

Timber Products Facility
Unit 2 Earlsfield Park
Knowsley Lane
Huyton
L34 4AH

Plant Noise Impact Assessment

Project Reference: 93803 | Revision: 01 | Date: 20th April 2026
Revised Date: 1st May 2026

Document Information

Project Name : Timber Products Facility at Unit 2, Earlsfield Park, Huyton L34 4AH
Project Reference : 93803
Report Title : Plant Noise Impact Assessment
Doc Reference : 93803/NIA
Date : 20th April 2026

	Name	Qualifications	Initials	Date
Prepared by:	Alfie Morgan	BSc(Hons), TechIOA	ADM	20 th April 2026
Reviewed and approved by:	Dean Bowden	BSc(Hons), MIOA	DMB	21 st April 2026
For and on behalf of Noise Solutions Ltd				

Revision	Date	Description	Prepared	Reviewed/ Approved
01	01/05/2026	Wording amendments	ADM	NAC
02	05/08/2026	Updates following comments from Council	DMB	JS

Noise Solutions Ltd (NSL) disclaims any responsibility to the Client and others in respect of any matters outside the scope of this report. This report has been prepared with reasonable skill, care and diligence within the terms of the Contract with the Client and generally in accordance with the appropriate ACE Agreement and taking account of the manpower, resources, investigations and testing devoted to it by agreement with the Client. This report is confidential to the Client and NSL (Noise Solutions Ltd) accepts no responsibility of whatsoever nature to third parties to whom this report or any part thereof is made known. Any such party relies upon the report at their own risk.

© Noise Solutions Ltd (NSL) 2026

Reg no. 3483481 Head office: Unit 5 Oriel Court, Omega Park, Alton, Hampshire, GU34 2YT
Manchester office: The Old Shippon, Moseley Hall Farm, Chelford Road, Knutsford, WA16 8RB

Contents

1.0	Introduction	1
2.0	Details of development proposals.....	1
3.0	Nearest noise sensitive receptors	2
4.0	Acoustic Standards and planning conditions	2
	Planning conditions	4
	Application of criteria	5
5.0	External plant noise assessment	6
6.0	Summary	14

Appendices

Appendix A	Acoustic terminology
Appendix B	Photograph of site showing areas of interest
Appendix C	Proposed development plans and elevations
Appendix D	Sound survey results from "AC103830-1R13"
Appendix E	Plant make/ models
Appendix F	Plant noise calculations

1.0 Introduction

- 1.1. Noise Solutions Ltd (NSL) has been commissioned to undertake a plant noise assessment relating to a proposed fixed plant installation at Unit 2, Earlsfield Park, Prescott.
- 1.2. An environmental sound survey has previously been undertaken, with a planning condition imposed requiring compliance with the levels outlined within the report. An assessment has been made of noise levels resulting from fixed plant installations at the premises.
- 1.3. To assist with the understanding of this report a brief glossary of acoustic terms can be found in **Appendix A**. A more in-depth glossary of acoustic terms can be assessed at the following web address <http://www.acoustic-glossary.co.uk/>.

2.0 Details of development proposals

- 2.1. Full planning permission is sought for:

"The erection of plant comprised of: forklift truck enclosure, sprinkler tanks, ancillary sprinkler buildings, roof access ladder, access stairs and biomass boiler facility including wood chipper enclosure, extract dust silo and boiler room at Unit 2 Earlsfield Park, Prescott"

- 2.2. The proposed layout of the site is shown in **Appendix C**.
- 2.3. Conditions 14 and 15 of application reference 25/00614/FUL state that noise from fixed plant and machinery should be at least 5dB below the existing L_{A90} background noise level. The full conditions are outlined in 4.13 and 4.14 below.
- 2.4. The following items of plant are proposed.
 - 4no. fans, external but with no atmospheric duct openings;
 - Biomass boiler and additional fan, within an external plant compound; and
 - A wood chipper, within an external plant compound.
 - The wood chipper will only operate for 30-minutes at a time, and only roughly 4 to 5 times per day.
- 2.5. Operation of the 4No fans and wood chipper will be limited to 07:45 – 16:30 hours Monday to Thursday and 07:45 – 12:30 hours on Friday.
- 2.6. The biomass boiler will only operate at full duty during the daytime period (07:00–23:00 hours). A small internal fan may continue to operate during the night-time period; however, the

associated noise emissions are significantly lower than those generated during normal boiler operation and are therefore expected to have a negligible effect on overall plant noise levels.

3.0 Nearest noise sensitive receptors

- 3.1. The area surrounding the site is mixed residential and commercial in use. The site is bounded to the north by the M57 motorway, to the east by other commercial premises, to the south by Arley Drive, the sole access road to the site, and by a residential housing estate to the west.
- 3.2. Receptor R1 has been identified as a residential property at 133 Knowsley Lane, approximately 160m from the closest item of plant, with full line of sight.
- 3.3. Receptor R2 has been identified as a residential property at 64 Higherfield Crescent. The plant is approximately 150m from this receptor and is screened by the commercial unit itself.
- 3.4. Residential receptors along Fountain Way, and Henhouse Drive have increased distance and screening compared with receptors R1, and R2, as such noise levels from the plant proposals outlined within this report will be lower at receptors on Fountain Way and Henhouse drive than R1, and R2.
- 3.5. Receptor R3 has been identified as a commercial premises, approximately 45m east of the plant location.
- 3.6. **Appendix B** contains an aerial photograph showing the site and surrounding area.

