NOISE ASSESSMENT – Waste Transfer Station

Noise Impact Assessment

Report by
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Ref: Midland Bio

Signed:

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1.0 INTRODUCTION

On the instructions of Midland Biomass, AC Environmental Consulting Ltd undertook a desk-top survey in connection with a proposed waste transfer station based at the Hillside Industrial Park, Draycott Cross Road, Cheadle, Staffordshire.

The site was previously used by TME Recycling.

To establish any potential for noise impact a survey carried out in 2012, to establish the background levels at the nearest sensitive receptors (by the same observer / author), has been used.

For that assessment the nearest receptors were identified by Richard Peers of Staffordshire County Council as:

Daisy Croft Farm
Commonside Nurseries
Commonside House

The purpose of the previous survey was to establish the current noise levels with and without the activity noise at the nearest noise sensitive properties (NSP's).

Activities for TME occurred from 08:00 – 17:00 (Monday to Friday) and 08:00 – 13.00 on Saturdays. Midland Biomass propose to start operations at 07:00 and finish at 18:00 (Monday to Friday) and 07:00 – 14:00 on Saturdays.

Original measurements were taken on the 20th, 21st and 28th September 2012.

For plant, equipment and activities associated with Midland Biomass, synthetic data from BS5228 or levels from previous assessments using similar equipment has been used.

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 application site (Hillside Industrial Estate) is situated off Draycott Cross Road and is in a predominantly industrial area (industrial estate). The nearest residential properties to the

application site (as determined previously by Staffordshire County Council) are located at the following approximate distances:

Commonside Nurseries 175m.
Commonside House 220m.
Daisy Croft Farm 490m.

Between the application site and the nearest sensitive properties there are other industrial units.

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

In the assessment for TME recycling, monitoring was carried out at the three receptors noted above. (See Figure 2). Measurements were taken at the sensitive receptors when the original application site wasn’t operating in order to compare rating levels (specific noise plus character correction) over background levels L90 – BS4142:2014.

Sources of noise at the sensitive receptors contributing to the ambient noise levels included:

- Distant road traffic

- Birdsong
- Dog barking
- Distant industrial noise – occasional
- Other animal noise (e.g. peacocks at Daisy Croft)
- Resident activities and vehicles

Subjective impression (from 2012) – To the observer, occasional industrial type noise was audible at Commonside nurseries and Commonside House but not at Daisy Croft Farm. Distant road traffic was audible at all locations and was constant.

Noise levels were measured in free-field conditions. See Appendix 3.

3.0 NOISE CRITERION

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

3.1 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.

An extract of the “Design Range” of BS.8233's Table 4 for indoor noise levels (with Note 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 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.

3.2 National Planning Policy Framework

The National Planning Policy Framework [3] document (27 March 2012) replaced PPG24 (and other planning policies) but contains no specific regulations or guidelines regarding acceptable noise levels but instead leaves local authorities to draw up planning policies and make decisions with the aim of avoiding noise from giving rise to significant adverse impacts and quality of life as a result of new development. The Noise Policy Statement for England is referenced which sets out a generic long term vision for noise policy supported by the following aims:

- To avoid significant adverse impacts on health and quality of life;

- Mitigate and minimise adverse impacts on health and quality of life; and
- Where possible, contribute to the improvement of health and quality of life.

3.3 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.

4.0 MEASUREMENT PROCEDURE

The site was originally visited on the 20th, 21st and 28th September 2012 and instrumentation was installed at the locations listed above.

The weather conditions during these days were predominantly dry (measurements were halted on the 21st due to imminent rain) with a temperature of approximately 11 – 16 degrees Celsius and a wind speed of 3-4m/s (W / SW). Cloud cover was 30 - 80%.

The sound level meters used were a Cirrus Integrating Sound Level Meter (CR821B), Class 1 Group BS EN 61672-1:2003 (s/n C18361FE)) with windmuff and Svan 947 (s/n 4280). The meters 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.

