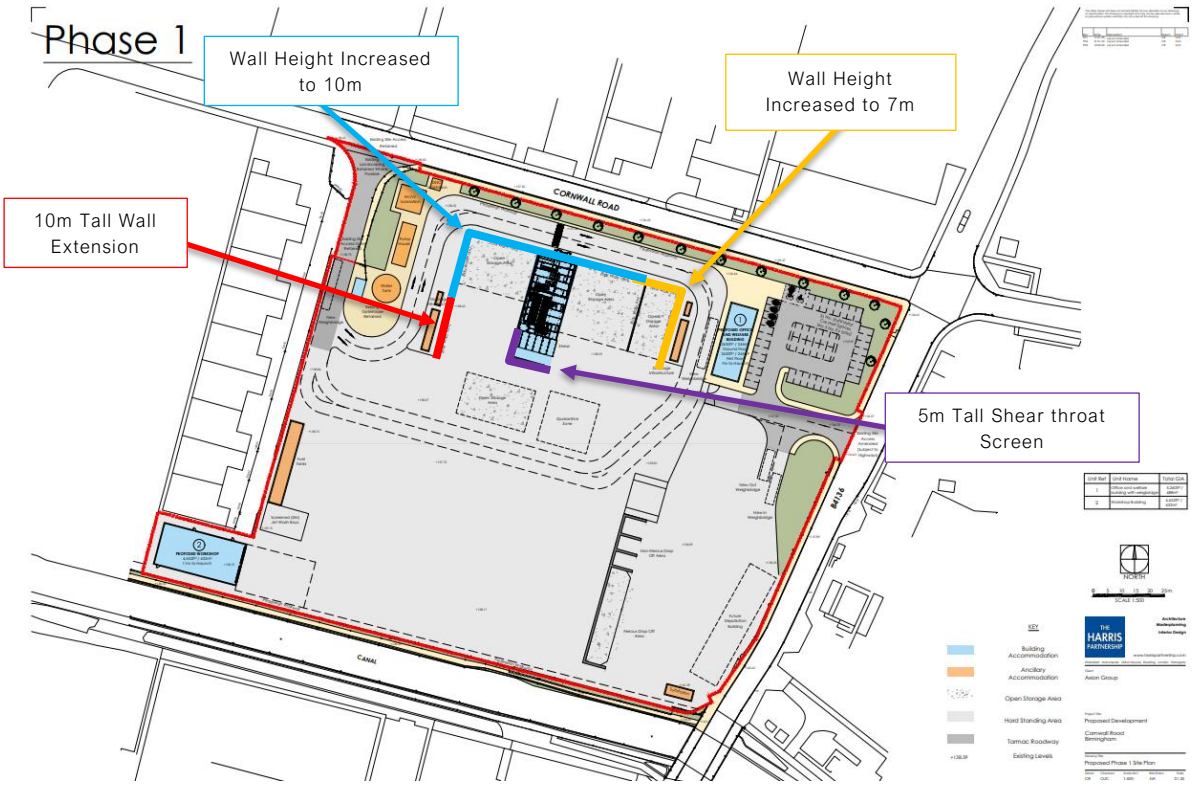


Figure 6 – Proposed Mitigation Layout

4.2 Specific Sound Levels & Noise Modelling

The sound maps showing the specific sound level emissions from the proposed development can be seen in the following figures.

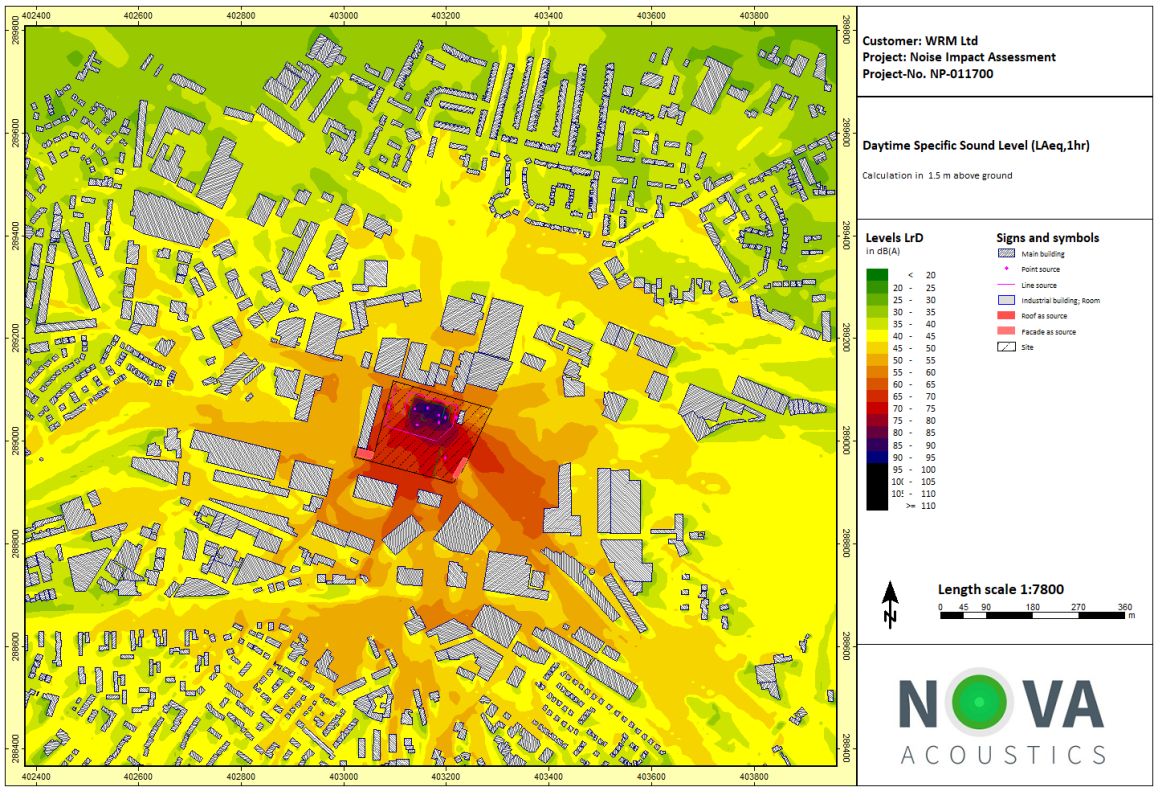


Figure 7 – Specific Sound Level Map (Mitigated Daytime Operations 07:00 – 23:00)

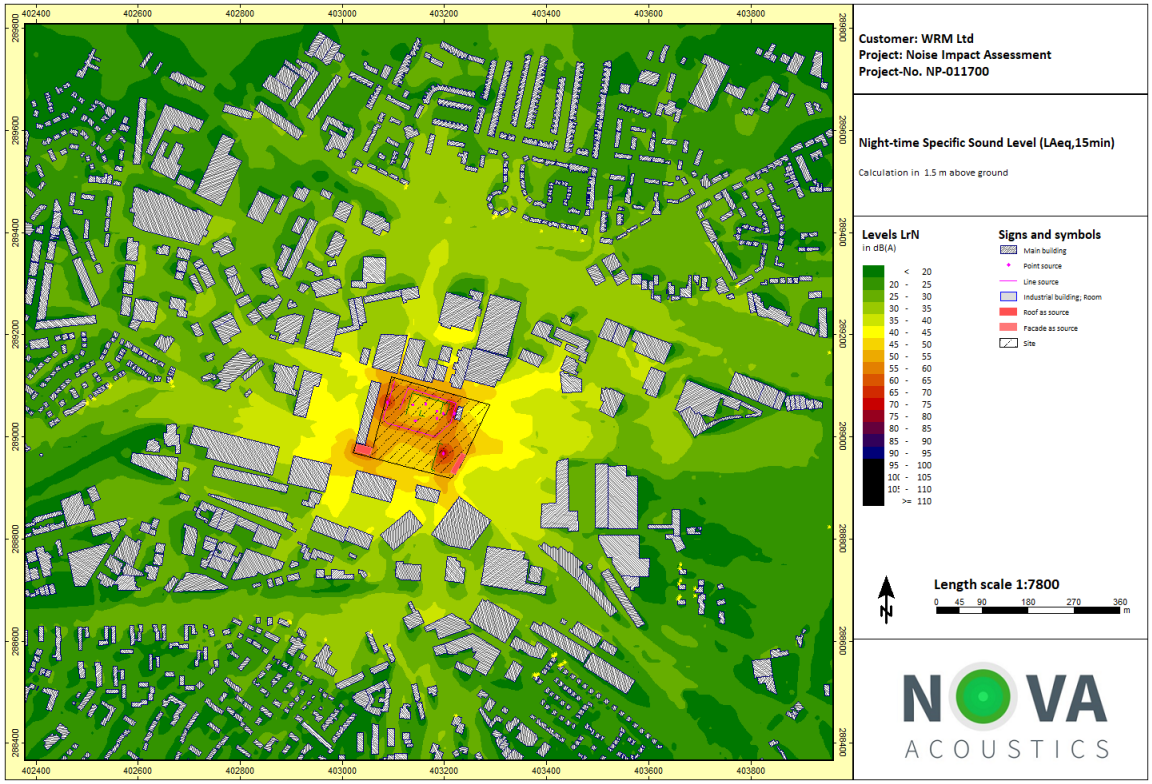


Figure 8 – Specific Sound Level Map (Mitigated Night-time Operations 23:00 – 07:00)

4.3 Mitigated BS4142 Noise Impact Assessments

A summary of the revised BS4142 assessments that incorporate the proposed mitigation measures are shown below.