4.0 Acoustic Standards and planning conditions

BS 4142:2014 + A1:2019 Methods for Rating and Measuring Industrial and Commercial Sound

- 4.1. BS 4142:2014+A1:2019 describes a method for rating and assessing sound of an industrial or commercial nature, which includes:
 - Sound from industrial and manufacturing processes;
 - Sound from fixed installations which comprise mechanical and electrical plant and equipment;
 - Sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
 - Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

-
- 4.2. Therefore, for the first time in the UK, noise associated with store deliveries (i.e. sound from loading and unloading of goods) has a recognised and approved assessment methodology as this type of noise was not included in the scope of previous versions of BS 4142.
- 4.3. The industrial or commercial sound is assessed outside a dwelling or premises used for residential purposes, upon which sound is incident.
- 4.4. The procedure contained in BS4142:2014 + A1:2019 is to quantify the "specific sound level", which is the measured or predicted level of sound from the source in question over a one hour period for the daytime and a 15-minute period for the night-time. Daytime is defined in the standard as 07:00 to 23:00 hours, and night-time as 23:00 to 07:00 hours.
- 4.5. The specific sound level is converted to a rating level by adding penalties on a sliding scale to account for either potentially tonal or impulsive elements. The standard sets out objective methods for determining the presence of tones or impulsive elements, but notes that it is acceptable to subjectively determine these effects.
- 4.6. The penalty for tonal elements is between 0dB and 6dB, and the standard notes: "Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible."
- 4.7. The penalty for impulsive elements is between 0dB and 9dB, and the standard notes: "Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible."
- 4.8. The background sound level should be established in terms of the L_{A90} noise index. The standard states that the background sound level should be measured over a period of sufficient length to obtain a representative value. This should not normally be less than 15-minute intervals. The standard states that: "A representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or modal value."
- 4.9. The assessment outcome results from a comparison of the rating level with the background sound level. The standard states:
- a) Typically, the greater this difference, the greater the magnitude of the impact.*
- b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
-

d) 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.

Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact."

The standard goes on to note that: "Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night."

- 4.10. In addition to the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level, the 2014 edition places emphasis upon an appreciation of the context, as follows:

"An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context."

- 4.11. BS 4142:2014 + A1:2019 requires uncertainties in the assessment to be considered, and where the uncertainty is likely to affect the outcome of the assessment, steps should be taken to reduce the uncertainty.

Planning conditions

- 4.12. A condition on the site regarding commercial noise has been set by Knowsley Metropolitan Borough Council.

- 4.13. Condition 14 of application reference 25/00614/FUL states the following.

"Fixed plant and machinery associated with the development shall be designed to a level that is at least 5dB(A) below the existing LA90 background noise level as measured during the relevant time period.

Any tonal, impulsive or irregular noise would be addressed by imposing a penalty as per the methodology set out in BS 4142:2014+A1:2019. Methods for rating and assessing industrial and commercial sound.

Noise limits for fixed plant are to apply at a position 1 metre from the closest affected window of the nearest noise sensitive property on Knowsley Lane, Highfield Crescent and Fountain Way.

Reason: To safeguard local residents from noise and disturbance, and to comply with Policy ENV2 of the Knowsley Replacement Unitary Development Plan adopted June 2006.
Application of criteria

4.14. Condition 15 of application reference 25/00614/FUL states the following.

The level of noise emitted from activities associated with the site shall not exceed the existing LA90 background noise level as set out within the Noise Impact Assessment submitted with the application (AC103830-1R13) and as measured at the following times:

- LAeq (1 hour) between 0700-2300
- LAeq (15 mins) between 2300-0700

Noise limits are to apply at a position 1 metre from the closest affected window of the nearest noise sensitive property on Knowsley Lane, Fountain Way and Highfield Crescent.

Reason: To safeguard local residents from noise and disturbance, and to comply with Policy ENV2 of the Knowsley Replacement Unitary Development Plan adopted June 2006.

4.15. Based on guidance within BS 4142:2014+A1:2019, alongside planning Conditions 14, and 15, the following noise limits have been set at nearby receptors.

Table 1 Maximum plant noise rating level at receptors

Period	Maximum Rating level, L _{Ar} , dB from fixed plant installations at nearby <u>residential</u> receptors
Daytime (07:00 – 23:00)	47
Night-time (23:00 – 07:00)	35

4.16. The above levels are based on 5dB below the lowest measured daytime weekday background sound pressure level of 52dB L_{A90}, and night-time background of 40dB L_{A90}, from Ensaf Consultants' report¹ titled "AC103830-1R13" at NMP3, for which the following was noted.

¹ Ensaf Consultants report titled "Noise Impact Assessment for ION Property Developments LTD at Knowsley Lane, Huyton AC103830-1R13" Dated 17/11/2020

NMP3: Located in an existing hedgerow to the north of existing receptors off Knowsley Lane and Lyme Close. The microphone of the sound level meter was positioned at a height of 1.5m above ground level and in free-field conditions. The noise climate at this location was dominated by road traffic sound.

- 4.17. With the above measurement being taken along Knowsley Lane, this position is likely an accurate representation of anticipated background sound levels at Receptors R1 and R2.

Commercial receptors

- 4.18. With reference to Appendix D, the lowest measured weekday background sound pressure level at NMP1 (representative of Receptor R3) was 66dB L_{A90} (from Ensaf Consultants' report² titled "AC103830-1R13"). The lowest measured background during typical office hours was measured to be 73dB L_{A90}.
- 4.19. Commercial premises are generally considered to be less noise sensitive than residential and, therefore, emissions criteria are generally relaxed at such receptors. Assuming the same emissions criteria were to apply to commercial premises as detailed in Condition 14, however, a plant noise rating level of 61dB L_{Aeq} would apply at the nearest commercial windows during the daytime.
- 4.20. Noise affecting commercial premises would not typically be assessed at night, when the premises are likely to be vacant.

5.0 External plant noise assessment

- 5.1. The cumulative plant noise level at the most affected noise sensitive receptors has been predicted. The assessment has taken into consideration distance attenuation and directivity corrections. Predictions are inclusive of the following:
- Acoustic enclosures formed of 1.2mm Galvanised Steel, with 50mm acoustic absorption internally, providing a 10dB attenuation loss to all fans.
 - External housing for the Biomass boiler, and woodchipper to be formed of the same cladding as the main warehouse, and comprises of;
 - Outer façade: 0.50mm galvanized steel cladding (Tata Steel HPS200 Ultra)
 - Cavity: 200mm Airgap, 75mm fibreglass mineral infill, with 1.45mm thick steel frames.

