

CONTENTS

Introduction	8-1
Government Advice, Standards and Good Practice	8-1
Consultation Undertaken	8-5
Approach to the Assessment	8-6
Baseline Conditions	8-6
Environmental Design Measures	8-9
Potential Impact	8-10
Operational Assessment	8-13
MPS2 Assessment – Landfill Operations	8-16
Cumulative Impacts	8-18
Impact on Dartmoor National Park	8-20
Mitigation Measures	8-21
Conclusions	8-22

Appendices

Appendix 8/1 – Glossary of Terminology	i
Acoustic Terminology	i
Appendix 8/2 – Noise Monitoring Equipment	iii
Appendix 8/3 – Full Survey Results	iv
Appendix 8/4 – List of Construction Plant	viii
Appendix 8/5 – List of landfill mobile Plant	ix
Appendix 8/6 – List of EfW plant	x
Appendix 8/7 – Limitations to this Report	xi

Drawings

Drawing 8/1

Noise Monitoring Locations



NOISE & VIBRATION 8



INTRODUCTION

- 8.1 An assessment of noise has been carried out with reference to British Standard and other government guidance. Noise issues relating to the operation of the proposed development have been considered to the nearest noise-sensitive properties surrounding the site.
- 8.2 Technical terms or references are occasionally used in this section. To assist the reader, a glossary of terminology, including a table of example noise levels that may be found in general life, are included in Appendix 8/1.

GOVERNMENT ADVICE, STANDARDS AND GOOD PRACTICE

Devon County Council – Waste Local Plan

- 8.3 Devon County Council as Waste Planning Authority has produced a Waste Local Plan which was adopted in June 2006.
- 8.4 Chapter 7 of the Waste Local Plan Detailed Policies states, in Paragraph 7.4.10.3, that:

“In the event of planning permission being granted for waste management facilities, conditions will be imposed to reduce noise at sensitive locations as follows:

- (a) requiring the operator to utilise the best practicable means in order to minimise noise generation during site operations;*
- (b) setting out clear hours of working;*
- (c) setting maximum noise limits at the site boundary and at noise boundary locations having regard to the hours of working agreed in (b) above;*
- (d) requiring plant and machinery to be adequately acoustically attenuated or silenced and requiring landscaping measures to mitigate noise emissions; and*
- (e) imposing conditions requiring the operator to monitor noise emanating from the site and to maintain records of such surveys.*

- 8.5 Chapter 7 goes on to state, in Paragraph 7.4.10.4, that:

“It is not intended that operators should seek to carry out their activities just below any imposed noise limits, but they should take all reasonable steps to achieve quietest working possible, especially when close to sensitive developments.

British Standard 5228:2009

- 8.6 British Standard 5228:2009 *Noise and vibration control on construction and open sites*, Part 1: *Noise* and Part 2: *Vibration* sets out a methodology for predicting noise levels arising from a wide variety of construction and related activities. As such, it can be used to predict noise levels arising from the

operations of proposed minerals extraction sites. BS5228 also sets out tables of sound power levels generated by a wide variety of mobile equipment.

8.7 Noise levels generated by the site operations and experienced at local receptors will depend upon a number of variables, the most significant of which are:

- the amount of noise generated by plant and equipment being used at the development site, generally expressed as a sound power level;
- the periods of operation of the plant at the development site, known as the “on-time”;
- the distance between the noise source and the receptor, known as the “stand-off”;
- the attenuation due to ground absorption or barrier screening effects; and
- any reflections of noise due to the presence of hard vertical faces such as walls.

8.8 The noise predictions in this section have been undertaken using a proprietary software-based noise model, CADNA/A, which implements the full range of UK calculation methods.

8.9 BS5228:2009 gives several examples of acceptable limits for construction or demolition noise. The most simplistic being based upon the exceedance of fixed noise limits and states in paragraph E.2:

“Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut.”

8.10 Paragraph E.2 goes on to state:

“Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed:

- *70 decibels (dBA) in rural, suburban areas away from main road traffic and industrial noise;*
- *75 decibels (dBA) in urban areas near main roads in heavy industrial areas.*

These limits are for daytime working outside living rooms and offices.”

British Standard 4142:1997

8.11 British Standard 4142:1997 *Method for rating industrial noise affecting mixed residential and industrial areas* is intended to be used to assess whether noise from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises is likely to give rise to complaints from people residing in nearby dwellings.

8.12 The procedure contained in BS4142 for assessing the likelihood of complaint is to compare the measured or predicted noise level from the source in

- question immediately outside the dwelling, the 'specific noise level', with the background noise level.
- 8.13 The specific noise level is measured in terms of a $L_{Aeq,T}$ value and the background noise level is measured in terms of a L_{A90} value.
- 8.14 Where the specific noise contains a 'distinguishable discrete continuous note (whine, hiss, screech, hum etc.) or if there are distinct impulses in the noise (bangs, clicks, clatters or thumps), or if the noise is irregular enough to attract attention' then a correction of +5dB is added to the specific noise level to obtain the 'rating level', or $L_{Ar,T}$.
- 8.15 The likelihood of noise provoking complaints is assessed by subtracting the background noise level from the rating noise level. BS4142 states:
- "A difference of around 10dB or higher indicates that complaints are likely. A difference of around 5dB is of marginal significance. A difference of -10dB is a positive indication that complaints are unlikely."*
- 8.16 The standard is not suitable for the assessment of complaint when the background and rating noise levels are both very low; very low background noise levels are defined as those below 30dB L_{A90} and very low rating noise levels are defined as those below 35dB $L_{Ar,T}$.

Minerals Policy Statement 2 – Annex 2: Noise

- 8.17 Minerals Policy Statement (MPS) 2 *Controlling and Mitigating the Environmental Effects of Minerals Extraction in England: Annex 2: Noise* provides advice on planning controls and good practice to keep noise emissions from surface mineral workings to acceptable levels. It also sets out noise limits for permanent surface mineral workings.
- 8.18 MPS2 states that:
- "Annex 2 states the planning considerations the Government expects to be applied to noise emissions from surface mineral operations. It covers both surface mineral extraction and surface operations associated with underground mineral extraction, including waste disposal and recycling operations that form an integral part of a mineral working operation. It is not framed with direct reference to other waste disposal and recycling operations. Since these share many operational features with surface mineral operations, waste management operators and waste planning authorities should take account of this Annex alongside Planning Policy Guidance Note 10 (PPG10) Planning and Waste Management."*
- 8.19 MPS2 states that:
- "Subject to a maximum of 55dB $L_{Aeq,1hr}$ (free-field) (sic), MPAs should aim to establish a noise limit at the noise-sensitive property that does not exceed the background level by more than 10dB(A)."*

NOISE & VIBRATION 8

- 8.20 MPS2 recognises that, in many circumstances, not exceeding the background noise level by more than 10dB(A) would be difficult to achieve without imposing unreasonable burdens on the mineral operator. In such cases, the noise limit should be set as near that level as practicable and should not exceed 55dB $L_{Aeq,1hr}$ during the daytime (07:00 – 19:00 hours), 10dB(A) above the background level during the evening (19:00 – 22:00 hours) or 42dB $L_{Aeq,1hr}$ during the night-time (22:00 – 07:00 hours) periods.
- 8.21 During periods of temporary operations the noise limits may be increased to up to 70dB $L_{Aeq,1hr}$ for periods of up to eight weeks in any working year at noise-sensitive locations. Temporary operations may include soil stripping, the construction of new permanent landforms and aspects of site road construction and maintenance.
- 8.22 Where temporary operations are likely to take longer than eight weeks, MPS2 states:
- “a lower limit over a longer period should be considered.”*
- 8.23 With reference to temporary operations, MPS2 also states:
- “In some wholly exceptional cases, where there is no viable alternative, a higher limit for a very limited period may be appropriate in order to attain environmental benefits.”*

Draft Guidelines for Noise Impact Assessment

- 8.24 The draft *Guidelines for Noise Impact Assessment* produced by the Institute of Acoustics/Institute of Environmental Management and Assessment Working Party have been referenced in relation to the potential changes in road traffic noise levels as a result of the operational use of the proposed development.
- 8.25 The findings of the Working Party are draft at present although they are of some assistance in this assessment. The draft guidelines state that for any assessment, the noise level threshold and significance should be determined by the assessor, based upon the specific evidence and likely subjective response to noise.
- 8.26 The impact scale adopted in this assessment is shown in Table 8-1 below.

