

**NOISE ASSESSMENT**

**PROPOSED WOOD STORAGE YARD AND SHREDDING,  
PEBBLE HALL, THEDDINGWORTH**

**WELLAND WASTE MANAGEMENT LTD**

**JANUARY 2017**

LF Acoustics Ltd  
Wrest Park Enterprise Centre  
Building 52, Wrest Park  
Silsoe, Bedfordshire  
MK45 4HS

t: 01525 888046  
e: mail@lfacoustics.co.uk

Registered in England  
Company Reg: 8434608



## NOISE ASSESSMENT

# PROPOSED WOOD STORAGE AND SHREDDING, PEBBLE HALL, THEDDINGWORTH

WELLAND WASTE MANAGEMENT LTD

JANUARY 2017

This report has been prepared using all reasonable skill and care within the resources and brief agreed with the client. LFAcoustics Ltd accept no responsibility for matters outside the terms of the brief or for use of this report, wholly or in part, by third parties.

## CONTENTS

1.	Introduction	1
2.	Current Planning Conditions	2
3.	Assessment of Noise Levels from Proposed Storage and External Shredding Operation	4
4.	Summary	6
	References	
	Figures	
	Appendices	

## 1. Introduction

LF Acoustics Ltd have been appointed to carry out a noise assessment to support a planning application for a proposed wood storage yard and wood shredding operation at Pebble Hall, Theddingworth.

Planning permission has recently been granted for two renewable energy facilities on the site (the REGF and TAD). Noise assessments were prepared to accompany the planning applications for the two developments, with appropriate noise conditions attached which sought to control the cumulative noise generated by the two operations.

The noise assessment prepared to support the REGF application allowed for external storage of wood, which would be hammer shredded prior to use within the plant. Since the planning permission was granted, the Environment Agency's guidance on fire prevention has changed, forcing the requirement for a larger area to store wood fuel externally, due to the larger separations required between the storage bays. To maximise the efficiency of the storage area, it is now proposed to use a slow speed shredder within the bays to pre-shred the wood prior to storage. The use of the shredder would be daytime only and intermittent depending upon the amount of material delivered to site.

This report presents an assessment of the noise levels at the surrounding noise sensitive receptors, and considers the cumulative effects of the shredding and operation of the two facilities to ensure that the overall noise levels associated with the site operations remain within the noise limits specified within the existing planning conditions, which seek to ensure any adverse noise effects are minimised.

## 2. Current Planning Conditions

The most recent planning permission granted for the REGF (NCC Application Ref. 13/00098/WASFUL) imposed planning conditions to limit noise levels from the operation of the sites, as follows:

### 15. Noise

Prior to the commencement of any part of the development hereby permitted, full details of proposed external plant and equipment including predicted noise levels and the provisions to be made for its control shall be submitted to and approved in writing by the Waste Planning Authority. The development shall be carried out and maintained in accordance with the approved details.

Reason: In the interests of amenity protection having regard to Policy 22 of the Northamptonshire Minerals and Waste Local Plan (October 2014).

16. Noise from the development, including from all plant and machinery, shall be controlled to ensure that no frequency, when measured as a one third octave band, shall be greater or less than 10dB of its neighbouring frequency. The noise levels shall be determined by a freefield measurement at the boundary of the nearest residential premises, unless an alternative methodology is agreed in writing by the Waste Planning Authority. The nearest residential premises are:

- i. Hothorpe Hall;
- ii. Hothorpe Hall Eco Lodges;
- iii. Pebble Hall Farm;
- iv. Woodside Farm;
- v. Bosworth Hall

Reason: In the interests of amenity protection having regard to Policy 22 of the Northamptonshire Minerals and Waste Local Plan (October 2014).

17. All plant, equipment and machinery required in connection with the development hereby permitted shall be maintained in accordance with the manufacturer's specification.
18. Vehicles and mobile plant used on site, excluding off site collection and delivery vehicles, shall not be operated unless they have been fitted with white noise alarms, or other non-tonal alarm as may be submitted to and agreed in writing by the Waste Planning Authority.
19. The development shall not commence until a scheme for monitoring cumulative day time and night time noise from the developments at Pebble Hall Farm in accordance with the requirements of BS4142 and BS8233 has been submitted to and approved in writing by the Waste Planning Authority. The scheme as agreed shall thereafter be implemented in full and maintained.

20. Noise levels from day time and night time operations at the site shall be controlled to ensure the BS4142 derived 'Rating Noise Level' for the development including cumulatively with the permitted TAD (NCC reference 13/00117/WASFUL and DDC reference DA/2013/0851) shall:

a) not exceed the equivalent background noise levels, L90 dB(A), by more than 5 dB(A), at the following locations;

- i. Hothorpe Hall;
- ii. Hothorpe Hall Eco Lodges;
- iii. Woodside Farm;
- iv. Bosworth Hall

b) not exceed the equivalent background noise levels, L90 dB(A), by more than 10 dB(A), at the following locations;

- v. Pebble Hall Farm;

This requirement shall not apply at times when the Rating Noise Level and the background noise level are deemed by BS4142 to be 'very low'.