² Ensaf Consultants report titled "Noise Impact Assessment for ION Property Developments LTD at Knowsley Lane, Huyton AC103830-1R13" Dated 17/11/2020

- Inner facing: 12.5mm plasterboard

The external housing for both includes a roller-shutter door. The roller shutter will be kept closed, except for access. To ensure a robust assessment, however, the calculations for the woodchipper assume the door will be open.

- 5.2. Sound reduction indexes of the external housing, and roller shutter door used for predictions within this assessment are outlined within the table below.

Table 2 Sound reduction indexes of external housing

Façade Build-up	Sound reduction index dB, at octave band centre frequencies (Hz)							
	63	125	250	500	1k	2k	4k	8k
External cladding ¹	11	18	37	46	47	62	63	63
Roller shutter door ²	10	15	17	23	18	25	40	46

Note 1 – SRI calculated using INSUL, based on the construction details above

Note 2 – spectra based on a roller shutter providing approximately Rw22dB. The final shutter has not been selected at this stage, but suitable shutters are available on the market (example link: [22dB Sound Reduction Roller Shutters / UK Roller Shutters](#))

- 5.3. It should be noted that the proposed ventilation plant will operate during operational hours only and is not anticipated to exhibit any tonal or impulsive characteristics provided it is well maintained. For robustness a +3dB feature correction has been applied to all ventilation plant, and the biomass boiler for the possible presence of " ...characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment..." as described in BS 4142:2014+A1:2019.
- 5.4. It is anticipated that the proposed woodchipper will likely exhibit some impulsive, and tonal characteristics. For robustness a +6dB feature correction has been applied for impulsivity, and a +4dB feature correction has been applied for tonality.
- 5.5. Tables 3 to Table 7 below summarise the results of the assessment outside the nearest noise-sensitive premises. All other nearby receptors benefit from increased distance/screening to the plant such that resulting noise levels will be lower than at the receptors considered. The full calculations are presented in **Appendix F**.

Table 3 BS 4142:2014 assessment of plant noise emissions at Receptor R1 (daytime)

Results	07:00 – 23:00 hrs	Relevant Clauses of BS 4142:2014	Commentary
Background Sound level	$L_{A90} = 52\text{dB}$	8.1, 8.2	Lowest measured daytime background sound level.
Assessment made during the daytime, so the reference interval is one hour		7.2	
Specific Sound Level	$L_{Aeq,T} = 39\text{dB}$	7.3.6	Calculations presented in Appendix F (worst-case tabulated)
Acoustic Feature Correction	+5dBA (overall)	9.2	See calculation
Rating Level	44dBA		
Excess of Rating Level over background sound level	(44-52) dBA = -8dBA		
Context	The rating $L_{Aeq,1\text{hour}}$ of 44dB, at the worst-case noise sensitive receptor is 8dBA below the lowest daytime background sound level. This means that noise levels comfortably comply with the requirements of Condition 14.		
Assessment of impact:	No impact		

Table 4 BS 4142:2014 assessment of plant noise emissions at Receptor R1 (night-time)

Results	23:00 – 07:00 hrs	Relevant Clauses of BS 4142:2014	Commentary
Background Sound level	$L_{A90} = 40\text{dB}$	8.1, 8.2	Lowest measured daytime background sound level.
Assessment made during the night-time, so the reference interval is 15-minutes		7.2	
Specific Sound Level	$L_{Aeq,T} = 26\text{dB}$	7.3.6	Calculations presented in Appendix F (worst-case tabulated)
Acoustic Feature Correction	+3dBA	9.2	See calculation
Rating Level	29dBA		
Excess of Rating Level over background sound level	(29-40) dBA = -11dBA		
Context	The rating $L_{Aeq,15\text{mins}}$ of 29dB, at the worst-case noise sensitive receptor is 11dBA below the lowest night-time background sound level. This means that noise levels comfortably comply with the requirements of Condition 14.		
Assessment of impact:	No impact		

Table 5 BS 4142:2014 assessment of plant noise emissions at Receptor R2 (daytime)

Results	07:00 – 23:00 hrs	Relevant Clauses of BS 4142:2014	Commentary
Background Sound level	$L_{A90} = 52\text{dB}$	8.1, 8.2	Lowest measured daytime background sound level.
Assessment made during the daytime, so the reference interval is one hour		7.2	
Specific Sound Level	$L_{Aeq,T} = 31\text{dB}$	7.3.6	Calculations presented in Appendix F (worst-case tabulated)
Acoustic Feature Correction	+7dBA (overall)	9.2	See calculation
Rating Level	38dBA		
Excess of Rating Level over background sound level	(38-52) dBA = -14dBA		
Context	The rating $L_{Aeq,1\text{hour}}$ of 38dB, at the worst-case noise sensitive receptor is 14dBA below the lowest daytime background sound level. This means that noise levels comfortably comply with the requirements of Condition 14.		
Assessment of impact:	No impact		

Table 6 BS 4142:2014 assessment of plant noise emissions at Receptor R2 (night-time)

Results	23:00 – 07:00 hrs	Relevant Clauses of BS 4142:2014	Commentary
Background Sound level	$L_{A90} = 40\text{dB}$	8.1, 8.2	Lowest measured daytime background sound level.
Assessment made during the daytime, so the reference interval is 15-minutes		7.2	
Specific Sound Level	$L_{Aeq,T} = 17\text{dB}$	7.3.6	Calculations presented in Appendix F (worst-case tabulated)
Acoustic Feature Correction	+3dBA	9.2	See calculation
Rating Level	20dBA		
Excess of Rating Level over background sound level	(20-40) dBA = -20dBA		
Context	The rating $L_{Aeq,15\text{mins}}$ of 21dB, at the worst-case noise sensitive receptor is 19dBA below the lowest night-time background sound level. This means that noise levels comfortably comply with the requirements of Condition 14.		
Assessment of impact:	No impact		

