NOISE ASSESSMENT

Midlands Biomass and Recycling (MBAR)

Hillside Industrial Park Draycott Cross Road
Cheadle
Stoke-on-Trent
ST10 1PN

Activity Noise Monitoring (Quarterly)

Report by
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Ref: MBAR Monitoring (1)
Site Visited by: S.B. Mellor MA, MIOA, CMIOSH
Site Visit: 18th April 2016

Signed:



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1.0 INTRODUCTION

As part of the planning conditions for this waste recycling site (biomass products), a noise management scheme (appended) was required. Part of this management scheme included periodic noise monitoring. As such AC Environmental will attend every quarterly (until instructed otherwise) and carry out the following monitoring:

- Attended measurements by MIOA qualified acoustician at quarterly intervals to determine levels at the nearest sensitive premises. LAeq, 5 minute levels over 1 hour.
- Monitoring to occur during typical working hours.
- Monitoring will be attended and meteorological conditions will be logged.
- Any 'pauses' for extraneous noise will be noted. Activities and events on site and off site will also be noted.
- The monitoring scheme will be reviewed after 12 months.
- Results and observations based on the above.

AC Environmental Consulting, attended the site to carry out the monitoring to determine the noise levels from site activities at the nearest sensitive premises and any likely impact.

Measurements were taken at the nearest accessible position to the closest sensitive receptor (house).

Acoustic terminology is explained at Appendix 1 of this report and the author's qualifications and experience are described in Appendix 2.

2.0 SITE DESCRIPTION

The site (Hillside Industrial Estate) is situated off Draycott Cross Road and is in a predominantly industrial area (industrial estate). The nearest residential property is to the rear (Commonside House) at approximately 140m from the principal site activities (see appendix) which in turn are approximately 160m from the monitoring position.

There are varied industrial activities in the vicinity including a timber yard (which lies between the nearest receptor and recycling site), construction companies, scrap metal companies and associated yards and activities.

The intervening ground between the site and receptor is predominantly 'soft' (grass) with a belt of trees approximately 30m in width directly behind the site.

Activities include the delivery of waste organic materials, the movement of waste on site by front end loader (Daewoo 400) and Jenz AZ600 Shredder. The shredder is loaded with organic waste for approximately 15 minutes in any hour (7-8 tonne per hour) maximum.

3.0 NOISE CRITERION

3.1 BS4142:2014 – Rating Industrial Noise Affecting Mixed Residential and Industrial Areas

BS4142:2014 states, *"Response to sound can be subjective and is affected by many factors, both acoustic and non-acoustic. The significance of its impact, for example, can depend on such factors as the margin by which a sound exceeds the background sound level, its absolute level, time of day and change in the acoustic*

environment, as well as local attitudes to the source of the sound and the character of the neighbourhood…This British Standard describes methods for rating and assessing sound of an industrial and/or commercial nature".

This British Standard describes a method for assessing whether a specific sound may have an adverse impact. The Standard requires that the ambient noise ***(totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far)*** including the "specific" sound from the source in question is measured in terms of the equivalent continuous sound level LAeq [see Appendix 1 for acoustic terms], which is then corrected for the residual sound (total LAeq excluding the "specific" sound).

A correction for character is made if ***"a tone, impulse or other characteristic occurs".*** For tonality a correction of between +2dB and 6dB is considered acceptable and for impulsivity between 3 and 9dB. See table below.

Character	Just Perceptible	Clearly Perceptible	Highly Perceptible
Tonality	+2dB	+4dB	+6dB
Impulsivity	+3dB	+6dB	+9dB

Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

Where tonal and impulsive characteristics are present in the specific sound within the same reference period then these two corrections can both be taken into account. If one feature is dominant, then it might be appropriate to apply a single correction. Where both features are likely to affect perception and response, the corrections ought normally to be added in a linear fashion.

The final figure, including any character correction is known as the Rating level.

This Rating Level is then compared with the measured background [LA90] level. The greater this difference the greater the likelihood of "adverse impact" (See Notes 1 & 2 from BS4142:2014 below).

NOTE 1
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.

