

## Annex D: Noise Assessment



**Hill Barton Business Park  
Noise Assessment  
Small Scale Thermal Processing  
and Energy Plant**

Stuart Partners Ltd

October 2014

# Notice

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# 1. Introduction

## Background

- 1.1. This study provides a Noise Assessment for a proposed redevelopment of a gasification plant at Unit 8, Hill Barton Business Park, near Clyst St Mary into a thermal processing and energy plant, at the location shown on the Site Location Plans contained in Appendix A.1.

## Site Description

- 1.2. The proposed facility is within the centre of Hill Barton Business Park and is not visible from any public highway or vantage point and is surrounded by other buildings.

## Development Proposals

### Proposal Details

- 1.3. The proposed development involves an extension of an existing building to accommodate a thermal processing plant and energy plant. The plant will process about 12,000 tonnes per annum. In addition containerised thermal drying plant utilising the waste heat will be installed at the eastern end as shown on the proposal plans provided in Appendix A3.

### Potential Noise Sources

- 1.4. In terms of noise the main potential source for the proposed installation would be associated with the external plant involving 14 large fans which are the focus of this report. The other noise sources mainly the turbine hall (90 dB(A) at 1m) will be enclosed in a blockwork room (Rw 50) and hence will not be an issue at the receptors.

### Hours of Operation

- 1.5. The plant, apart from maintenance, will run 24hrs a day, 7 days a week although deliveries and vehicle movements will be restricted to 7.30am - 6.00pm Monday to Friday and 7.30am – 1.00pm on Saturday.

## Scope of Works

- 1.6. The following scope of works has been carried out for the Noise Assessment:
- Undertaking of background noise surveys;
  - Assessment of predicted noise levels from the thermal drying plant ; and
  - Comparison of predicted noise levels to existing planning guidelines regarding the noise impact of the proposed development itself and in combination with two other proposed energy plants in the vicinity. The combined impact with the landfill tip is also considered.

## 2. Policy Context & Assessment Guidance

### Legislative Context

- 2.1. Key legislation regarding noise includes:
- Environmental Protection Act 1990, Part III, as amended by the Noise and Statutory Nuisance Act 1993; and
  - Control of Pollution Act 1974, as amended.
- 2.2. The Environmental Protection Act 1990 Part III, Section 79 defines a statutory nuisance caused by noise to be; 'noise emitted from premises so as to be prejudicial to health or a nuisance'.

### Policy Context: National

#### National Planning Policy Framework 2012

- 2.3. Within England the principle source of guidance with regard to planning is the National Planning Policy Framework (NPPF), published on 27<sup>th</sup> March 2012<sup>1</sup>.
- 2.4. The NPPF Paragraph 109, requires that the planning system should contribute to and enhance the natural and local environment by "*preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability*". Pollution, including noise, is defined as anything that might lead to an adverse impact on human health, the natural environment or general amenity.
- 2.5. In support of this, NPPF Paragraph 123 states that planning decisions should aim to:
- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
  - mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
  - recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
  - identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

#### Noise Policy Statement for England 2010

- 2.6. The Noise Policy Statement for England (NPSE)<sup>2</sup>, published on 15<sup>th</sup> March 2010, sets out the long-term vision of the Government's noise policy, as being to "*promote good health and a good quality of life through the management of noise within the context of Government policy on sustainable development*".
- 2.7. Through the effective management and control of environmental, neighbour and neighbourhood noise, within the context of Government policy on sustainable development, the NPSE 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.

<sup>1</sup> <http://planningguidance.planningportal.gov.uk/>.

<sup>2</sup> Noise Policy Statement for England, DEFRA, March 2010.