Table 7 BS 4142:2014 assessment of plant noise emissions at Receptor R3 (daytime)

Results	07:00 – 23:00 hrs	Relevant Clauses of BS 4142:2014	Commentary
Background Sound level	$L_{A90} = 66\text{dB}$	8.1, 8.2	Lowest measured daytime background sound level.
Assessment made during the daytime, so the reference interval is one hour		7.2	
Specific Sound Level	$L_{Aeq,T} = 50\text{dB}$	7.3.6	Calculations presented in Appendix F (worst-case tabulated)
Acoustic Feature Correction	+5dBA (overall)	9.2	See calculation
Rating Level	55dBA		
Excess of Rating Level over background sound level	(55-66) dBA = -11dBA		
Context	The rating $L_{Aeq,1\text{hour}}$ of 55dB, at the worst-case noise sensitive receptor is 11dBA below the lowest daytime background sound level. This means that noise levels comfortably comply with the requirements of Condition 14.		
Assessment of impact:	No impact		

- 5.6. The noise level predictions at nearby residential receptors, inclusive of robust feature corrections, demonstrate that cumulative noise emissions from the proposed plant will comply with the requirements of Condition 14.

Context and uncertainties

- 5.7. As BS 4142:2014 advises, the impact must be considered within the context of the site and the surrounding acoustic environment. The following must, therefore, also be taken into consideration when determining the potential impact that may be experienced:
- The assessment is undertaken at the nearest residential and commercial windows. The impact on all other nearby receptors will be lower due to screening and distance attenuation.
 - The noise level predictions are based on the proposed equipment running at maximum daytime and night-time duty, as applicable. The plant will not run in this manner at all times and, therefore, this is a robust assessment.
 - The assessments are based on the lowest recorded daytime and night-time background noise levels. The impact would be reduced if a representative level was used.
 - The woodchipper will only operate for 30-minutes at a time, and only roughly four to five times per day. The calculations in this report assume the woodchipper will run continuously during the 1-hour daytime assessment period and, therefore, are robust. The actual impact will likely be less than predicted.
 - The woodchipper will only be operated with the enclosure roller shutter closed. The calculations in this report robustly assume the shutter is open. The actual impact will likely be less than predicted.
 - The biomass boiler will only operate at full duty during the daytime period (07:00–23:00 hours). A small internal fan may continue to operate during the night-time period; however, the associated noise emissions are significantly lower than those generated during normal boiler operation and are therefore expected to have a negligible effect on overall plant noise levels. In any case, to ensure a robust assessment, the assessment considers the boiler operating at full duty 24hours a day.
 - For additional context relating to the assessment of noise affecting commercial premises at Receptor R3 - BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' provides guidance on typical noise levels in non-domestic buildings. For offices, it gives a design range of 35–40dB $L_{Aeq,T}$. Assuming a partially open window will provide an overall noise reduction of 15dBA from outside to inside, an appropriate external design range would typically be 50–55dB $L_{Aeq,T}$. The predicted external specific noise levels at

receptor are 50dBA, and therefore meet these limits. Furthermore, given the prevailing environmental noise levels it is unlikely that windows are left open for ventilation particularly when quieter internal conditions are required.

5.8. Where possible uncertainty in the above assessments has been minimised by taking the following steps:

- Uncertainty in the calculated impacts has been reduced by the use of a well-established calculation method.
- Manufacturer stated noise levels have been established through testing in accordance with relevant standards.
- The worst-case predicted noise levels comply with the requirements of Condition 14, achieving a margin of 3dBA at the worst-affected receptors. Given the conservative assessment methodology adopted, there is additional confidence that the proposed scheme will achieve compliance under typical operating conditions.

Vibration isolation

5.9. The woodchipper and ventilation fans will be mounted on suitable anti-vibration isolators to minimise the potential for structure-borne vibration. In any event, the plant is located a considerable distance from the nearest noise-sensitive receptors and will not be installed on a shared structural slab. Consequently, the potential for vibration transmission to nearby receptors is considered to be very low.

6.0 Summary

6.1. Noise Solutions Ltd (NSL) has been commissioned to provide an assessment of noise relating to a proposed development at Unit 2, Earlsfield Park, Knowsley Lane, Huyton, L34 4AH.

6.2. Conditions 14 of application reference 25/00614/FUL states outlines noise from fixed plant and machinery should be at least 5dB below the existing L_{A90} background noise level.

6.3. Predicted noise levels for proposed plant when assessed at the nearest noise sensitive receptor are no louder than a level 5dBA below the existing background sound level outlined in Ensaf Consultants' report, and thus satisfy Condition 14. Predictions are inclusive of the following mitigation measures:

