NOVA ACOUSTICS

EA Permitting Noise Impact Assessment

Site Address: Recycling PVC Limited, 376 Higginshaw Lane, Oldham, OL1 3LA

Client Name: Oaktree Environmental

Project Reference: NP-013048

In partnership with:

Oaktree Environmental
Waste, Planning & Environmental Consultants

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Amendment History		
Revision	Date	Summary of Amendments
01	31/07/2025	First draft.
02	05/08/2025	Mitigation section update.
03	28/08/2025	Report revised after additional site visit & mitigation section update.

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1. Introduction

NOVA Acoustics Ltd has been commissioned by Oaktree Environmental to prepare a noise impact assessment as part of an Environmental Agency ('EA') retrospective application for a bespoke installation permit ('the application') on behalf of Recycling PVC at 376 Higginshaw Lane, Oldham, OL1 3LA ('the site'). 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 impacts 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 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

Recycling PVC operates as a processor of PVC waste, which is sourced either as factory offcuts or directly from construction and demolition sites. All waste is processed through shredders, hoppers, and a granulation system, some of which is located within on-site buildings.

A permit is required for all activities conducted at the site. The core operation involves the receipt, sorting, and processing of PVC waste. Material is delivered in containers, either from factories (typically offcuts and rubber) or from various sites (such as full window frames that may include metals).

Site-derived waste is unloaded outdoors and fed into shredders. The shredded material is then loaded into hoppers located outside, which feed into the granulation and sorting system housed in Building A.

Factory waste is directed to the granulation system located in Building B.

It is understood that the site operates 24 hours a day, 7 days a week for the acceptance, processing, and removal of waste.

The figure overleaf illustrates the proposed site layout.

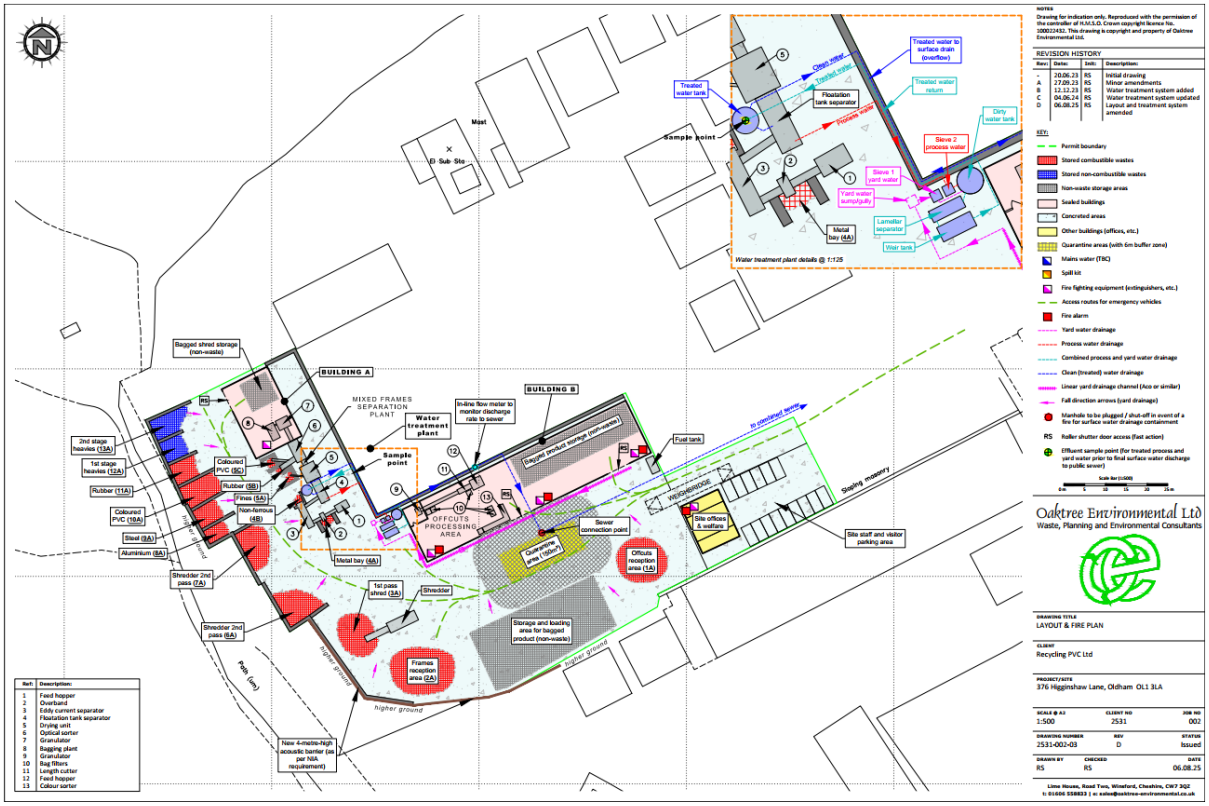


Figure 1 – Proposed Site plans

2. Environmental Noise Survey

2.1 Measurement Methodology

An environmental noise survey was carried out by NOVA Acoustics in July and August of 2025 across the application site and the surrounding area.

The following table and figure outline the measurement dates and particulars and the locations of the nearest NSRs.

All sound level meters were fitted with a proprietary environmental kit complete with a suitable windshield (130mm in diameter for 'long-term' positions); any measurement position at a height greater than 1.5m was to avoid interference from the public.

MP1 & MP2 were deemed surrogate measurement locations based on the site being inaudible and the significant acoustic screening present between the site and MPs. Additional spot check measurements were also carried out at MP3 to MP6 and these were also uninfluenced by on-site operations (except for MP5). All measurements were carried out under free-field conditions.

Location	Survey Dates	Measurement Particulars
MP1	23-29/07/2025 ('Long-term')	Microphone mounted on a lamppost at 4m above ground on Highfield Drive.
MP2	23-26/07/2025 ('Long-term')	Microphone mounted on a lamppost at 4m above ground on Kirkstone Close.
MP3	23/07/2025 & 29/07/2025 ('Short-term')	Microphone attached to a tripod at 1.5m above the ground for attended ambient measurements.
MP4	29/07/2025 ('Short-term')	
MP5	27/08/25 ('Short-term')	Microphone attached to a tripod at 1.5m above the ground for attended measurements.
MP6		

Table 1 – Measurement Methodology

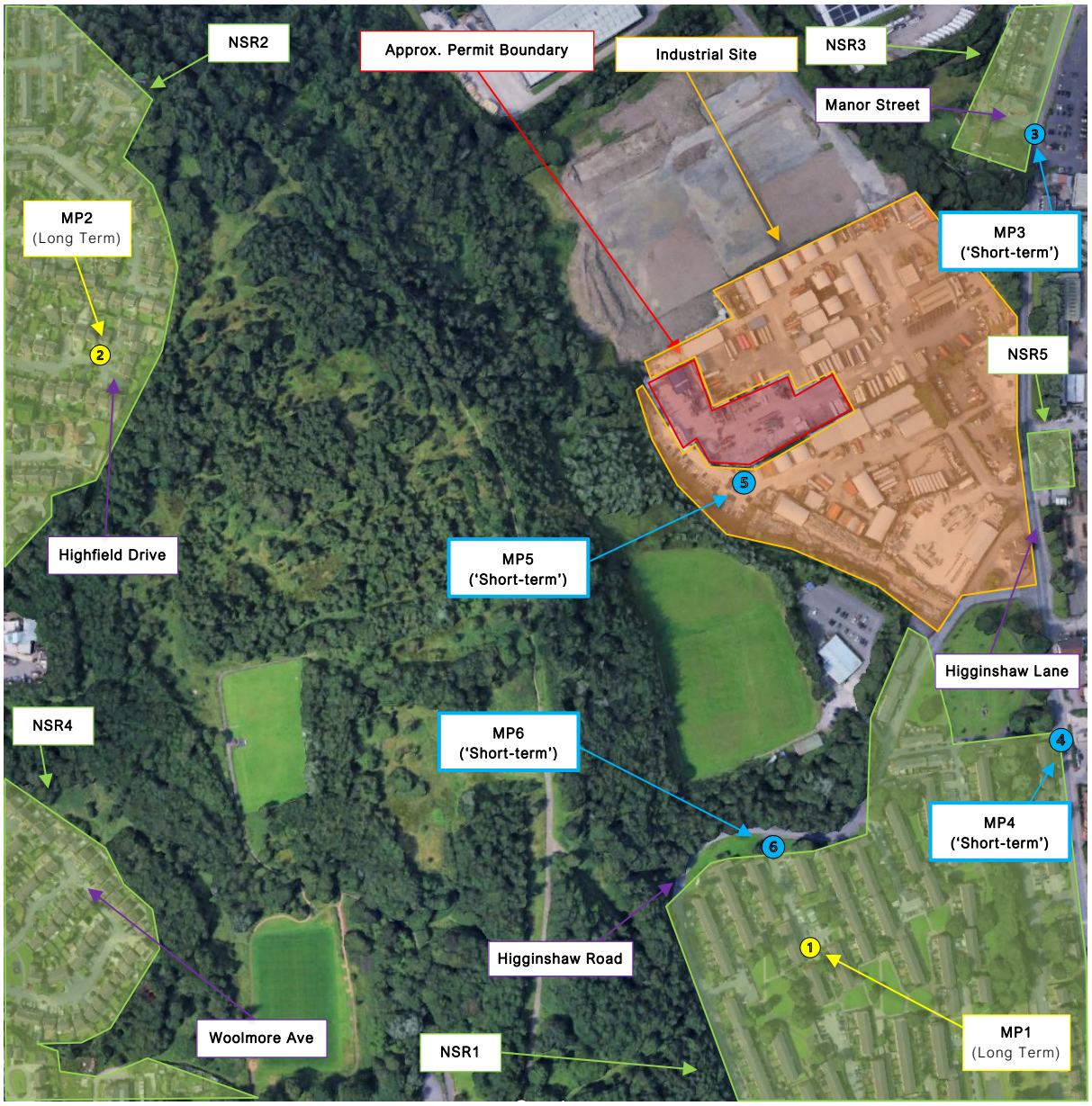


Figure 2 – Measurement Locations and Site Surroundings

2.2 Area Description and Context

The area immediately surrounding the site is primarily industrial/commercial usages with residential properties scattered in all directions further afield. For the purpose of the assessment, the closest residential NSRs are all assumed to be two-storey properties:

- NSR1 – Approximately 230m S of the site off Higginshaw Road
- NSR2 – Approximately 375m W of the site off Highfield Drive
- NSR3 – Approximately 230m NE of the site off Manor Street
- NSR4 – Approximately 550m SW of the site off Woolmore Avenue
- NSR5 – Approximately 160m W of the site off Higginshaw Road

Other industrial/commercial sites are situated on the wider industrial estate, who's activity was deemed more intensive at times than that from the Recycling PVC site under assessment.

Whilst NSR5 is listed as an NSR, it is unclear if this is a residential receptor. The receptor appears to represent the 380 Shaw Road address; however, the ground floors appear to be operated by The Flowerpot Café, Area 25 Ltd cocktail bar and Golden Chippy takeaway. As such, the residential receptor element of the buildings could possibly be located at first floor level.

2.3 Subjective Impression of Noise Environment

The acoustic climate at MP1 was deemed low to moderate in level and the noise profile was dominated by road traffic noise emissions from the surrounding roads, aircraft pass by's and noise from nearby playing fields. The noise climate was deemed similar at MP2 but was also affected by distant road works taking place further to the west of the site.

At MP3 and MP4, the noise climate was deemed moderate to high in level and was dominated by consistent road traffic on Higginshaw Lane. Measurements were not carried out external to the properties labelled as NSR4 as the noise climate was deemed akin to MP1 and MP2.

As identified in the time history at both MP1 and MP2, there were large spikes in noise levels (particularly at MP2) that occurred during the afternoons. It is unclear what this was due to. To form a robust approach, the noise levels measured during these periods have been excluded from the assessment.