## Planning Practice Guidance - Noise 2014

- 2.8. Planning Practice Guidance (PPG) has been revised and updated and is now readily available online<sup>3</sup>. PPG 30 *Noise* was updated on 6<sup>th</sup> March 2014 and advises on how planning can manage potential noise impacts in new development<sup>4</sup>.
- 2.9. PPG 30 *Noise* states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. It also comments that when preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.
- 2.10. Although PPG 30 *Noise* acknowledges that noise could override other planning concerns, it states that neither the Noise Policy Statement for England nor the NPPF, which reflects the Noise Policy Statement, expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of proposed development.
- 2.11. This document utilises the approach referred to in the Explanatory Note of the NPSE regarding identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level<sup>5</sup> and the lowest observed adverse effect level<sup>6</sup> for the given situation. Increasing noise exposure will at some point cause the significant observed adverse effect level boundary to be crossed. Above this level the noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is above this level the planning process should be used to avoid this effect occurring, by use of appropriate mitigation such as by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of the activity causing the noise, but it is undesirable for such exposure to be caused.
- 2.12. PPG 30 *Noise* includes a table summarising the noise exposure hierarchy, based on the likely average response. This table is reproduced below.
- 2.13. PPG 30 *Noise* states that the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. Instead this will depend on how various factors combine in any particular situation, including:
- the source and absolute level of the noise together with the time of day it occurs;
  - for non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise; and
  - the spectral content of the noise (i.e. whether or not the noise contains particular high or low frequency content) and the general character of the noise (i.e. whether or not the noise contains particular tonal characteristics or other particular features). The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.

<sup>3</sup> <http://planningguidance.planningportal.gov.uk/>.

<sup>4</sup> <http://planningguidance.planningportal.gov.uk/blog/guidance/noise/noise-guidance/>

<sup>5</sup> The level of noise exposure above which significant adverse effects on health and quality of life occur.

<sup>6</sup> The level of noise exposure above which adverse effects on health and quality of life can be detected

Table 2-1 PPG 30 Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		Lowest Observed Adverse Effect Level	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect Level	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

## Policy Context: Local

### Devon Structure Plan

- 2.14. The Devon Structure Plan 2001 to 2016 - 'Devon to 2016', adopted October 2004, previously formed part of the Development Plan for the whole of Devon, including Plymouth, Torbay and Dartmoor National Park, but excluding Exmoor National Park. However, by order of the Secretary of State, the Structure Plan (together with the Regional Spatial Strategy for the South West) was revoked on 20<sup>th</sup> May 2013<sup>7</sup>. Devon County Council now refer to the Local Plans pertaining to each district within Devon.
- 2.15. The following paragraph regarding the former Devon Structure Plan's position regarding noise has been included for reference purposes only.
- 2.16. The former Structure Plan requested that the issue of noise pollution be addressed when considering the location of new development and stated that "*new development that would by its nature give rise to potentially significant levels of noise pollution should not be located where it could adversely affect other land uses in the area to an unacceptable extent*". Policy CO16 Noise Pollution of the former Structure Plan set out broad guidance regarding noise and stated that "*development should not be located where it would result in a significant increase in the level of noise affecting existing or proposed land uses in the vicinity, and noise sensitive land uses should not be located in areas affected by significant existing noise*".

<sup>7</sup> [http://www.devon.gov.uk/index/environmentplanning/planning-system/devon\\_county\\_structure\\_plan.htm](http://www.devon.gov.uk/index/environmentplanning/planning-system/devon_county_structure_plan.htm)

## Assessment Guidance

### IPPC H3: Integrated Pollution Prevention and Control (IPPC) – Horizontal Guidance for Noise Part 1 – Regulation and Permitting

- 2.17. This document outlines the main considerations relating to the regulation and permitting of noise (and vibration). It is aimed primarily at the regulators and gives guidance on setting numerical noise limits.
- 2.18. On the basis that noise from the installation should not be so loud that it gives reasonable cause for annoyance to persons in the vicinity this document suggests:

- 1) That an absolute limit should be established:

*“The starting point for numerical levels should be a free-field rating level ( $L_{Ar,Tr}$ ) of 50dB by day and a façade rating level of 45dB by night. Daytime is defined as being 07:00 to 23:00 and night 23:00 to 07:00, in line with Planning Policy Guidance Note PPG 24<sup>9</sup>. Additionally, the  $L_{Amax}$  measured with the fast time weighting should not normally exceed 60dB at the façade of any bedrooms to prevent sleep disturbance.”*