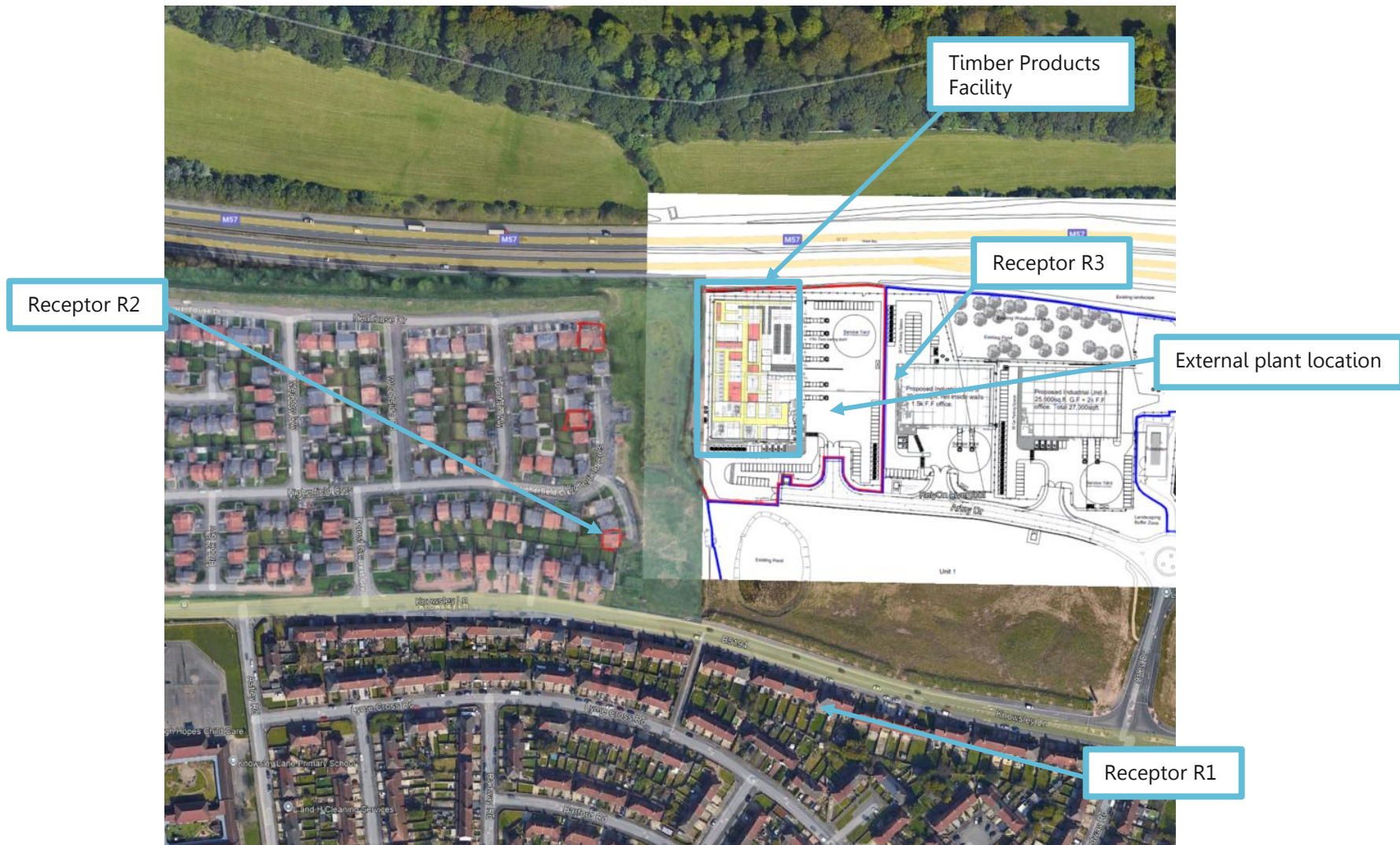
- 4no. ventilation fans to be housed within acoustic enclosures;
- Biomass boiler and additional fan to be housed within an enclosure comprised of composite panelling similar to the main building structure; and

-
- Woodchipper to be housed within an enclosure comprised of composite panelling similar to the main building structure.
 - The woodchipper and ventilation fans are to be fitted with suitable anti-vibration mounts.
- 6.4. Based on the findings of this assessment, noise should not be grounds for refusal of planning permission for the proposed plant.