2.4 Environmental Noise Survey Results

Long-term Sound Level Results Summary & Baseline Noise Levels

The 'lowest typical' background sound levels and average ambient sound levels measured throughout the survey are presented in the table overleaf. The background sound levels have been derived from statistical analysis of the measured $L_{A90,15min}$ data, and are based on the range and distribution of the $L_{A90,15min}$ measurements. For reference, the data ranges are also presented in brackets beneath. At both positions any site-specific noise emissions were inaudible.

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

In addition to presenting the daytime (07:00 – 23:00 hours) and night (23:00 – 07:00 hours), the period between 09:00 – 16:00 hours is also presented as this is the period during which the shredder operates.

Period ('T')	$L_{Aeq,15min}$ (dB)	$L_{A90,15min}$ (dB)
MP1: 07:00 – 23:00	50 (37 – 60)	40 (30 – 45)
MP1: 07:00 – 09:00	48 (44 – 53)	43 (33 – 44)
MP1: 09:00 – 16:00	51 (43 – 60)	42 (33 – 45)
MP1: 16:00 – 23:00	50 (37 – 59)	40 (30 – 44)
MP1: 23:00 – 07:00	42 (26 – 52)	34 (23 – 42)
MP2: 07:00 – 23:00	49 (39 – 66)	42 (33 – 45)
MP2: 07:00 – 09:00	49 (41 – 63)	36 (33 – 45)
MP2: 09:00 – 16:00	48 (39 – 58)	42 (33 – 44)
MP2: 16:00 – 23:00	49 (40 – 66)	41 (35 – 43)
MP2: 23:00 – 07:00	43 (31 – 51)	37 (28 – 44)

Notes:
The background sound levels shown are representative of the modal or highest typical background sound levels measured during the entire assessment period. It is noted that background sound levels at their lowest can reduce by at least 10dB from these figures. However, this appear to be isolated on a few instances and would be classed as anomalous and not representative of the 'typical' noise environment measured. Additionally, given the similarity in ambient and background sound levels at both locations, use of the typical background sound level is deemed to be an appropriate approach.

Table 2 – Long-term Sound Level Results Summary

Attended Sound Survey Results Summary

Presented in the following table are the results from the attended surveying; all measurements were undertaken under free-field conditions.

Description	1/1 Octave Frequency Band (Hz, $L_{eq,T}$ dB)							$L_{Aeq,T}$ (dB)	$L_{A90,T}$ (dB)
	63	125	250	500	1k	2k	4k		
MP3 (NSR3) 23/07/25, 12:20 – 13:20	65	59	58	56	57	53	46	60	53
MP3 (NSR3) 29/07/25, 11:53 – 12:53	66	59	57	56	58	57	46	62	53
MP4 (NSR1) 29/07/25, 12:59 – 13:58	69	64	60	57	59	57	52	63	57
MP5 (specific level of shredder) 27/08/25, 11:24 – 11:30	82	68	66	70	68	67	70	75	--
MP6 Shredder Off (NSR1a) 27/08/25, 11:47 – 12:02	63	55	52	50	53	50	47	57	45
MP6 Shredder On (NSR1a) 27/08/25, 12:02 – 12:08	64	55	53	50	54	51	46	58	46

Table 3 – Attended Sound Level Results Summary

As can be seen in Table 3, the noise climate at ground level adjacent to NSR1b is unaffected by the shredder plant operating; this supports the subjective impression obtained during the site visits.

The specific sound level calculated at MP5 was in direct line of sight to the mobile shredder plant.

Assumed BS4142 Background Sound Levels

As can be seen in Table 2, the background sound levels ($L_{A90,15min}$) are broadly consistent across all the assessment time periods. Furthermore, there is an approximate 1dB difference in background sound levels between the periods in which the shredder operates and when it is shut off in the evening. There is, however, a 5dB drop in background sound level at MP2 between 07:00 – 09:00, when compared to the rest of the daytime periods shown.

In comparison to the attended measurements in Table 3, the background sound climate is significantly higher external to properties overlooking Higginshaw Road due to presence of continuous road traffic.

Due to the difference in background sound levels closer to Higginshaw Road, NSR1 will be split into NSR1a and NSR1b. The former will represent the receptors located to the west away from Higginshaw Road and NSR1b will represent those to the eastern side.

Given the similarities in the background sound levels between MP1 (NSR1a) and MP2 (NSR2) and the on-site observations of the noise climate also being similar at NSR4, the lowest of these background sound levels will be used in the BS4142 assessment at NSR4.

As it was not possible to measure night-time measurements at MP3 (NSR3 and NSR5) and MP4 (NSR1b), the largest reduction in background sound levels at either MP1 or MP2 will be used to inform the night-time BS4142 assessments at MP3 and MP4.

Considering the above, it is determined that the approaches to determining the background sound levels is representative of a robust and reasonable 'worst-case' scenario. A summary of the background sound levels that will be used to inform the assessment is presented below.

NSR	Period ('T')		
	07:00 – 09:00 & 16:00 – 23:00 (Without Shredder)	09:00 – 16:00 (With Shredder)	23:00 – 07:00
NSR1a	40	42	34
NSR1b	57	57	48
NSR2	36	42	37
NSR3	53	53	44
NSR4	36	42	34
NSR5	53	53	44

Table 4 – BS4142 Assessment Background Sound Level Summary

3. Noise Impact Assessment

3.1 Relevant Standards Guidance & Policies

Environmental Permitting Regulations 2022

Please see Appendix B.4 for the EA guidance followed throughout this assessment.

BS4142:2014+A1:2019

When assessing industrial or commercial noise, acoustic design criteria are commonly set based on the guidance presented within BS4142:2014+A1:2019.

The following summarises the primary steps in the BS4142:2014+A1:2019 assessment methodology:

- A representative background sound level ($L_{A90,Tr}$) is determined based on the noise survey results. The background sound level should not include any contribution from existing site-specific noise emissions.
- The cumulative specific sound level ($L_{Aeq,Tr}$) from the proposed development is predicted outside of the NSRs.
- The rating sound level ($L_{Ar,Tr}$) is determined by applying 'acoustic feature corrections' which correct for the acoustic characteristics of the sound which may be perceptible and potentially cause annoyance at each NSR.
- The predicted rating sound level is compared with the background sound level, and the level of impact is initially estimated in accordance with BS4142:
    - 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 'low impact, depending on the context'.
- Further context can then be provided where necessary which may alter the initially quantified impact level.
- If necessary, mitigation measures are recommended to reduce the predicted noise impact.

3.2 Adopted Criteria

It is required that any site noise emissions causing significant noise 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' must 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 'negligible impact' to 'low impact' may not require any action over the basic appropriate measures or BAT.

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

3.3 Operational Procedures & Permit Proposals

Assessment Periods

The following main equipment is in addition to the sources located within Building's A and B:

- Shredder
- Mixed frames separation plant (which comprises a hopper, eddy current separator, floatation tank separator, dying unit and optical sorted).
- Telehandler
- External Komatsu PW 160 excavator
- Truck / slip wagon arrivals
- Forklift movements

It is understood that currently only the operations with the buildings, the mixed frame separation plant, the telehandler and the forklifts operate for 24 hours a day. The shredder only operates from 09:00 to 16:00 hours, Monday to Friday.

In terms of vehicles in and out of the site, site contacts have stated that typically 50 arrive within a typical working day.

Site Operations

A summary of the site operations is presented on the below figure and is subsequently discussed below.

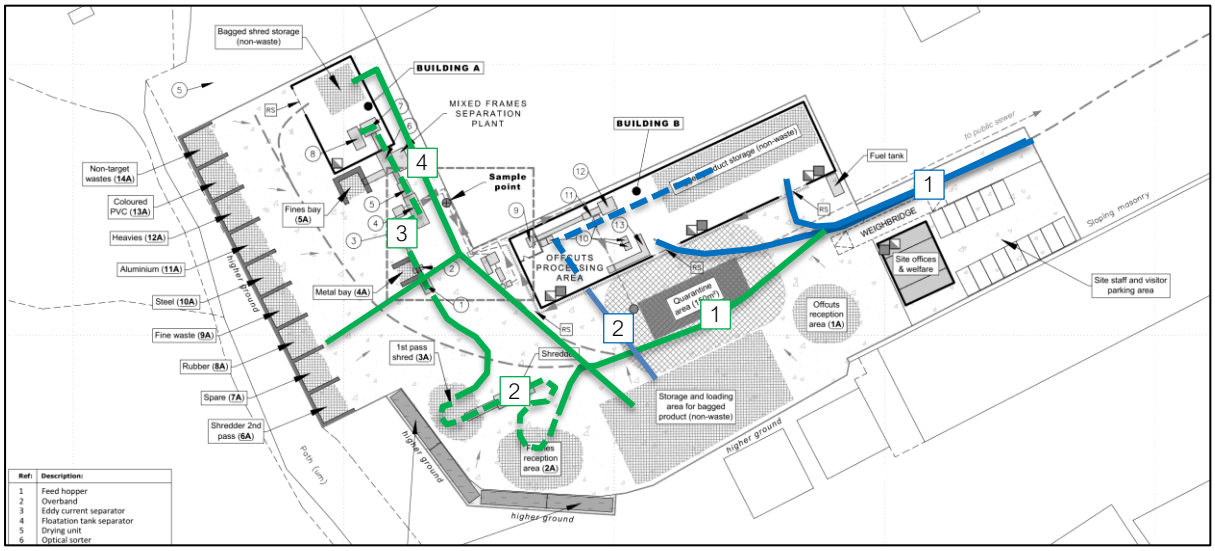


Figure 3 – Site Layout Procedures Plan

Process	Measurement Particulars
Waste from Factories	
1	Waste from factories take this route and are delivered by vehicles of varying sizes e.g. vans, HGVs etc., and unloaded directly into Building B for sorting.
2	Waste is loaded in to be granulator and is exported via forklifts to 'Storage and loading area for bagged product' to the south of the site.
Waste from Construction Sites	
1	Waste from construction sites take this route and are delivered by vehicles of varying sizes e.g. vans, HGVs etc., and unloaded in the area to the south of the shredder.
2	The waste is loaded into the shredder via a Komatsu PW 160 excavator.
3	The shredded waste is loaded via a JCB loading shovel to the sorting facility and fed into Building A.
4	Bagged waste is taken out of the north-eastern roller shutter door via forklifts to the 'Storage and loading area for bagged product' to the south of the site or to the bays to the west.

Table 5 – Site Procedures

Due to the high noise levels measured from the shredder and the mixed frames separating plant, it was not possible to measure isolated noise emissions from the digger, telehandler and forklift movements as these were inaudible in comparison. As a result, these items of plant will be modelled based on previously measured noise level data or from appropriate guidance documents (all of which has been augmented based on the site measurements).

3.4 Noise Modelling Data & Specific Sound Levels

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.
- Where possible, measurements have been taken at a position where point source propagation is to be expected.
- 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.

Full calculations can be found in Appendix D.

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 below. The separation plant has been divided into what were the most dominant sources indicates via discrete measurements around the whole system.

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 to present a reasonable 'worst-case' scenario.

Description	1/1 Octave Frequency Band (Hz, L_W dB)								L_{WA} (dB)	On-Time Correction
	63	125	250	500	1k	2k	4k	8k		
External Komatsu PW160 Sorting/Loading Frames	108	103	107	110	111	112	109	107	117	100%
Shredder Operating	122	113	115	114	115	112	111	107	120	100%
Mixed Frames Separating Plant: Magnetic Sorting Plant	112	107	107	103	105	106	108	108	113	100%
Mixed Frames Separating Plant: Cyclone Separator	109	107	106	104	106	106	108	108	113	100%
Mixed Frames Separating Plant: Vibration Sorter	101	99	99	96	95	96	98	97	103	100%
Telehandler Pass-by (JCB 542-70) [1][2]	101	101	97	94	92	90	86	86	97	8no. (day & night)
Truck/Skip Wagon Pass-by [1]	95	87	86	90	92	87	79	71	94	6no. (day & night)
Forklift Movements [3]	83	78	76	75	74	73	71	67	80	100%

Notes:
[1] Taken from noise data measured by NOVA Acoustics, as per NP-011281.
[2] This includes a broadband reversing alarm.
[3] Taken from noise data measured by NOVA Acoustics, as per NP-010442.