Reason for conditions 15-20: In the interests of amenity protection having regard to Policy 22 of the Northamptonshire Minerals and Waste Local Plan (October 2014).

The noise assessment prepared by Ian Sharland Limited to accompany the planning application [1], presented the results of a baseline noise assessment which had been carried out to determine the prevailing background noise levels at the surrounding noise sensitive receptors indicated in Condition 20.

For daytime operations, the report indicated the following background noise levels for morning and afternoon periods, upon which appropriate noise limits have been determined to satisfy the requirements of Condition 20.

Receptor	Typical Daytime Background Noise Levels [dB L <sub>A90</sub> ]	Proposed Daytime Noise Limit [dB L <sub>Aeq, 1 hour</sub> ]
Hothorpe Hall	37 – 41	42
Hothorpe Hall Eco Lodges	37 – 41	42
Woodside Farm	47 – 53	52
Bosworth Hall	40 – 44	45
Pebble Hall Farm	42 – 48	52

**Table 2.1 Proposed Noise Limits for Daytime Operations**

### 3. Assessment of Noise Levels from Proposed Storage and External Shredding Operation

#### 3.1. Introduction

As discussed previously, there is a requirement to extend the wood storage area, previously granted permission, to meet updated Environment Agency guidelines.

Figure 1 indicates the revised layout.

The new layout provides increased separation between storage bays, however to ensure sufficient wood can be stored, there will now be a required to pre-shred the incoming wood prior to storage.

It is proposed to utilise a Hass 2500 slow speed shredder within the storage bays. This would operate intermittently throughout the year, to process the wood as it was brought into the site. The shredder would operate adjacent to the bay being filled and would generally be screened by the bay sides or existing stockpiled material.

The requirement to use the shredder would be dependent upon the amount of material being brought to site, with a maximum of 12 loads per day anticipate during the summer harvest period and an average of 7 loads at other times. The shredder would operate intermittently throughout the day and would only operate during normal daytime working hours.

In addition, there would be a requirement for a JCB loader to handle the material and place it onto the stockpiles.

#### 3.2. Calculation of Noise Levels

Noise levels associated with the operation of the shredder and associated plant have been calculated at the properties identified previously using the methodology contained within BS 5228:1 [2].

Source term noise levels for the plant likely to operate on the site have either been obtained from measurements carried out at similar facilities or from manufacturer’s data (the latter likely to provide a worst case). The source terms adopted are provided in Table 3.1.

Plant	Source Level	Information Source
Hass 2500 Slow Speed Shredder	111 dB SWL	Manufacturer
JCB 436 Loader	105 dB SWL	Manufacturer
HGV Movements	79 dB SEL @ 10 metres	Site measurement

**Table 3.1 Source Term Noise Levels**

Whilst the calculations have taken account of the screening provided by the boundary bunding, no account has been made of any localised screening from the storage bays and stockpiles, whilst the shredder was operational and thus the calculations represent a worst case scenario.

Details of the calculations are provided in Appendix B.

### 3.3. Results and Assessment of Noise Levels

The results of the calculations from the proposed shredding operation have been combined with the noise levels calculated previously for the REGF and TAD sites to evaluate the cumulative noise levels from the site. These cumulative levels are presented in Table 3.2.

Given that the character of the noise associated with the proposed shredding operation, as within the assessments prepared previously, no penalties have been applied when assessing the noise levels from the proposed operations, as the noise generated would be continuous and principally attributable to the operation of a diesel engine.

Receptor	Calculated Daytime $L_{Aeq, 1 \text{ hour}}$ [dB]		
	REGF + TAD	Shredding	Cumulative
Hothorpe Hall	29	36	37
Hothorpe Hall Eco Lodges	33	36	38
Woodside Farm	34	42	42
Bosworth Hall	27	37	38
Pebble Hall Farm	50	41	51

**Table 3.2** Calculated Cumulative Daytime Noise Levels

The calculated cumulative noise levels have been assessed against the noise limits derived from the requirements of Condition 20, as follows.