Table 8-1
Impact Scale for Comparison of Future Noise against Existing Noise

Noise Level Change dB(A)	Subjective Response	Significance
0	No change	No impact
0.1 – 2.9	Barely perceptible	Minor impact
3.0 – 4.9	Noticeable	Moderate impact
5.0 – 9.9	Up to a doubling or halving of loudness	Substantial impact
10.0 or more	More than a doubling or halving of loudness	Major impact

8.27 The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3dB(A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear. A 10dB(A) change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

8.28 It is considered that the criteria specified in the above table provide a good indication as to the likely significance of changes on noise levels in this case and have been used to assess the impact of the operational noise.

ISO9613

8.29 The noise levels generated by the operation of fixed plant at the proposed development have been predicted in accordance with the noise prediction framework set out in ISO 9613-2 *Acoustics – Attenuation of sound during propagation outdoors – Part 2 General method of calculation*.

8.30 The model takes into account the distance between the sources and the receptors and the amount of attenuation due to atmospheric absorption.

8.31 The model also assumes downwind propagation, i.e. a wind direction that assists the propagation of noise from the source to all receptors.

Sources of Information

8.32 Information regarding the proposed development, including plant utilisations associated with construction and operations, operational hours and proposed vehicles movements to and from the site has been supplied by the client and/or their sub-consultants.

CONSULTATION UNDERTAKEN

8.33 Devon County Council was consulted to confirm their views and policies on noise-related issues for the area around the proposed development site.

8.34 It was agreed with Devon County Council that the assessment of noise from the EfW facility and any fixed plant associated with land-filling or recycling

NOISE & VIBRATION 8

operations should be undertaken in accordance with the guidance contained in BS4142:1997 and that a tonal penalty should be applied to the noise sources where appropriate.

- 8.35 It was also agreed that mobile operations associated with the land-filling and recycling operations should be assessed in accordance with MPS2.
- 8.36 Devon County Council confirmed that predicted noise levels should be determined using the methodology outlined in BS5228-1:2009 for mobile plant and ISO9613 for fixed plant.

APPROACH TO THE ASSESSMENT

- 8.37 This assessment considers the likely noise levels that would be generated by the proposed development at the nearby noise-sensitive receptors.
- 8.38 An assessment has been made of the baseline situation and the potential impact of the proposals. Environmental advantages and disadvantages have been identified and where appropriate, mitigation measures and/or scheme changes to offset potentially adverse environmental impacts have been identified.
- 8.39 Noise levels during the construction phase have been calculated using the methodology contained within British Standard 5228-1:2009 the predicted noise levels have been assessed against the guideline noise limits suggested in the *Significance based on fixed noise limits* detailed in paragraph E.2 of BS5228-1:2009 and the draft *Guidelines for Noise Impact Assessment* produced by the Institute of Acoustics and the Institute of Environmental Management and Assessment. Vibration during the construction phase has also been considered.
- 8.40 Operational noise levels generated by the EfW facility and the fixed plant associated with land-filling and recycling activities have been predicted using the guidance contained in ISO9613 and have been assessed against the guidance contained in BS4142.
- 8.41 Operational noise levels generated by the mobile plant associated with land-filling and recycling operations have been predicted using the guidance contained in BS5228 and have been assessed against the guidance contained in MPS2.
- 8.42 Noise levels generated by heavy goods vehicle movements has been predicted using the guidance contained in BS5228 and assessed against using the draft *Guidelines for Noise Impact Assessment*.

BASELINE CONDITIONS

- 8.43 Environmental noise surveys were carried out at the noise-sensitive receptors closest to the application site on Sunday 10th, Monday 11th and Tuesday 26th May 2009 to capture typical background noise levels.

NOISE & VIBRATION 8

- 8.44 An environmental noise survey was also undertaken on Wednesday 29th and Thursday 30th July adjacent to two properties on New Park Road. These measured noise levels will be used for assessing any impacts from site related road traffic.
- 8.45 The survey methodology and results are set out below.
- 8.46 The noise monitoring equipment used during the surveys is detailed in Appendix 8/2. All noise monitoring equipment was calibrated before and after the measurements and no calibration drifts were found to have occurred. The equipment had been calibrated to a traceable standard by UKAS-accredited laboratories within the 24 months preceding the surveys.
- 8.47 The noise monitoring locations, shown on SLR drawing reference no. NE 8/1, are considered as being representative of the nearest noise-sensitive locations to the proposed development site. These are:
- Location 1 – Beacon View, to the north-west of the site;
 - Location 2 – The Piggery, to the east of the site;
 - Location 3 – Swainstone, to the south-west of the site;
 - Location 4 – Challonsleigh, to the north-west of the site;
 - Location 5 – No.72 New Park Road – West, to the north of the site; and
 - Location 6 – Beech Farm Bungalow, New Park Road – East, to the north of the site.
- 8.48 Measurements at locations 1 to 4 were taken over a number of 15 minute non-consecutive periods to cover the proposed operational hours of the proposed development during the week and on a Sunday, namely:
- Daytime – 07:00 to 19:00 hours – 4 x 15 minute measurements;
 - Evening – 19:00 to 23:00 hours – 2 x 15 minute measurements; and
 - Night-time – 23:00 to 07:00 hours – 2 x 15 minute measurements.
- 8.49 Measurements at Locations 5 and 6 were taken over a 24 hour midweek period.
- 8.50 Measurements undertaken during the night-time were measured in 5 minute log periods and measurements undertaken during the daytime and evening were measured in 15 minute log periods.
- 8.51 At the measurement positions the following noise level indices were recorded:
- $L_{Aeq,T}$ The A-weighted equivalent continuous noise level over the measurement period.
- L_{A90} The A-weighted noise level exceeded for 90% of the measurement period. This parameter is often used to describe background noise.
- L_{A10} The A-weighted noise level exceeded for 10% of the measurement period. This parameter is often used to describe road traffic noise.

NOISE & VIBRATION 8

L_{Amax} The maximum A-weighted noise level during the measurement period.

- 8.52 The weather conditions during the survey periods were acceptable for noise monitoring, being dry with little or no wind.
- 8.53 The microphone was placed 1.5m above the ground in free-field conditions, *i.e.* at least 3.5m from the nearest vertical, reflecting surface.
- 8.54 The results of the noise surveys are presented in full in Appendix 9/3 and are summarised in Tables 8-2 and 8-3 below.

