Application for an environmental permit
Part B2 – General – new bespoke permit

Fill in this part of the form together with parts A, F1 or F2 if you are applying for a new bespoke permit. You also need to fill in part B3, B4, B5, B6, or B7 (this depends on what activities you are applying for). Please check that this is the latest version of the form available from our website.

Please read through this form and the guidance notes that came with it. Please write clearly in the answer spaces.

It will take less than two hours to fill in this part of the application form.

Contents

1 About the permit

1a Discussions before your application

If you have had discussions with us before your application, give us the permit reference or details on a separate sheet. Tell us below the reference you have given this extra sheet.

Permit or document reference: Supporting Statement 3) EPB2: Question 1a & Attachment 1

1b Is the permit for a site or for mobile plant?

Site ☑ Now go to section 2

Mobile plant ☐ Now go to question 1c

Note: The term 'mobile plant' does not include mobile sheep dipping unit.

Mobile plant

1c Have we told you during pre-application discussions that we believe that a mobile permit is suitable for your activity?

No ☐

Yes ☐

1d Have there been any changes to your proposal since this discussion?

No ☐ Now go to section 3

Yes ☐ You should send us a description of the activity you want to carry out, highlighting the changes you have made since our pre-application discussions.

Document reference

Now go to section 3

2 About the site (but not mobile plant)

2a What is the site name, address, postcode and national grid reference?

Site name: North London Anaerobic Digestion Facility

Address: Coursers Farm
Coursers Road
St. Albans
Hertfordshire

Postcode: AL4 0PG

National grid reference for the site
(for example, ST 12345 67890): TL 20337 04539

2b What type of regulated facility are you applying for?

Note: if you are applying for more than one regulated facility then go to 2c.

Installation	☑ Now tick the relevant box in question 2b1
Waste operation	☐ Now tick the relevant box in question 2b2
Mining waste operation	☐ Now tick the relevant box in question 2b3
Water discharge activity	☐ Now go to question 3d
Groundwater activity (point source)	☐ Now go to question 3d
Groundwater activity (discharge onto land)	☐ Now go to question 3d

What is the national grid reference for the regulated facility (if only one)? (See the guidance notes on part B2.)

As in 2a above	☐
Different from that in 2a	☐ Please fill in the national grid reference below

National grid reference for the regulated facility:

What is the type of activity?

2b1 Installation

Intensive farming installation	☐
Local authority (Part A (2) and Part B)	☐
Low impact installation (see question 2d below)	☐
Opra charged activity	☑
Paragraph-17 installation	☐

2b2 Waste operation

Landfill gas facility	☐
Opra charged activity	☐
Pet cemetery	☐
Tier 2 charged bespoke activity (see charging guidance for list)	☐

2b3 Mining waste operation

Non-Opra charged activity	☐
Opra charged activity	☐

Now go to question 2d

2 About the site, continued

2c If you are applying for more than one regulated facility on your site, what are their types and their grid references?

See the guidance notes on part B2.

Regulated facility 1

National grid reference

What is the regulated facility type?

Installation	☐	Now tick the relevant box in question 2c1
Waste operation	☐	Now tick the relevant box in question 2c2
Mining waste operation	☐	Now tick the relevant box in question 2c3
Water discharge activity	☐	Now go to question 3d
Groundwater activity (point source)	☐	Now go to question 3d
Groundwater activity (discharge onto land)	☐	Now go to question 3d

What is the type of activity?

2c1 Installation

Intensive farming installation	☐
Local authority (part A (2) and part B)	☐
Low impact installation (see question 2d below)	☐
Opra charged activity	☐
Paragraph-17 installation	☐

2c2 Waste operation

Landfill gas facility	☐
Opra charged activity	☐
Pet cemetery	☐
Tier 2 charged bespoke activity (see charging guidance for list)	☐

2c3 Mining waste operation

Non-Opra charged activity	☐
Opra charged activity	☐

Regulated facility 2

National grid reference

What is the regulated facility type?

Installation	☐	Now tick the relevant box in question 2c1
Waste operation	☐	Now tick the relevant box in question 2c2
Mining waste operation	☐	Now tick the relevant box in question 2c3
Water discharge activity	☐	Now go to question 3d
Groundwater activity (point source)	☐	Now go to question 3d
Groundwater activity (discharge onto land)	☐	Now go to question 3d

What is the type of activity?

2c1 Installation

Intensive farming installation	☐
Local authority (part A (2) and part B)	☐
Low impact installation (see question 2d below)	☐
Opra charged activity	☐
Paragraph-17 installation	☐

2c2 Waste operation

Landfill gas facility	☐
Opra charged activity	☐
Pet cemetery	☐
Tier 2 charged bespoke activity (Charging guidance for list)	☐

2c3 Mining waste operation

Non-Opra charged activity	☐
Opra charged activity	☐

Use several copies of this page or separate sheets if you have a long list of regulated facilities. Send them to us with your application form. Tell us below the reference you have given these extra sheets.