Description	NSR					
	1	2	3	4	5	6
BS4142 Noise Impact Assessment – Daytime (07:00 – 23:00)						
Specific Sound Level ($L_{Aeq,1hr}$)	48	47	52	49	45	42
Acoustic Feature Correction	+3[1]	0[4]	0[4]	+3[1]	+3[1]	+3[1]
Rating Sound Level ($L_{Ar,Tr}$)	51	47	52	52	48	45
Background Sound Level ($L_{A90,1hr}$)	48	48	54	54	48	48
Exceedance of L_{A90}	+3	-1	-2	-2	0	-3
BS4142 Noise Impact Assessment – Night-time (23:00 – 07:00)						
Specific Sound Level ($L_{Aeq,15min}$)	31	32	32	26	24	30
Acoustic Feature Correction	+3[1]	+3[1]	0[2]	0[2]	0[2]	0[2]
Rating Sound Level ($L_{Ar,Tr}$)	34	35	32	26	24	30
Background Sound Level ($L_{A90,15min}$)	37	41	46	46	42	42
Exceedance of L_{A90}	-3	-6	-14	-20	-18	-12

Notes:

[1] *A +3dB penalty has been applied to account for just perceptible impulsivity from metal waste sorting and loading, although the acoustic characteristics are generally in keeping with the area.*

[2] *No penalty has been applied due to the absolute specific sound level relative the background sound and that the acoustic features are generally in keeping with the area.*

[3] *A +6dB penalty has been applied to account for clearly perceptible impulsivity as during the night-time the acoustic features are not generally in keeping with the residual noise climate.*

[4] *No penalty has been applied as the acoustic features are generally in keeping with the area and they are not thought to be anymore perceptible than currently present.*

Table 13 – BS4142 Noise Impact Assessment of Mitigated Operations

The night-time BS4142 assessment above shows that the rating sound levels at all NSRs are not predicted to exceed the respective background sound levels. Considering the wider context of the site, this is an indication of 'low impact' in accordance with BS4142, which in line with the NPSE and NPPF relates to NOAEL at NSRs 1 & 2 and NOEL at all other NSRs.

Daytime Noise Impact Discussion & BS4142 Context

The assessment above indicates that during the daytime there is a low likelihood of 'adverse impact' at NSR1 and 'low impact' at all other receptors; all dependant on context.

BS4142:2014+A1:2019 comments the following, "*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 sources exceeds the background sound level and the context in which the sound occurs*".

The initial condition of the above statement has been defined in the noise impact assessment above. To establish context in which the industrial sound will reside, there are three crucial factors that should be considered:

- The absolute sound level,
- The character and level of the residual sound compared to the character and level of the specific sound,
- The sensitivity of the receptor.

Absolute Sound Levels

To determine whether the residual and background sound levels are high or low, Section 11 of BS4142 has been consulted:

"...Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse."

The average daytime residual sound level at NSR1 is 52dB L_{Aeq} and the typical background sound level is 48dB $L_{A90,1hr}$. From on-site observations, the existing residual sound climate at NSR1 (most exposed dwellings) is already affected by industrial/commercial noise emissions and, therefore, the residual sound itself may already result in adverse impacts.

Furthermore, the source noise levels used to derive the sound power levels could not be corrected for residual noise, however, they were thought to be dominant at the measurement location. Thus, the noise levels used within the predictions are thought to present a 'worst-case' scenario that may contain a degree of uncertainty which would not be favourable for the proposed development.

Although the BS4142 rating sound levels exceed the background sound levels by 3dB the specific sound levels are not predicted to exceed the residual sound.

Character and Level of Residual and Specific Sound

The residual sound at NSR1 is predominantly of low to mid frequency noise from road traffic. The majority of contributing specific sound sources associated with the proposed development are similar in character, as so only low-level impulsive events are anticipated to be just audible at times. Again, these events would be akin to those already experienced by these NSRs. The noise emissions from the proposed development may at times be audible, however, the risk of them being intrusive is considered low.

Sensitivity of the Receptor

Section 11 of BS4142 comments that receptor sensitivity and dwellings design measures should also be considered.

It is assumed that the surrounding dwellings of NSR1 are to a degree, accustomed their acoustic climate which includes industrial/commercial noise emissions.

Daytime Noise Impact

Considering the above context, the noise impact at NSR1 is considered as a low likelihood of 'adverse impact' in accordance with BS4142.

In line with the NPSE and NPPF, the noise impacts are deemed at a 'No Observed Adverse Effect Level' ('NOAEL'). 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 BS4142 noise impacts at all other NSRs are predicted as 'low impact', which in this instance also relate to NOAEL in line with the NPSE and NPPF.

5. Limitations and Uncertainty

Any measurement of existing ambient and background sound levels will be subject to a degree of inherent uncertainty. Environmental sound levels vary between days, weeks and throughout the year due to the variations in source level and conditions, meteorological effects on sound propagation and other factors.

Therefore, any environmental noise survey can only provide a snapshot of the noise levels. However, all efforts have been made to ensure that the measurements were conducted in a way to provide a robust sample of representative and typical conditions, e.g., avoiding or omitting adverse weather conditions. Nonetheless, a small degree of uncertainty will always remain in the noise levels from surveys.

The impact assessment has been prepared in accordance with source data measured during the site visit. The measurement distances were measured accurately using a laser meter, and the worst-case highest sound levels measured where directivity was at its greatest have been used.

To reduce uncertainty when measuring noise sources that are erratic or variable, longer measurements were taken that included several full cycles rather than a snapshot.

The measurements were undertaken at distances where noise emissions from operations were thought to be dominant and also where they were propagating in point source manner. This allowed for calculations of sound power levels in accordance with BS5228:2009.

The existing S Norton facility was inherently active and difficult to obtain isolated measurements or to correct for residual noise from undesired sources. Therefore, the sound power levels presented in the report are thought to be a ‘worst-case’ scenario that will inevitably contain a degree of uncertainty that would not be favourable for the proposed development.

All measurements were taken with a 130mm diameter windshield fitted that is effective up to 8m/s according to manufacturer’s data. The average wind speeds shown in Appendix C fall below the aforementioned wind speed.

The calculations using SoundPlan 9.0 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.

6. 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.

In accordance with BS4142 the daytime noise impact from the site was initially estimated as having an 'adverse impact' at NSRs 1 & 2, dependant on context. After consideration of the context, the noise impacts were deemed at a NOAEL to LOAEL in line with the NPSE and NPPF.

The night-time BS4142 assessment indicated 'significant adverse impact' at NSRs 1, 2 and 3, and a high-level 'adverse impact' at all other NSRs. Given the margin by which the rating sound levels exceed the relevant background sound levels, any uncertainty within the calculations is not thought to have a material effect on the assessment outcome. As such, the noise impacts during the night-time are considered as LOAEL to SOAEL in line with the NPSE and NPPF.

An agreed scheme of mitigation has been specified within Section 4. The scheme is thought to be most cost-effective and practicable solution for the site out of all the measures proposed over several months.

Considering the proposed mitigation measures, the wider context of the site, its surroundings and the assessment assumptions, the mitigated daytime noise impact is thought to be lower than what has been predicted numerically. The noise impact at the most affected NSR1 is predicted as a low likelihood of 'adverse impact', with 'low impact' predicted at all other NSRs in accordance with BS4142. In line with the NPSE and NPPF, the noise impacts are deemed a NOAEL.

It should be recognised that the assessment has considered a 'worst-case' pre-BAT scenario and that there is a degree of uncertainty within the calculations as residual noise could not be corrected for when measuring the external sources at an existing S Norton facility.

The mitigation scheme also restricts any heavy mobile plant operations and shearing to daytime hours exclusively (07:00 – 23:00).