Table 8-2
Summary of Measured Noise Levels - Weekday, free-field, dB

Location	Period	$L_{Aeq,T}$	L_{A90}	L_{A10}	L_{Amax}
1. Beacon View	Night-time	44.6	39.3	47.5	56.8
	Daytime	56.1	53.9	57.6	72.8
	Evening	53.0	49.6	54.7	68.9
2. The Piggery	Night-time	40.5	34.2	41.6	70.6
	Daytime	58.6	47.1	56.0	89.6
	Evening	49.6	41.9	47.0	75.4
3. Swainstone	Night-time	39.2	34.5	41.2	57.4
	Daytime	57.1	43.8	59.0	82.1
	Evening	44.0	39.3	45.9	64.4
4. Challonsleigh	Night-time	51.2	41.5	55.0	65.2
	Daytime	62.5	58.6	64.8	76.9
	Evening	59.9	55.5	62.4	71.3
5. No.72 New Park Road	Night-time	51.5	41.9	52.4	74.5
	Daytime	59.5	56.0	60.8	99.2
	Evening	54.6	49.6	55.5	87.5
6. Beech Farm Bungalow, New Park Road	Night-time	55.6	49.6	56.8	76.8
	Daytime	63.4	61.3	65.0	91.0
	Evening	58.1	55.4	60.4	83.5

NOISE & VIBRATION 8

Table 8-3
Summary of Measured Noise Levels - Sunday, free-field, dB

Location	Period	$L_{Aeq,T}$	L_{A90}	L_{A10}	L_{Amax}
1. Beacon View	Night-time	44.7	35.2	48.1	62.3
	Daytime	59.5	48.0	61.1	84.5
	Evening	52.6	44.6	53.3	73.7
2. The Piggery	Night-time	31.7	28.2	33.8	52.1
	Daytime	48.6	40.3	45.5	78.0
	Evening	43.5	40.7	45.1	55.0
3. Swainstone	Night-time	36.5	34.6	36.5	70.1
	Daytime	46.8	41.2	48.3	62.3
	Evening	44.1	41.2	46.0	57.8
4. Challonsleigh	Night-time	51.6	42.2	54.1	73.2
	Daytime	62.9	55.1	62.8	91.8
	Evening	59.3	49.7	56.8	54.1

8.55 The night-time noise climate during both the Sunday morning and weekday morning monitoring periods comprised:

- Location 1 distant road traffic (A38), wind in trees;
- Location 2 distant road traffic (A38), wind in trees, hum from power-lines;
- Location 3 distant road traffic (A38), wind in trees, water in brook; and
- Location 4 road traffic (A38).

8.56 The daytime noise climate during both the Sunday and weekday monitoring periods comprised:

- Location 1 distant road traffic (A38), local road traffic;
- Location 2 distant road traffic (A38), local road traffic, wind in trees;
- Location 3 distant road traffic (A38), local farm activity, wind in trees; and
- Location 4 road traffic (A38).

8.57 The evening noise climate was again similar during the Sunday evening and weekday evening periods, comprising of:

- Location 1 distant road traffic (A38), local road traffic, wind in trees;
- Location 2 distant road traffic (A38), local road traffic, wind in trees;
- Location 3 distant road traffic (A38), wind in trees; and
- Location 4 road traffic (A38).

8.58 The noise climate at Locations 5 and 6 included road traffic on the A38 and New Park Road.

ENVIRONMENTAL DESIGN MEASURES

8.59 The main energy from waste (EfW) facility operational processes take place within buildings wherever possible with heavy goods vehicles accessing the

- site from the A38 via the weighbridge, to the waste reception area at the northern end of the development.
- 8.60 Bottom ash recycling and storage will take place to the south-west of the main EfW building.
- 8.61 The landfill development will take place to the south of the main EfW building to the north of New England Road.
- 8.62 The layout of the site has been designed in such a way that external activities are screened from the nearby noise-sensitive receptors by either the intervening landform, purpose built screening mounds or by the proposed buildings within the development.

POTENTIAL IMPACT

Construction Noise Assessment

- 8.63 It is inevitable with any major development of this nature that some disturbance will be caused to those living and working nearby during the construction phase. However, disruption due to construction is a localised phenomenon and is temporary in nature. In general, only people living within 100 to 200m of the site boundary are likely to be seriously impacted by construction noise.
- 8.64 Although there are techniques available to predict the likely noise effects from construction works, such as those contained in BS5228:2009 Part 1: *Noise* are necessarily based on quite detailed information on the type and number of plant being used, their location within the site and the length of time they are in operation.
- 8.65 An estimate of the likely effects of noise from site clearance and preparation and construction of the buildings and surrounding service areas has been made for those properties closest to the site. The predictions are based on the methodology contained within BS5228:2009 Part 1: *Noise* over the core working day and reflect the currently available construction information. The predictions assume that no mitigation measures have been implemented, such as those identified later in this report.
- 8.66 The predicted noise levels have been assessed against an external façade criterion of 75dB $L_{Aeq,1hr}$ and against the existing ambient noise levels in the area. The derivation of the 75dB criterion is contained earlier in this chapter.
- 8.67 For the purpose of predicting the likely noise impact, the construction works have been divided into the following phases. The full list of plant assumed for each phase or works is contained in Appendix 9/4, the on-times given are based on data supplied for a similar site:
- **Site preparation works** – to include earthmoving, site profiling and landscaping works. The total sound power level for these items is assumed to be 116dB L_{WA} ;

NOISE & VIBRATION 8

- **Piling works** – the total sound power level for piling works is assumed to be 115dB L_{WA};
 - **Foundation works** – it is assumed that any concreting would require the use of a concrete pump and poker vibrators. The total sound power level for these items is assumed to be 113dB L_{WA}; and
 - **Building works** – to include the use of a tracked crane. The total sound power level for these items of plant is assumed to be 115dB L_{WA}.
- 8.68 It is acknowledged that there are likely to be other sub-phases of the construction work. However, in the absence of detailed information pertaining to how these operations are likely to be carried out the four main phases assessed are considered to give a good indication of the likely impact during the construction works.
- 8.69 Predictions have been made for construction works being undertaken at the proposed development building nearest to the nearby noise-sensitive receptors. The predicted assume that all construction operations are being undertaken simultaneously to give a worst-case situation.
- 8.70 Predictions have been carried out of the noise levels likely to be generated by each of the above phases of work using the methodology outlined in BS5228:2009 Part 1: *Noise*.
- 8.71 Construction works are likely to be limited to the following hours:
- Monday to Friday 08:00 to 18:00 hours; and
 - Saturday 08:00 to 13:00 hours.
- 8.72 In each instance, the façade that faces towards the site has been considered where the construction works are being undertaken at the most exposed location to each property. The worst-case predicted noise levels are set out Table 8-4.

Table 8-4
Predicted Construction Noise Levels, Façade L_{Aeq,1hr}, dB

Location	Site Prep	Piling	Foundation	Building
1. Beacons View	40.3	39.0	37.2	39.2
2. The Piggery	50.4	47.6	47.3	49.3
3. Swainstone	39.3	37.7	35.6	37.6
4. Challonsleigh	44.5	40.5	38.5	40.5
5. No.72 New Park Road	44.8	39.2	37.5	39.4
6. Beech Farm Bungalow	59.3	37.8	36.3	38.3

- 8.73 Table 8-4 indicates that the predicted noise levels from construction operations at the proposed development are below the 75dB criterion adopted for this assessment at all of the receptors.
- 8.74 The effect that the construction works will have on the ambient noise levels at the closest noise-sensitive receptors can be assessed by logarithmically

NOISE & VIBRATION 8

adding the predicted construction noise levels to the measured L_{Aeq} noise levels during the daytime period. This has been done for the total construction noise, i.e. the cumulative impact of all construction operations being undertaken simultaneously. The proposed working methods are unknown at present therefore assessing the total construction noise, rather than the noisiest phase of construction alone, will present a worst-case assessment. The results are shown in Table 8-5.

- 8.75 Note that the predicted construction noise levels have been reduced by 3dB so that free-field values are obtained. These may be added directly to the free-field measured values.