Receptor	Calculated Daytime $L_{Aeq, 1 \text{ hour}}$ [dB]		
	Cumulative Noise Level [dB $L_{Aeq, 1 \text{ hour}}$ ]	Worst Case Noise Limit [dB $L_{Aeq, 1 \text{ hour}}$ ]	Difference [dB]
Hothorpe Hall	37	42	-5
Hothorpe Hall Eco Lodges	38	42	-4
Woodside Farm	42	52	-10
Bosworth Hall	38	45	-7
Pebble Hall Farm	51	52	-1

**Table 3.3** Assessment of Calculated Noise Levels

Table 3.3 indicates that the proposed shredding operation would give rise to an increase in the overall noise levels from the site. However, the calculations indicate that the overall noise levels would remain below the noise limits derived from the requirements of Condition 20 of the planning permission for the REGF and would thus remain acceptable to ensure any potential adverse effects upon the occupants of the surrounding properties were minimised.

On this basis, the intermittent operation of a wood shredder within the storage bays would not result on any adverse noise effects.



#### 4. Summary

Planning permission has previously been granted for two renewable energy generation facilities on land at Pebble Hall, Theddingworth.

Since the permission was granted for the REGF, the Environment Agency guidance on wood storage has been updated and there is now a requirement to increase the size of the wood storage area to accommodate the required amount of wood waste. The revised proposals would require the wood brought onto site for stockpiling to be pre shredded to maximise the efficiency of the storage bays, which would require the intermittent use of a slow speed wood shredder.

Noise levels associated with the additional operations have been calculated and combined with the noise levels calculated previously for the TAD and REGF to evaluate the cumulative noise levels from the site. The calculated noise levels have been assessed against noise limits for daytime operations based upon the requirements of Condition 20 of the REGF planning permission, which demonstrated that noise levels from the combined operation, including shredding, would remain below the noise limits.

The proposed shredding operation would therefore give rise to acceptable noise levels at surrounding properties, thus ensuring that any potential adverse effects were minimised.

## References

1. Carbonarius Limited. Renewable Energy Generation Facility, Pebble Hall, Theddingworth. Assessment of Environmental Impact. Ian Sharland Limited. 6 January 2014. Ref M2744-v5.
2. British Standards Institute. Code of Practice for Noise and Vibration Control on Construction and Open Sites. Part 1:Noise. BS 5228-1+A1. 2014.

**Figure**



## Appendix A Noise Units

### *Decibels (dB)*

Noise can be considered as 'unwanted sound'. Sound in air can be considered as the propagation of energy through the air in the form of oscillatory changes in pressure. The size of the pressure changes in acoustic waves is quantified on a logarithmic decibel (dB) scale firstly because the range of audible sound pressures is very great, and secondly because the loudness function of the human auditory system is approximately logarithmic.

The dynamic range of the auditory system is generally taken to be 0 dB to 140 dB. Generally, the addition of noise from two sources producing the same sound pressure level will lead to an increase in sound pressure level of 3 dB. A 3 dB noise change is generally considered to be just noticeable, a 5 dB change is generally considered to be clearly discernible and a 10 dB change is generally accepted as leading to the subjective impression of a doubling or halving of loudness.

### *A-Weighting*

The bandwidth of the frequency response of the ear is usually taken to be from about 18 Hz to 18,000 Hz. The auditory system is not equally sensitive throughout this frequency range. This is taken into account when making acoustic measurements by the use of A-weighting, a filter circuit that has a frequency response similar to the human auditory system. All the measurement results referred to in this report are A-weighted.

### *Units Used to Describe Time-Varying Noise Sources ( $L_{Aeq}$ , $L_{Amax}$ , $L_{A10}$ , and $L_{A90}$ )*

Instantaneous A-weighted sound pressure level is not generally considered as an adequate indicator of subjective response to noise because levels of noise usually vary with time.

For many types of noise the Equivalent Continuous A-Weighted Sound Pressure Level ( $L_{Aeq,T}$ ) is used as the basis of determining community response. The  $L_{Aeq,T}$  is defined as the A-weighted sound pressure level of the steady sound which contains the same acoustic energy as the noise being assessed over a specific time period, T.

The  $L_{Amax}$  is the maximum value that the A-weighted sound pressure level reaches during a measurement period.  $L_{Amax F}$ , or Fast, is averaged over 0.125 of a second and  $L_{Amax S}$ , or Slow, is averaged over 1 second. All  $L_{Amax}$  values referred to in this report are Fast.

The  $L_{A90}$  is the noise level exceeded for 90% of the measurement period. It is generally used to quantify the background noise level, the underlying level of noise that is present even during the quieter parts of measurement period.