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

5.0 MEASUREMENT RESULTS

Receptors

Date	Time	Run Time	Leq	Lmax	L1	L10	L50	L90	L95	Lmin	Notes
20/09/2012	17:13	00:15:04	62.3	86.0	77.2	48.9	41.6	38.9	38.4	36.7	Commonside nurseries - site not operating
20/09/2012	17:29	00:15:03	46.4	71.0	57.0	45.4	40.5	38.2	37.6	35.9	Commonside House - site not operating
20/09/2012	17:53	00:15:00	47.2	58.6	55.4	52.0	38.5	35.6	35.2	32.7	Daisy Croft Farm - site not operating
21/09/2012	07:00	00:15:00	45	61.9	56	48	40	35	NA	31.4	Nurseries - no activities
21/09/2012	07:15	00:15:00	42	56.8	49	44	40	37	NA	33.5	House - no activities
21/09/2012	07:25	00:15:00	49	65.5	61	51	44	40	NA	36	Daisy - no activities
21/09/2012	08:00	00:15:00	47	59.9	57	50	44	41	NA	39.1	Nurseries - activities
21/09/2012	08:15	00:15:00	49	66.6	60	52	46	42	NA	38.8	House - actvities
21/09/2012	08:25	00:15:00	45	60.5	55	48	42	38	NA	35	Daisy - activities
28/09/2012	15:26	00:15:00	58	85.8	66	44	40	38	NA	34	Nurseries - activities
28/09/2012	15:43	00:15:00	43	55.9	49	45	42	40	NA	38.2	House - actvities
28/09/2012	16:06	00:15:00	47	69.1	58	50	39	36	NA	32.7	Daisy - activities
28/09/2012	16:30	00:15:00	46	68.8	59	43	38	36	NA	33.7	Nurseries - activities
28/09/2012	16:46	00:15:00	43	64.2	49	44	41	39	NA	36.8	House - actvities
28/09/2012	17:08	00:15:00	48	63.9	61	48	38	34	NA	32.4	Daisy - activities
28/09/2012	17:31	00:15:00	43	67.9	54	43	38	35	NA	32.2	Nurseries - no activities
28/09/2012	17:47	00:15:00	41	55.1	48	43	39	37	NA	34.4	House - no activities
28/09/2012	18:09	00:15:00	49	69.4	62	49	39	34	NA	32	Daisy - no activities

Subjectively, to the observer any noise potentially associated with the former TME site was not audible at any time during the attended monitoring at Daisy Croft Farm.

Lowest L90 level at Commonside Nurseries = 35dBA
Lowest L90 level at Commonside House = 37dBA

Proposed Equipment

1. Wood Shredder (Measured at Wilshee's Skip Hire of Burton on Trent)

Date	Time	Run Time	Leq	Lmax	L1	L10	L50	L90	L95	Lmin
23/03/2012	10:40	00:06:31	78.50	87.8	82.9	80.5	78.1	76.2	75.9	73.7

@ 10m = 78.5dBA

Includes running typical materials through the shredder (wood)

Corrected for 30 minute use per hour = **75.5dBA**

2. Wheeled Loader (Levels from BS5228)

Ref no.	Equipment	Power rating, kW	Equipment size, weight (mass), capacity	Octave band sound pressure levels at 10 m, Hz								A-weighted sound pressure level, L_{Aeq} dB at 10 m
				63	125	250	500	1k	2k	4k	8k	
	Loading lorries											
26	Wheeled loader	209	—	87	82	77	78	73	70	64	57	79
27	Wheeled loader	193	—	85	83	76	75	75	72	72	61	80
28	Wheeled loader	170	—	86	82	77	74	70	66	62	55	76
	Front end loaders											
32	Wheeled loader (loading hopper)	198	23 t	83	77	70	70	70	68	64	58	75
33	Wheeled loader (loading lorry)	190	25 t	92	84	83	77	76	74	71	62	82
34	Wheeled loader	184	23 t	82	82	71	73	69	67	66	58	76

Highest level = 82dBA @10m

Corrected for 30 minute use per hour = **79dBA**

3. Trommel Screen (Levels from measurements at TC Skips Stoke on Trent)

04/02/2015	14:53:56	04FEB08	00:05:08	74.5	85.4	81.4	76.4	73.4	71.2	68.7	@8m from screen