Table 8-5
Predicted Construction Noise Levels, Façade $L_{Aeq,1hr}$, dB

Location	Ambient Noise Levels		Change	Impact
	Existing	Predicted		
1. Beacons View	56.1	56.3	+0.2	Minor
2. The Piggery	58.6	59.4	+0.8	Minor
3. Swainstone	57.1	57.2	+0.1	Minor
4. Challonsleigh	62.5	62.6	+0.1	Minor
5. No.72 New Park Road	59.5	59.6	+0.1	Minor
6. Beech Farm Bungalow	63.4	64.2	+0.8	Minor

- 8.76 Table 8-5 indicates that the predicted worst-case noise levels from construction operations would have a minor, barely perceptible impact on the existing ambient noise climate at all of the locations assessed.
- 8.77 Mitigation measures to reduce the construction noise impact are set out later in this chapter.

Construction Vibration

- 8.78 BS5228:2009 Part 2 *Vibration* gives recommendations for controlling vibration on construction and open sites. It is considered that the main source of vibration during construction works relates to piling operations
- 8.79 It is generally accepted that for the majority of people, vibration levels in excess of 0.15 and 0.30mms^{-1} peak particle velocity are just perceptible. The table below details the distances at which certain activities give rise to a just perceptible level of vibration, these figures are based on historical field measurements.

Table 8-6
Distances at which Vibration may just be Perceptible

Construction Activity	Distance from activity when vibration may just be perceptible (metres)
Excavation	10 – 15
Heavy vehicles (e.g. dumper trucks)	5 – 10
Hydraulic breaker	15 – 20
Augered Piling	30 – 50

8.80 The closest vibration-sensitive residential property to the proposed development is considered to be The Piggery at a distance of approximately 375m from the closest area of construction. On the basis of the above figures it is probable that vibration from construction operations would be imperceptible and mitigation measures are considered unnecessary.

Construction Traffic Noise

8.81 At this stage, there is no information on the likely levels of traffic during the construction works. However, it is considered that construction related traffic movements would be no greater than those associated with operation of the proposed development and therefore reference should be made to the assessment of site related traffic movements detailed later in this chapter.

OPERATIONAL ASSESSMENT

8.82 The operational noise effects associated with the proposed development are anticipated to include the following:

- EfW operations;
- Land-filling operations;
- Recycling operations; and
- Site related heavy goods vehicle movements.

8.83 There are no assessment methods that apply to all aspects of the operation of the site. British Standard 4142:1997 *Method for rating industrial noise affecting mixed residential and industrial areas* is applicable to the assessment of noise from fixed plant and there are no specific guidelines for the assessment of on-site vehicle movements. Mobile plant noise and site-related heavy goods vehicle movements have been calculated using the haul route methodology detailed in BS5228-1:2009 and have been assessed against MPS2 and the existing ambient noise levels respectively. In addition, the cumulative effect of all types of noise generating activities has been considered against the existing ambient noise levels.

BS4142 Assessment – Fixed Plant

- 8.84 An assessment has been carried out in accordance with the guidance contained in British Standard 4142 to determine whether noise emissions from the fixed plant associated with the proposed energy from waste facility are likely to give rise to complaints from occupants of the residential noise-sensitive receptors closest to the development site.
- 8.85 Predictions of the noise levels at the nearby noise-sensitive receptors have been undertaken using the proprietary software-based noise model, CADNA/A, which implements the full range of UK calculation methods. In this instance, the calculation algorithms set out in ISO9613 have been used.
- 8.86 It is assumed that the plant will have some intermittent noise sources or noise sources that will be variable in nature, therefore an acoustic feature correction of 5dB has been added to the noise level to give a noise rating level, $L_{Ar,T}$.
- 8.87 The predicted noise levels assume that the buildings provide a sound reduction index of 20dB.

Table 8-7
Weekday BS4142 Assessment, free-field, dB

Location	Period	Measured Background Noise Level L_{A90}	Predicted Rating Level $L_{Ar,T}$	Difference
1. Beacon View	Night-time	39.3	22.7	-16.6
	Daytime	53.9	22.3	-31.6
	Evening	49.6	22.3	-27.3
2. The Piggery	Night-time	34.2	32.9	-1.3
	Daytime	47.1	28.3	-18.8
	Evening	41.9	28.3	-13.6
3. Swainstone	Night-time	34.5	24.5	-10.0
	Daytime	43.8	20.6	-23.2
	Evening	39.3	20.6	-18.7
4. Challonleigh	Night-time	41.5	22.2	-19.3
	Daytime	58.6	18.6	-40.0
	Evening	55.5	18.6	-36.9
5. No.72 New Park Road	Night-time	41.9	20.8	-21.1
	Daytime	56.0	20.5	-35.5
	Evening	49.6	20.5	-29.1
6. Beech Farm Bungalow	Night-time	49.6	24.2	-25.4
	Daytime	61.3	19.8	-41.5

NOISE & VIBRATION 8

Evening	55.4	19.8	-35.6
---------	------	------	-------

Table 8-8
Sunday BS4142 Assessment, free-field, dB

Location	Period	Measured Background Noise Level L_{A90}	Predicted Rating Level $L_{Ar,T}$	Difference
1. Beacon View	Night-time	35.2	22.7	-12.5
	Daytime	48.0	22.3	-25.7
	Evening	44.6	22.3	-22.3
2. The Piggery	Night-time	28.2	32.9	+4.7
	Daytime	40.3	28.3	-12.0
	Evening	40.7	28.3	-12.4
3. Swainstone	Night-time	34.6	24.5	-10.1
	Daytime	41.2	20.6	-20.6
	Evening	41.2	20.6	-20.6
4. Challonleigh	Night-time	42.2	22.2	-20.0
	Daytime	55.1	18.6	-36.5
	Evening	49.7	18.6	-31.1

8.88 BS4142 states:

“A difference of around 10dB or higher indicates that complaints are likely. A difference of around 5dB is of marginal significance. A difference of -10dB is a positive indication that complaints are unlikely”.

8.89 With reference to the above, Table 8-7 details the BS4142 for fixed plant associated with the proposed EfW development during a midweek period. The table indicates that noise levels generated by fixed plant will lead to:

- a situation between marginal significance and complaints unlikely at The Piggery during the night-time; and
- a situation giving a positive indication that complaints will be unlikely at all other times and locations.

8.90 Table 8-8 details the BS4142 for fixed plant associated with the proposed EfW development during Sunday operations. The table indicates that noise levels generated by fixed plant will lead to:

- a situation between marginal significance and complaints unlikely at The Piggery during the night-time; and
- a situation giving a positive indication that complaints will be unlikely at all other times and locations.

8.91 Based on the above mitigation measures to reduce the noise rating levels of the fixed plant are considered un-necessary.

MPS2 ASSESSMENT – LANDFILL OPERATIONS

- 8.92 MPS2 contains the current government advice on noise from mineral extraction sites in England. As waste management sites share many of the operational characteristics at mineral extraction sites the guidance is considered applicable to the proposed development site.
- 8.93 The recommended derivation of free-field criteria for normal daytime operations and the absolute 70dB $L_{Aeq,1hr}$ criterion for temporary operations are appropriate for this assessment. Table 8-9 shows the criteria for normal daytime operations derived in accordance with the advice contained in Annex 2 of MPS2 and the results of the noise surveys.