**Appendix B**  
**Calculation Details**

**Welland Waste Management Ltd**  
**Pebble Hall Farm, Theddingworth - Wood Shredding and Storage**  
**Calculated Noise Levels**

27-Jan-2017

Receptor: Hothorpe Hall Uses BS5228  
 Height 120 m

Predicted Freefield Noise Levels

	Ref Level @10m	No.	% On Time	Source Ht	Dist S-R	Barrier Ht	Dist S-B	Distance Attenuation		Barrier Attenuation	Max Attenuation	LAeq [dB]	Total LAeq [dB]
								Hard	Soft				
Haas 2500 Slow Speed Shredder	83.0	1	100	125	1000	127	120	-40.0	-48.0	-7.6	-48.0	35.0	
JCB 436 Loading Shovel	77.0	1	100	125	1000	127	120	-40.0	-48.0	-7.6	-48.0	29.0	
HGV Movements	79.0	4	-	125	1000	127	120	-40.0	-48.0	-7.6	-48.0	1.5	36.0

Daytime LAeq from REGF and TAD = 29

Overall = 37

**Welland Waste Management Ltd**  
**Pebble Hall Farm, Theddingworth - Wood Shredding and Storage**  
**Calculated Noise Levels**

27-Jan-2017

Receptor: Hothorpe Hall Eco Lodges Uses BS5228  
 Height 118 m

Predicted Freefield Noise Levels

	Ref Level @10m	No.	% On Time	Source Ht	Dist S-R	Barrier Ht	Dist S-B	Distance Attenuation		Barrier Attenuation	Max Attenuation	LAeq [dB]	Total LAeq [dB]
								Hard	Soft				
Haas 2500 Slow Speed Shredder	83.0	1	100	125	960	127	120	-39.6	-47.6	-7.9	-47.6	35.4	
JCB 436 Loading Shovel	77.0	1	100	125	960	127	120	-39.6	-47.6	-7.9	-47.6	29.4	
HGV Movements	79.0	4	-	125	960	127	120	-39.6	-47.6	-7.9	-47.6	1.9	36.4

Daytime LAeq from REGF and TAD = 33

Overall = 38

**Welland Waste Management Ltd**  
**Pebble Hall Farm, Theddingworth - Wood Shredding and Storage**  
**Calculated Noise Levels**

27-Jan-2017

Receptor: Woodside Farm Uses BS5228  
 Height 122 m

Predicted Freefield Noise Levels

	Ref Level @10m	No.	% On Time	Source Ht	Dist S-R	Barrier Ht	Dist S-B	Distance Attenuation		Barrier Attenuation	Max Attenuation	LAeq [dB]	Total LAeq [dB]
								Hard	Soft				
Haas 2500 Slow Speed Shredder	83.0	1	100	125	590			-35.4	-42.3	0.0	-42.3	40.7	
JCB 436 Loading Shovel	77.0	1	100	125	590			-35.4	-42.3	0.0	-42.3	34.7	
HGV Movements	79.0	4	-	125	590			-35.4	-42.3	0.0	-42.3	7.2	41.7

Daytime LAeq from REGF and TAD = 34

Overall = 42

**Welland Waste Management Ltd**  
**Pebble Hall Farm, Theddingworth - Wood Shredding and Storage**  
**Calculated Noise Levels**

27-Jan-2017

Receptor: Bosworth Hall Uses BS5228  
 Height 154 m

Predicted Freefield Noise Levels

	Ref Level @10m	No.	% On Time	Source Ht	Dist S-R	Barrier Ht	Dist S-B	Distance Attenuation		Barrier Attenuation	Max Attenuation	LAeq [dB]	Total LAeq [dB]
								Hard	Soft				
Haas 2500 Slow Speed Shredder	83.0	1	100	125	850			-38.6	-46.2	0.0	-46.2	36.8	
JCB 436 Loading Shovel	77.0	1	100	125	850			-38.6	-46.2	0.0	-46.2	30.8	
HGV Movements	79.0	4	-	125	850			-38.6	-46.2	0.0	-46.2	3.2	37.7

Daytime LAeq from REGF and TAD = 27

Overall = 38

**Welland Waste Management Ltd**  
**Pebble Hall Farm, Theddingworth - Wood Shredding and Storage**  
**Calculated Noise Levels**

27-Jan-2017

Receptor:  
Height

Pebble Hall Farm  
119 m

Uses BS5228

Predicted Freefield Noise Levels

	Ref Level @10m	No.	% On Time	Source Ht	Dist S-R	Barrier Ht	Dist S-B	Distance Attenuation		Barrier Attenuation	Max Attenuation	L <sub>Aeq</sub> [dB]	Total L <sub>Aeq</sub> [dB]
								Hard	Soft				
Haas 2500 Slow Speed Shredder	83.0	LAeq	1	100	125	620		-35.8	-42.8	0.0	-42.8	<b>40.2</b>	
JCB 436 Loading Shovel	77.0	LAeq	1	100	125	620		-35.8	-42.8	0.0	-42.8	<b>34.2</b>	
HGV Movements	79.0	SEL	4	-	125	620		-35.8	-42.8	0.0	-42.8	<b>6.6</b>	<b>41.2</b>

Daytime LAeq from REGF and TAD = 50

**Overall = 51**