- 2) Limit linked to the background noise:

*“However, evidence suggests that the setting of absolute levels can lead to difficulties. Consequently the setting of levels linked to the background, with an overriding safeguard of absolute levels to ensure a baseline of good practice, is considered to be most appropriate. To be sure that there is no reasonable cause for annoyance, the Rating Level ( $L_{Ar,Tr}$ ) of the noise from the installation should be the same as the Background Noise Level ( $LA_{90,T}$ ). As the difference between the two increases, then it is clear that there is an increasing likelihood of complaints.”*

- 2.19. The aim should be to set Rating Levels ( $L_{Ar,Tr}$ ) from an installation at the numerical value of the Background Noise Level ( $LA_{90,T}$ ), but there are several reasons why departures from this approach could be justified:

- (a) Setting a less stringent standard:

- Open-air activities that cannot be undertaken indoors – such as landfills or mineral workings;
- Temporary or short-term problems such as construction or decommissioning; and
- A well-established installation with no significant history of noise problems.

- (b) More stringent standard:

- Tonal or other acoustic characteristics;
- A tranquil area that requires preservation;
- Creeping background; and
- A large area affected.

<sup>9</sup> PPG 24 has been superseded by NPPF but the IPC is yet to be updated.

The guidance also states:

*"Where background noise levels are low (below about 30 dB) and the requirement to restrict the rating level to that of the background would be technically very difficult or the costs would be out of proportion to the benefit, a judgement may be required as to how far the Operator should go in reducing noise. The factors listed above under (a) should be considered in deciding upon an appropriate and reasonable regulatory approach, together with the complaint and enforcement history (both planning and environmental health) and whether it is a new or existing plant."*

- 2.20. It is identified in the horizontal guidance that the determination of best available techniques (BAT) is limited where a site conducts open air operation, and it is important for permit conditions to promote good operational practices. The guidance refers to the detailed information given in the Environment Agency's 'Internal Guidance for the Regulation of Noise at Waste Management Facilities' which contains guidance that applies to waste management facilities which are licensed under the Waste Management Licensing Regulations, now covered by Environmental Permits.
- 2.21. The Environment Agency - Internal Guidance for the Regulation of Noise at Waste Management Facilities
- 2.22. The aim of the guidance is to provide a background to the issues and put forward a nationally consistent approach to the control of noise through the licensing system.
- 2.23. The guidance is based on the risk of a site causing an impact on surrounding noise sensitive receptors, with risk being defined as high, medium, or low according to the following criteria.

*"A high risk site may be one that:*

- Is located in or adjacent to a residential area;
- Is in close proximity to a Site of Special Scientific Interest (SSSI);
- Operates outside of the normal working day;
- Is located in a mixed industrial and residential areas and there is a possibility that the BS 4142 rating level will be above the background noise level at sensitive receiver/s; and
- Is a landfill site that has identifiable sensitive receptors, as defined in Section 4.4.6 of the Guidance, especially if a land raise operation.

*A medium-risk site is where sensitive receptors do not fall into the high-risk category.*

*A low risk site is where there are no identified sensitive receptors".*

- 2.24. The approach of the Noise at Waste Management Facilities document has considered the published guidance of:
- BS 4142: 1997, Method for rating industrial noise affecting mixed residential and industrial areas;
  - MPG 11: Mineral Planning Guidance (Department of the Environment, The Control of Noise at Surface Mineral Workings, April 1993).
- 2.25. It should be noted that MPG 11 has been superseded by MPS 2, which in turn has been superseded by the National Planning Policy Framework (NPPF), March 2012. The Technical Guidance to the NPPF March 2012 includes noise standards that are the same as MPS 2.