Table 6 – Sound Power Levels of External Plant

It is understood that there are two forklifts located at the site, however, these are typically located within the buildings and the noise levels from these are therefore picked up within the 'Internal Noise Breakout Emissions' section below.

However, as there are periods where the forklifts exit the buildings, to form a robust approach, it is assumed that there would be one forklift continually moving externally.

Internal Noise Breakout Emissions

Internal noise level measurements were undertaken in the areas of the buildings most affected by internal noise generation. Due to its size, two measurements were undertaken in Building B. The plant equipment located in the building were all operating at their typical duty throughout the measurement and a full cycle of their operations was captured.

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)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
Building A ($L_{eq,5min}$)	86	88	89	84	81	83	84	88	93
Building A – Open RSD ($L_{eq,5min}$)	89	84	82	83	78	77	79	82	87
Building A – Opening for Separation Plant System at 3m	84	85	83	79	78	78	80	82	87
Building B (1st Measurement) ($L_{eq,6min}$)	79	86	86	87	85	91	94	96	99
Building B (2nd Measurement) ($L_{eq,5min}$)	81	80	82	82	80	86	90	92	95
Building B – Eastern RSD	76	82	84	84	82	87	89	90	94
Building B – Western RSD	70	71	74	75	72	75	77	77	83

Table 7 – Measured Internal Ambient Noise Levels & Doorway/External Augmentation Levels

To form a robust assessment, the loudest noise level in each octave band across the two measurement positions in Building B will be used within the assessment.

Based on a review of the building envelops', both were constructed from an unlined steel frame. Outlined in the following table is the assumed sound insulation for each building fabric element.

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 8 – Assumed Sound Insulation of Building Fabric Elements

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 heights have been set to 1.5m (ground floor) and 4m (first-floor) 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.
- NOVA acoustics has been informed that the 4m tall southern boundary screening is to be extended eastwards to the pig hut shaped buildings.
- The sound levels and on-times presented in Tables 6 & 7 have been inputted into the noise model.
- All fixed operations and mobile plant with little movement have been modelled as point source emitters.
- The following source heights have been used:
    - Shredder & Excavator – 2m
    - Mixed frames separation plant:
        - Magnetic Sorter – 3m
        - Cyclone Separator – 6m
        - Vibration Sorter – 5m
    - Telehandler and Truck / Skips – 1.5m
    - Forklift movement – 1m
- The number of truck/wagon arrivals is unknown. A figure of 6 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.
- Telehandler pass-bys have also been modelled as 8 movements per hour. This is also deemed to be a sufficiently robust.
- 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 7.
    - The assumed sound reduction values shown in Table 8.
    - Cd corrections of -5dB from solid elements, and -3dB from any openings (i.e. roller shutter doors).
    - It is understood that the roller shutter doors for Building A work on an automatic opening schedule and so are not left opened for sustained periods. Within the model, these will be assumed as open for 15 minutes within 1-hour daytime period and 5 minutes within a 15-minute night-time period.

- The roller shutter doors to Building B, however, are understood to be left opened entirely during the daytime. At night, it is assumed that it will be open for 30 minutes in a 1-hour period i.e. 7.5-minutes within a 15-minute period.

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

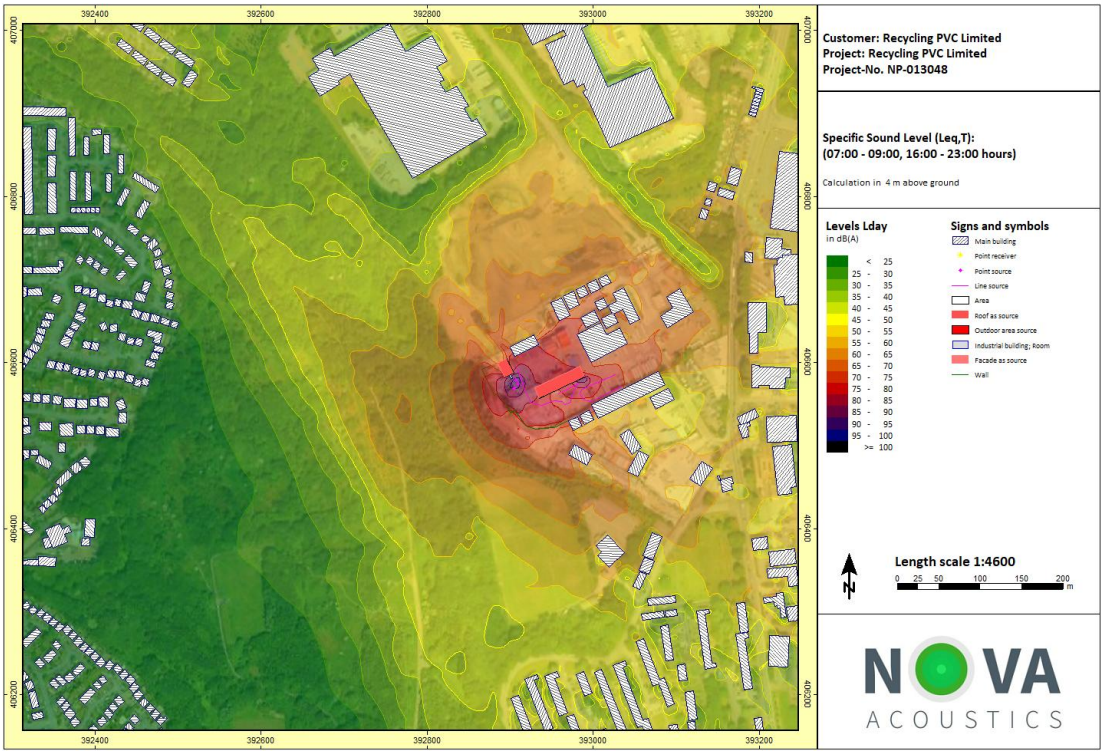


Figure 4 – Daytime (07:00 – 09:00 & 16:00 – 23:00 hours) Specific Sound Level Map

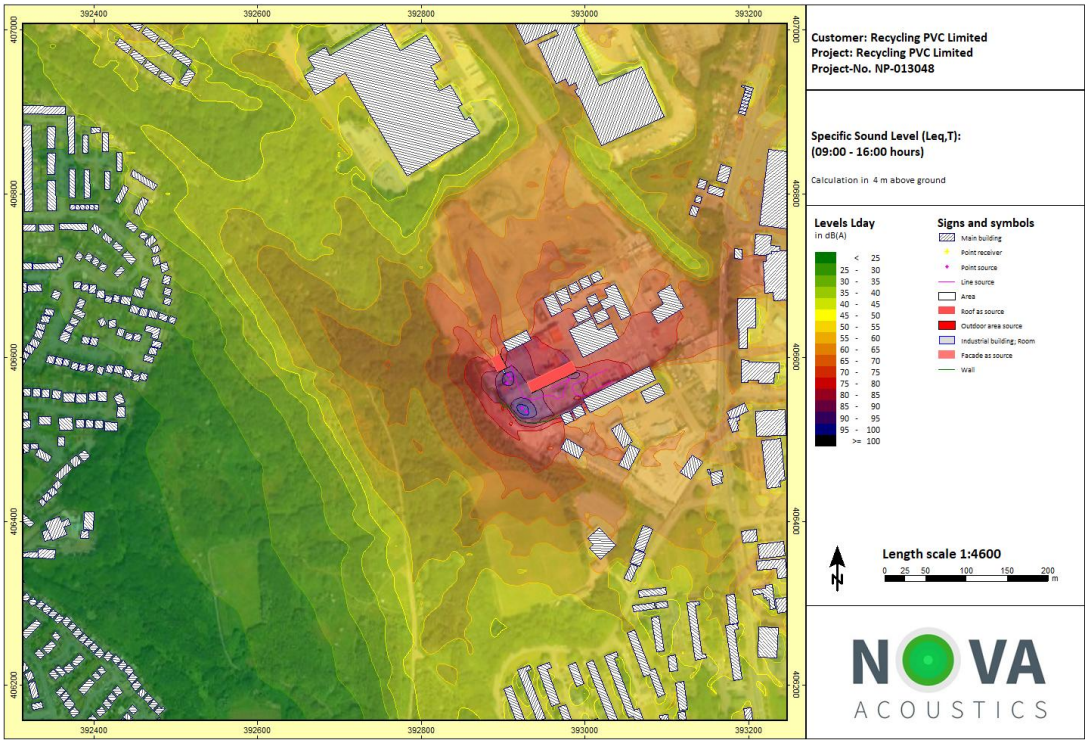


Figure 5 – Daytime (09:00 – 16:00 hours) Specific Sound Level Map

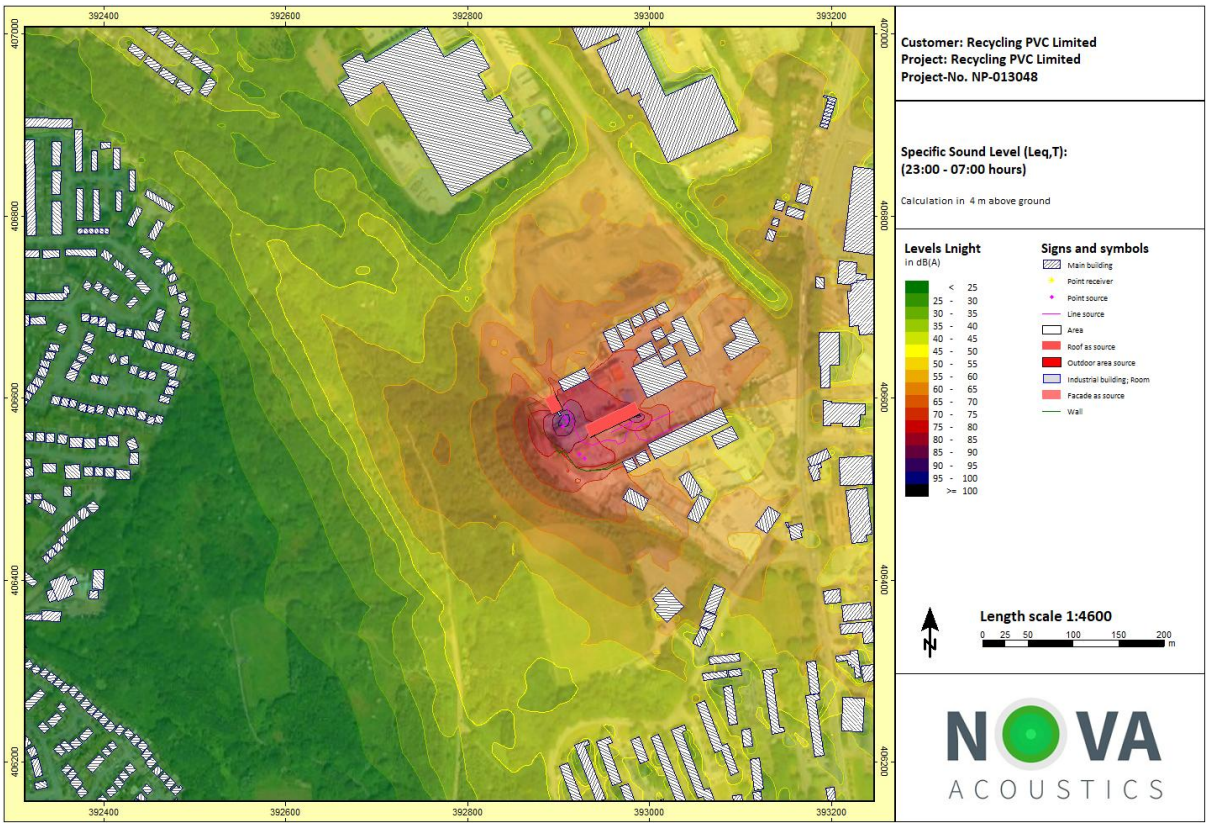


Figure 6 – Night-time (23:00 – 07:00 hours) Specific Sound Level Map

3.5 BS4142 Noise Impact Assessment

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. As a result, all discussions presented below are pre-contextual.