Table 8-9
Criteria for Normal Operations, free-field, dB

Location	Measured Noise Level L_{A90}	Daytime Criteria 07:00 – 19:00 hrs $L_{Aeq,1hr}$
1. Beacons View	53.9	55.0
2. The Piggery	47.1	55.0
3. Swainstone	43.8	53.8
4. Challonsleigh	58.6	55.0
5. No.72 New Park Road	56.0	55.0
6. Beech Farm Bungalow	61.3	55.0

- 8.94 Plant teams and a list of mobile noise sources have been provided by the applicant and are set out in Appendix 8/5 together with adopted sound power levels and estimate on-times. The sound power levels are derived from discussions with the relevant plant manufactures, measurement of similar plant in the field or from the tables in BS5228. All measured sound power levels take into account the operation of any reverse warning systems fitted to the plant, where applicable.
- 8.95 The noise predictions represent worst-case scenarios in terms of plant location where mobile plant would be working at the closest approach to the nearby noise-sensitive properties or at elevations where noise reductions due to barriers would be minimal or absent. In reality, operations would take place at greater distances or within the mineral void and therefore additional distance and barrier attenuation would occur leading to lower noise levels.
- 8.96 It is understood that land-filling operations would take place between 07:00 and 17:00 hours Monday to Friday and 07:00 and 13:00 hours on Saturday. There are no land-filling operations proposed outside of these hours therefore only a daytime assessment has been undertaken for these operations.

NOISE & VIBRATION 8

- 8.97 The predicted noise levels, including land-filling and cell engineering operations, have been undertaken for a worst-case situation when operations are being undertaken at their closest approach or most exposed elevation where screening from natural landforms and/or purpose built screening mounds is at a minimum.
- 8.98 Table 8-10 shows the assessment of predicted noise levels against the criteria derived in accordance with MPS2 for normal operations.

Table 8-10
MPS2 Assessment, free-field, dB

Location	Predicted Noise Level, $L_{Aeq,1hr}$	Derived Criteria	Difference
1. Beacons View	35.4	55.0	-19.6
2. The Piggery	45.6	55.0	-9.4
3. Swainstone	36.3	53.8	-17.5
4. Challonsleigh	30.3	55.0	-24.7
5. No.72 New Park Road	33.1	55.0	-21.9
6. Beech Farm Bungalow	32.8	55.0	-22.2

- 8.99 Table 8-10 shows that the predicted noise levels from normal landfill operations are below the derived criteria at all of the locations assessed therefore no mitigation measures are considered necessary.

Site Related Traffic Movements

- 8.100 The predicted noise level produced by site related traffic movements has been calculated using the methodology contained in BS5228. Calculations have been undertaken using the proprietary noise modelling software CADNA/A.
- 8.101 The traffic assessment has advised that, during the worst-case hour, there would be a total of 36 heavy goods vehicle movements and 40 light goods vehicles/passenger cars movements to/from the proposed development. It is assumed that there is a 50:50 split of traffic coming from the east and west along the road network to the site.
- 8.102 The former Department of Transport document *Calculation of Road Traffic Noise* (CRTN, 1988) states that calculations of noise level for traffic flows below 50 vehicles per hour or 1000 vehicles per 18 hour day are unreliable and measurements should be taken when evaluating such cases. However, as the site is not yet operational, the noise generated by waste lorry movements has been predicted using the haul route method outlined in BS5228. The impact of noise from traffic movements has been assessed against the existing ambient noise levels for the midweek daytime only.

NOISE & VIBRATION 8

- 8.103 Table 8-11 shows the predicted noise level produced by traffic movements at the site. The prediction is based on vehicles speeds of 20kph within the site and 50kph beyond the site.

Table 8-11
Predicted Noise Levels from Traffic Movements, free-field, L_{Aeq} dB

Location	Predicted L_{Aeq}
1. Beacons View	16.7
2. The Piggery	19.2
3. Swainstone	17.4
4. Challonsleigh	20.4
5. No.72 New Park Road	22.7
6. Beech Farm Bungalow	34.7

- 8.104 The future ambient noise levels at the closest noise-sensitive receptors have been calculated by logarithmically adding the above total predicted noise levels to the existing ambient noise levels.
- 8.105 Table 8-12 compares the predicted future ambient noise levels with the impact scale adopted for this assessment.

Table 8-12
Predicted Ambient Noise Levels from Site Related Traffic Movements
Weekday, free-field, $L_{Aeq,T}$ dB

Location	Period	Ambient Noise Level		Change	Impact
		Existing	Predicted Future		
1. Beacons View	Daytime	56.1	56.1	0	None
2. The Piggery	Daytime	58.6	58.6	0	None
3. Swainstone	Daytime	57.1	57.1	0	None
4. Challonsleigh	Daytime	62.5	62.5	0	None
5. No.72 New Park Road	Daytime	56.0	56.0	0	None
6. Beech Farm Bungalow	Daytime	61.3	61.3	0	None

- 8.106 Table 8-12 indicates that there would be no change to the existing ambient noise levels due to heavy goods vehicle movements associated with the proposed development. On this basis, no mitigation measures are considered necessary.

CUMULATIVE IMPACTS

- 8.107 The noise levels from operational processes at the site have been assessed against standards appropriate for each type of source considered, i.e. BS4142 for the operation of fixed plant, MPS2 for landfill operations and the existing ambient noise levels for traffic movements. The scope of BS4142

NOISE & VIBRATION 8

specifically excludes the assessment of mobile noise sources and is not appropriate guidance for the assessment of the cumulative impacts.

- 8.108 Tables 8-13 and 8-14 summaries the cumulative impact at each receptor during the daytime, evening and night-time periods for midweek and Sunday operations respectively. The cumulative noise levels have been assessed against the existing ambient noise levels and the potential change has been compared to the impact scale adopted for this assessment.

Table 8-13
Cumulative Impact Assessment - Weekday, Free-field $L_{Aeq,T}$ dB

Location	Period	Ambient Noise Level		Change	Impact
		Existing	Predicted Future		
1. Beacons View	Night-time	44.6	44.6	0	None
	Daytime	56.1	56.1	0	None
	Evening	53.0	53.0	0	None
2. The Piggery	Night-time	40.5	40.7	+0.2	Minor
	Daytime	58.6	58.8	+0.2	Minor
	Evening	49.6	49.6	0	None
3. Swainstone	Night-time	39.2	39.2	0	None
	Daytime	57.1	57.1	0	None
	Evening	44.0	44.0	0	None
4. Challonsleigh	Night-time	51.2	51.2	0	None
	Daytime	62.5	62.5	0	None
	Evening	59.9	59.9	0	None
5. No.72 New Park Road	Night-time	41.9	41.9	0	None
	Daytime	56.0	56.0	0	None
	Evening	49.6	49.6	0	None
6. Beech Farm Bungalow	Night-time	49.6	49.6	0	None
	Daytime	61.3	61.3	0	None
	Evening	55.4	55.4	0	None

- 8.109 It can be seen from Table 8-13 that the cumulative impact of the operations at the proposed development, including traffic movements would, at worst, lead to a minor, barely perceptible impact during the midweek period.

Table 8-14
Cumulative Impact Assessment - Sunday, Free-field $L_{Aeq,T}$ dB

Location	Period	Ambient Noise Level		Change	Impact
		Existing	Predicted Future		
1. Beacons View	Night-time	44.7	44.7	0	None
	Daytime	59.5	59.5	0	None
	Evening	52.6	52.6	0	None
2. The Piggery	Night-time	31.7	33.2	+1.5	Minor
	Daytime	48.6	48.6	0	None
	Evening	43.5	43.5	0	None
3. Swainstone	Night-time	36.5	36.6	+0.1	Minor
	Daytime	46.8	46.8	0	None
	Evening	44.1	44.1	0	None
4. Challonsleigh	Night-time	51.6	51.6	0	None
	Daytime	62.9	62.9	0	None
	Evening	59.3	59.3	0	None

8.110 It can be seen from Table 8-14 that the cumulative impact of the operations at the proposed development would, at worst, lead to a minor, barely perceptible impact during Sunday operations.