Level = 74.5dBA @8m or 72.5dBA @10m

Corrected for 30 minute use per hour = **70dBA**

4. Vehicle Movements (Levels from original survey at TME Recycling)

20/09/2012	14:46	00:00:08	77.6	82.3	78.5	78.2	77.0	75.6	74.7	74.1	Vehicle movement @ 5m

Level = 77.6dBA @ 5m **or 71.6dBA @10m**

It is understood that either the screen or shredder will operate for 30 minutes each hour (unlikely) i.e. they won't operate together. They will operate with the wheeled loader. We assume that vehicle movement is constant for 1 hour, at least one vehicle entering or leaving the site (worst case) and @10m[1]:

Total (site) noise level = 78-81dBA @10m[2]

5.1 Distance Correction

To estimate the levels of noise propagating from the site to the nearest residents (noted above), a 'distance correction' is necessary.

Commonside Nurseries
20log (r1/r2)
Nearest affected properties at approx 175m from source, therefore distance correction necessary:
Correction = 20log (r1/r2)
r1 = Measurement distance from activities 10m (cumulative level from above)
r2 = Receiver Distance 175m (centre of yard)
= - 24.8dBA
= 77 to 81 – 24.8 = 52.2 to 56.2dBA

Commonside House
20log (r1/r2)
Nearest affected properties at approx 220m from source, therefore distance correction necessary:
Correction = 20log (r1/r2)

[1] Vehicle movement is not likely to be constant, vehicles will enter and leave the site periodically (see design and access statement) although the screening and shredding noise will be dominant
[2] Equipment will be located at different positions around the site (see site plan) and some plant such as the wheeled loader will be mobile

r1 = Measurement distance from activities 10m (cumulative level from above)
r2 = Receiver Distance 220m (centre of yard)
= - 26.8dBA
= 78 to 81 – 26.8 = 51.2 to 54.2dBA

Daisy Bank Farm
20log (r1/r2)
Nearest affected properties at approx 490m from source, therefore distance correction necessary:
Correction = 20log (r1/r2)
r1 = Measurement distance from activities 10m (cumulative level from above)
r2 = Receiver Distance 490m (centre of yard)
= - 33.8dBA
= 78 to 81 – 33.8 = 44.2 to 47.2dBA

Barrier correction. 3m high wall at the site boundary but as residents are in an elevated position assumed 5dB *(from guidance in British Standard 5228: Code of practice for noise and vibration control on construction and open sites).*

Nurseries	52.2 to 56.2 – 5 = 47.2 to 51.2dBA
House	51.2 to 54.2 – 5 = 46.2 to 49.2dBA
Daisy	44.2 to 47.2 – 5 = 39.2 to 42.2dBA

Ground absorption: Soft sites are sites that have an absorptive ground surface (e.g., grass, or soil) and receive an excess ground attenuation value of approximately 1.5 dBA per doubling of distance. Predictions using Table 8 from CRTN and a height of propagation of 1.5m. Therefore:

1. 47.2 to 51.2 – 6 = 41.2 to 45.2dB

2. 46.2 to 49.2 – 7 = 39.2 to 42.2dB
3. 39.2 to 42.2 – 8 = 31.2 to 34.2dB

5.2 Site Levels at Receptors

Therefore, the range of levels anticipated at each of the receptors are as follows:

Commonside Nurseries = 41.2 to 45.2dBA
Commonside House = 39.2 to 42.2dBA
Daisy Bank Croft = 31.2 to 34.2dBA

As noted above, during the previous survey for TME Recycling, industrial type noise was not audible at Daisy Bank Croft at any time and this observation is likely to still stand for Midland Biomass (similar activities). Predicted levels are at or below the current background levels at Daisy Bank. Therefore it is suggested that this location is likely to remain unaffected by site operations.

6.0 ADDITIONAL OBSERVATIONS

During the previous survey for TME Recycling the industrial type noise observed at Commonside Nurseries and Commonside

House was occasional and was principally impact noise which could be associated with the use of the Sennebogen Grab (impact noise) and items being dropped or dragged by the 'grab', or otherwise metal on metal impact. There is no proposed use of a "grab" for Midland Biomass.

7.0 ASSESSMENT OF RESULTS

7.1 BS8233:2014 / WHO Guidelines

To achieve the desirable external and therefore internal levels during the day and night at the nearest residences, external levels should not exceed LAeq 50-55dBA. Desirable levels are therefore likely to be achieved with or without the site activities present.