- 2.26. The guidance recommends that if the risk assessment has demonstrated that there is a risk of noise causing an unacceptable impact, then some form of numerical conditions restricting noise to a particular limit or limits should be considered. It states that limits should not be set in addition to any noise limits set by planning condition.
- 2.27. In situations where noise from waste management activities has the potential of impacting dwellings and private gardens, BS 4142 is the preferred method for defining noise limits. The following guidance is provided with regards to the results of a BS 4142 assessment:
- 2.28. "On this basis it is considered that at a rating level of 5 dB above the background noise level, the operator should enact the noise action plan. If the noise level reaches a rating level of 10 dB above the existing background level, then direct enforcement action should be considered."

### **British Standard 4142:1997**

- 2.29. British Standard BS4142:1997 Method for rating industrial noise affecting mixed residential and industrial areas is compatible with International Organisation for Standardisation ISO 1996: Parts 1 to 3 "Assessment of Noise with Respect to Community Response". BS4142 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 noise sensitive receptors in the vicinity. The standard is currently under review.
- 2.30. 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, i.e. the 'specific noise level' measured in terms of a LAeq,T value, immediately outside the dwelling, with the background noise level, measured in terms of a LA90 value.
- 2.31. 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 LAr,T.
- 2.32. 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."
- 2.33. 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 LA90 and very low rating noise levels are defined as those below 35dB LAr,T.

### **WHO Guidelines for Community Noise**

- 2.34. The World Health Organisation (WHO) publication entitled 'Guidelines for Community Noise' (1999), provides guidance with regard to recommended internal and external noise levels for various building uses, outlining the potential health impacts associated with noise. Specifically, the document recommends internal and external noise levels that would provide an acoustic environment that is conducive to uninterrupted speech and sleep. Daytime noise limits aim to prevent the majority of the population being moderately or seriously annoyed by noise. Night-time noise limits are intended to ensure a good night's sleep.
- 2.35. Table 4.1 of the WHO guidelines states that the guideline value to avoid sleep disturbance with open windows is 45 dB LAeq.

### 3. Sensitive Receptors

- 3.1. The main receptors sensitive to noise are nearby properties and areas utilised by humans.
- 3.2. There are several industrial properties on Hill Barton Business Park to the west of the proposed location of the site, in particular Stuart's Trucks and Buses, ingredient supplies and Exeter Contractors Ltd. There are residential properties in close proximity to the south of the proposed site.

#### **Potential Noise Sensitive Receptors**

- 3.3. The typical distance and direction of the nearest properties are approximated in the table below.
- 3.4. Natural ground, i.e. soft cover, exists between the proposed development and the receptors to the north, east and south of the site.

Table 3-1 Representative Potential Noise Sensitive Receptors

Potential Noise Sensitive Receptor		Proposed Source to Receptor				Receptor Line of Sight to Proposed Source	Intervening Topography
Location	Property	No. of Storeys	Direction from source	Approx. Distance m	Elevation @ Property		
Swiss Cottage	Swiss Cottage	1 / 2	NW	574	26	43.1	Industrial Estate, farmland and hedges
Denbow	Denbow House	3	N	610	38	43.1	Industrial Estate, landscaping, farmland and hedges
Princes Cross	Princes Cottage and Hazel Cottage	2 / 3	ESE	581	51	43.1	Restored Landfill, farmland and hedges
Farrington Cross	Fearnundun House	2	SE	530	44	43.1	Restored Landfill, farmland and hedges
Properties at Hill Barton Farm	The Stables	2	S	150	40	43.1	Industrial Estate and restored landfill
	Hill Barton Farm	2	S	224	37	43.1	Industrial Estate and restored landfill