Document reference for the extra sheets

Now go to question 2d

2 About the site, continued

2d Low impact installations (installations only)

Are any of the regulated facilities low impact installations?

No ☑

Yes ☐ If yes, tell us how you meet the conditions for a low impact installation. (See the guidance notes on part B2 – Appendix 1.)

Document reference

Tick the box to confirm you have filled in the low impact installation checklist in appendix 1 for each regulated facility. ☐

2e Treating batteries

Are you planning to treat batteries? (See the guidance notes on part B2.)

No ☑

Yes ☐ Tell us how you will do this, send us a copy of your explanation and tell us below the reference you have given this explanation.

Document reference for the explanation

2f Multi-operator installation

If the site is a multi-operator site (that is there is more than one operator of the installation) then fill in the table below the application reference for each of the other permits.

Table 1 – Other permit application references

3 Your ability as an operator

If you are only applying for a standalone water discharge or for a groundwater activity, you only have to fill in question 3d.

3a Relevant offences (applies to all except standalone surface water discharges and groundwater discharges – see the guidance notes on part B2)

Have you, or any other relevant person, been convicted of any relevant offence?

No ☑ Now go to question 3b

Yes ☐ Please give details below

Name of the relevant person

Title (Mr, Mrs, Miss and so on)

First name

Last name

Date of birth (DD/MM/YYYY)

Position at the time of the offence

Name of the court where the case was dealt with

Date of the conviction (DD/MM/YYYY)

Offence and penalty set

Date any appeal against the conviction will be heard (DD/MM/YYYY)

If necessary, use a separate sheet to give us details of other relevant offences and tell us below the reference number you have given the extra sheet.

Document reference of the extra sheet

3 Your ability as an operator, continued

3b Technical ability (for specified waste management activities and waste operations only – see the guidance notes on part B2)

Please tick the scheme you are using to show you have the suitable technical skills and knowledge to manage your facility.

CIWM/WAMITAB ☑

ESA/EU ☐

Please send in a registration letter from your scheme as above ☐

Now go to question 3c

3c Finances (for installations, waste operations and mining waste operations only)

Please note that if you knowingly or carelessly make a statement that is false or misleading to help you get an environmental permit (for yourself or anyone else), you may be committing an offence under the Environmental Permitting (England and Wales) Regulations 2010.

Do you or any relevant person have current or past bankruptcy or insolvency proceedings against you?

No ☑

Yes ☐ Please give details below, including the required set-up costs (including infrastructure), maintenance and clean up costs for the proposed facility against which a credit check may be assessed.

We may want to contact a credit reference agency for a report about your business's finances.

Landfill, Category A mining waste facilities and mining waste facilities for hazardous waste only

How do you plan to make financial provision (to operate a landfill or a mining waste facility you need to show us that you are financially capable of meeting the obligations of closure and aftercare)?

Bonds ☐

Escrow account ☐

Trust fund ☐

Lump sum ☐

Other ☐

Provide a plan of your estimated expenditure on each phase of the landfill or mining waste facility.

Give the document plan reference

Now go to question 3d

3d Management systems (all)

You can find guidance on management systems in 'How to Comply'. We have also developed environmental management toolkits for some business sectors which you can use to produce your own management system. You can get these by calling 03708 506 506 or by downloading them from our website at www.environment-agency.gov.uk.

Does your management system meet the conditions set out in our guidance?

No ☐

Yes ☑

3 Your ability as an operator, continued

What management system will you provide for your regulated facility?

EC Eco-Management and Audit Scheme (EMAS) ☐

ISO 14001 ☑

BS 8555 (Phases 1–5) ☐

Green Dragon ☐

Own management system ☐

Please make sure you send us a summary of your management system with your application.

Document reference or references: Supporting Statement 5) EPB2 Question 3d & Attachment 3

4 Consultation (fill in 4a to 4c for installations and waste operations and 4d for installations only)

Could the waste operation or installation involve releasing any substance into any of the following?

4a A sewer managed by a sewerage undertaker

No ☑

Yes ☐ Please name the sewerage undertaker

4b A harbour managed by a harbour authority

No ☑

Yes ☐ Please name the harbour authority

4c Direct into relevant territorial waters or coastal waters within the sea fisheries district of a local fisheries committee

No ☑

Yes ☐ Please name the fisheries committee

4d Is the installation on a site for which:

4d1 a nuclear site licence is needed under section 1 of the Nuclear Installations Act 1965?

No ☑

Yes ☐

4d2 a policy document for preventing major accidents is needed under regulation 5 of the Control of Major Accident Hazards Regulations 1999, or a safety report is needed under regulation 7 of those Regulations?

No ☑

Yes ☐

5 Supporting information

5a Provide a plan or plans for the site (but not any mobile plant)

Clearly mark the site boundary or discharge point, or both – see the guidance notes on part B2.