The mitigated night-time BS4142 assessment indicates that 'low impact' would be present at all NSRs, dependant on context. Given context of the site and assessment assumptions, the night-time noise impacts are deemed a NOEL to NOAEL in accordance with the NPSE and NPPF.

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

1. The mitigation outlined in Section 4 should be implemented and retained throughout the lifetime of the development.
2. The Noise Management Plan ('NMP') outlined in Section 7 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.

7. Noise Management Plan ('NMP')

This noise management plan outlines the methods by which the site operator will systematically assess and minimise the potential impacts of noise generated by the site. The noise management plan is a working document with the specific aim to ensure that:

- Noise impact is considered as part of routine inspections.
- Noise is primarily controlled at source by good operational practices and 'Best Available Techniques ('BAT'), including physical and management control measures.
- All appropriate measures are taken to prevent or, where that is not reasonably practical, to reduce noise emissions from the site.

The noise management plan addresses the impact of noise, and the control measures employed to mitigate the risk. These are supported through monitoring procedures to identify elevated levels and review complaints should they arise. The complaints management procedure is also addressed, which includes the management responsibilities.

7.1 Hours of Operation

Site operations are 24/7, however, heavy mobile plant and shearing operations are restricted to daytime hours exclusively (07:00 – 23:00).

7.2 Equipment Maintenance

All failed/broken plant and equipment will be replaced with equivalents that produce equal or lower levels of noise. This will be verified with manufacturers technical datasheets or on-site noise measurements.

All plant and machinery will be regularly and properly maintained in accordance with the preventative maintenance schedule of which the appropriate staff will be trained in.

7.3 Operator Monitoring Plan

Monitoring of noise emissions from the site will be undertaken both subjectively and objectively.

Continuous Subjective Noise Monitoring

- All operational staff will, as part of their induction, be made aware of their roles and responsibility. It is the responsibility of all staff to be aware of noise on site and to report any potential noise issues to the sites Operations Manager at the earliest opportunity.
- All staff will have refresher training on noise issues, prevention and management at six-monthly intervals.
- If members of staff report any instances of elevated noise, this should be investigated immediately. In the event that increased noise levels are verified; the source of the noise should be taken out of commission and must be fixed/corrected prior to the equipment being put back into commission.
- A visual inspection of all equipment should be made before use to ensure that there are no obvious faults or malfunctions that could lead to elevated noise levels. It will be ensured that all noise mitigation measures (silencers, etc.) are installed as per manufacturer's guidance.

7.4 Noise Control Measures Summary

- Reversing alarms will be self-adjusting white noise models.
- Engines will be switched off when not in use. Vehicles will not be left idling.
- Vehicle horns to be used as a Health and Safety measure only.
- Deliveries will be spread evenly throughout the day where practicable.
- All drop heights (including that from heavy mobile plant) will be reduced to as low as possible.
- All mobile plant will be fit with the appropriate exhaust silencers and radiator intake attenuators.
- The mitigation measures proposed in Section 4 of this report shall be implemented in full and maintained throughout the lifetime of the development.

7.5 Management Control Measures

- Users of on-site plant and equipment complete a daily defect log at the beginning of the working day if they observe that their vehicle is not working to its optimum. An on-site mechanic actions the defect log on the same working day and machines are not used until this action has been completed.
- Tool-box talks are provided by site management on a regular basis to site operatives. These talks include all aspects of the management plans for this site.
- Plant maintenance schedules using the manufacturer's recommendations where vehicles are serviced after 500 hours of operation.
- Pre-use checks are completed prior to using plant and equipment daily.
- Defects are reported and actions are taken to rectify the problem or remove the offending item from service until such time as the issue is resolved.
- All plant and equipment are visually inspected by the operator at the end of the working day.
- Specialist contractors are used to perform maintenance outside the scope and expertise of the site management and operatives.
- All documentation relating to plant and equipment maintenance is retained in the site office for inspection.

7.6 Noise Complaint Investigation

Typically, it is recommended that an Issue Management System ('IMS') is implemented. The applicant is proposing to use an EHS reporting system called 'Assure' which automatically alerts senior staff of new events; trends are then reviewed on a weekly basis.

Further to this, a complaints procedure should be implemented; this procedure would need to allow for all complaints, feedback and requests made by third parties regarding the site's operational activities, as well as the health and safety performance or quality of service/product.

A phone number for the head office should be available online (it is understood that this available) in order to allow for any member of the public to lodge a complaint without entering the operational site. The operations manager will be specifically assigned to deal with complaints.

All complaints received from third parties including statutory authorities, statutory consultees, members of the general public and representatives of the company will be forwarded to the operations manager to action as below within 2 hours (where feasible). The complaint will be logged in the incident database within 72 hours.

The operations manager will ensure that:

- The complaint is investigated to identify the cause, if necessary, this may involve direct communication with the complainant.
- The noise source will be measured using a class 2 sound level meter and compared with monthly objective monitoring records.
- In the event of elevated noise being detected, the presence of 'abnormal' onsite activity is assessed and if necessary, action is taken immediately to prevent a reoccurrence of the same problem. These actions must be documented.
- The complainant will be contacted and given information on the investigations conducted and actions taken as appropriate.
- All complaints are reported to regional directors and discussed at site meetings.
- Details of other complaints are sent to the other company personnel as appropriate.

If the investigation indicates that the complaint has not been justified this will be clearly recorded on the incident report. All complaints will be logged.

7.7 Reporting Measures

In the event of elevated levels of noise being identified, the event will be reported into the IMS/EHS by a member of operational staff. Upon notification of an environmental incident, the site manager will complete an incident reporting form. The completed form is then distributed throughout the company for review at operational, management and health and safety meetings.

All performance failures will be categorised for input into the IMS/EHS as follows:

- Minor event: quick fix possible, locally resolved.
- Medium event: brief disruption to service, management intervention required.
- Major event: significant disruption to service.

Each non-conformance category must have a given deadline for rectification. The deadline for each category is:

- Minor Event: within 24 hours
- Medium Event: within 6 hours
- Major Event: within 1 hour

The IMS/EHS will record any actions taken to rectify the issue, ensure that any necessary actions or review are recorded onto the IMS/EHS and ensure that the person reporting the incident is notified. The site manager will investigate the performance failure within a reasonable time frame (ideally 2 hours). Once the issue has been resolved, the corrective action will be entered onto the system and the issue will be closed.

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), published 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:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life;
- 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:

- "Typically, the greater this difference, the greater the magnitude of the impact."
- "A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context."
- "A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context."
- "The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a 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:

- 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;

- 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;
- 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.

B.4 – Environmental Permitting Regulations 2022

Most recently updated in January 2022, the 'Noise and Vibration Management: Environmental Permits' provides advice on how the Environment Agency ('EA') assesses noise from industrial processes, what the law says must be done to manage noise and vibration, how to carry out a noise impact assessment and what should be included in a noise management plan ('NMP'). It replaces Horizontal Guidance for Noise (H3) Parts 1 and 2, and the Scottish Environmental Protection Agency (SEPA) Guidance on the control of noise at Pollution Prevention and Control (PPC) installations.

The guidance lists the reasons why regulation of noise is important, defines when an assessment is needed, and states required competency standards before presenting the approved methodology for undertaking a noise impact assessment, broken into the following four steps:

Step 1: desktop risk assessment:

- Identification of plant or operations that could be audible at any known or proposed NSR, including non-routine noise sources (e.g. emergency pressure relief / venting systems).
- Description and ranking of noise sources in terms of off-site impact, noting what they sound like and when they operate.
- Identification of current and proposed NSRs by name, type, location and distance from source.
- Description of the land between the site and the NSRs and whether any man-made features could increase or decrease the audibility of the sound at the NSRs.

Step 2: off-site monitoring survey, involving baseline measurements at NSRs to the standards defined in BS4142:

- When considering overall site impact, background sound levels at NSRs must not be influenced by site noise.
- In addition to assessment of the 'typical' impact required by BS4142, worst-case impact scenarios should also be considered, e.g. atypical sound sources, low background sound levels, or downwind propagation from the noise source.
- When applying for a variation, the existing noise sources on the site (before changes) must not be included in the baseline background and residual sound levels. The existing and proposed sources should be considered as separate components and combined to give a new total for the specific sound level at the receptor(s).

Step 3: source assessment, involving quantification of the noisiest items of plant or operations identified in Step 1 and estimating / predicting their impact at the receptor using BS4142. Due consideration of uncertainty should be incorporated into the assessment:

- Where modelling or calculation is used, they must comply with the requirements of 'ISO 9613 Acoustics – attenuation of sound during propagation outdoors' and the following must be provided alongside the assessment:
    - Statement of modelling/calculation assumptions.
    - Copy of all modelling/calculation files (models to be submitted in original software format and, where possible, QSI data exchange format).
    - Copy of numerical noise data (excluding terrain data) in a clearly labelled and concise spreadsheet.