## 4. Existing Noise Levels

### Survey

#### Methodology

- 4.1. Noise surveys of the existing background climate were monitored at four longer-term locations (LT), as shown on the figure contained in Appendix A.2.
- LT1 is representative of Princes Cross;
  - LT2 is representative of Denbow and Swiss Cottage;
  - LT3 is representative of Farringdon Cross; and
  - LT4 is representative of The Stables and Hill Barton Farm.
- 4.2. The noise surveys were carried out using the following equipment:
- Rion NL-32 Type 1 Sound Level Meter, complete with environmental protection kit;
  - Rion NL-74 Sound Level Calibrator.
  - Brüel & Kjaer Type 2250 Hand-held Sound Analyzer
  - Brüel & Kjaer Type 4231 Sound Level Calibrator
- 4.3. The sound level analysers were calibrated before each set of measurements were taken. All sound equipment is regularly calibrated and serviced, certificates for which are provided in Appendix B. The results were measured in A-weighted decibels in a range of statistical indices that describe the variation in noise levels, including the level exceeded for 90 percent of the time ( $L_{A90}$ ) and the equivalent continuous sound level ( $L_{Aeq}$ ).

#### Weather

- 4.4. The surveys were conducted in dry, calm conditions and were in accordance with advice given on 'Precautions against Interference' and Weather Conditions contained in BS4142<sup>9</sup>. Full weather data is contained within Appendix C.

#### Measured Existing Noise Levels

- 4.5. The full existing background noise survey results from the LT 2014 / 2015 surveys are contained in Appendices D, E and G and results for the historic LT survey at Waldrons Farm are contained in Appendix F. The results of these surveys are summarised in the tables below.

#### Principal Noise Sources

- 4.6. During the background noise survey the principal noise sources included the M5 Motorway.

<sup>9</sup> British Standard: Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas, BS4142, 1997 Sections 5.4 and 5.5.



Table 4-1 Measured Night-time Background Noise Levels at Receptors (23:00 – 07:00 hours)

Location	From	To	Duration	LA90	LAeq
LT1	Saturday 6 <sup>th</sup> Sept 2014	Thursday 11 <sup>th</sup> Sept 2014	8 hrs	25 - 31	33 - 41
LT2	Thursday 11 <sup>th</sup> Sept 2014	Sunday 14 <sup>th</sup> Sept 2014	8 hrs	28 - 31	34 - 45
LT3	Thursday 27 <sup>th</sup> August 2009	Sunday 30 <sup>th</sup> August 2009	8 hrs	32 - 47	43 - 53
LT4	Monday 9 <sup>th</sup> February 2015	Tuesday 10 <sup>th</sup> February 2015	8 hrs	34 - 45	40 - 52

Table 4-2 Measured Daytime Background Noise Levels at Receptors (07:00 – 23:00 hours)

Location	From	To	Duration	LA90	LAeq
LT1	Saturday 6 <sup>th</sup> Sept 2014	Thursday 11 <sup>th</sup> Sept 2014	16 hrs	33 - 37	43 - 46
LT2	Thursday 11 <sup>th</sup> Sept 2014	Sunday 14 <sup>th</sup> Sept 2014	16 hrs	38 - 41	42 - 47
LT3	Thursday 27 <sup>th</sup> August 2009	Sunday 30 <sup>th</sup> August 2009	16 hrs	46 - 53	52 - 59
LT4	Monday 9 <sup>th</sup> February 2015	Tuesday 10 <sup>th</sup> February 2015	9 hrs	42 - 52	50 - 61

## 5. Predicted Noise Impact

### Operational Hours

- 5.1. The operating working hours for the proposed development are assumed to be 24hrs a day.

### Proposed Operations

- 5.2. The proposed operation is a containerised drying plant with 14 fans, each rated at 99dB (A) Sound Power as shown in Appendix I. The units will be 2.5m high with a ground level of 37m AOD. They are to be fitted with splitter silencers which brings the total height of the units, ducts and attenuators of 6.1m, hence the sources have been assumed to be at 43.1m AOD. The proposed scheme will actually reduce the number of vehicles and hence have been omitted from the assessment.