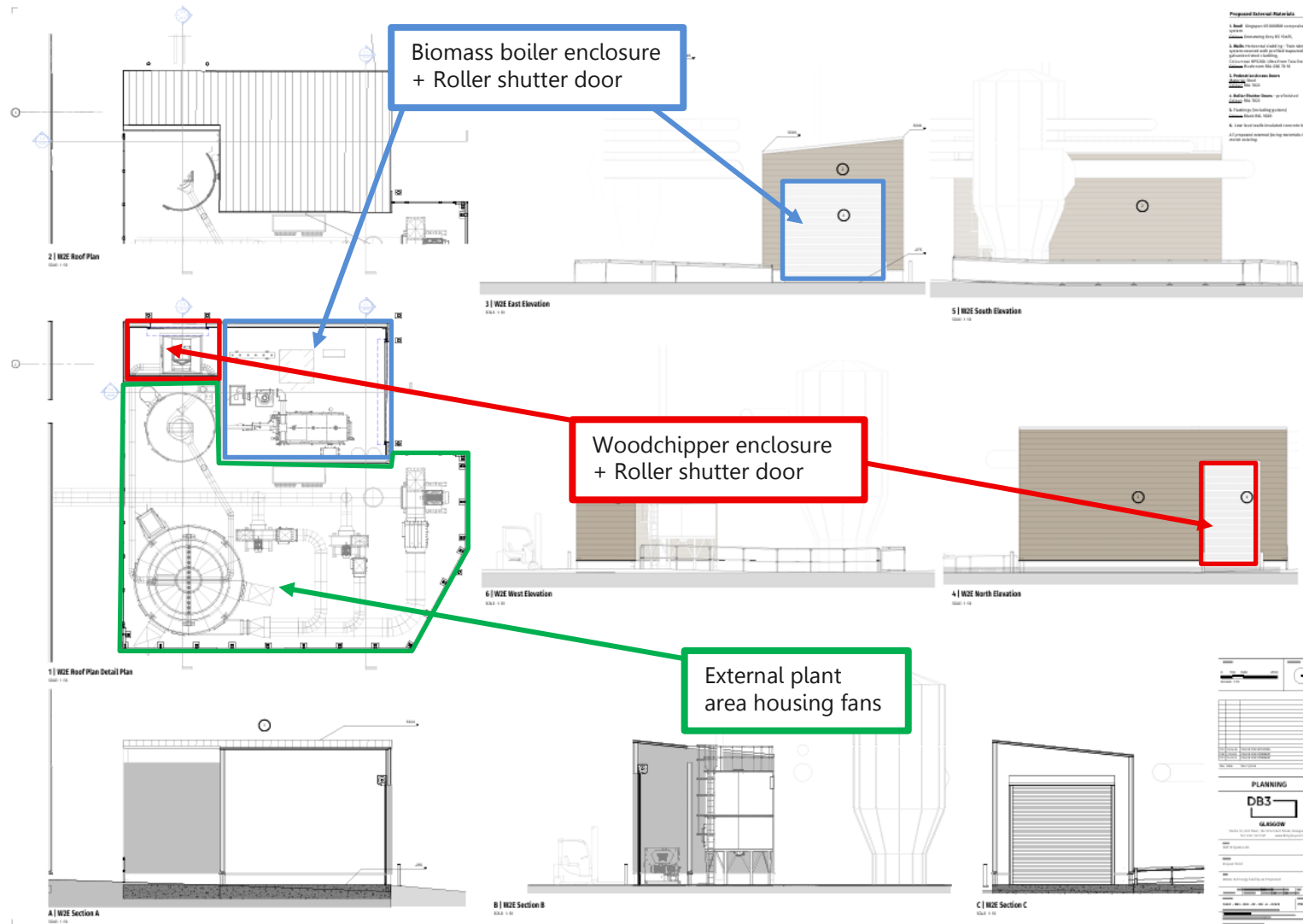
Appendix A Acoustic terminology

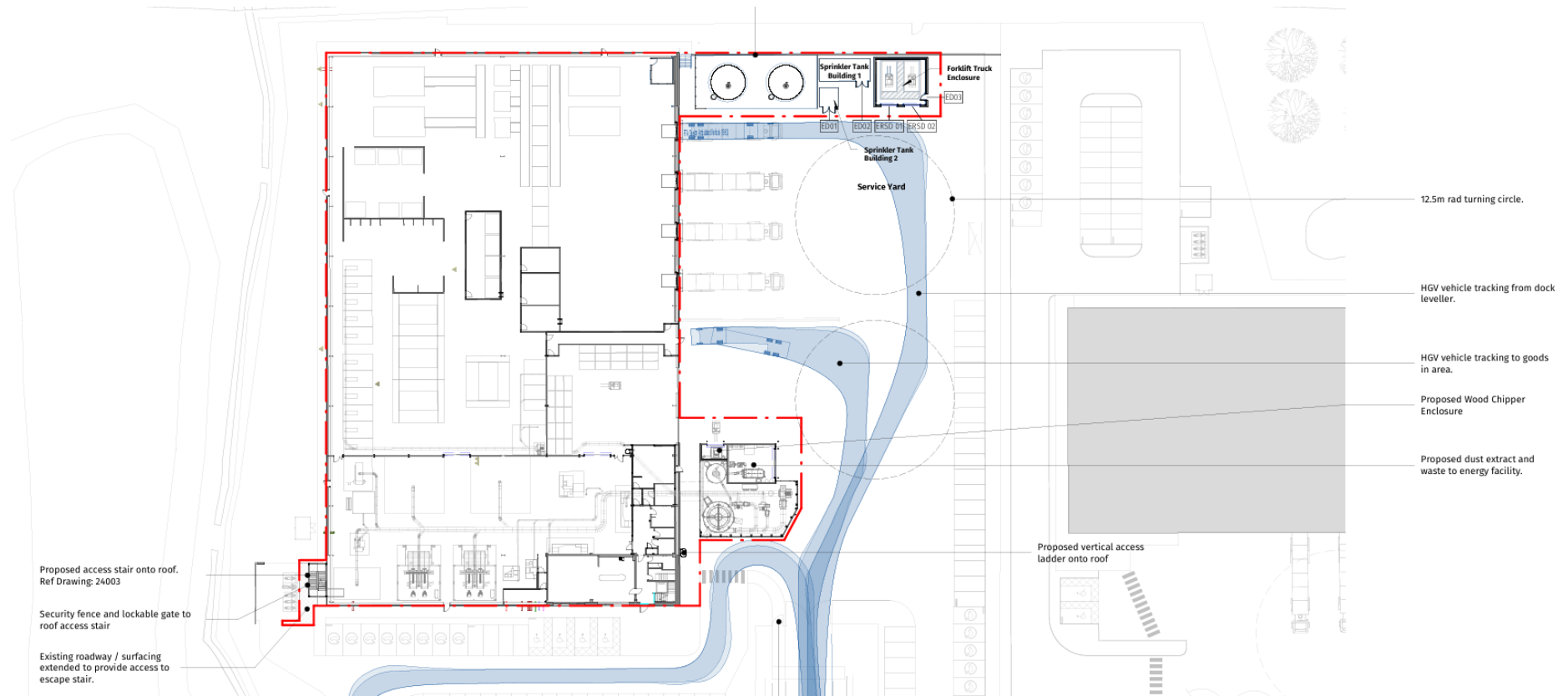
Parameter	Description
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ($L_{Aeq,T}$).
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10} (s_1/s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is $20\mu\text{Pa}$. The threshold of normal hearing is in the region of 0 dB and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.
dB(A), L_{Ax}	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
Fast Time Weighting	Setting on sound level meter, denoted by a subscript F, that determines the speed at which the instrument responds to changes in the amplitude of any measured signal. The fast time weighting can lead to higher values than the slow time weighting when rapidly changing signals are measured. The average time constant for the fast response setting is 0.125 (1/8) seconds.
Free-field	Sound pressure level measured outside, far away from reflecting surfaces (except the ground), usually taken to mean at least 3.5 metres
Façade	Sound pressure level measured at a distance of 1 metre in front of a large sound reflecting object such as a building façade.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level recorded during a noise event with a period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise. $L_{A10,18h}$ is the A-weighted arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06:00-24:00.
$L_{90,T}$	A noise level index. The noise level that is exceeded for 90% of the measurement time interval, T. It gives an indication of the lower levels of fluctuating noise. It is often used to describe the background noise level and can be considered to be the "average minimum" noise level and is a term used to describe the level to which non-specific noise falls during quiet spells, when there is lull in passing traffic for example.