Description	Exceedance Levels & Initial Assessment Outcome			
Exceedance of Background (L_{A90})	<0	0 – 4	5 – 9	10+
Initial BS4142 Assessment Outcome	Low Impact to 'Negligible Impact	Low Impact / Low Likelihood of Adverse Impact	Adverse Impact	Significant Adverse Impact

Table 9 – BS4142 Initial Noise Impact Criteria

The BS4142 noise impact assessments are conducted at the most affected NSRs in the following tables. The highest specific sound levels measured within each NSR have been selected.

BS4142 Noise Impact Assessment – Daytime (07:00 – 09:00 hours, 16:00 – 23:00 hours)						
Description	NSR					
	1a (10)	1b (34)	2 (61)	3 (1)	4 (79)	5
Specific Sound Level ($L_{Aeq,1hr}$)	49	53	43	56	24	50
Acoustic Feature Correction	+3 [2]	+3 [1]	+3 [1]	+3 [1]	+3 [1]	+3 [1]
Rating Sound Level ($L_{Ar,Tr}$)	52	56	46	59	27	53
Background Sound Level ($L_{A90,15min}$)	40	57	36	53	36	53
Exceedance of L_{A90}	+12	-1	+10	+6	-9	0
Initial BS4142 Assessment Outcome	SAI	LI	SAI	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. Subjectively, no other acoustic features were perceptible over the residual noise climate at this receptor.
SAI = Significant adverse impact, dependant on context.
AI = Adverse impact, dependant on context.
LowAI = A low likelihood of adverse impact, dependent on context.
LI = Low impact, dependant on context.

Table 10 – BS4142 Noise Impact Assessment – Daytime (07:00 – 09:00 hours, 16:00 – 23:00 hours)

Based on a review of the BS4142 assessment above, 'significant adverse impact' is predicted at NSR1a and NSR2. The dominant noise sources affecting the noise climate are part of the separation plant.

At all other receptors, the highest level of exceedance is +6dB and 'significant adverse impact' is avoided in all instances.

BS4142 Noise Impact Assessment – Daytime (09:00 – 16:00 hours)						
Description	NSR					
	1a (13)	1b (34)	2 (58)	3 (3)	4 (79)	5
Specific Sound Level ($L_{Aeq,1hr}$)	50	54	50	60	28	55
Acoustic Feature Correction	+3 [2]	+3 [1]	+3 [1]	+3 [1]	+3 [1]	+0 [3]
Rating Sound Level ($L_{Ar,Tr}$)	53	57	53	63	31	55
Background Sound Level ($L_{A90,15min}$)	42	57	42	53	42	53
Exceedance of L_{A90}	+11	+0	+11	+10	-11	+2
Initial BS4142 Assessment Outcome	SAI	LI	SAI	SAI	LI	LowAI

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. Subjectively, no other acoustic features were perceptible over the residual noise climate at this receptor.
[3] Based on the subjective impression obtained at this receptor, the associated acoustic features are not distinguishable against the residual noise climate.
SAI = Significant adverse impact, dependant on context.
AI = Adverse impact, dependant on context.
LowAI = A low likelihood of adverse impact, dependent on context.
LI = Low impact, dependant on context.

Table 11 – BS4142 Noise Impact Assessment – Daytime (09:00 – 16:00 hours)

With the introduction of shredder to the noise climate, 'significant adverse impact' is predicted at NSR3 also. There are marginal increases of noise impact at all NSRs.

BS4142 Noise Impact Assessment – Night-time (23:00 – 07:00 hours)						
Description	NSR					
	1a (10)	1b (34)	2 (61)	3 (1)	4 (79)	5
Specific Sound Level ($L_{Aeq,15min}$)	48	53	43	55	24	50
Acoustic Feature Correction	+3 [2]	+3 [1]	+3 [1]	+3 [1]	+3 [1]	+3 [1]
Rating Sound Level ($L_{Ar,Tr}$)	51	56	46	58	27	53
Background Sound Level ($L_{A90,15min}$)	34	48	37	44	34	44
Exceedance of L_{A90}	+17	+8	+9	+14	-7	+9
Initial BS4142 Assessment Outcome	SAI	AI	AI	SAI	LI	AI

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.
SAI = Significant adverse impact, dependant on context.
AI = Adverse impact, dependant on context.
LowAI = A low likelihood of adverse impact, dependent on context.
LI = Low impact, dependant on context.

Table 12 – BS4142 Noise Impact Assessment – Night-time (23:00 – 07:00 hours)

As can be seen in the BS4142 assessment above, 'significant adverse impact' is predicted at NSR1a and NSR3. This is primarily due to the mixed frames separation plant.

At NSRs 1b, 2 and 5, 'adverse impact' is predicted, with 'low impact' being predicted at NSR4.

Contextual Arguments

Whilst the BS4142 assessments have indicated cases of 'significant adverse impact', these are pre-consideration of contextual factors.

Based on a review of the uncertainty budget outline in Section 5, the BS4142 assessments are thought to be 'robust' and likely to be overestimation by approximately 4dB (accounting for 'worst-case' conditions).

Moreover, the development is located within an industrial estate and there are additional screening elements such as shipping containers and other minor buildings that have not been included within the noise model. Based on conservative estimations, the modelled noise breakout particularly to NSR's 1, 3 and 5, may be an over estimation by as much as 2dB.

In any case, given the extent of background sound level exceedances, particularly at NSR1a, it is unlikely that any contextual argument would offset the noise impact predicted numerically.

4. Recommendations and Mitigation Measures

Outlined in the following section are the mitigation measures necessary to reduce the noise impact to more acceptable levels.

4.1 Proposed Mitigation Scheme

Indicated in the figures below are the acoustic screens that should be erected.

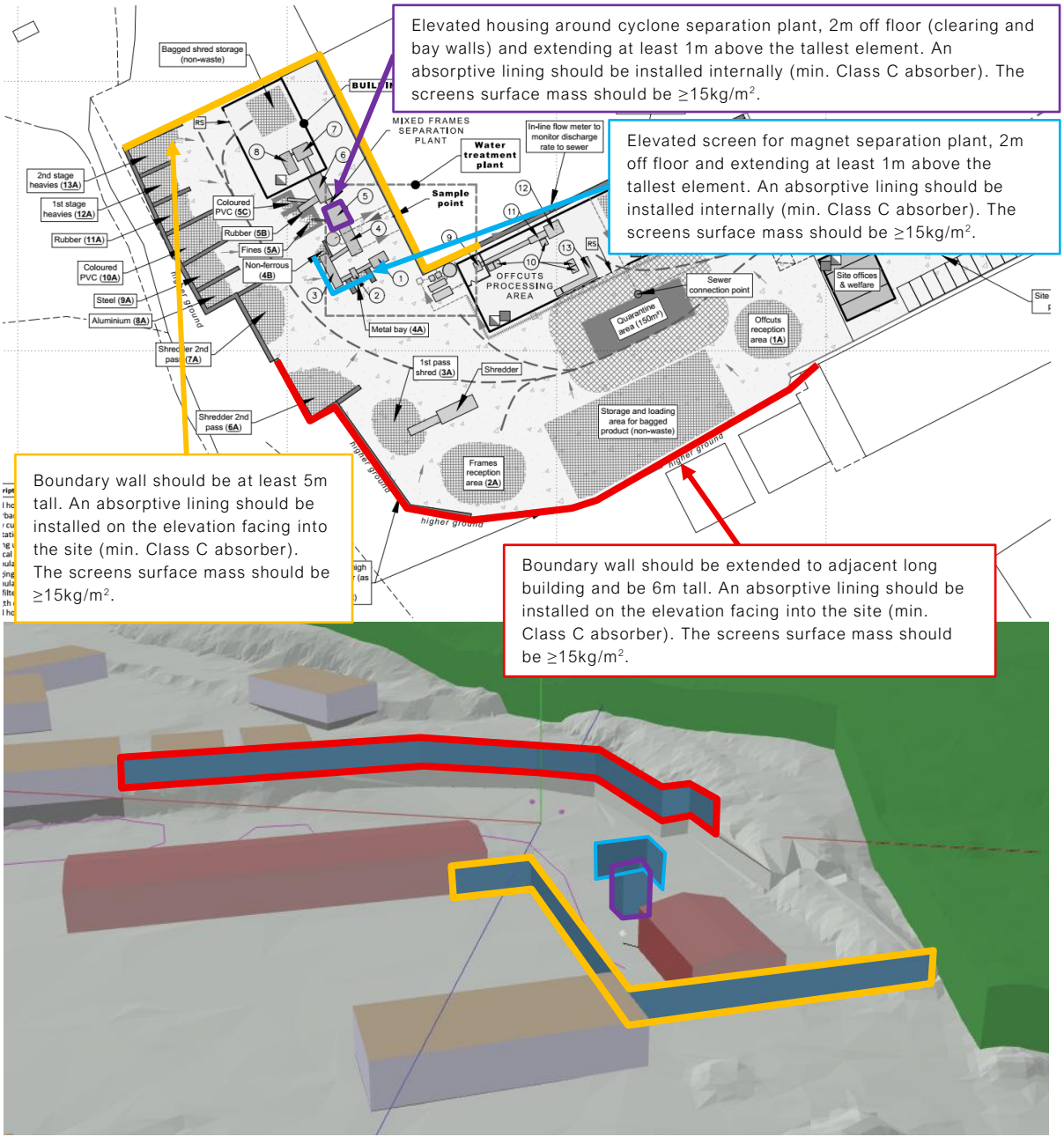


Figure 7 – Acoustic Screen Strategy

The south facing elevations of the separation plant screens should also be externally cladded with a minimum of a Class C absorber; this indicated overleaf.

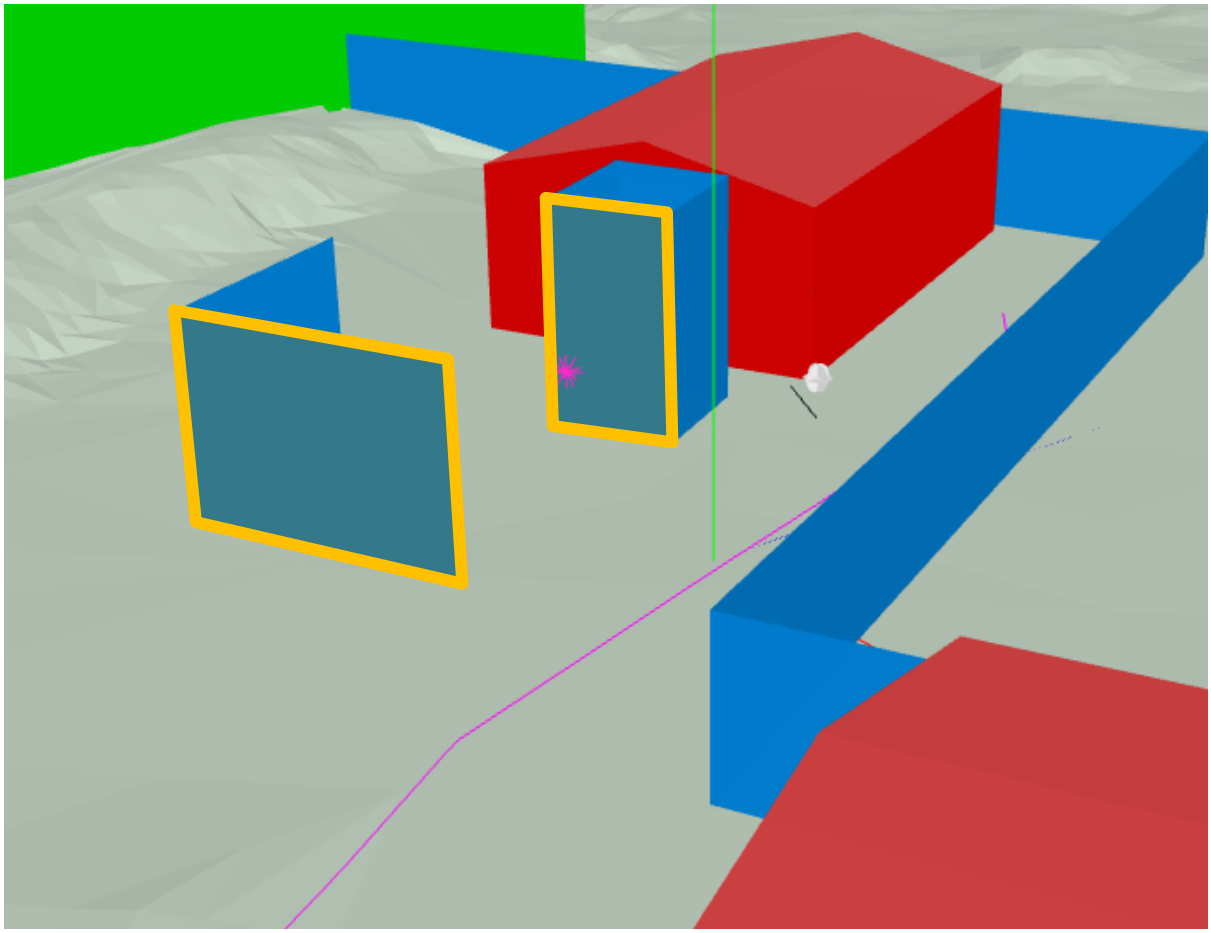


Figure 8 – Acoustic Screen Strategy – Absorptive Cladding

The boundary acoustic screening may be constructed from a timber product such as the Jacksons 'Absorptive fencing'; however, any other product will suffice provided it meets the requirements outlined in Figure 9.