Step 4: BAT or appropriate measures justification, involving presentation of Best Available Techniques or appropriate measures and justification for their use in the context of the specific application:

- Demonstration that emissions have been prevented or minimised as far as reasonably practicable with respect to:
    - The dominant noise sources (where necessary considered as sub-components within a system).
    - All existing noise attenuation measures (physical, managerial and maintenance).
    - Consideration of all reduction techniques for dominant noise sources and provide a reasoned determination of what is achievable.
    - As appropriate, prediction of the impact of upgrade works and commitment to a firm timescale.
    - Development of a noise management plan where there will be a noise impact beyond the site boundary.

Further guidance is provided in the 'Method Implementation Document ('MID') for BS4142 (2023)'.

Appendix C – Environmental Survey

C.1 – Time History Noise Data

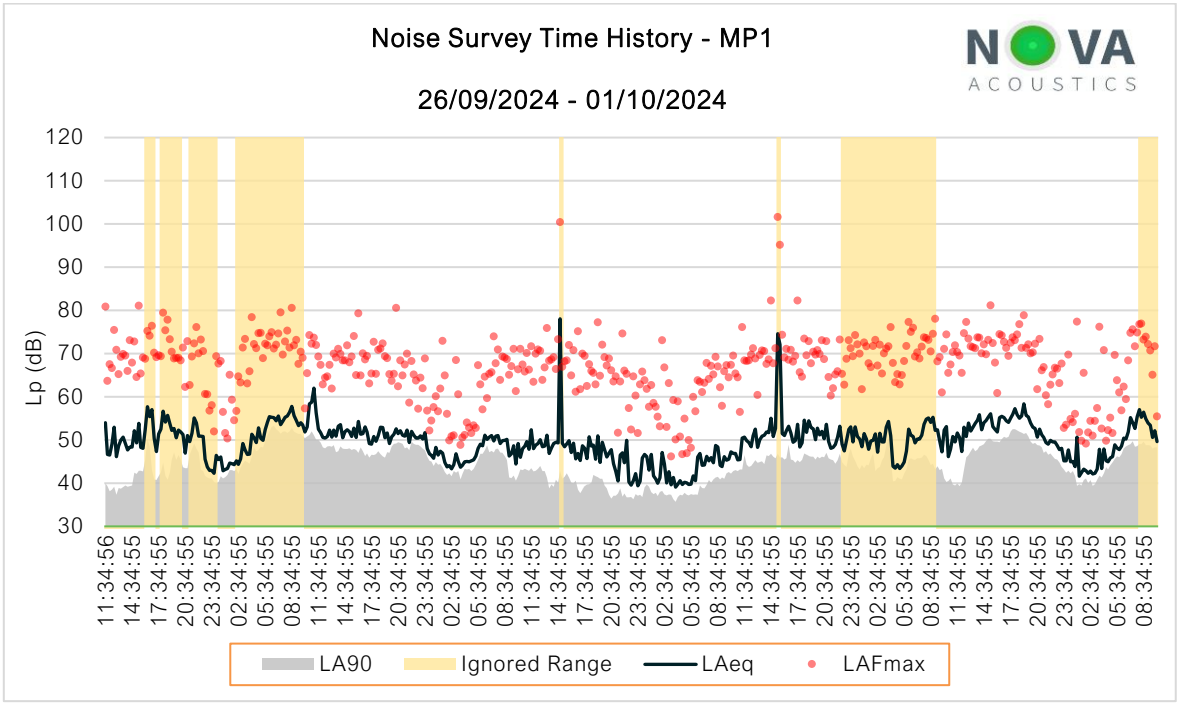
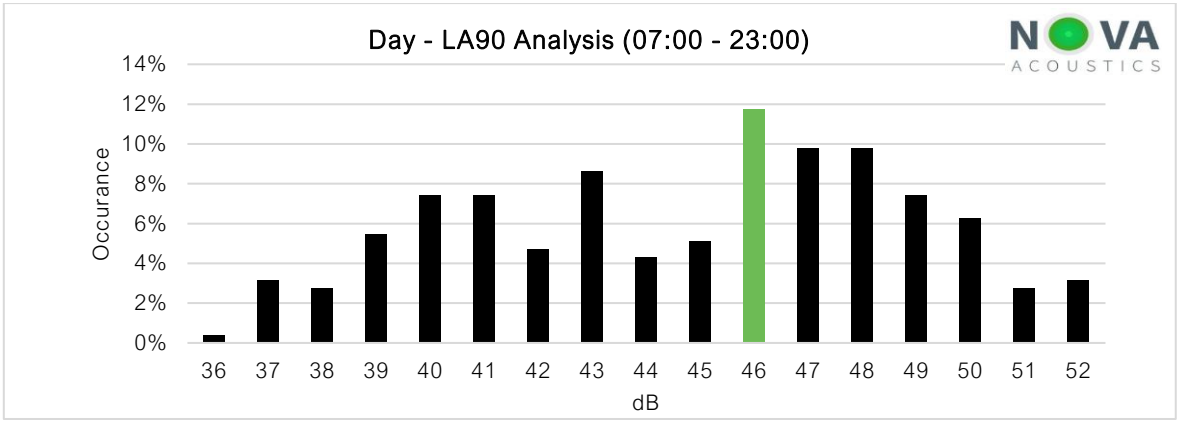


Figure 9 – MP1 Noise Survey Time History (Full Period)