8.111 Based on the above, mitigation measures to reduce the noise levels are considered un-necessary.

IMPACT ON DARTMOOR NATIONAL PARK

8.112 The nearest point in Dartmoor National Park to the proposed development, considered to be Dinnaton County Club, is located approximately 3.4km to the north-east. The worst-case predicted noise level at that distance from the proposed development would be 32.4dB $L_{Aeq,1hr}$.

8.113 It should be noted that between Dartmoor National Park and the proposed development there are other sites of an industrial nature, i.e. Lee Mill Industrial Estate to the north of the A38 and a sewage works to the south of the A38. There is a mainline railway line running along the boundary of the National Park and the A38 dual carriage way lies to the south.

8.114 To the west of Cornwood there are also china clay workings at Lee Moor and Headon Down which boarder the National Park.

8.115 It is considered that the worst-case predicted noise level of 32.4dB $L_{Aeq,1hr}$ would not effect the tranquillity of Dartmoor National Park.

MITIGATION MEASURES

Construction Noise

- 8.116 The assessment of construction noise has shown that the adopted criterion is unlikely to be exceeded at the nearby noise-sensitive receptors. The predicted increase in the ambient noise climate would lead to a minor, barely perceptible, impact at all locations assessed. Therefore, no mitigation measures are considered necessary.

Construction Traffic Noise

- 8.117 Construction related traffic movements would be no greater than traffic movements associated with the operation of the proposed development. The assessment has shown that operational traffic movements would have no impact at the noise-sensitive receptors assessed.

Construction Vibration

- 8.118 Vibration during construction operations is unlikely to be perceptible at any of the nearby vibration-sensitive receptors due to their distance from the site.

Operational Noise

- 8.119 The assessment has shown that:
- predicted daytime noise rating levels produced by fixed plant associated with the proposed development would lead to a situation where there is a positive indication that complaints would be unlikely at all locations during the week and on Sunday;
 - predicted evening noise rating levels produced by fixed plant associated with the proposed development would lead to a situation where there is a positive indication that complaints would be unlikely at all locations during the week and on Sunday;
 - predicted night-time noise rating levels produced by fixed plant associated with the proposed development would lead to a situation where there is a positive indication that complaints would be unlikely at all locations during the week and on Sunday except at The Piggery where there would be a situation between marginal significance and complaints unlikely during the week and on Sunday;
 - landfill operations associated with the proposed development would be well within the criteria derived in accordance with MPS2 at all of the locations assessed;
 - site related traffic movements, including heavy goods vehicles, light goods vehicles and passenger cars accessing the site via the A38 and New Park Road, would have no impact on the ambient noise level at any of the locations assessed; and

- the cumulative impact of all operations and traffic movements assessed against existing measured ambient noise levels would, at worst, lead to a minor, barely perceptible impact.
- 8.120 Based on the above no specific noise mitigation measures are considered necessary however, the following generic good practice mitigation measures should be considered to help reduce noise emissions at the site to a minimum:
- periods when access doors are open should be kept to a minimum or, preferably, avoided during the night-time period;
 - ensure all plant is maintained appropriately to ensure noise emissions are minimised;
 - use quiet plant options wherever possible;
 - use localised screening and/or acoustic enclosures where possible.

CONCLUSIONS

- 8.121 The assessment has considered both the potential for the construction and operational proposals to give rise to noise and vibration impacts at the closest noise-sensitive receptors.
- 8.122 The assessment has found that:
- predicted daytime noise rating levels produced by fixed plant associated with the proposed development would lead to a situation where there is a positive indication that complaints would be unlikely at all locations during the week and on Sunday;
 - predicted evening noise rating levels produced by fixed plant associated with the proposed development would lead to a situation where there is a positive indication that complaints would be unlikely at all locations during the week and on Sunday;
 - predicted night-time noise rating levels produced by fixed plant associated with the proposed development would lead to a situation where there is a positive indication that complaints would be unlikely at all locations during the week and on Sunday except at The Piggery where there would be a situation between marginal significance and complaints unlikely during the week and on Sunday;
 - landfill operations associated with the proposed development would be well within the criteria derived in accordance with MPS2 at all of the locations assessed;
 - site related traffic movements, including heavy goods vehicles, light goods vehicles and passenger cars accessing the site via the A38 and New Park Road, would have no impact on the ambient noise level at any of the locations assessed;
 - the cumulative impact of all operations and traffic movements assessed against existing measured ambient noise levels would, at worst, lead to a minor, barely perceptible impact; and
 - neither construction nor operational noise levels would have any impact on Dartmoor National Park.

NOISE & VIBRATION 8

- 8.123 Based on the results of the assessment, noise and vibration are not considered to be material constraints of the proposed development.

APPENDIX 8/1 – GLOSSARY OF TERMINOLOGY

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale, is used. The decibel scale typically ranges from 0dB (the threshold of hearing) to over 120dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

**Table A8/1-1
Noise Levels Commonly Found In the Environment**

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at one metre away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

Acoustic Terminology

dB (decibel) The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2×10^{-5} Pa).

dB(A) A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.

L_{Aeq} L_{Aeq} is defined as the notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.

L₁₀ & L₉₀ If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L₁₀ is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L₉₀ is the 'average minimum level' and is often used to describe the background

NOISE & VIBRATION 8

noise. It is common practice to use the L_{10} index to describe traffic noise.

L_{Amax}

L_{Amax} is the maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, 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.

APPENDIX 8/2 – NOISE MONITORING EQUIPMENT

**TableA8/2-1
Noise Monitoring Equipment**

Location	Description	Serial No.
Locations 1, 2 and 4	Norsonic Nor-140 Type 1 sound level meter	1403009
	Norsonic Type 1251 acoustic calibrator	31872
Location 3	Norsonic Nor-140 Type 1 sound level meter	1403012
	Norsonic Type 1251 acoustic calibrator	31874
Location 5	Cirrus CR:831B Type 1 sound level meter	C17175FF
	Cirrus Type CR:511 acoustic calibrator	32327
Location 6	Norsonic Nor-140 Type 1 sound level meter	1403010
	Norsonic Type 1251 acoustic calibrator	31821

APPENDIX 8/3 – FULL SURVEY RESULTS

Table A8/3-1
Measured Sunday Noise Levels at Location 1 – Beacon View, Smithaleigh
free-field, dB

Date	Time	L _{Aeq,T}	L _{A90}	L _{A10}	L _{Amax}
Sunday 10/05/09 Night-time	02:22	43.1	33.1	46.5	54.4
	02:27	44.9	35.5	48.3	62.3
	02:32	42.6	35.3	45.9	56.3
	03:43	45.8	34.3	49.5	54.2
	03:48	46.3	36.5	50.3	56.3
	03:53	44.5	36.7	48.1	54.5
Sunday 10/05/09 Day-time	12:00	57.3	46.0	61.2	76.0
	13:11	58.8	47.7	59.6	81.6
	14:20	57.8	49.0	61.4	73.3
	15:19	62.2	49.4	62.3	84.5
Sunday 10/05/09 Evening	20:42	52.6	45.5	54.8	69.6
	21:40	52.6	43.7	51.8	73.7

Table A8/3-2
Measured Sunday Noise Levels at Location 2 – The Piggery
free-field, dB