NOTE 2
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.

Local Authorities will also often seek to achieve the internal noise limits of BS 8233 (based on World Health Organisation - WHO Guidelines).

3.2 British Standard 8233:2014 (Guidance on Sound Insulation and Noise Reduction for Buildings)

The latest version of BS.8233 "Guidance on Sound Insulation and Noise Reduction for Buildings", was published in February 2014. BS 8233:2014 adopts guideline external noise values provided in WHO for external amenity areas such as gardens and patios. The Standard states that it is "desirable" that the external noise does not exceed 50 dB $L_{Aeq,T}$ with an upper guideline value of 55 dB $L_{Aeq,\ T.}$ Where design standards cannot be achieved for traditional amenity spaces (e.g. gardens and patios) then the '*lowest practical levels*' should be achieved.

An extract of the "Design Range" of BS.8233's Table 4 for indoor noise levels (with Notes 4 & 7) appears below and it should also be noted that the assessment period is for the whole of the day (16 hours) or night (8 hours).

Table 4 **Indoor ambient noise levels for dwellings**

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	—
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	—
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

NOTE 4 regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or LAmax,P depending on the character and number of events per night. Sporadic noise events could require separate values.

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB LAeq,T , with an upper guideline value of 55 dB LAeq,T. which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable."

4.0 MEASUREMENT PROCEDURE

The site was visited on the **18th April 2015** and instrumentation was installed at the location listed above.

The weather conditions were dry, sunny and with a temperature of approximately 10 degrees Celsius and a wind speed of 3-4m/s (SE). Cloud cover approximately 80%.

It is not considered that the weather conditions would have influenced the results.

The sound level meter used was a Svan 977 (s/n 36870). The meter calibrated correctly before and after the measurements using a Cirrus calibrator type CR:551E (s/n 039816); the instrumentation had been laboratory calibrated within the preceding 2 years.

5.0 MEASUREMENT RESULTS

The results obtained are shown in Tables 1 and 2 below.

Table 1

Start date & time	Duration	LAeq	LAFmax	LAFmin	L01	L10	L50	L90	L95	Notes
18/04/2016 10:26	05:00.0	47.8	62.2	41.9	54.8	49.9	46.4	44.4	44	Industrial equipment audible + birdsong
18/04/2016 10:31	05:00.0	50.2	57	42.5	55.3	53	49.5	45.7	44.9	Industrial equipment audible + birdsong
18/04/2016 10:36	05:00.0	50.4	59.8	41.1	57.6	53.8	48.2	45	44.3	Distant road traffic + birdson. Industrial source stopped.
18/04/2016 10:41	05:00.0	50.5	59.5	43.6	56.9	53.6	48.9	46.3	45.9	Distant road traffic + birdson. Industrial source stopped.
18/04/2016 10:46	05:00.0	45.5	62	39.7	50.8	47.7	44.5	41.8	41.2	Distant road traffic + birdson. Industrial source stopped.
18/04/2016 10:51	05:00.0	49.4	70.7	39.6	60.4	50.8	44.8	42	41.4	Distant road traffic + birdson. Industrial noise audible.
18/04/2016 10:56	05:00.0	51.8	68	38.8	63.4	55	45.7	42	41.1	Distant road traffic + birdson. Industrial noise audible.
18/04/2016 11:01	05:00.0	51.6	66.9	41.8	59.2	55.2	49	45.3	44.3	Distant road traffic + birdson. Industrial source stopped.
18/04/2016 11:06	02:55.0	47.4	59.5	40.1	81.9	50.6	46.4	43	42	Distant road traffic + birdson. Industrial source stopped.
18/04/2016 11:09	00:09.0	47.4	59.5	40.1	81.9	50.6	46.4	43	42	Distant road traffic + birdson. Industrial source stopped.
18/04/2016 11:10	01:56.0	47.4	59.5	40.1	81.9	50.6	46.4	43	42	Distant road traffic + birdson. Industrial noise audible.
18/04/2016 11:12	05:00.0	50.7	62.8	39.2	60.3	55.1	45.9	41.5	40.9	Distant road traffic + birdson. Industrial noise audible.
18/04/2016 11:17	00:24.0	54	64	44.5	64.6	57.5	50.9	46.2	45.3	Distant road traffic + birdson. Industrial noise audible.
Total / Max / Avge	50:24.0	50	70.7	38.8	72.1	53.1	47.3	44.1	43.4	Distant road traffic + birdson. Industrial noise audible.