The separation plant housing and screen would likely require mounting to the supporting steel frame structure via an isolated spacer system. It has been modelled as a floating screen (2m above the ground) with transmissive properties of Kingspan AWP (Table 8), as such, it is advised to install a product that provides at least 25dB R_W of sound reduction.

Due to adverse reflections created by the structures, it is proposed that internally the screen is lined with an absorptive material, preferably with an NRC greater than at least 0.8. The absorptive properties of the lining would need to be maintained throughout the lifetime of the barrier. Therefore, it is advised that a weather moisture resistant absorptive foam product, or mineral wool slabs lined with a glass tissue (and perforated steel liner) are installed. Other products such as the 'Quietstone Cladding 50mm' would also suffice.

Due to specific reflections created by the separation plant that give rise to adverse noise impact levels from the shredder, the external southern elevations of the separation plant screens must be cladded with at least a Class C absorbent material (as shown above). For the purpose of this assessment, the elevations are assumed to be cladded with the 'Quietstone Cladding 50mm', however, any other product meeting the requirements will suffice (datasheet in Appendix F).

4.2 Revised BS4142 Assessments

Revised Noise Modelling

A noise model has been reproduced considering the proposed migration scheme.

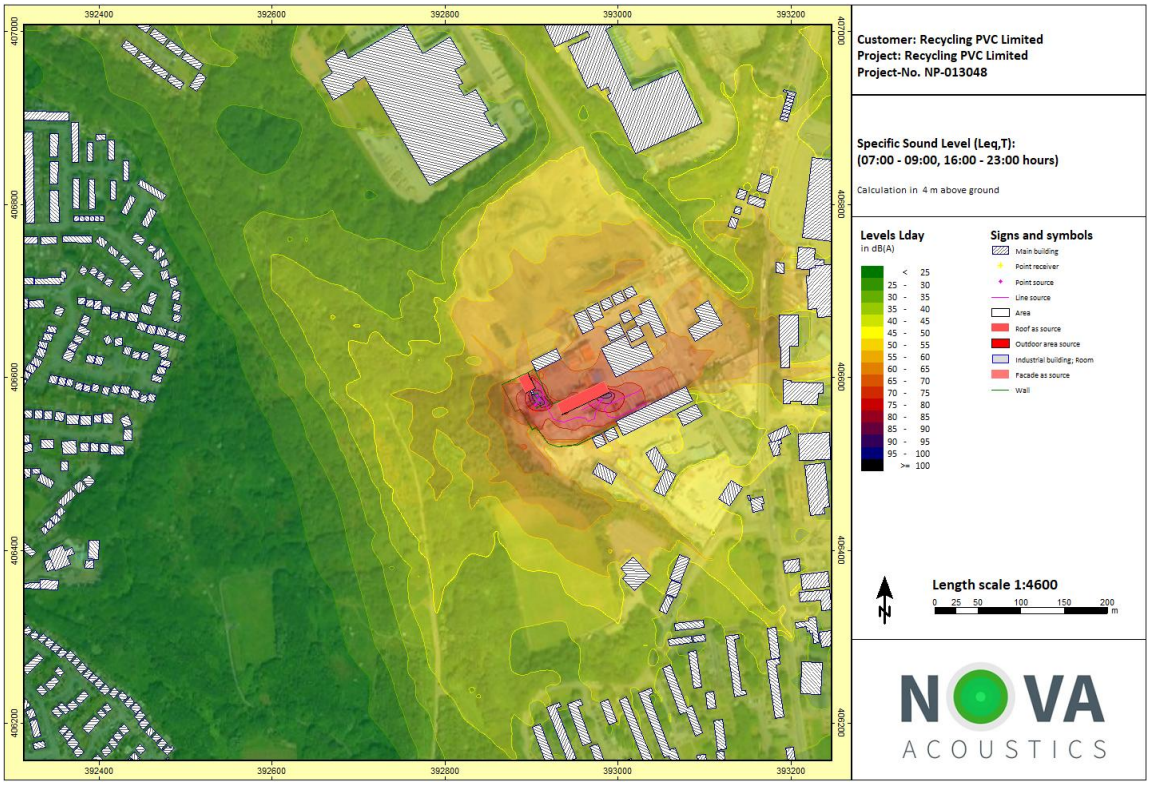


Figure 9 – Daytime (07:00 – 09:00 & 16:00 – 23:00 hours) Specific Sound Level Map (Post-Mit)

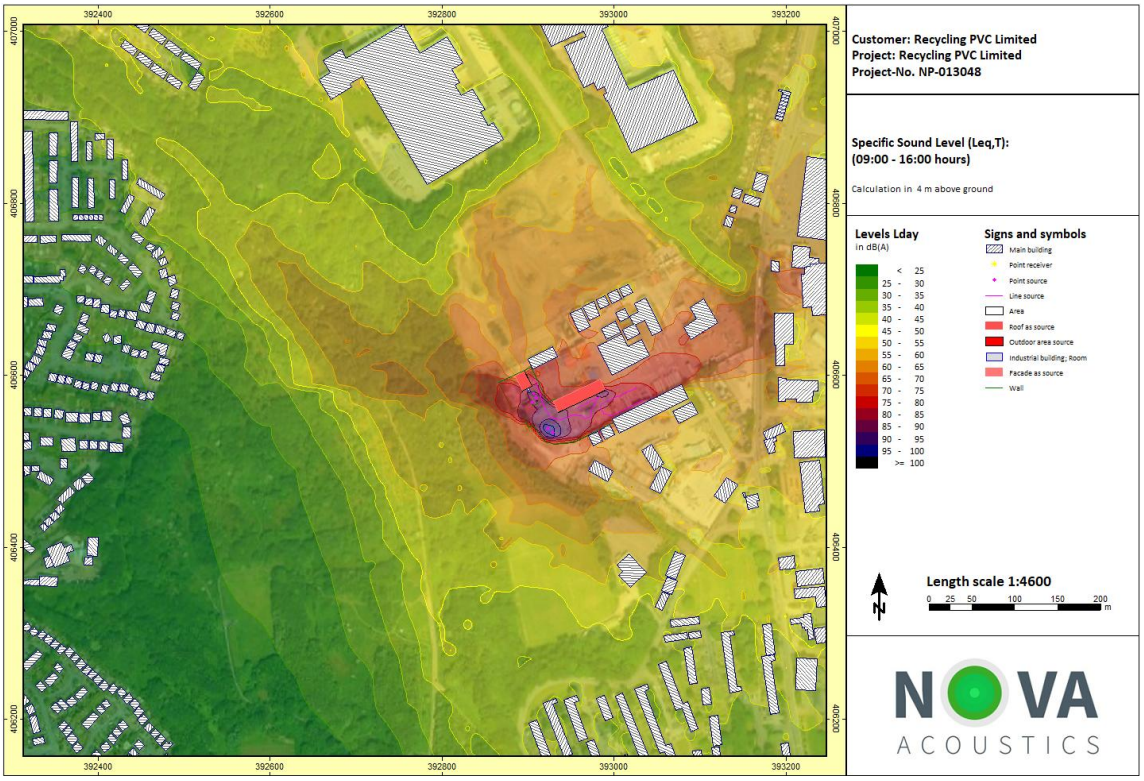


Figure 10 – Daytime (09:00 – 16:00 hours) Specific Sound Level Map (Post-Mit)

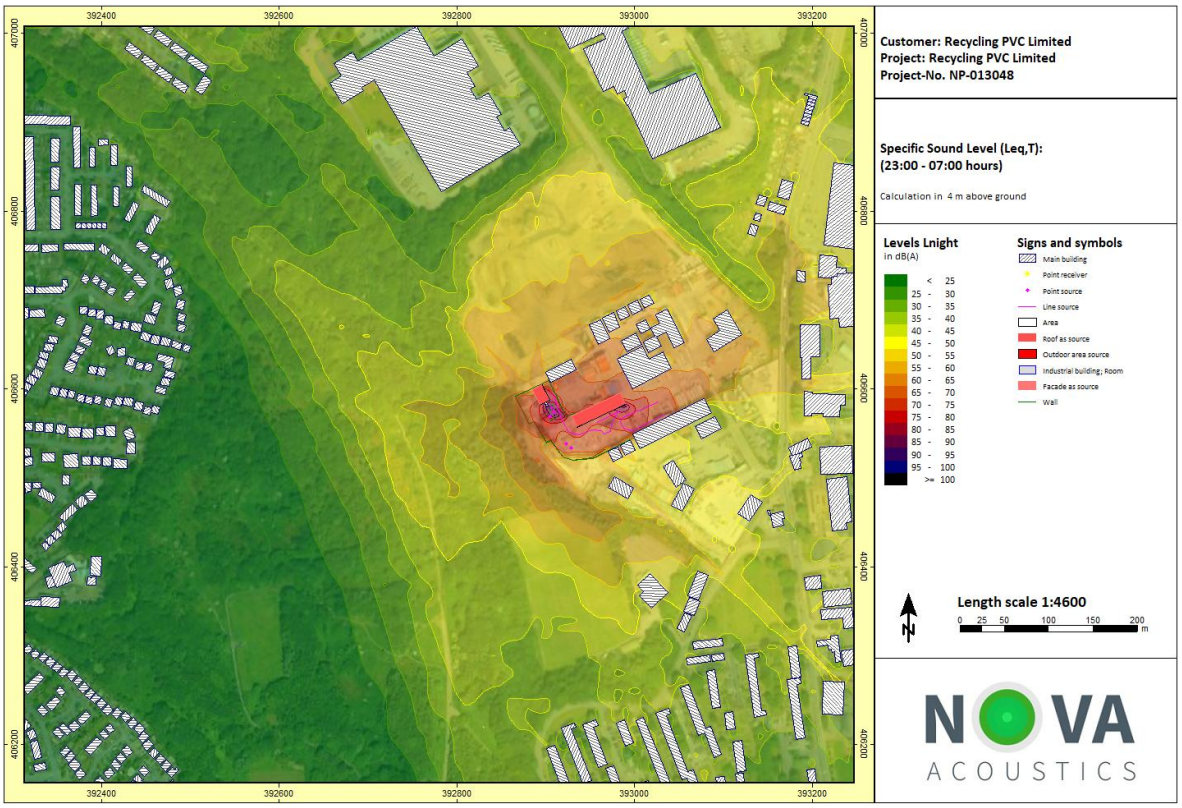


Figure 11 – Night-time (23:00 – 07:00 hours) Specific Sound Level Map (Post-Mit)

Revised BS4142 Assessment

The BS4142 noise impact assessments are conducted at the most affected NSRs in the following tables. The highest specific sound levels measured within each NSR have been selected.