Date	Time	L _{Aeq,T}	L _{A90}	L _{A10}	L _{Amax}
Sunday 10/05/09 Night-time	02:43	31.7	28.0	34.1	45.8
	02:48	32.5	28.7	35.2	46.1
	02:53	32.0	27.9	34.4	46.8
	03:24	29.4	27.2	31.2	39.8
	03:29	32.0	28.9	33.8	52.1
	03:34	31.7	28.7	34.2	43.5
Sunday 10/05/09 Day-time	12:52	40.9	38.1	43.0	54.4
	14:00	45.4	40.9	44.5	67.9
	15:00	50.4	40.0	47.2	74.8
Sunday 10/05/09 Evening	15:57	51.3	42.2	47.2	78.0
	20:23	44.8	42.2	46.6	55.0
	21:20	41.7	39.1	43.5	49.5

NOISE & VIBRATION 8

Table A8/3-3
Measured Sunday Noise Levels at Location 3 – Swainstone
free-field, dB

Date	Time	L _{Aeq,T}	L _{A90}	L _{A10}	L _{Amax}
Sunday 10/05/09 Night-time	03:05	39.4	34.7	36.2	70.1
	03:10	35.8	35.0	36.6	38.1
	03:15	35.9	34.9	36.3	56.0
	04:26	35.0	34.1	35.9	47.4
	04:31	35.0	34.2	35.8	45.4
	04:36	36.3	34.6	38.1	44.8
Sunday 10/05/09 Day-time	13:01	44.3	40.7	46.1	62.3
	13:41	49.1	41.5	51.9	61.0
	14:12	47.9	42.3	50.5	60.3
	14:47	43.2	40.1	44.7	59.2
Sunday 10/05/09 Evening	20:16	45.0	42.1	47.1	57.8
	20:56	42.9	40.2	44.8	56.3

Table A8/3-4
Measured Sunday Noise Levels at Location 4 – Challonsleigh
free-field, dB

Date	Time	L _{Aeq,T}	L _{A90}	L _{A10}	L _{Amax}
Sunday 10/05/09 Night-time	02:02	48.0	42.4	51.2	57.7
	02:07	53.8	45.2	54.7	73.2
	02:12	49.3	42.0	52.1	64.7
	04:02	49.7	40.4	53.2	63.1
	04:07	51.3	34.9	55.8	62.1
	04:12	54.0	48.0	57.7	62.8
Sunday 10/05/09 Day-time	12:34	61.5	53.4	61.9	77.7
	13:32	60.5	54.1	61.6	77.1
	14:38	65.7	56.1	64.0	91.8
Sunday 10/05/09 Evening	15:37	62.0	56.7	63.6	77.8
	21:00	59.0	48.9	55.3	79.7
	22:00	59.6	50.5	58.2	84.1

NOISE & VIBRATION 8

Table A8/3-5
Measured Midweek Noise Levels at Location 1 – Beacon View, Smithaleigh
free-field, dB

Date	Time	L _{Aeq,T}	L _{A90}	L _{A10}	L _{Amax}
Monday 11/05/09 Night-time	02:40	44.4	38.2	47.7	56.6
	02:45	43.6	37.7	47.1	56.8
	02:50	46.6	41.5	49.7	56.1
	03:47	45.6	40.8	48.5	53.8
	03:52	42.8	37.8	45.7	51.1
	03:57	43.6	39.6	46.5	51.3
Tuesday 26/05/09 Day-time	12:36	55.8	53.5	57.3	72.8
	14:21	55.3	53.2	56.8	69.3
	15:19	56.4	54.3	58.0	67.2
	16:44	56.6	54.4	58.2	60.9
Tuesday 26/05/09 Evening	19:16	52.9	50.0	54.7	62.9
	20:12	53.0	49.1	54.6	68.9

Table A8/3-6
Measured Midweek Noise Levels at Location 2 – The Piggery
free-field, dB

Date	Time	L _{Aeq,T}	L _{A90}	L _{A10}	L _{Amax}
Monday 11/05/09 Night-time	02:18	40.5	35.1	43.6	57.1
	02:23	45.1	37.8	46.3	70.6
	02:28	40.4	35.7	43.4	49.7
	03:26	36.5	32.3	38.9	47.0
	03:31	35.7	30.2	38.4	48.8
	03:36	37.2	34.0	39.2	42.0
Tuesday 26/05/09 Day-time	12:57	52.5	44.8	54.4	70.5
	14:41	63.0	51.2	60.0	89.6
	15:40	55.0	45.4	54.1	81.4
Tuesday 26/05/09 Evening	16:24	56.3	46.8	55.6	83.8
	19:34	49.7	41.6	46.5	73.8
	20:34	49.5	42.2	47.4	75.4

NOISE & VIBRATION 8

Table A8/3-7
Measured Midweek Noise Levels at Location 3 – Swainstone
free-field, dB

Date	Time	L _{Aeq,T}	L _{A90}	L _{A10}	L _{Amax}
Monday 11/05/09 Night-time	03:11	40.0	37.5	41.9	46.8
	03:16	39.2	25.9	41.4	57.4
	03:21	40.0	36.3	42.2	50.2
	04:06	39.0	36.3	41.2	47.0
	04:11	38.8	36.2	40.6	44.2
	04:16	38.1	34.6	40.1	46.4
Tuesday 26/05/09 Day-time	15:16	53.6	43.7	58.6	75.5
	15:46	53.8	43.6	50.7	78.4
	16:16	59.2	43.7	64.2	82.1
Tuesday 26/05/09 Evening	16:46	58.7	44.0	62.6	78.9
	19:02	45.2	40.5	47.6	63.8
	19:32	42.4	38.0	44.1	64.4

Table A8/3-8
Measured Midweek Noise Levels at Location 4 – Challonsleigh
free-field, dB

Date	Time	L _{Aeq,T}	L _{A90}	L _{A10}	L _{Amax}
Monday 11/05/09 Night-time	03:02	50.7	40.7	54.5	65.2
	03:08	50.3	37.7	54.2	62.2
	03:13	50.3	40.7	54.9	63.5
	04:06	50.7	40.6	54.3	63.9
	04:11	52.9	45.8	56.6	64.3
	04:16	51.7	43.3	55.2	63.8
Tuesday 26/05/09 Day-time	12:18	62.0	58.1	64.2	74.0
	14:01	61.9	58.5	64.0	72.7
	15:00	62.4	58.6	64.6	74.6
Tuesday 26/05/09 Evening	16:00	63.4	59.0	66.3	76.9
	18:58	60.6	56.8	63.3	69.0
	19:54	59.0	54.2	61.5	71.3

APPENDIX 8/4 – LIST OF CONSTRUCTION PLANT

**Table A8/4-1
Construction Plant Employed**

Phase	Plant	No. of Plant	Plant L _{WA} dB	Estimated On-Time %	Equivalent Continuous L _{WA} dB
Site Preparation	Tracked Excavator	2	108	50	108
	Dozer	2	109	50	109
	Lorry	2	104	10	97
	Scraper/Grader	1	104	50	101
	Articulated Dump Truck	2	110	50	110
	Road Roller	2	108	50	108
	Asphalt Spreader	1	110	50	107
Piling	Piling Equipment	2	115	50	115
Foundation	Tracked Excavator	2	108	50	108
	Concrete Pump	2	107	50	107
	Articulated Dump Truck	2	108	50	108
Building	Mobile Crane	2	110	50	110
	Concrete Truck	4	108	50	111
	Concrete Pump	2	107	50	107
	Hand Tools	2	111	10	104
	Compressor	1	100	100	100
	Articulated Dump Truck	1	108	50	105
	Scaffolding (Striking)	1	92	10	92

APPENDIX 8/5 – LIST OF LANDFILL MOBILE PLANT

Table A8/5-1
Landfill Mobile Plant Employed

Phase	Plant	Plant L _{WA} dB	On-time
Cell Engineering	CAT365C L Excavator	107	83
	CAT D6N Track-Type Tractor	112	83
	Ingersol Rand 122DX Roller	96	50
	Volvo A40D Articulated Dump Truck	110	n/a
Infilling	CAT 861B Compactor	113	83
	CAT 953D Tracked Loading Shovel	112	107
	Waste Lorry	104	n/a