7.2 BS4142:2015

Positions 2 & 3 (Commonside Nurseries & House)

Specific Noise Level (Metal waste Recycling Activities)	39 to 45 dB
Assumed distinctive sound feature audible	3 dB
Rating Level [Specific + Character Correction]	42 to 48 dB
Background Noise Level L90 (Lowest)	35 to 37 dB
Excess over Background	+7 to 11 dB

Potential for adverse impact
Includes L90 levels from 07:00 - the new proposed starting time.

8.0 DISCUSSION AND CONCLUSIONS

8.1 BS8223 / WHO

The desirable external levels (50-55dBA); and therefore the “good” internal levels for all receptors are likely to be achieved whether the site is operating or not. However, the characteristics of the site noise may still be audible and distinctive.

8.2 BS4142

The noise levels produced by the waste recycling activities may attract attention and could precipitate complaint without additional noise mitigation (see noise action plan). To reduce levels to below those which could potentially have an “adverse impact” (BS4142) noise reduction of between 2 to 6dB is necessary.

8.3 Additional Noise Control

To achieve 2 to 6dBA of noise reduction and otherwise reduce impact and other site noise (which may attract attention at the

receptors' even if the noise is not in excess of the background) the following noise action plan is proposed.

9.0 NOISE ACTION PLAN

- Screening – Screening will be effective if the line of sight from the source e.g. shredder and screen is obscured. Even partial screening may reduce levels by 5dBA. It is understood from the client that there is an earth embankment behind the perimeter wall which is 3-4m in height. The perimeter wall is 3m in height. There are also plans to stockpile materials at between 3-5m in height close to the plant which may be more effective i.e. close to the source of noise. Noise reduction from such barrier should achieve 5-10dBA+. *Where there is no line of sight the predicted level of noise reduction is 10dBA using the simple approximation from BS5228 (Code of practice for noise and vibration control on construction and open sites – see excerpts below).*

> In the absence of spectral data, as a working approximation, if there is a barrier or other topographic feature between the source and the receiving position, assume an approximate attenuation of 5 dB when the top of the plant is just visible to the receiver over the noise barrier, and of 10 dB when the noise screen completely hides the sources from the receiver. High

Site buildings such as offices and stores can be grouped together to form a substantial barrier separating site operations and nearby NSPs. On some sites, stacks of certain materials such as bricks, aggregate, timber or top soil can be strategically placed to provide a barrier. Areas which have been excavated below ground level such

Earth bunds can be built to provide screening for major earth-moving operations and can be subsequently landscaped to become permanent features of the environment when works have been completed. The

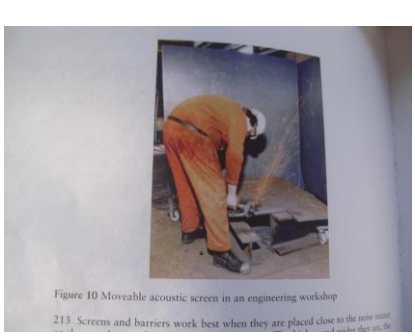
- Site management to check site plant and equipment to ensure that there is no excessive noise due to maintenance issues on an ongoing basis.

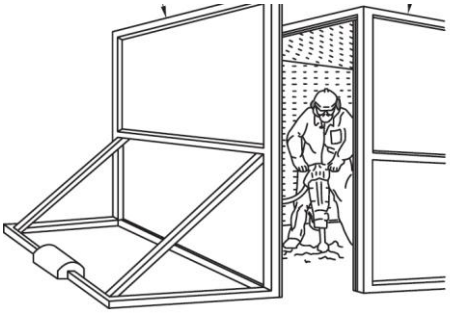
- Impact noise is the type of noise most likely to attract attention. Therefore the company will need to look at the methodology for moving and dropping materials, cleaning the yard etc. with a view to reducing drop heights and otherwise reducing impact noise. Cushioned linings should also be used where practical.

- If an additional barrier is deemed impractical then overall noise reduction can be achieved by reducing the time that the equipment is used, e.g. if the screens are used for 15 minutes per hour instead of 30 minutes then noise levels will be reduced by a further 3dBA over that one hour period.