Appendix B Photograph of site showing areas of interest



Appendix C Proposed development plans and elevations





Appendix D Sound survey results from "AC103830-1R13"

D.1 Measurements at Position NMP3, considered representative of Receptors R1 and R2

Table 6: Summary of Measured Ambient and Background Sound Levels

Date	Period	Range of Measured Sound Pressure Level, $L_{Aeq,T}$ (dB)	Range of Measured Background Sound Level, $L_{A90,T}$ (dB)
Thursday 31 st August 2017	Daytime (14:00 – 23:00)	59.0 – 64.3	56.2 – 62.7
	Night-time (23:00 – 07:00)	54.0 – 64.8	49.4 – 62.2
Friday 1 st September 2017	Daytime (07:00 – 23:00)	59.3 – 64.3	56.7 – 64.2
	Night-time (23:00 – 07:00)	52.8 – 60.1	49.4 – 57.0
Saturday 2 nd September 2017	Daytime (07:00 – 23:00)	52.7 – 61.6	50.7 – 56.6
	Night-time (23:00 – 07:00)	47.5 – 53.1	44.5 – 50.6
Sunday 3 rd September 2017	Daytime (07:00 – 23:00)	50.1 – 58.3	48.0 – 57.4
	Night-time (23:00 – 07:00)	43.9 – 56.1	39.8 – 54.3
Monday 4 th September 2017	Daytime (07:00 – 12:00)	53.5 – 57.4	51.5 – 56.3

D.2 Measurements at Position NMP1, considered representative of Receptor R3

Table A3 Measured Sound Pressure Levels at NMP1

Measurement Start Time	Measured Sound Pressure Levels (dB)		
	L _{Aeq,1hr}	L _{A90,1hr}	L _{A10,1hr}
23/08/2017 13:00	80.9	73.8	83.9
23/08/2017 14:00	81.5	74.9	84.3
23/08/2017 15:00	82.2	76.1	84.7
23/08/2017 16:00	83.2	78.4	85.1
23/08/2017 17:00	83.1	78.6	85.2
23/08/2017 18:00	82.9	77.4	85.3
23/08/2017 19:00	81.3	73	84.3
23/08/2017 20:00	78.3	67.2	82
23/08/2017 21:00	77.1	65.5	81
23/08/2017 22:00	77.1	66.5	81.2
24/08/2017 07:00	82.7	77.1	85.3
24/08/2017 08:00	82.8	77.6	85.2
24/08/2017 09:00	81.5	74.3	84.4
24/08/2017 10:00	80.9	73.2	84
24/08/2017 11:00	81.1	74.1	84
24/08/2017 12:00	81.1	73.9	84.1

Appendix E Plant make/ models

Plant	Make/ Model	No. of units	Location	Manufacturer stated Sound Pressure Level
Fan 1*	Air Plants/ 915HE 110kW	1	External	83dBA at 1m
Fan 2*	Air Plants/ 710HP 22kW	1	External	81dBA at 1m
Fan 3*+4	Air Plants/ 710HP 30kW	2	3. External 4. Within Boiler enclosure	81dBA at 1m
Fan 5*	Air Plants/ Load 5 18.5kW	1	External	85dBA at 1m
Biomass Boiler	Talbotts/ MWE 300 Boiler	1	Boiler enclosure	78dBA at 1m
Woodchipper	Talbotts/ Bulldog BD800	1	Woodchipper enclosure	82dBA at 1m

**Each external fan will be housed within an acoustic enclosure comprising 1.2mm galvanized steel, and lined with a 50mm class A absorber, providing 10dB of insertion loss.*

***Manufacturer noise data are understood to represent worst-case noise emissions from the units. For fans operating correctly and free from maintenance defects, the maximum and average noise emission levels are typically very similar due to the steady-state nature of their operation.*

Appendix F Plant noise calculations

Calculations for biomass enclosure breakout

Description	Sound reduction index, dB, at 1/1 octave band centre frequencies, Hz								dBA
	63	125	250	500	1k	2k	4k	8k	
Biomass Boiler Southern Façade (Radiating wall = 7.2m x 6.2m)									
Total source sound power level L_w	92	90	86	86	86	83	80	68	90
Surface absorption coefficient (Hard room)	0.05	0.05	0.08	0.08	0.08	0.1	0.1	0.1	n/a
Total absorption	12.2	12.2	19.6	19.6	19.6	24.5	24.5	24.5	
Krev	-5	-5	-7	-7	-7	-8	-8	-8	
Reverberant pressure level L_p	87	84	78	78	78	75	72	60	83
Façade SRI (Cladding)	11	18	37	46	47	62	63	63	n/a
Sound pressure level 1m from façade	79	69	44	35	34	16	11	-1	56

Description	Sound reduction index, dB, at 1/1 octave band centre frequencies, Hz								dBA
	63	125	250	500	1k	2k	4k	8k	
Biomass Boiler Western Façade (Radiating wall = 3.6m x 6.2m)									
Total source sound power level L_w	92	90	86	86	86	83	80	68	90
Surface absorption coefficient (Hard room)	0.05	0.05	0.08	0.08	0.08	0.1	0.1	0.1	n/a
Total absorption	12.2	12.2	19.6	19.6	19.6	24.5	24.5	24.5	
Krev	-5	-5	-7	-7	-7	-8	-8	-8	
Reverberant pressure level L_p	87	84	78	78	78	75	72	60	83
Façade SRI (Cladding)	11	18	37	46	47	62	63	63	n/a
Sound pressure level 1m from façade	76	66	41	32	31	13	8	-4	53