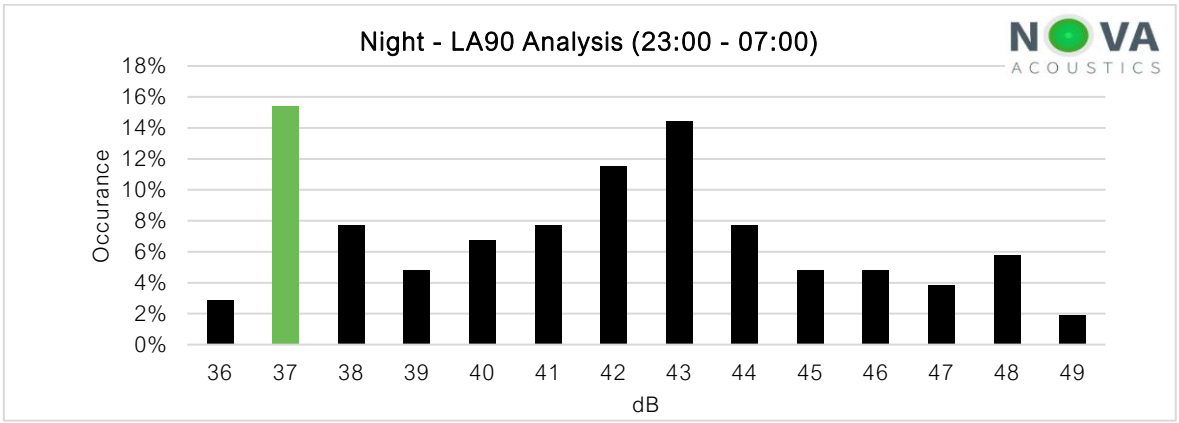


Figure 10 – MP1 Background Sound Level Analysis – 15min

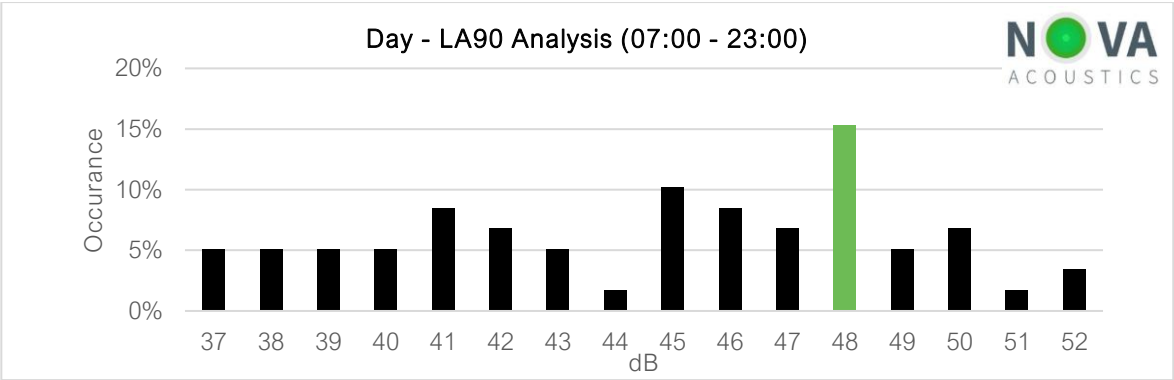


Figure 11 – MP1 Background Sound Level Analysis – 1hr Daytime

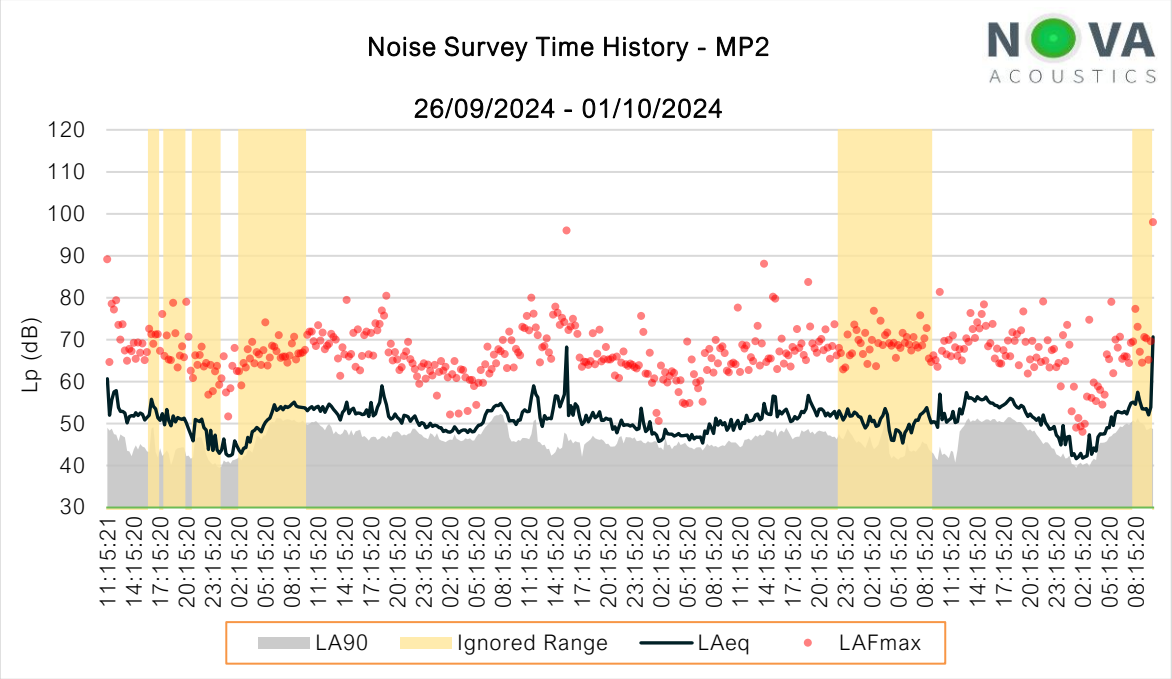
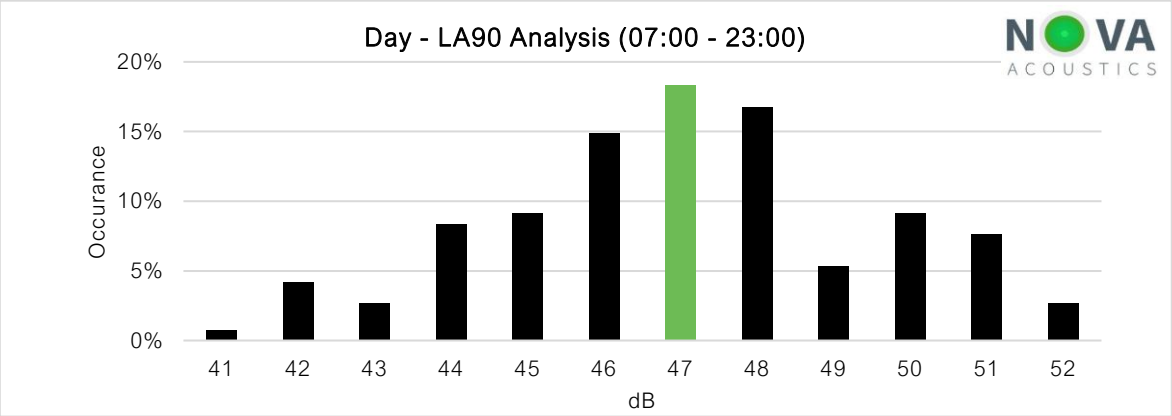


Figure 12 – MP2 Noise Survey Time History (Full Period)