- If there are any manual activities in the open yard using power tools, again screens can be used close to the operation and between the activity and receptors.

Example screening for yard activities not carried out in workshop (e.g. cutting)





Acoustic screens - which work best when placed close to the source of noise. Covering the barrier or screen with noise absorbing material on the side facing the noise source will have the added advantage of reducing the sound reflected back. May be constructed of sheet metal.

Purchasing

- Future equipment purchasing policy should include consideration of the noise produced by the equipment and the methods of work. Where a choice of methods or plant is available, the quieter should be chosen. Generally, manufacturers will include sound level output in the specification of their equipment which site management will refer to. This should be considered in regard to the specification of the loader, Trommel (screen) and shredder.

- Where vehicle-reversing alarms are used, because of their tone, site management should consider the use of adjustable or directional audible alarms in regard to future purchasing, or other alternative warning systems – e.g. white noise alarms give a full spectrum of noise rather than a single tone, which is claimed to be as good as single tone alarms at close range and at a distance, it blends into the background noise. Reversing should be kept to a minimum.

- Site management should ensure that staff avoid unnecessary revving of engines, reducing speed of vehicle movement, maintain roads to minimise vehicle noise; and pointing directional noise away from sensitive areas where possible. Vehicle routes and surfaces should be kept smooth free from debris to prevent additional noise – i.e. “crunching” and “cracking” as vehicles drive over the debris.

- Site management should ensure that staff receive adequate information, instruction and training in regard to keeping levels of noise as low as possible on site with the use of screens, methods and avoiding impact. Site management will also use notices and signs to remind staff and visitors.

Training should include:

- avoiding unnecessary revving of engines and switching off equipment when not required;
- keeping internal routes well maintained;
- avoiding impact noise;
- minimising drop height of materials;
- avoiding reversing (reversing alarms);
- Utilising screens and barriers;
- starting up plant and vehicles sequentially rather than all together.

Sequencing

- Site managers should liaise with the local community (Commonside residents) to enable noisy operations to take place at times when they would have the least impact on the occupiers.

Monitoring

- Site management should regularly monitor the noise action plan listed above and ensure that staff are employing noise reduction techniques.

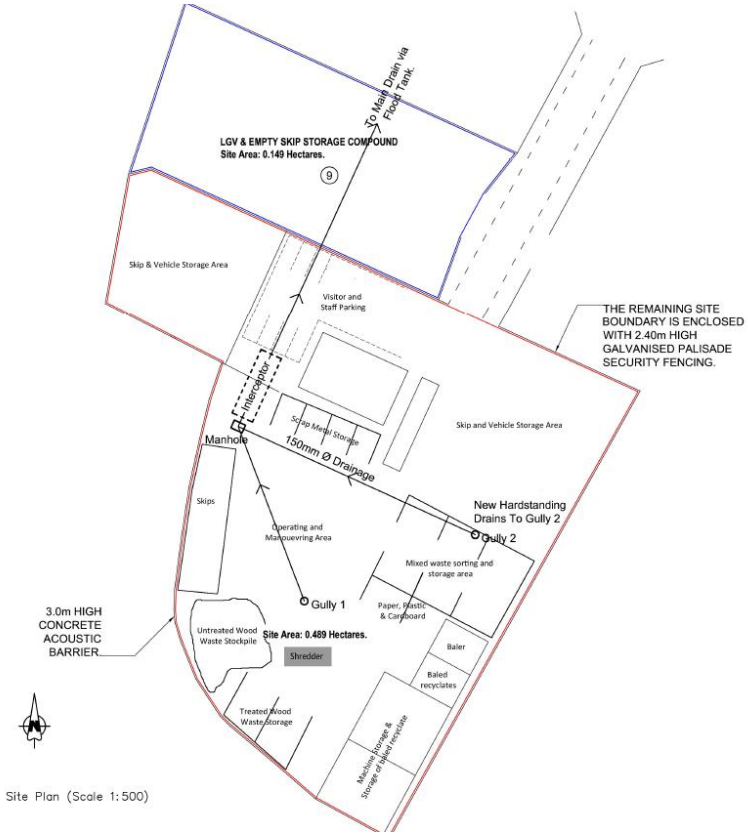
- Site management should regularly patrol Commonside and listen out for potentially problematic noise emanating from the site to ensure that the noise action plan is effective. Any additional action will be taken as necessary.