APPENDIX 8/6 – LIST OF EFW PLANT

**Table A8/6-1
EfW Plant Details**

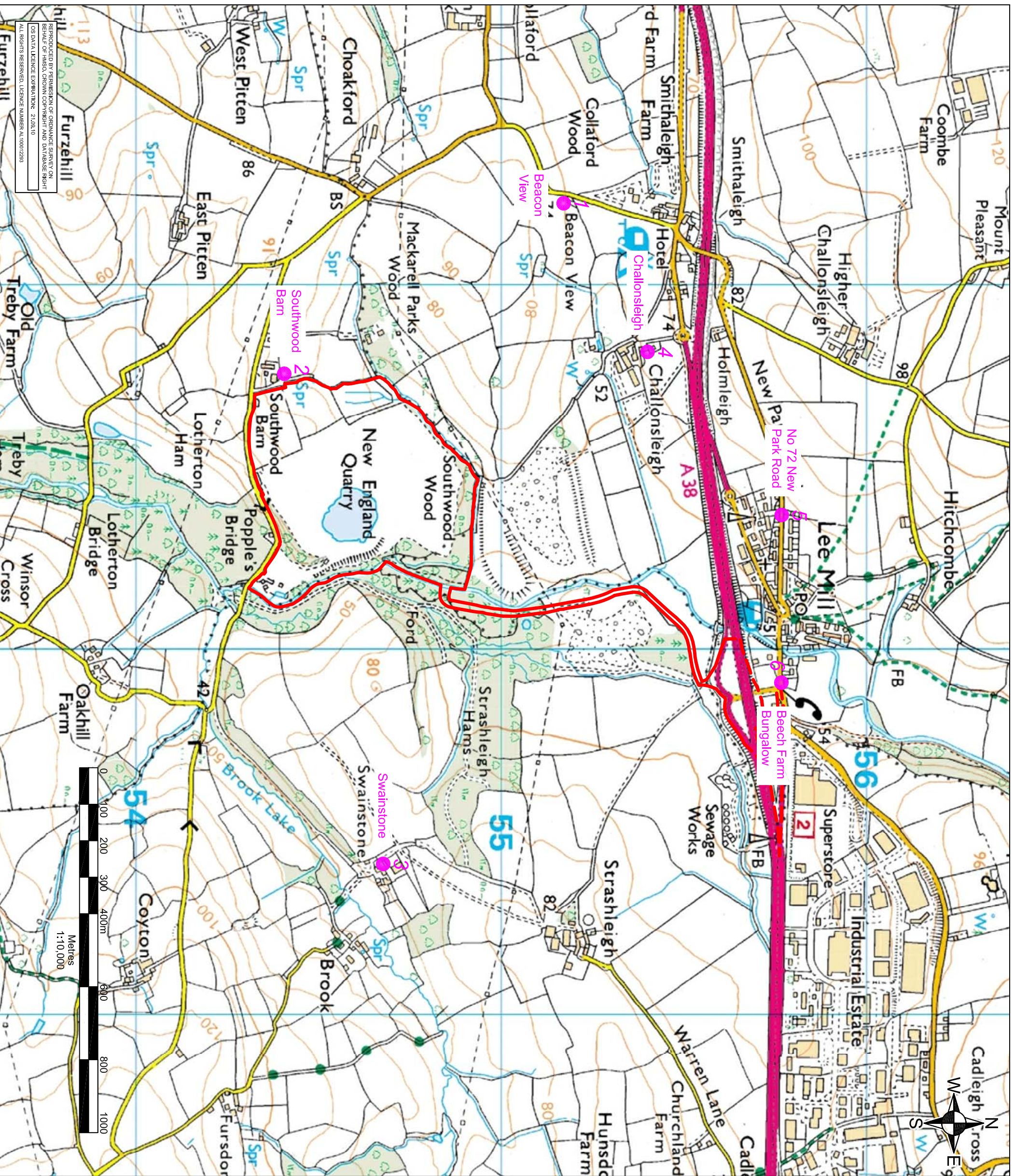
Area	Plant	No. of Plant	Plant L _{WA} dB	Estimated On-Time %	Equivalent Continuous L _{WA} dB
Tipping/Bunker Hall	HGV unloading	n/a	88	50	85
	Shredder	1	93	25	87
	Crane	1	78	100	78
	Hopper Loading	1	88	20	81
	MRF	1	115	80	112
Bottom Ash Hall	HGV	n/a	93	100	93
	Unloading	n/a	100	100	100
	Conveyor	6	85	100	93
Boiler Hall	Ash Transport	4	78	100	84
	Combustion Fan	2	93	100	96
	Rappers	12	95	10	96
	De-aerator	1	88	100	88
	Air Cooling System	1	100	100	100
	Conveyor Drive Units	16	93	100	105
	Conveyors	16	78	100	90
Flue Gas Hall	ID Fans	2	100	100	103
	Residue & Ash Conveyors	12	78	100	89
Turbine Hall	Turbine	1	108	100	108
	Gearbox	1	108	100	108
	Generator	1	108	100	108
	Feed water Pumps	2	98	100	101
	Condensate Pumps	1	93	100	93
	Vacuum Ejectors	1	103	100	103
	Air Cooled Condensers	4	92	100	98
Cooling	Fans	6	92	80	97

APPENDIX 8/7 – LIMITATIONS TO THIS REPORT

This entails a physical investigation of the site with a sufficient number of sample measurements to provide quantitative information concerning the type and degree of noise and vibration affecting the site. The objectives of the investigation have been limited to establishing sources of noise and vibration material to carrying out an appropriate assessment.

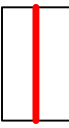


The number and duration of noise and vibration measurements have been chosen to give reasonably representative information on the environment within the agreed time, and the locations of measurements have been restricted to the areas unoccupied by building(s) that are easily accessible without undue risk to our staff.

As with any sampling, the number of sampling points and the methods of sampling and testing cannot preclude the existence of “hotspots” where noise or vibration levels may be significantly higher than those actually measured due to previously unknown or unrecognised noise or vibration emitters. Furthermore, noise or vibration sources may be intermittent or fluctuate in intensity and consequently may not be present or may not be present in full intensity for some or all of the survey duration.



LEGEND

1. SURVEY CARRIED OUT BY SLR CONSULTING LTD
19th MAY 2009

-  PLANNING APPLICATION BOUNDARY
-  NOISE MONITORING LOCATION (APPROXIMATE)
-  Swainstone 3

Revision	By	Chk'd By	Date	Comments

Viridor



FULMAR HOUSE
BEIGNON CLOSE
OCEAN WAY
CARDIFF, CF24 5HF
T: 029 2049 1010
F: 029 2048 7903
www.slrconsulting.com

Site: NEW ENGLAND RESOURCE RECOVERY CENTRE

Project: PLANNING APPLICATION

Drawing Title
NOISE MONITORING LOCATION PLAN

Project File Reference 0036.00350.18.8-1 NOISE.DWG	Drawn By AB
Scale 1:10,000 @A3	Date January 2010
Drawing Number 8/1	Chk'd By WR
	Revision PL0

REPRODUCED BY PERMISSION OF ORDNANCE SURVEY ON BEHALF OF HISCO, DRAWING COPYRIGHT AND DATABASE RIGHT. OS DATA LICENCE EXPIRATION: 21.03.10
ALL RIGHTS RESERVED. LICENCE NUMBER AL10001293