### BS4142 Assessment

- 5.3. Following the methodology in BS4142, the specific noise at the receptors can be adjusted to derive a Rating Level which is compared to the measured background noise level ( $L_{A90}$ ) in Section 4 to give an indication of the likelihood of complaints from noise of an industrial nature at the receptors based on the following criteria:
- A difference between the rating level and background noise of around +10 dB or more indicates that complaints are likely;
  - A difference of around +5 dB is of marginal significance; and
  - A difference of more than -10 dB is a positive indication that complaints are unlikely.
- 5.4. In general the likelihood of complaint in response to noise depends on factors including the margin by which it exceeds the background noise level, its absolute level, time of day, change in the noise environment etc., as well as local attitudes to the facilities and the nature of the neighbourhood.
- 5.5. The method is not suitable when the background and the rating noise levels are low as in the case of most receptors at this site at night (i.e. 30 dB (A) and 35 dB (A) respectively), but the assessment has been included at the representative noise sensitive receptors for completeness.
- 5.6. For the BS4142 assessment, a 5dB (A) penalty has been added to the predicted noise level of the plant as there is a potential for annoyance caused by a distinctive fan noise, although other studies omit this adjustment when the source noise at the receptor is low.
- 5.7. Where properties have two or more floors the receptor is taken as the uppermost bedroom window i.e. Denbow House has three stories and Princes Cottage and Swiss Cottage have attic windows.
- 5.8. The following table presents the results of the BS4142 assessment for day and night-time noise due to the proposed development.
- 5.9. With mitigation in the form of attenuators the site with respect to noise is assessed as "not noticeable" and all night-time predictions are well below WHO guidelines of 45 dB  $L_{Aeq}$  to avoid sleep disturbance with open windows.

Table 5-1 BS4142 Noise Assessment: Night-time Noise Levels

Receptor	Specific Noise Level dB LAeq	Rating Level dB LAeq	Measured Background Level dB LA90	Assessment Level (dB LA <sub>r</sub> – LA <sub>90</sub> )	Significance
Swiss Cottage	0	0	28	N/A	Complaints Unlikely
Denbow House	8	13	28	-15	Complaints Unlikely
Princes and Hazel Cottages	1	6	25	-19	Complaints Unlikely
Fearndun House (Waldron Farm Survey)	5	10	32	-22	Complaints Unlikely
Hill Barton Farm	14	19	34	-15	Complaints Unlikely
The Stables	18	23	34	-11	Complaints Unlikely

Table 5-2 BS4142 Noise Assessment: Daytime Noise Levels

Receptor	Specific Noise Level dB LAeq	Rating Level dB LAeq	Measured Background Level dB LA90	Assessment Level (dB LA <sub>r</sub> – LA <sub>90</sub> )	Significance
Swiss Cottage	0	0	38	N/A	Complaints Unlikely
Denbow House	8	13	38	-25	Complaints Unlikely
Princes and Hazel Cottages	1	6	33	-27	Complaints Unlikely
Fearndun House (Waldron Farm Survey)	5	10	46	-36	Complaints Unlikely
Hill Barton Farm	14	19	42	-23	Complaints Unlikely
The Stables	18	23	42	-19	Complaints Unlikely

## 6. Cumulative Impacts

### Energy Plants

- 6.1. As well as the proposed Small Scale Thermal Processing and Energy Plant it is also potentially proposed to construct two Gasification Plants, one currently with permission and the other without.
- 6.2. The following tables present the results of the BS4142 assessment for night-time and daytime noise due to the proposed development in combination with the proposed gasification developments. These noise predictions are based on receptor predictions presented in these reports. Where equivalent receptors were not available the nearest closer receptor has been used. These predictions have also been assessed against WHO guidelines to avoid sleep disturbance with open windows (i.e. 45 dB  $L_{Aeq}$ ).
- 6.3. With mitigation in the form of attenuators the combined sites with respect to noise is assessed as "Noticeable and not intrusive" and all night-time predictions are well below the WHO guidelines of 45 dB  $L_{Aeq}$ .