5 minute samples. 1-hour total period. 10 minutes spent changing batteries on two occasions.

LAeq, 50 minutes = 50dBA to nearest whole decibel.

Table 2

Start date & time	Duration	LAeq	LAFmax	LAFmin	L01	L10	L50	L90	L95	Notes
18/04/2016 11:33	01:01.0	69.1	72.7	66.8	71.7	69.9	69	68	67.6	Level at site boundary

20log (r1/r2)
Approx. 140m from source, therefore distance correction necessary:
Correction = 20log (r1/r2)
r1 = Measurement distance from activities (30m at site boundary)
r2 = Receiver Distance (140m)
= - 13.3dBA
= 69.1 – 13.3 = 55.8dBA

We can see from the tables above that the LAeq level never reaches the predicted level (from site boundary level) at the monitoring position during the two 5 minute periods when the screening plant was operating (first two periods). Although this position was a little further back from the property the difference would be negligible, maybe 1dB. The extra attenuation will be due to ground absorption, the screening provided by the rear wall and general topography.

6.0 ADDITIONAL OBSERVATIONS

To the observer, the screening activities were clearly audible at the monitoring position. When the screening had stopped however, other industrial sources of noise were also occasionally audible.

Distant road noise was audible throughout the monitoring period as was birdsong.

7.0 ASSESSMENT OF MONITORING RESULTS

7.1 LAeq, 1 Hour (Internal Level)

The resultant external level (at nearest receptor) LAeq, 1 hour:

Monitoring Results

Date	External Level
18th April 2016	50dB
Next July 2016	

7.2 BS8233:2014

The resultant external noise level of 50dBA at the nearest receptor would meet the desirable external range for amenity spaces of between 50-55dBA. However, the noise is noticeable (see BS4142 below).

7.3 BS4142:2014

Using the background level just after the site plant ceased, after the first two 5 minute samples, and assuming the measured value represents a likely 1-hour reference period (BS4142).

Activity Noise at Monitoring Position	50 LAeq
Tonal Character Correction	0 dB
Impulsive Character Correction	0 dB
Other Sound Characteristics [it is noticeable]	+3 dB
Intermittency Correction	Nil
Correction of % of reference period [assumes jet washing constant]	Nil
Rating Level	53 dB
Background Noise Level LA90	45 dB
Excess over Background [Rating – Background = 47-44]	+8dB
Conclusion – "likely to be an indication of an adverse impact, depending on the context".	

7.3 Conclusion

The site activities (shredder) are audible at the receptor but it is arguable as to whether they are out of context or not given the other surrounding industrial uses. The shredder does not operate continually but may possibly have an adverse impact in reference

to the BS4142 calculation above when it operates for 10 minutes within any hour.

It is therefore recommended that a noise action plan is introduced and monitoring continues at quarterly intervals to ensure that:

a). desirable external noise levels from BS8233 are maintained.

b). The shredder when operating, subjectively, is “less noticeable”.

7.4 Next monitoring period

On or around 18th July 2016.

APPENDIX 1

EXPLANATION OF ACOUSTIC TERMS

The dB or the decibel, is the unit of noise. The number of decibels or the level, is measured using a sound level meter. It is common for the sound level meter to filter or 'weight' the incoming sound so as to mimic the frequency response of the human ear. Such measurements are designated **dB (A)**.

A doubling of the sound is perceived, by most people, when the level has increased by 10 dB (A). The least discernible difference is 2 dB (A). Thus most people cannot distinguish between, say 30 and 31 dB (A).

The Background level of noise is most commonly represented by the level which is exceeded for 90% of the time i.e. the LA90.

If a noise varies over time then the **equivalent continuous level, or LAeq**, is the notional constant level of noise which would contain the same amount of acoustic energy as the time varying noise.