Description	Sound reduction index, dB, at 1/1 octave band centre frequencies, Hz								dBA
	63	125	250	500	1k	2k	4k	8k	
Biomass Boiler Eastern Façade (Radiating wall = 5.8m x 6.2m)									
Total source sound power level L _w	92	90	86	86	86	83	80	68	90
Surface absorption coefficient (Hard room)	0.05	0.05	0.08	0.08	0.08	0.1	0.1	0.1	n/a
Total absorption	12.2	12.2	19.6	19.6	19.6	24.5	24.5	24.5	
Krev	-5	-5	-7	-7	-7	-8	-8	-8	
Reverberant pressure level L _p	87	84	78	78	78	75	72	60	83
Façade SRI (Roller door)	10	15	17	23	18	25	40	46	n/a
Sound pressure level 1m from façade	79	71	63	57	62	52	33	15	64

Description	Sound reduction index, dB, at 1/1 octave band centre frequencies, Hz								dBA
	63	125	250	500	1k	2k	4k	8k	
Biomass Boiler Northern Façade (Radiating wall = 7.2m x 6.2m)									
Total source sound power level L_w	92	90	86	86	86	83	80	68	90
Surface absorption coefficient (Hard room)	0.05	0.05	0.08	0.08	0.08	0.1	0.1	0.1	n/a
Total absorption	12.2	12.2	19.6	19.6	19.6	24.5	24.5	24.5	
Krev	-5	-5	-7	-7	-7	-8	-8	-8	
Reverberant pressure level L_p	87	84	78	78	78	75	72	60	83
Façade SRI (Cladding)	11	18	37	46	47	62	63	63	n/a
Sound pressure level 1m from façade	79	69	44	35	34	16	11	-1	56

Description	Sound reduction index, dB, at 1/1 octave band centre frequencies, Hz								dBA
	63	125	250	500	1k	2k	4k	8k	
Biomass Boiler Roof (Radiating area = 7.2m x 5.8m)									
Total source sound power level L_w	92	90	86	86	86	83	80	68	90
Surface absorption coefficient (Hard room)	0.05	0.05	0.08	0.08	0.08	0.1	0.1	0.1	n/a
Total absorption	12.2	12.2	19.6	19.6	19.6	24.5	24.5	24.5	
Krev	-5	-5	-7	-7	-7	-8	-8	-8	
Reverberant pressure level L_p	87	84	78	78	78	75	72	60	83
Façade SRI (Cladding)	11	18	37	46	47	62	63	63	n/a
Sound pressure level 1m from façade	78	69	43	35	34	15	11	-1	55

Receptor	Elevation	Calculation of noise from a plane source							
		Length a (m)	Length b (m)	Distance to receptor (m)	Façade Lp at 1m (dBA)	Screening (dBA)	Directivity (dBA)	Feature correction (dBA)	Rating level at receptor (dBA)
R1	S	7.2	6.2	160	56	0	3	3	24
	E	5.8	6.2	167.5	64	-5	3	3	26
	N	7.2	6.2	175	56	-10	3	3	14
	W	5.8	6.2	167.5	53	0	3	3	20
	Roof	5.8	7.2	167.5	55	-5	3	3	18
	Cumulative								29
R2	S	7.2	6.2	150	56	-10	3	3	15
	E	5.8	6.2	150	64	-15	3	3	17
	N	7.2	6.2	150	56	-15	3	3	10
	W	5.8	6.2	150	53	-15	3	3	6
	Roof	5.8	7.2	150	55	-15	3	3	9
	Cumulative								20
R3	S	7.2	6.2	45	56	0	3	3	35
	E	5.8	6.2	45	64	0	3	3	43
	N	7.2	6.2	45	56	0	3	3	35
	W	5.8	6.2	45	53	-10	3	3	22
	Roof	5.8	7.2	45	55	0	3	3	34
	Cumulative								44

Cumulative plant noise at R1

Unit	Manufacturer source noise level		Distance correction		Directivity, dB	Attenuation, dB	Screening, dB	BS 4142 Feature correction	Specific level, dBA	Rating level, dBA
	L _{pA}	at / m	Distance, m	Correction, dB						
Fan 1	83	1	160	-44	3	-10	0	3	32	35
Fan 2	81	1	160	-44	3	-10	0	3	30	33
Fan 3	81	1	160	-44	3	-10	0	3	30	33
Fan 5	85	1	160	-44	3	-10	0	3	34	37
Woodchipper (door open)	82	1	170	-45	3	0	-10	10	30	40
Biomass boiler	See separate calculation								26	29
Rating level at R1 – Daytime									39	44
Rating level at R1 – Night-time									26	29

Cumulative plant noise at R2

Unit	Manufacturer source noise level		Distance correction		Directivity, dB	Attenuation, dB	Screening, dB	BS 4142 Feature correction	Specific level, dBA	Rating level, dBA
	L _{pA}	at / m	Distance, m	Correction, dB						
Fan 1	83	1	150	-44	3	-10	-10	3	22	25
Fan 2	81	1	150	-44	3	-10	-10	3	20	23
Fan 3	81	1	150	-44	3	-10	-10	3	20	23
Fan 5	85	1	150	-44	3	-10	-10	3	24	27
Woodchipper (door open)	82	1	150	-44	3	0	-15	10	26	36
Biomass boiler	See separate calculation								17	20
Rating level at R2 – Daytime									31	38
Rating level at R2 – Night-time									17	20

Cumulative plant noise at R3

Unit	Manufacturer source noise level		Distance correction		Directivity, dB	Attenuation, dB	Screening, dB	BS 4142 Feature correction	Specific level, dBA	Rating level, dBA
	L _{pA}	at / m	Distance, m	Correction, dB						
Fan 1	83	1	45	-33	3	-10	0	3	43	46
Fan 2	81	1	45	-33	3	-10	0	3	41	44
Fan 3	81	1	45	-33	3	-10	0	3	41	44
Fan 5	85	1	45	-33	3	-10	0	3	45	48
Woodchipper (door open)	82	1	45	-33	3	0	-10	10	42	52
Biomass boiler	See separate calculation								41	44
Rating level at R3 – Daytime									50	55
Rating level at R3 – Night-time									41	44