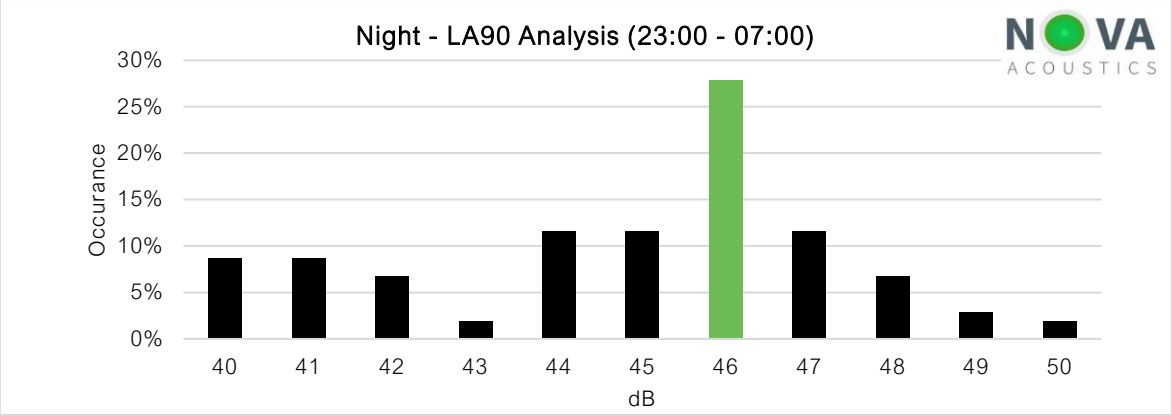


Figure 13 – MP2 Background Sound Level Analysis – 15min

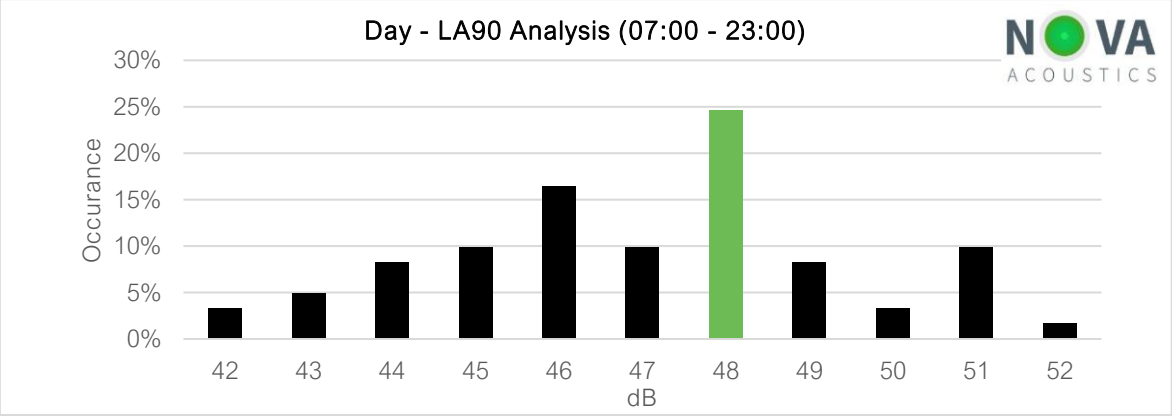


Figure 14 – MP2 Background Sound Level Analysis – 1hr Daytime

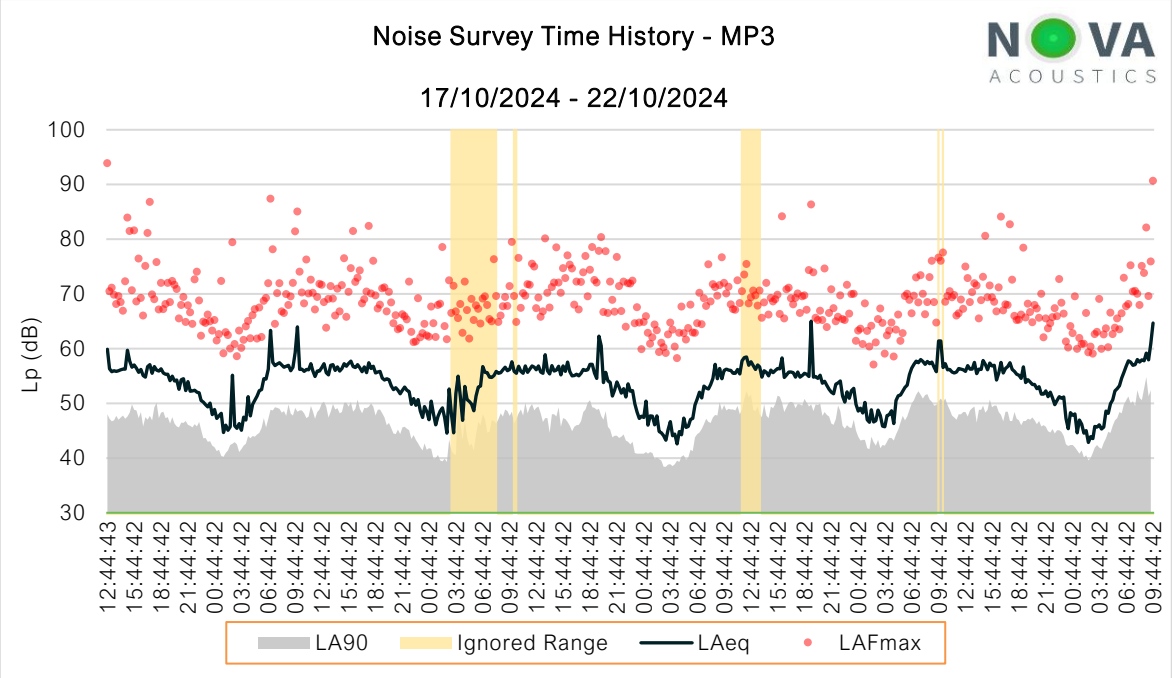


Figure 15 – MP3 Noise Survey Time History (Full Period)