Table 6-1 BS4142 Noise Assessment: Night-time Noise Levels Cumulative Impacts

Receptor	Thermal Processing Plant 2015	Gasification Plant 2009	Gasification Plant 2014	Combined Rating Level dB $L_{Aeq}$	Measured Night-time Background Level dB $L_{A90}$	Assessment Level dB $L_A - L_{A90}$	Significance
Swiss Cottage	0	23	20.9	25	28	-3	Proposed noise is below background
Denbow House	13	23	20.9	25	28	-3	Proposed noise is below background
Princes and Hazel Cottages	6	23	12.9	23	25	-2	Proposed noise is below background
Fearndun House (Waldron Farm Survey)	10	23	12.9	24	32	-8	Proposed noise is below background
Hill Barton Farm	19	25	12.9	26	34	-8	Proposed noise is below background
The Stables	23	25	12.9	27	34	-7	Proposed noise is below background

Table 6-2 BS4142 Noise Assessment: Daytime Noise Levels Cumulative Impacts

Receptor	Thermal Processing Plant 2015	Gasification Plant 2009	Gasification Plant 2014	Combined Rating Level dB LAeq	Measured Night-time Background Level dB LA90	Assessment Level dB LAr - LA90	Significance
Swiss Cottage	0	28	30.9	33	38	-5	Proposed noise is below background
Denbow House	13	28	30.9	33	38	-5	Proposed noise is below background
Princes and Hazel Cottages	6	28	35.3	36	33	3	Marginal Significance
Fearndun House (Waldron Farm Survey)	10	28	35.3	36	46	-10	Complaints Unlikely
Hill Barton Farm	19	34	35.3	38	42	-4	Proposed noise is below background
The Stables	23	34	35.3	38	42	-4	Proposed noise is below background

### Landfill Extension

- 6.4. As well as the proposed Small Scale Thermal Processing and Energy Plant and potentially two Gasification Plants, one currently with planning permission and the other without, it is also proposed to extend the existing landfill which only operates during the day and is a totally different noise source and highly transient and sporadic and hence subject to a different assessment methodology of assessing noise increase.
- 6.5. The following table presents the results using BS5288. The noise levels from the proposed plant are less than 10 dB(A) and hence have no effect and hence the landfill assessment remains valid.

Table 6-3 Comparison of Daytime Noise Levels With and Without Operation of Landfill

Location	Operation	Average Existing Noise Level (L <sub>Aeq</sub> dB)	Proposed TPP and Gasification Plants	Average Noise Level from Operation of Landfill (L <sub>Aeq</sub> dB)	Combined Noise Levels (dB) including Background	Difference in Noise Levels L <sub>Aeq</sub> - L <sub>Aeq</sub> dB	Significance
Denbow House	Topsoil Strip	46	28	46	49	3	Slight effect
	Bund Creation	46	28	45	49	3	Slight effect
	Operation (Closest)	46	28	41	47	1	Slight effect
	Operation (centre of Landfill)	46	28	36	46	0	Negligible effect
Glebe House / Princes & Hazel Cottages	Topsoil Strip	45	31	46	49	4	Moderate effect / Short term
	Bund Creation	45	31	45	48	3	Slight effect
	Operation (Closest)	45	31	41	47	2	Slight effect
	Operation (centre of Landfill)	45	31	37	46	1	Slight effect
Broadway View	Topsoil Strip	45	31	59	59	14	Substantial effect / Short Term
	Bund Creation	45	31	58	58	13	Substantial effect / Short term
	Operation (Closest)	45	31	52	53	8	Significant effect / < 55 dB(A)
	Operation (centre of Landfill)	45	31	41	47	2	Negligible effect

## 7. Conclusions and Recommendations

- 7.1. With mitigation in the form of attenuators specified the site with respect to noise is assessed as “not noticeable”.
- 7.2. With the other two plants taken into account with respect to noise it is assessed as “noticeable and not intrusive”.
- 7.3. Although non continuous and highly variable the cumulative effects of the landfill have also been considered. For the properties around Princes Cross although the impact is no greater than from the current consented landfill the Impact is assessed as “noticeable and intrusive”, but is below the allowable 55dB(A) limit and the actual distances to most properties are equal or less than the current landfill operations.

# Appendices