BS4142 Noise Impact Assessment – Daytime (07:00 – 09:00 hours, 16:00 – 23:00 hours)						
Description	NSR					
	1a (9)	1b (34)	2 (62)	3 (1)	4 (79)	5
Specific Sound Level ($L_{Aeq,1hr}$)	41	46	33	50	20	46
Acoustic Feature Correction	+3 [2]	+3 [1]	+3 [1]	+3 [1]	+3 [1]	+3 [1]
Rating Sound Level ($L_{Ar,Tr}$)	44	49	35	53	23	49
Background Sound Level ($L_{A90,15min}$)	40	57	36	53	36	53
Exceedance of L_{A90}	+4	-8	-1	0	-13	-4
Initial BS4142 Assessment Outcome	LowAI	LI	LI	LI	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. Subjectively, no other acoustic features were perceptible over the residual noise climate at this receptor.
SAI = Significant adverse impact, dependant on context.
AI = Adverse impact, dependant on context.
LowAI = A low likelihood of adverse impact, dependent on context.
LI = Low impact, dependant on context.

Table 13 – BS4142 Noise Impact Assessment – Daytime (07:00 – 09:00 hours, 16:00 – 23:00 hours)

As can be seen above, a low likelihood of 'adverse impact' is predicted at NSR1a exclusively. At all other receptors, 'low impact' is predicted.

BS4142 Noise Impact Assessment – Daytime (09:00 – 16:00 hours)						
Description	NSR					
	1a (13)	1b (34)	2 (59)	3 (3)	4 (79)	5
Specific Sound Level ($L_{Aeq,1hr}$)	45	48	46	54	26	53
Acoustic Feature Correction	+3 [2]	+3 [1]	+3 [1]	+3 [1]	+3 [1]	+0 [3]
Rating Sound Level ($L_{Ar,Tr}$)	48	51	49	57	29	53
Background Sound Level ($L_{A90,15min}$)	42	57	42	53	42	53
Exceedance of L_{A90}	+6	-6	+7	+4	-13	0
Initial BS4142 Assessment Outcome	AI	LI	AI	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. Subjectively, no other acoustic features were perceptible over the residual noise climate at this receptor.
[3] Based on the subjective impression obtained at this receptor, the associated acoustic features are not distinguishable against the residual noise climate.
SAI = Significant adverse impact, dependant on context.
AI = Adverse impact, dependant on context.
LowAI = A low likelihood of adverse impact, dependent on context.
LI = Low impact, dependant on context.

Table 14 – BS4142 Noise Impact Assessment – Daytime (09:00 – 16:00 hours)

With the introduction of shredder to the noise climate, 'adverse impact' has been predicted at NSRs 1a & 2, with a low likelihood of 'adverse impact' at NSR3. In accordance with BS4142, 'low impact' has been predicted at all other NSRs.

BS4142 Noise Impact Assessment – Night-time (23:00 – 07:00 hours)						
Description	NSR					
	1a (13)	1b (34)	2 (62)	3 (1)	4 (79)	5
Specific Sound Level ($L_{Aeq,15min}$)	40	46	33	48	19	44
Acoustic Feature Correction	+3 [2]	+3 [1]	+3 [1]	+3 [1]	+3 [1]	+3 [1]
Rating Sound Level ($L_{Ar,Tr}$)	43	49	36	51	22	47
Background Sound Level ($L_{A90,15min}$)	34	48	37	44	34	44
Exceedance of L_{A90}	+9	+1	-1	+7	-12	+3
Initial BS4142 Assessment Outcome	AI	LowAI	LI	AI	LI	LowAI

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, due to metal fines dropping.
SAI = Significant adverse impact, dependant on context.
AI = Adverse impact, dependant on context.
LowAI = A low likelihood of adverse impact, dependent on context.
LI = Low impact, dependant on context.

Table 15 – BS4142 Noise Impact Assessment – Night-time (23:00 – 07:00 hours)

During the night-time, 'adverse impact' has been predicted at NSRs 1a & 3, with a low likelihood of 'adverse impact' at NSRs 1b and 5. In accordance with BS4142, 'low impact' has been predicted at all other NSRs.

The noise impact at NSR1a is primarily due to the magnetic and vibration sorting plant, which have been mitigated by as much as practicable.

Summary

Shown in the table overleaf is a summary of the BS4142 rating sound level exceedances over the background.

Description	Exceedance Over Background Sound Level (dB)					
	1a	1b	2	3	4	5
Pre-mit Daytime (07:00 – 09:00 hours, 16:00 – 23:00 hours)	+12	-1	+10	+6	-9	0
Pre-mit Daytime (09:00 – 16:00 hours)	+11	0	+11	+10	-11	+2
Pre-mit Night-time (23:00 – 07:00 hours)	+17	+8	+9	+14	-7	+9
Post-mit Daytime (07:00 – 09:00 hours, 16:00 – 23:00 hours)	+4	-8	-1	0	-13	-4
Post-mit Daytime (09:00 – 16:00 hours)	+6	-6	+7	+4	-13	0
Post-mit Night-time (23:00 – 07:00 hours)	+9	+1	-1	+7	-12	+3

Table 16 – Comparison of BS4142 Exceedance Levels

As identified above, the proposed mitigation scheme is predicted to reduce the 'significant adverse impact' to 'adverse impact' in accordance with BS4142, prior to any contextual factors.

It should also be recognised that the specific sound levels predicted at NSR1a, do not exceed the average $L_{Aeq,15min}$ residual noise levels recorded at MP1 over any period, and only marginally exceed the lowest measured. Based on the short-term measurements taken adjacent to NSR3, it is anticipated that the predicted specific sound levels would be unlikely to regularly exceed the residual $L_{Aeq,15min}$ noise levels.

The above is a positive indication that whilst the site operations may at times be audible, they're unlikely to be deemed intrusive and cause significant change to behaviour, particularly given the local of the site and its industrial nature.

It should also be recognised that the total modelling uncertainty has been calculated up to 2dB conservatively (Section 5). Therefore, instances of 'adverse impact' predicted at NSRs 1a, 2 and 3 would be akin to a 'low likelihood of adverse impact' in accordance with BS4142.

In light of the above, the mitigated noise impacts are thought to align with the NPSE as follows:

- NSR1a & 3: NOAEL during the daytime with and without the shredder operating, and LOAEL during the night-time.
- NSR1b & 5: NOAEL during both the daytime and night-time.
- NSR2: NOAEL during the morning, evening and night-time, and NOAEL to LOAEL during the daytime when the shredder is operating.
- NSR4: NOEL during all periods.

5. 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(227/230) = -0.1 20*Log)(233/230) = +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.
ISO 9613 Uncertainty	±3.0 dB	3/√3 = **1.7 dB**	Stated model uncertainty due to Para. 9 of ISO 9613, Table 4.
Modelling Augmentation Uncertainty	±2.0 dB	2/√3 = **1.2 dB**	
Modelling Total Uncertainty	Total Variance = **3.2 dB**	Total Uncertainty: √3.2 = **1.8 dB**	
Combined Uncertainty	Total Variance = **4.3 dB**	Total Uncertainty = √4.3 = 2.1 dB Expanded to 95% confidence = 2.1 * 2 = **4.2 dB**	

Table 17 – Expanded Uncertainty of Measurement and Modelling

The table above shows an expanded uncertainty of up to 4.2dB. 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.

6. Conclusion and Action Plan

A BS4142 assessment has been undertaken for the bespoke permit application in line with the EA requirements.

In summary, three scenarios of assessment have been carried out and are discussed in Section 3. These are the following:

1. 07:00 – 09:00 hours & 16:00 - 23:00 hours – All on-site equipment operational excluding shredder.
2. 09:00 - 1600 hours – All on-site equipment operational including shredder.
3. 23:00 – 07:00 hours – All on-site equipment operational excluding shredder.

The report has found that in Scenario 1, 'significant adverse impact' is predicted at NSR1a and NSR2. The dominant noise sources are part of the separation plant. The same sources are impactful in Scenario 2; however, the introduction of the shredder elevates the impact at NSR3 to also be 'significant adverse impact'.

At night, NSR1a and NSR3 are determined as 'significant adverse impact'. This is due to the separation plant but is exacerbated by the inherent reduction to night-time background sound levels.

At all other receptors not discussed, 'significant adverse impact' is avoided in all instances.

Based on the levels of exceedances, the assessment has found that any contextual arguments would not materially alter the outcomes of the initial BS4142 assessments. Therefore, mitigation measures are required. These are presented in Section 4.

The proposed mitigation scheme is predicted to reduce the 'significant adverse impact' to 'adverse impact' in accordance with BS4142, prior to any contextual factors.

In light of the discussed context, it is concluded that whilst the site operations may at times be audible, they're unlikely to be deemed intrusive and cause significant change to behaviour, particularly given the local of the site and its industrial nature.

It should also be recognised that the total modelling uncertainty has been calculated up to 2dB conservatively (Section 5). Therefore, instances of 'adverse impact' predicted at NSRs 1a, 2 and 3 would be akin to a 'low likelihood of adverse impact' in accordance with BS4142.

The mitigated noise impacts are thought to align with the NPSE as follows:

- NSR1a & 3: NOAEL during the daytime with and without the shredder operating, and LOAEL during the night-time.
- NSR1b & 5: NOAEL during both the daytime and night-time.
- NSR2: NOAEL during the morning, evening and night-time, and NOAEL to LOAEL during the daytime when the shredder is operating.
- NSR4: NOEL during all periods.

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

The site operating hours shall remain 24/7 for the acceptance, removal and processing of waste, however, the shredder will operate 09:00 to 16:00 hours exclusively.

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.

Objective Noise Monitoring

- A class 2 sound level meter should be purchased to measure sound levels on site. This will take place during typical operations when the site is in use and associated plant vehicles are operating as normal.

Monthly Measurements

Noise levels will be measured at monthly intervals at the site perimeter in the location shown below.

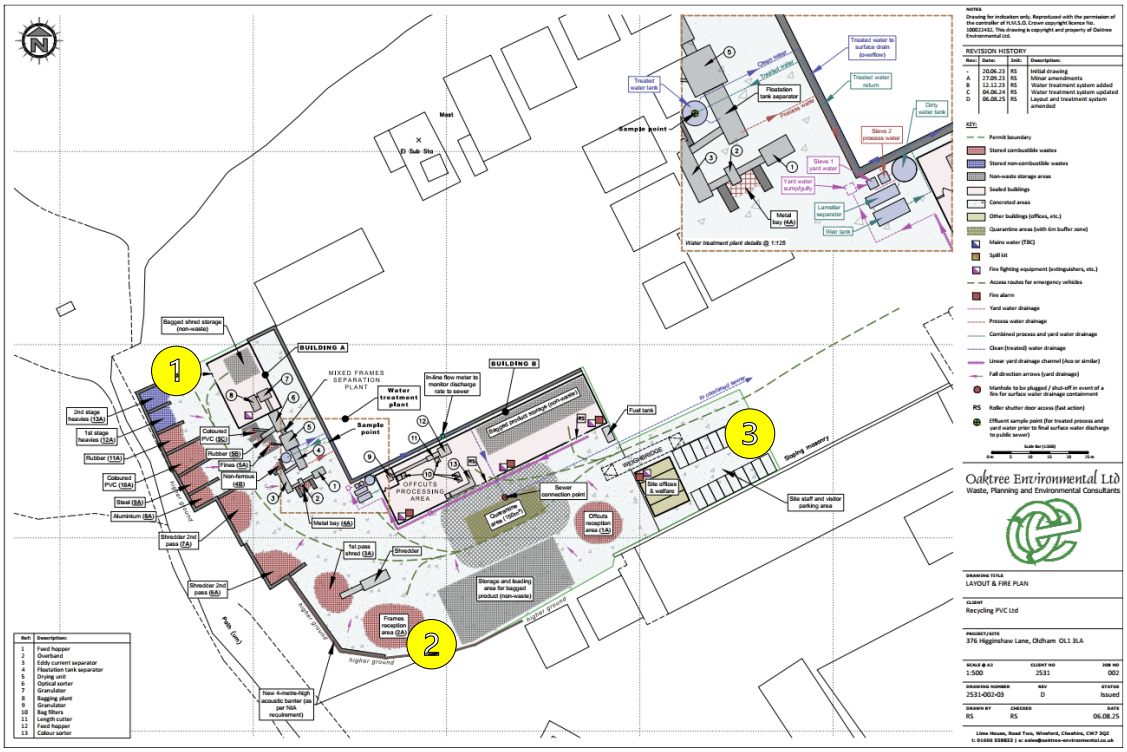


Figure 12 – Proposed Objective Monitoring Locations

- $L_{Aeq,1hour}$ (A-weighted noise levels averaged over a 1-hour assessment period) and L_{AFmax} noise levels will be recorded. Measurements taken on site will be compared with previous measurements. If $L_{Aeq,1hour}$ noise levels increase by more than 3dB from the previous month then the cause of the increase shall be investigated.
- When the source of the elevated noise levels is discovered, remedial work shall be undertaken to reduce noise emissions to 'normal' levels. If complex remedial work is required, the offending equipment will be taken out of commission until repair work is completed. This will be logged in an IMS (Issue Management System).