- Site management should regularly consult with residents at Commonside to ensure that the noise action plan is effective and to discuss any potential issues.

By implementing the above action plan significant noise reduction is likely and the desirable 2 to 6dBA (minimum) or more is achievable.

Figure 1.

Proposed Site Plan

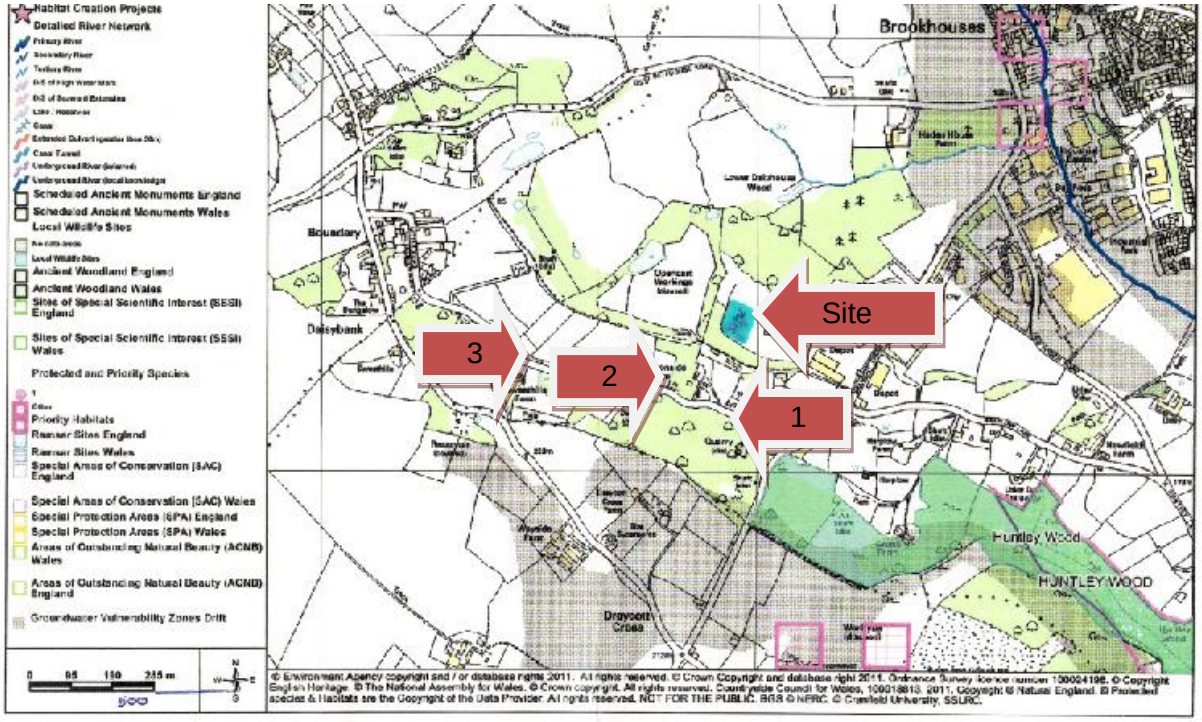


AC ENVIRONMENTAL CONSULTING

Client	Midland Biomass and Recycling Hillside Industrial Park, Draycott Cross Roads, Cheadle, Stoke on Trent, ST10 1PN.
Project	Planning Application for Operation of a Waste Recycling Facility and Skip Hire Site
Title	Site Plan and Processes.
Drawing No.	1506 - MBAR01
Rev	a
Date	30/06/2015
Scale	1:500 @ A3

Figure 2

Receptors



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 M. S. MELLOR

My full name is Steven Brian Mellor. I am the principal consultant at the firm of SBM Safety Solutions Ltd, a consultancy company that specialises in health, safety and environmental services including noise assessment and control.

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' experience of dealing with problems caused by noise and vibration, both regarding noise and vibration in the environment, the workplace and the home. The firm of SBM Safety Solutions Ltd. was formed 12 years ago. 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.