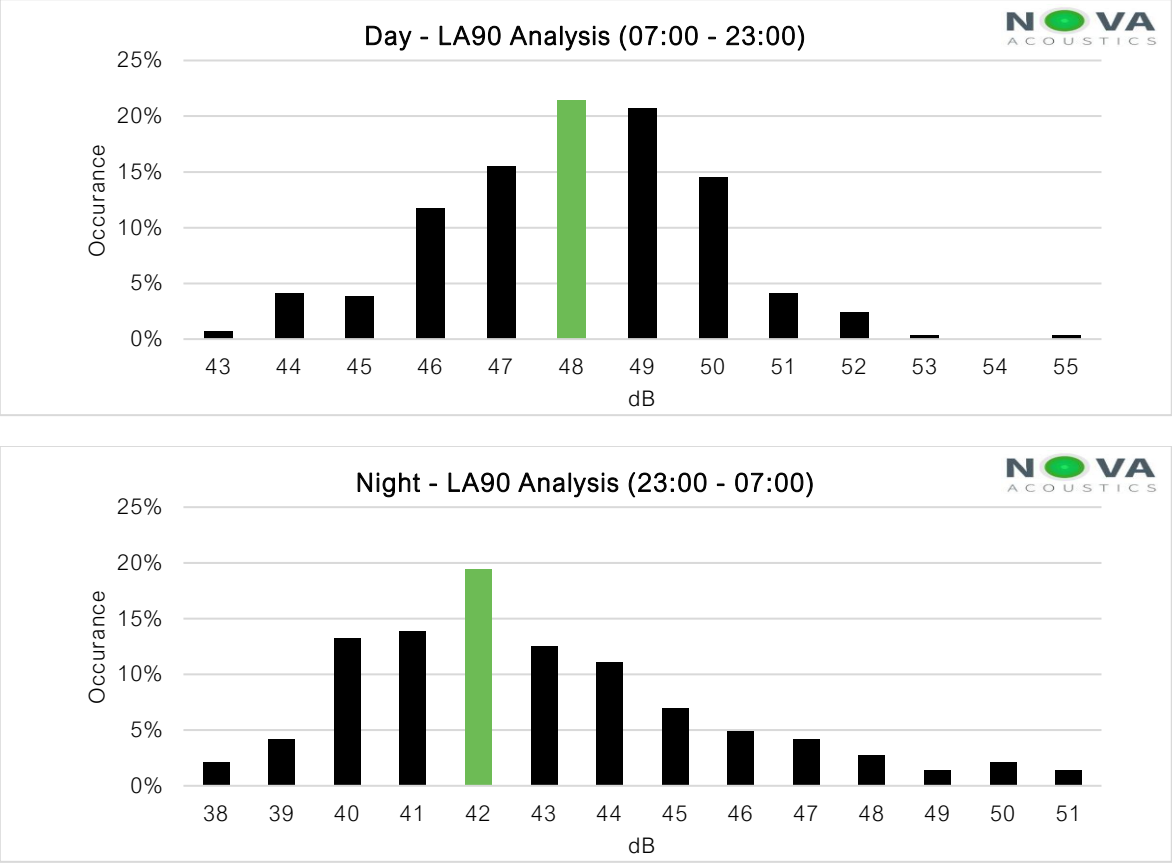


Figure 16 – MP3 Background Sound Level Analysis – 15min

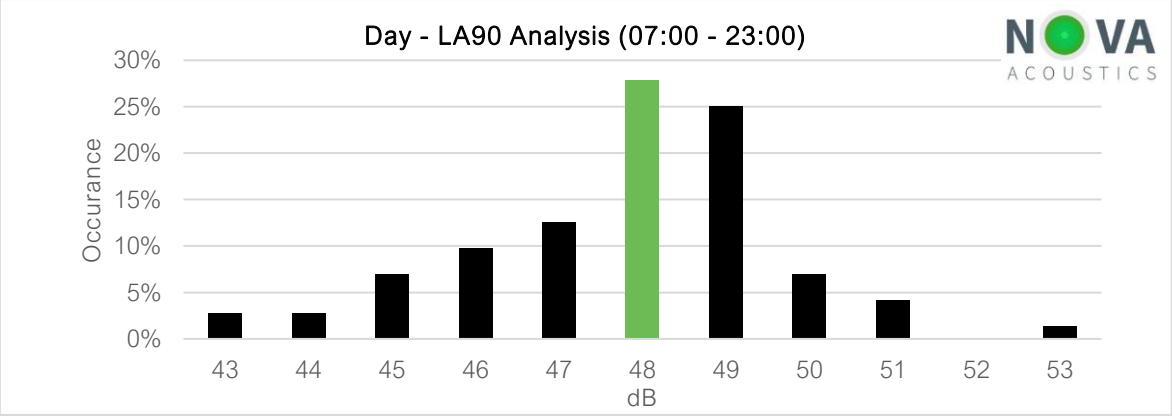


Figure 17 – MP3 Background Sound Level Analysis – 1hr Daytime

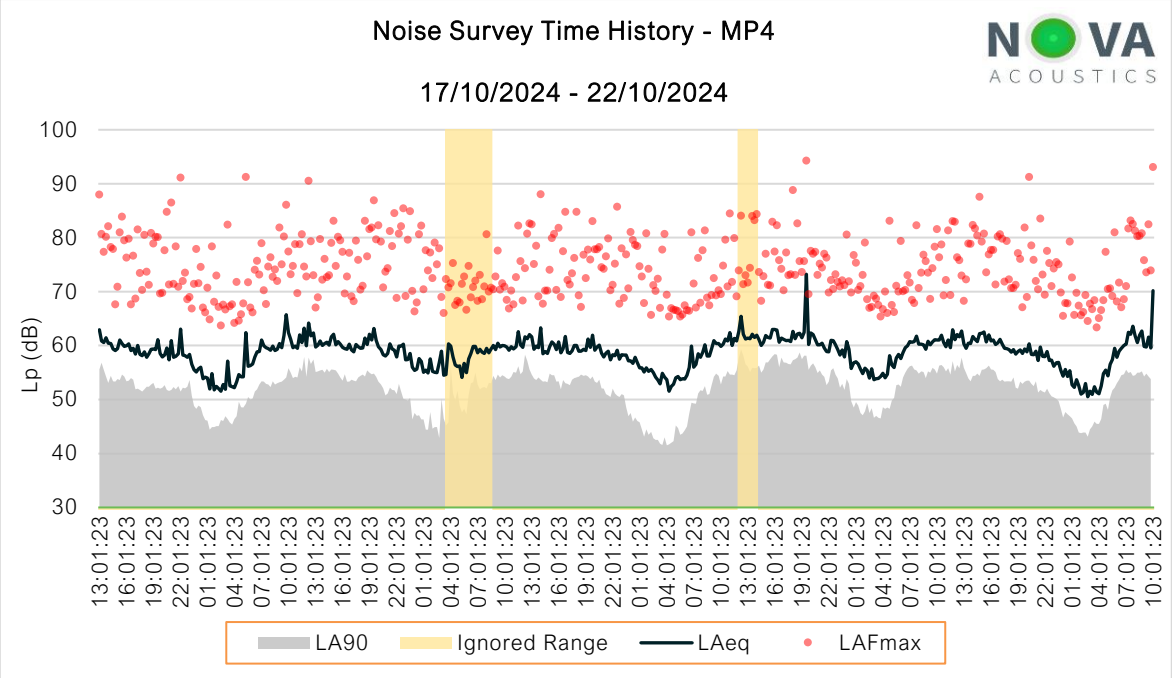
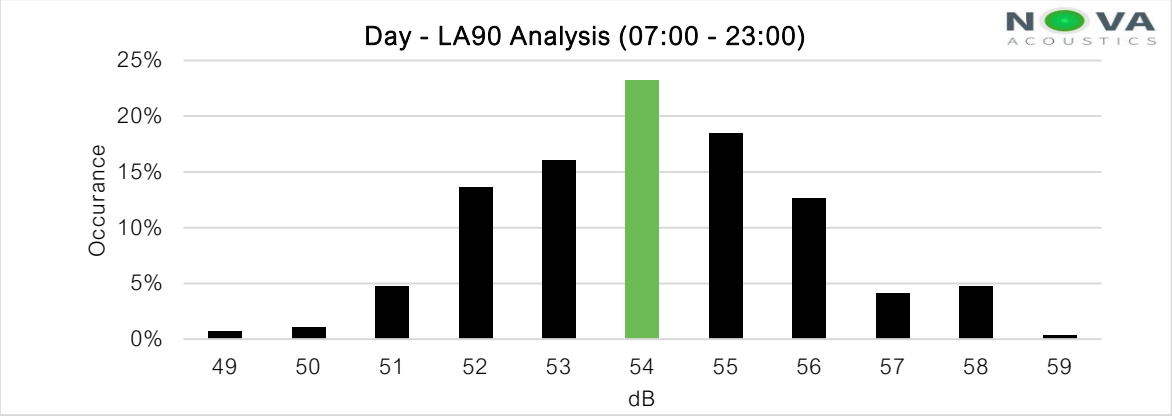


Figure 18 – MP4 Noise Survey Time History (Full Period)



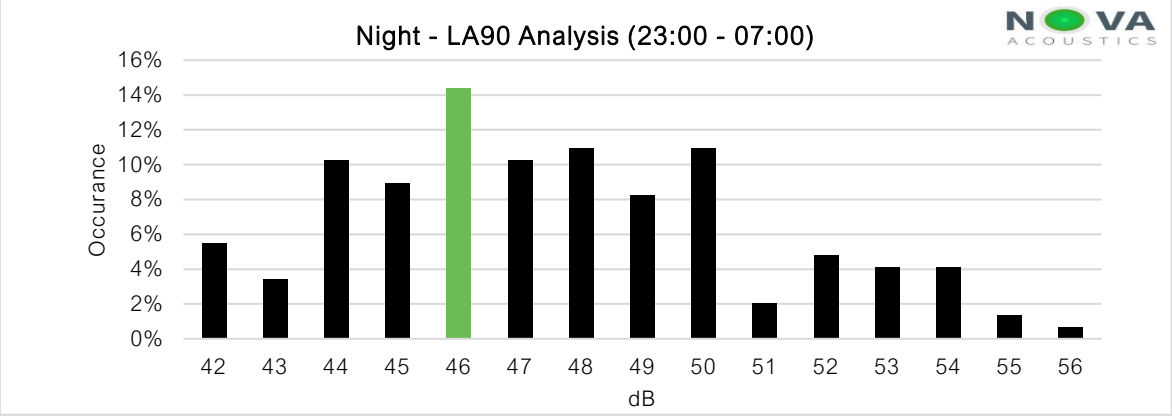


Figure 19 – MP4 Background Sound Level Analysis – 15min

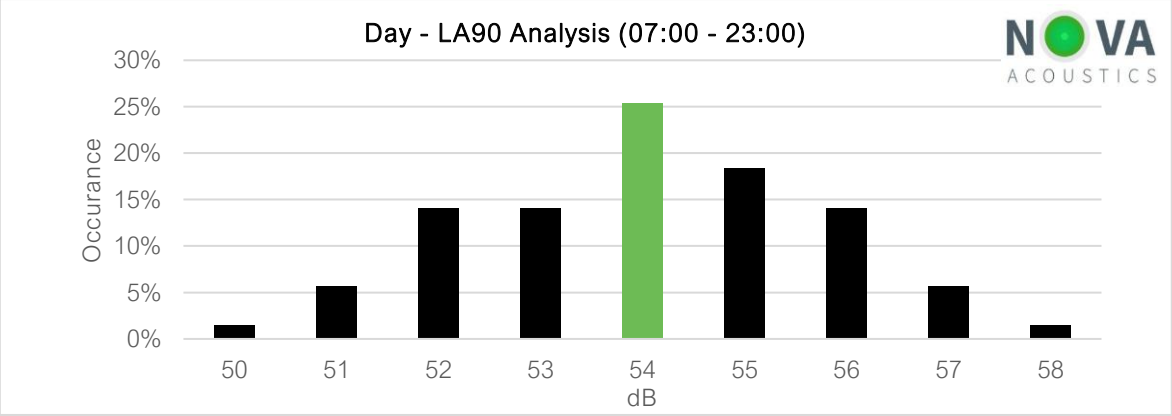


Figure 20 – MP4 Background Sound Level Analysis – 1hr Daytime

C.2 – Surveying Equipment

Piece of Equipment	Serial No.	Calibration Deviation
Svantek SV971 Class 1 Sound Level Meter	143583	93.76 (pre) / 93.82 (post)
CESVA CB006 Class 1 Calibrator	901927	
CESVA SV420 Class 1 Sound Level Meter	T238593	93.7 (pre) / 94 (post)
CESVA CB006 Class 1 Calibrator	901927	
Svantek SV971A Class 1 Sound Level Meter	127628	93.82 (pre) / 93.68 (post)
Svantek SV33 Class 1 Calibrator	125774	

Table 14 – Surveying Equipment

All equipment used during the survey was field calibrated at the start and end of the measurement period with a negligible deviation of ≤0.3 dB. 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.

C.3 – Meteorological Conditions

As the environmental noise survey was carried out over a long un-manned period, localised records of weather conditions were measured with a Davis Instruments Vantage Vue weather station left on the proposed development site under 'free-field' conditions. In addition, 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

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 following figures present the average temperature, wind speed and rainfall rate throughout the entire survey period. Temperatures range from 15 to 25 degrees Celsius during the daytime and 11 to 15 degrees Celsius during the night-time.

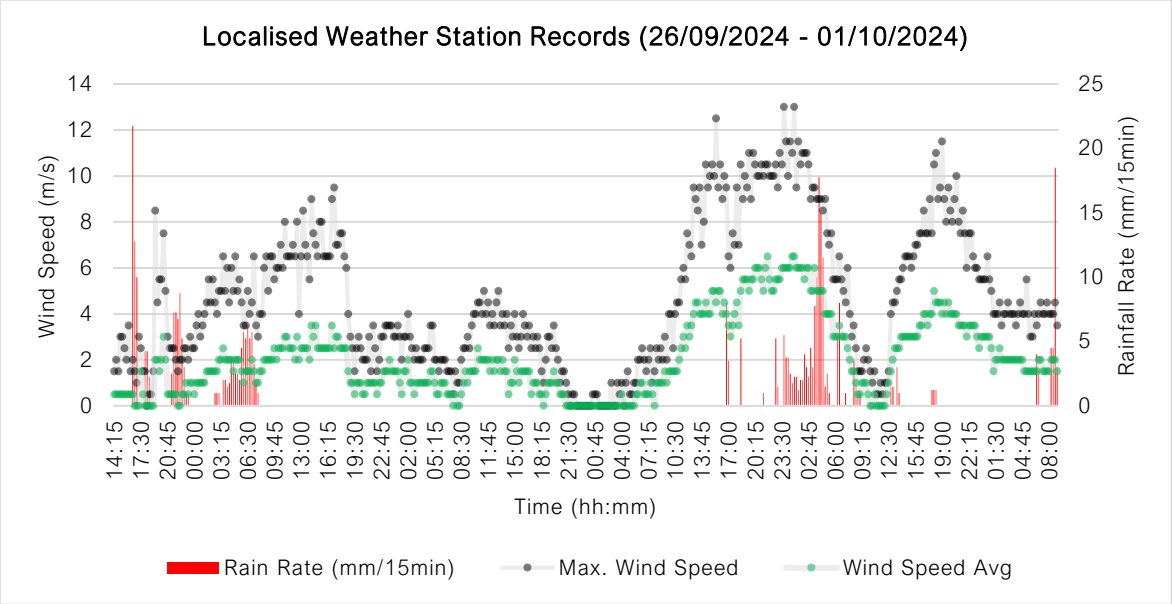


Figure 21 – 1st Survey Weather Conditions

The second survey 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.