7.4 Noise Control Measures Summary

BPM – Physical Noise Control Measures

- The mitigation measures proposed in Section 4.1 shall be implemented in full and retained throughout the lifetime of the site

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.
- Throughout the day operators are vigilant in checking vulnerable areas like exhausts and engine bays.
- 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

It is understood that an Issue Management System ('IMS') is not currently implemented.

Therefore, this should be completed by a site manager and should include a site diary, plus forms and records of complaints. 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 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 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), 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:

- 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.

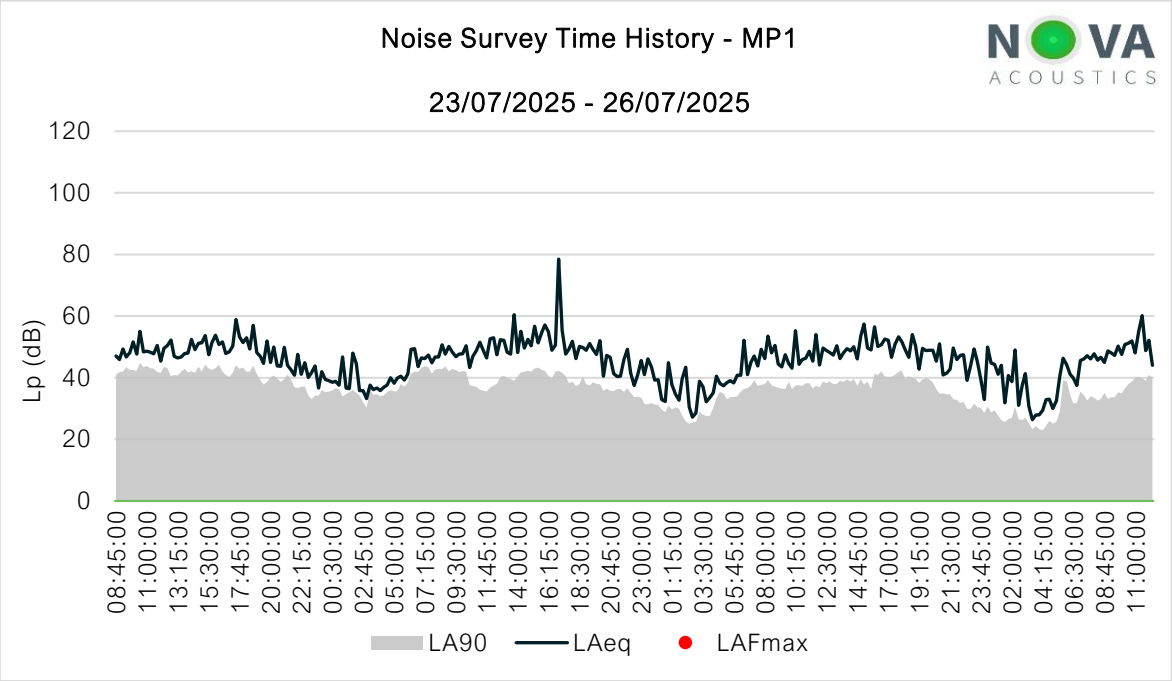
Step 4: BAT or appropriate measures justification, involving presentation of Best Available Techniques or appropriate measures and justification for their use in the context of the specific application:

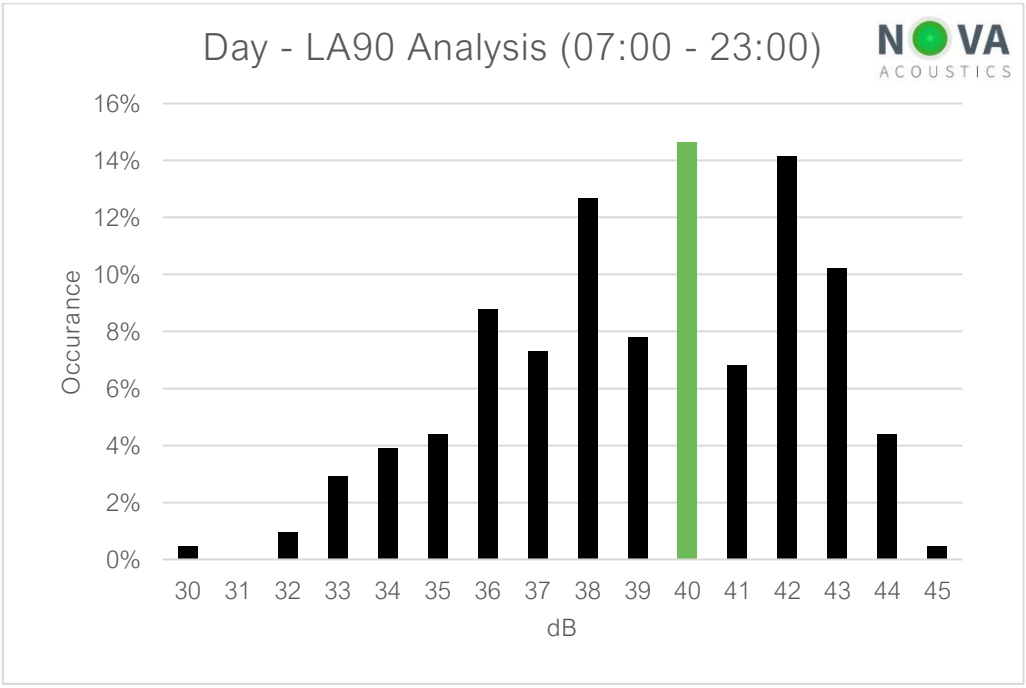
- Demonstration that emissions have been prevented or minimised as far as reasonably practicable with respect to:
    - The dominant noise sources (where necessary considered as sub-components within a system).
    - All existing noise attenuation measures (physical, managerial and maintenance).
    - 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





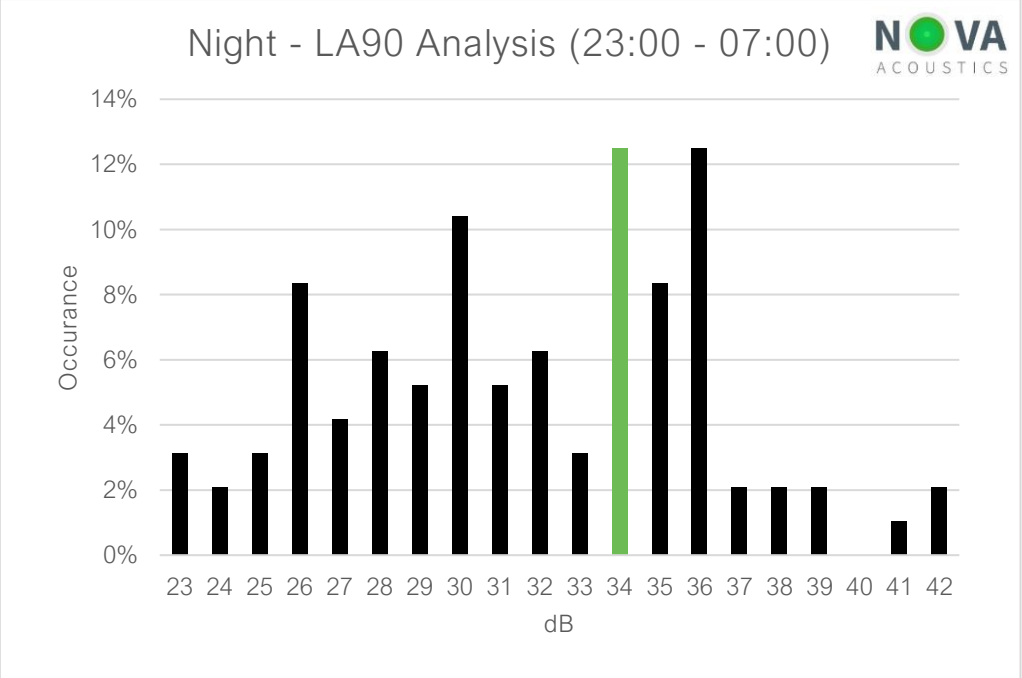
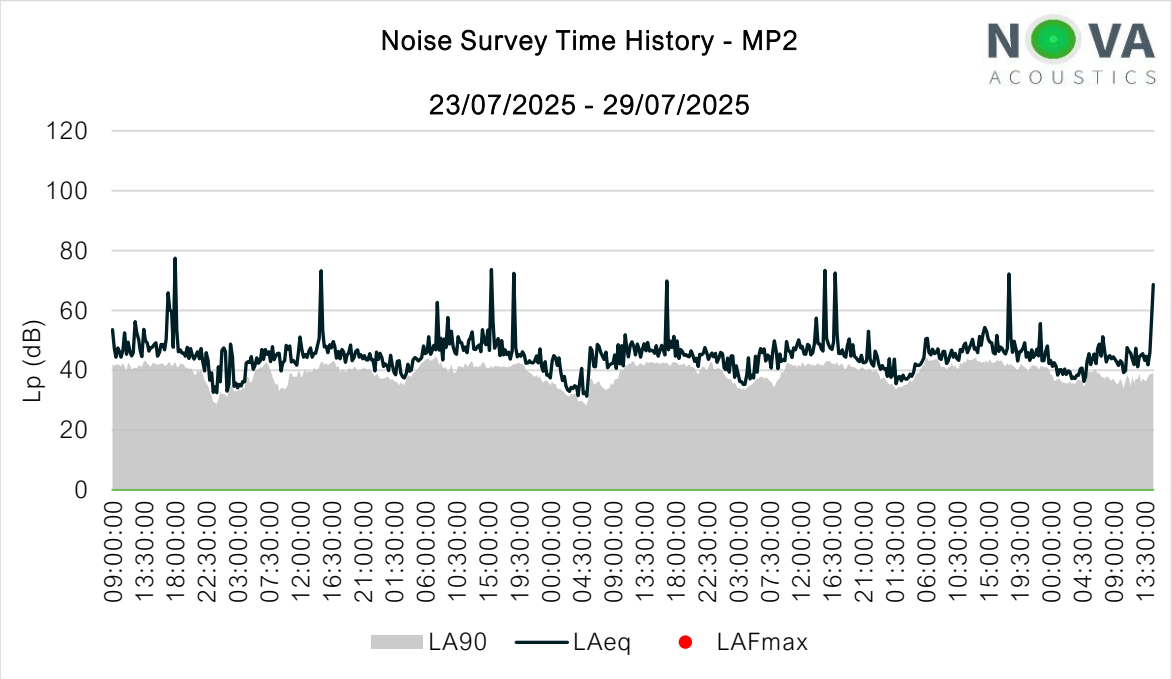


Figure 13 – MP1 Noise Survey Time History (Full Period) & $L_{A90,15min}$ Histograms