The following table gives an indication of the comparative loudness of various noises expressed in terms of the A weighted scale:

Source of noise	dB(A)	Nature of Noise
Inside Quiet bedroom at night	30	Very Quiet
Quiet office	40	
Rural background noise	45	
Normal conversational level	60	
Busy restaurant	65	
Typewriter @ 1m	73	
Inside suburban electric train	76	
Alarm clock ringing @ .5m	80	
Hand clap @ 1m	80	
HGV accelerating @ 6m	92	Very Loud

APPENDIX 2

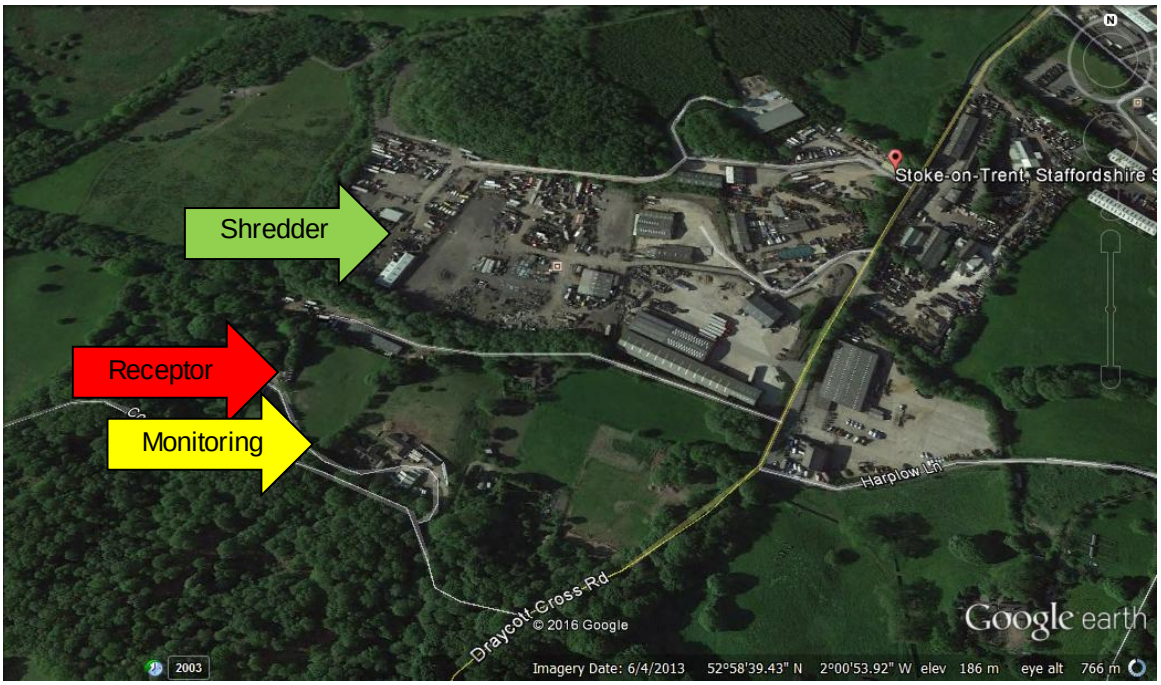
QUALIFICATIONS AND EXPERIENCE OF S. MELLOR

My full name is Steven Brian Mellor. I hold a Master's degree in Health, Safety and Environmental Law, British Occupational Health Society (BOHS) M104 certificate in Noise and Vibration and Institute of Acoustics Certificate of Competence in Environmental Noise Measurement (Derby University), plus Diploma in Acoustics and Noise Control (Bristol University). I am member of the professional body for noise and vibration specialists, the Institute of Acoustics, MIOA.

I have some 14 years of experience dealing with problems caused by noise and vibration, both regarding noise and vibration in the environment, the workplace and the home. During that time, we have advised many groups including employers, residents and developers about the problems of noise and vibration in the workplace and environment.

APPENDIX 3

Site and Monitoring Position



Source: Google Earth



Monitoring Position



Site in Distance



Shredder in Operation



Site