Weather Conditions – University of Birmingham (Approx. 5.7km SE of Site)				
Time Period	Air Temp (°C)	Rainfall (mm/h)	Prevailing Wind Direction	Wind Speed (m/s)
17/10/2024: 00:00 – 23:59	7.2 – 17.4	0.0 – 1.8[1]	ESE	0.0 – 1.7
18/10/2024: 00:00 – 23:59	5.9 – 16.3	0.0 – 1.8[1]	SE	0.0 – 2.5
19/10/2024: 00:00 – 23:59	7.4 – 17.1	0.0 – 10.8[2]	ESE	0.0 – 2.0
20/10/2024: 00:00 – 23:59	7.5 – 15.8	0.0 – 15.8[2]	SSE	0.0 – 3.9
21/10/2024: 00:00 – 23:59	7.3 – 12.9	0.0	E	0.0 – 3.7
22/10/2024: 00:00 – 23:59	6.2 – 17.5	0.0	E	0.0 – 2.2

Notes:
[1] Periods of rainfall localised to weather station did not affect measurements.
[2] Periods of rainfall omitted from dataset used to derive background sound levels.
[3] Windspeeds obtained from closest weather station to record such data: Yew Tree Lane (approx. 6.7km NW of site).

Table 15 – 2nd Survey Weather Conditions

Appendix D – Manufacturer's Datasheets

KS1000 RW Trapezoidal

Insulation Core

KS1000 RW insulated wall panels are manufactured with an ECO*safe* and FIRE*safe* polyisocyanurate (PIR) core.

Fire

The external and internal faces of the panel to be Class 0 in accordance with the Building Regulations when tested to BS 476: Part 6: 2009 and Part 7: 1997.

This FIRE*safe* system has passed all the requirements of LPS1181: 2005: Part 1: Issue 1.2, ceiling lining tests by the Loss Prevention Certification Board (LPCB) certified to LPS 1181 Grade EXT – B and achieves periods of fire resistance (EXT-A), for further information please contact Kingspan envirocare Technical Services. This system is also FM approved to FMRC 4880 & 4881 Class 1 fire classification, unlimited height, for wall applications. Reaction to fire classification according to BS EN 13501-1:2007+A1:2009: B-s1,d0.

FM APPROVED

LPCB
LPS 1181 : Issue 1.2
Cert No: 260a & 186a

Environmental

Kingspan Insulated Panels produced in the UK are certified to BES 6001 (Framework Standard for the Responsible Sourcing of Construction Products) 'Very Good'. Kingspan Insulated Panels directly contribute to BREEAM/LEED credits.

Air Leakage

An air leakage rate of $3m^3/hr/m^2$ at 50Pa or less can be achieved when using Kingspan insulated roof wall panels

Acoustic

Sound Reduction Index (SRI)

Hz*	63	125	250	500	1K	2K	4K	8K
SRI (dB)	20	18	20	24	20	29	39	47

* Frequency

The KS100 RW insulated wall panel has a single figure weighted sound reduction Rw = 25dB.

Biological

Kingspan panels are normally immune to attack from mould, fungi, mildew and vermin. No urea formaldehyde is used in the construction, and the panels are not considered deleterious.

Materials

Substrate

- Kingspan XL Forté, Kingspan Spectrum, Kingspan AQUA*safe*, Kingspan AQUA*safe*55 and Kingspan CLEAN*safe*: Metallic protected steel to BS EN 10346:2015.thickness 0.5mm.
  CLEAN*safe* 15: Metallic protected steel to BS EN10346:2015.thickness 0.4mm
- Stainless Steel: Austenitic Grade 316 stainless steel to BS EN 10088: Part 2: 2014, thickness 0.4mm.
- Aluminium: Please contact Kingspan envirocare Technical Services.

Coatings - External Weather Sheet

- Kingspan XL Forté: Consists of multi-layer organic coating, embossed with a traditional leather-grain finish.
- Kingspan Spectrum: Consists of a coated semi-gloss finish with slight granular effect.

Coatings - Internal Liner Sheet

- CLEAN*safe* 15: The coating has been developed for use as the internal lining of insulated panels. Standard colour is "bright white" with an easily cleaned surface.
- Kingspan AQUA*safe*: The coating has been developed for use as the internal lining of insulated panels to suit high humidity internal environments.
- Kingspan AQUA*safe* 55: The coating has been developed for use as the internal lining of insulated panels to swimming pool internal environments.
- Kingspan CLEAN*safe* 120: The coating has been developed for use as the internal lining of insulated panels where a high level of cleanliness and hygiene is required, and the panels are to be cleaned down on a regular basis.
- Stainless Steel: The stainless steel liner has been developed for use as the internal lining of insulated panels in buildings with a very aggressive/corrosive internal environment.

DATA SHEET REFERENCE NO. 3-12 APRIL 2018

Bolton Gate Company's Fireroll range of roller shutters is the most comprehensive available in the market. The latest addition is the Fireroll Acoustic Servery Roller Shutter which combines fire resistance with a high degree of sound reduction.

In an extensive testing regime at the Department of Acoustics at Salford University, the door achieved a sound reduction of 25dB Rw and has also been successfully tested for two hours fire resistance to BS 476 Part 22 and EN 1634-1 when it also achieved a two-hour radiation reduction classification (EW120).

The product can be utilized in any application where fire and sound compartmentation are required but has been specifically designed for use in schools and in particular multi-purpose halls where Building Regulations specify that half or one-hour fire compartmentation is required but where a sound-break is also essential to avoid disruption from kitchen staff when assemblies or other school activities are taking place in the main hall.

STANDARD SPECIFICATION

Curtain

Shutter curtains are constructed from 100mm high flat section continuously interlocked galvanised steel laths which are securely held in place by steel end locks. Each lath is infilled with fire resisting acoustic material and a steel bottom rail is fitted at the base.

Guides

Vertical guides are formed from galvanised steel channels and are supplied with suitable angles for fixing to the structure.

Endplates

Prime painted mild steel of appropriate thickness relative to door size and supplied with angles for fixing to the structure.

Barrel

The barrel is constructed from seamless steel tube of adequate diameter to resist deflection and held in bearings or cups attached to the endplates.

Casing

A galvanised steel coil casing is supplied to maintain the fire seal at the head.

Finish

The standard finish of the internal face is white with the external face available in a wide range of RAL or BS colours.

Electrical Operation

All shutters are electrically operated and have adjustable limit switches incorporated to stop the shutter at the end of each travel. Smaller shutters are supplied with a single phase tubular motor with larger units being driven by the highly reliable Speedsafe motor which allows gravity failsafe closure in fire conditions via a fusible link or auto reset solenoid or magnet.

Standard controls are open/close/stop buttons with other options available.

MAXIMUM SIZES

3 metres wide x 1.5 metres high (tubular motor)
7 metres wide x 3.0 metres high (external motor)

OPTIONS

- Keyswitches
- Fusible links
- Auto reset solenoids
- Auto reset magnets
- Polyester powder coated finish
- Fascias

WEIGHT

Approximately 50kgs/m².

Waterloo Street, Bolton, BL1 2SP, UK 01204 871001 sales@boltongate.co.uk www.boltongate.co.uk

Appendix E – On-Site Spot Measurement Results Summary

Description	1/1 Octave Frequency Band (Hz, L_{eq} dB)								L_{eq} (dBA)	Distance (m) & Q Factor
	63	125	250	500	1k	2k	4k	8k		
Shear & 835e Grab Loading (Front Elevation)	77	74	71	72	71	72	72	67	78	20m Q2
Shear & 835e Grab Loading (Side Elevation)	75	74	70	68	65	65	66	60	73	20m Q2
CAT972 Sorting & Moving Waste	92	96	87	83	83	80	79	76	88	4m Q2
HGV (un)loading & 835e Grab Sorting/Loading Waste	80	79	75	75	74	74	74	69	81	12m Q2
1no. HGV Idling at Weigh Bridge[1]	77	75	68	65	63	62	59	54	69	3m Q2

Notes:
[1] Measurement taken for report no. NP-011281.

Table 16 – External Plant Measurement Results Summary (Existing S Norton Facility)


NOVA
ACOUSTICS