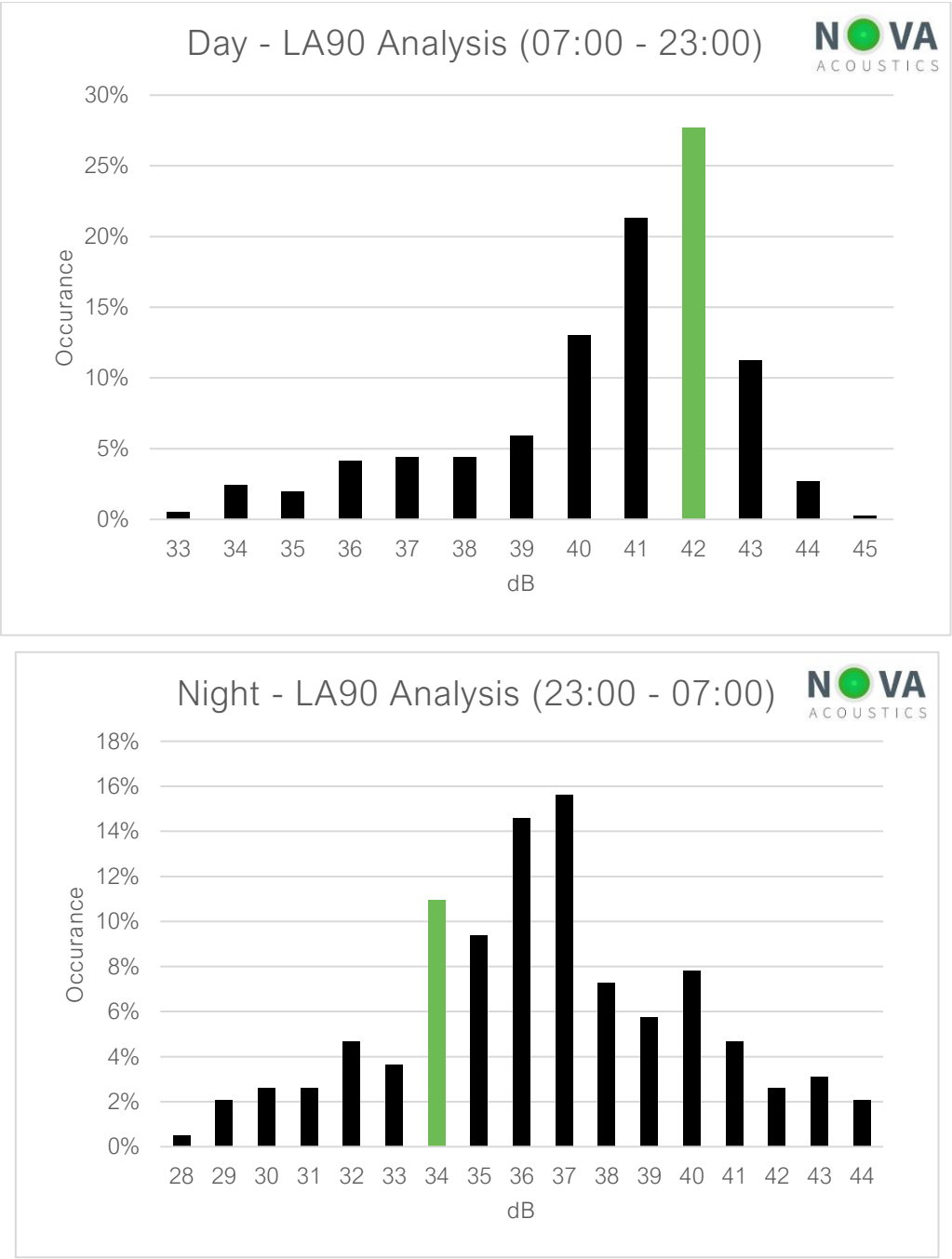


Figure 14 – MP2 Noise Survey Time History (Full Period) & $L_{A90,15min}$ Histograms

C.2 – Surveying Equipment

Piece of Equipment	Serial No.	Calibration Deviation
Svantek SV977 Class 1 Sound Level Meter	34826	114.1 (pre) – 114.2 (post)
Svantek SV971A Class 1 Sound Level Meter	127628	114.0 (pre) – 113.9 (post)
Svantek SV971A Class 1 Sound Level Meter	113255	114.0 (pre) – 114.0 (post)
Svantek SV33B Class 1 Calibrator	116639	--

Table 18 – Surveying Equipment

All equipment used during the survey was field calibrated at the start and end of the measurement period with 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.

C.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 – Chadderton (Approx. 3.2km SW of Site)				
Time Period	Air Temp (°C)	Rainfall (mm/h)	Prevailing Wind Direction	Wind Speed (m/s)
23/07/25: 00:00 – 23:59	14.1 – 19.1	0.0 – 0.6	N	0.0 – 3.0
24/07/25: 00:00 – 23:59	14.9 – 20.5	0.0	WNW	0.0 – 3.0
25/07/25: 00:00 – 23:59	11.9 – 22.7	0.0	W	0.0 – 3.5
26/07/25: 00:00 – 23:59	15.2 – 18.2	0.0 – 0.4	WNW	0.0 – 3.5
27/07/25: 00:00 – 23:59	13.4 – 17.7	0.0	NW	0.0 – 3.1
28/07/25: 00:00 – 23:59	13.6 – 19.1	0.0	NW	0.0 – 3.9

Notes:
[1] *A light rain shower was recorded on 23/07/25 and 26/07/25. Based on a review of the time history data, this did not adversely affect the noise levels measured and so these periods have been retained within the assessment.*

Table 19 – Survey Weather Conditions

Appendix D – Full Sound Power Calculations (External Sources)

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB) 63	125	250	500	1k	2k	4k	8k	Lp Dist (m)	Q Factor
Model / Unit	Forklift Movement	Octave-Band Lp	Lp at 1m, Q factor (Q=2)	72	75	70	68	67	66	65	63	59	1	2
No. of	1													
Data Type	Manufacturers Data		Total Lw	80	83	78	76	75	74	73	71	67		

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB) 63	125	250	500	1k	2k	4k	8k	Lp Dist (m)	Q Factor
Model / Unit	Telehandler Pass By	Octave-Band Lp	Lp at 3m, Q factor (Q=2)	80	83	83	79	76	74	72	68	68	3	2
No. of	1													
Data Type	Manufacturers Data		Total Lw	97	101	101	97	94	92	90	86	86		

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB) 63	125	250	500	1k	2k	4k	8k	Lp Dist (m)	Q Factor
Model / Unit	Truck Pass By	Octave-Band Lp	Lp at 3m, Q factor (Q=2)	77	77	69	68	72	74	69	61	53	3	2
No. of	1													
Data Type	Manufacturers Data		Total Lw	94	95	87	86	90	92	87	79	71		

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB) 63	125	250	500	1k	2k	4k	8k	Lp Dist (m)	Q Factor
Model / Unit	Shredder Operating - 2nd Pass	Octave-Band Lp	Lp at 10m, Q factor (Q=2)	92	94	85	87	86	87	84	83	79	10	2
No. of	1													
Data Type	Manufacturers Data		Total Lw	120	122	113	115	114	115	112	111	107		

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB) 63	125	250	500	1k	2k	4k	8k	Lp Dist (m)	Q Factor
Model / Unit	Excavator Moving/Sorting Frames	Octave-Band Lp	Lp at 12m, Q factor (Q=2)	87	78	73	77	80	81	82	79	77	12	2
No. of	1													
Data Type	Manufacturers Data		Total Lw	117	108	103	107	110	111	112	109	107		

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB) 63	125	250	500	1k	2k	4k	8k	Lp Dist (m)	Q Factor
Model / Unit	SW Corner Vibration Sorting Plant (1.5m high)	Octave-Band Lp	Lp at 3m, Q factor (Q=1)	83	80	78	78	75	74	75	77	76	3	1
No. of	1													
Data Type	Emperical Data		Total Lw	103	101	99	99	96	95	96	98	97		

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB) 63	125	250	500	1k	2k	4k	8k	Lp Dist (m)	Q Factor
Model / Unit	Eastern Side of Cyclone Tank Sorted (4m high)	Octave-Band Lp	Lp at 6m, Q factor (Q=1)	87	82	80	79	77	79	79	81	81	6	1
No. of	1													
Data Type	Emperical Data		Total Lw	113	109	107	106	104	106	106	108	108		

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB) 63	125	250	500	1k	2k	4k	8k	Lp Dist (m)	Q Factor
Model / Unit	Western Side Magnetic Plant & Rubber Drop-off (3m high)	Octave-Band Lp	Lp at 6m, Q factor (Q=1)	87	85	80	80	76	78	79	81	81	6	1
No. of	1													
Data Type	Emperical Data		Total Lw	113	112	107	107	103	105	106	108	108		

Appendix E – Spot Measurements

The following table outlines the results summary of the sound level measurements used to derive the sound power levels of the external plant.

Description	1/1 Octave Frequency Band (Hz, L_{eq}, dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
Alongside Driving Forklift at 1m (Q2) – Report Ref: NP-010442	75	70	68	67	66	65	63	59	72
Telehandler pass by including collection of waste and reversing alarm at 3m (Q2) – Report Ref: NP-011281	83	83	79	76	74	72	68	68	80
Lorry / Truck pass by at 3m (Q2) – Report Ref: NP-011281	77	69	68	72	74	69	61	53	77
Digger Feeding Shredder at 8m	91	86	85	89	89	88	87	86	95
Mixed Frame Separating Plant at 6m	86	82	84	81	81	82	83	83	89
Magnetic Sorting Plant at 6m (Q1)	85	80	80	76	78	79	81	81	87
Cyclone Separator Plant at 6m (Q1)	82	80	79	77	79	79	81	81	87
Vibration Sorting Plant at 3m (Q1)	80	78	78	75	74	75	77	76	83

Table 20 – External Plant Sound Pressure Levels

Appendix F – Datasheets

QUIETSTONE Innovative Acoustics

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Products

Back Solutions Markets

Acoustic Panels – Quietstone Light

Applications

- Sound proof ceilings – including curved atriums
- Sound absorbing walls
- Noise barriers – impervious to weather and impact resistant
- Tunnel lining – suitable for outdoor settings
- External – verandas, smoking areas, generators
- Halls – high impact resistance, easy installation ideal in sports halls
- Exterior cladding – light weight and cutting can be done on site
- Swimming pools – will not sag or stain with moisture exposure
- Healthcare – can be washed with any detergents including sterilizers
- Acoustic balconies soffit
- Dog kennels noise
- Shooting range acoustics
- Recording studios
- plant rooms

Technical Specifications

Panel size
1200 x 600 mm (other sizes available on request)

Thicknesses
Anything from 15mm to 50mm

Weight
8kg/m² at 25mm

Fire safety
Class 0

Acoustic performance
up to class A (α_w 0.95) depending on thickness and mounting

Cleaning
Can be cleaned with all detergents

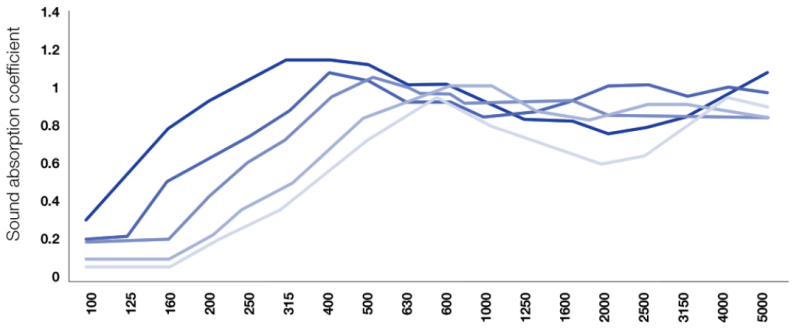
Weather resistance
Impervious to frost and rain

Specification Information

- Quietstone Light Brochure
- Quietstone Light - Sound Absorbtion Charts
- Sports Halls
- Quietstone Panels - Wall Installation - Adhesive
- Quietstone Panels - Wall Installation - Battens
- Quietstone Panels - Wall Installation - Direct to Wall

Acoustic Performance – Tested to BS EN 354:2003

- 25mm panel, 50mm air gap
- 25mm panel, 50mm mineral fibre
- 50mm panel
- 50mm panel, 25,, air gap
- 85mm panel 12 gap or fixings

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ACOUSTICS