Document reference or references of the plans: Supporting Statement 6) EPB2 Question 5a & Attachment 4

5b Provide the relevant sections of a site condition/baseline report if this applies (see the guidance notes on part B2 for what needs to be marked on the plan)

Document reference of the report: Supporting Statement 7) EPB2 Question 5b & Attachment 5

If you are applying for an installation, tick the box to confirm that you have sent in a baseline report. ☑

5c Provide a non-technical summary of your application (see the guidance notes on part B2)

Document reference of the summary: Supporting Statement 8) EPB2 Question 5c & Attachment 6

6 Environmental risk assessment

Provide an assessment of the risks each of your proposed regulated facilities poses to the environment. The risk assessment must use H1 or an equivalent method.

Document reference for the assessment: Supporting Statement 9) EPB2 Question 6 & Attachment 7

7 How to contact us

If you need help filling in this form, please contact the person who sent it to you or contact us as shown below.

General enquiries: 03708 506 506 (Monday to Friday, 8am to 6pm)

Textphone: 03702 422 549 (Monday to Friday, 8am to 6pm)

Email: enquiries@environment-agency.gov.uk

Website: www.environment-agency.gov.uk

If you are happy with our service, please tell us. It helps us to identify good practice and encourages our staff. If you're not happy with our service, please tell us how we can improve it.

Please tell us if you need information in a different language or format (for example, in large print) so we can keep in touch with you more easily.

Feedback

(You don't have to answer this part of the form, but it will help us improve our forms if you do.)

We want to make our forms easy to fill in and our guidance notes easy to understand. Please use the space below to give us any comments you may have about this form or the guidance notes that came with it.

How long did it take you to fill in this form?

We will use your feedback to improve our forms and guidance notes, and to tell the Government how regulations could be made simpler.

Would you like a reply to your feedback?

Yes please ☐

No thank you ☐

Crystal Mark 19103
Clarity approved by Plain English Campaign

For Environment Agency use only

Date received (DD/MM/YYYY)

Our reference number

Payment received?

No ☐

Yes ☐ Amount received

£

Plain English Campaign's Crystal Mark does not apply to appendix 1.

Appendix 1 – Low impact installation checklist (see the guidance notes on part B2)

Installation reference				
Condition	Response			Do you meet this?
A – Management techniques	Provide references to show how your application meets A.			Yes ☐ No ☐
	References			
B – Aqueous waste	Effluent created		m^3/day	Yes ☐ No ☐
C – Abatement systems	Provide references to show how your application meets C.			Yes ☐ No ☐
	References			
D – Groundwater	Do you plan to release any hazardous substances or non-hazardous pollutants into the ground?		Yes ☐ No ☐	Yes ☐ No ☐
E – Producing waste	Hazardous waste		Tonnes per year	Yes ☐ No ☐
	Non-hazardous waste		Tonnes per year	
F – Using energy	Peak energy consumption		MW	Yes ☐ No ☐
G – Preventing accidents	Do you have appropriate measures to prevent spills and major releases of liquids? (See 'How to comply'.)		Yes ☐ No ☐	Yes ☐ No ☐
	Provide references to show how your application meets G.			
	References			
H – Noise	Provide references to show how your application meets H.			Yes ☐ No ☐
	References			
I – Emissions of polluting substances	Provide references to show how your application meets I.			Yes ☐ No ☐
	References			
J – Odours	Provide references to show how your application meets J.			Yes ☐ No ☐
	References			
K – History of keeping to the regulations	Say here whether you have been involved in any enforcement action as described in Compliance History Appendix 1 explanatory notes.		Yes ☐ No ☐	

REC
Resource & Environmental Consultants Ltd

National Consultancy, Locally Delivered

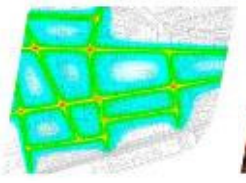
NOISE IMPACT ASSESSMENT
ANAEROBIC DIGESTION FACILITY – COURSERS FARM
EA PERMIT

REC REFERENCE: AC100899-1R2

REPORT PREPARED FOR: AGRIVERT

17TH MAY 2016





QUALITY ASSURANCE

Issue/revision	Draft	Revision 1	Revision 2
Remarks	Draft, for comment	Final	Final with Additional Receptors
Date	1st February 2016	15th February 2016	17th May 2016
Prepared by	Lee Faulkner	Lee Faulkner	Lee Faulkner
Qualifications	BSc (Hons), AMIOA	BSc (Hons), AMIOA	BSc (Hons), AMIOA
Signature			
Checked by	John Goodwin	John Goodwin	John Goodwin
Qualifications	BSc (Hons), MIOA	BSc (Hons), MIOA	BSc (Hons), MIOA
Signature			
Authorised by	John Goodwin	John Goodwin	John Goodwin
Qualifications	BSc (Hons), MIOA	BSc (Hons), MIOA	BSc (Hons), MIOA
Signature			
Project number	AC100899-1r0	AC100899-1r1	AC100899-1r2

EXECUTIVE SUMMARY

Noise Survey

A full weekday and weekend Background Sound Survey had been completed in order to quantify the existing levels of background sound levels at the closest receptors to the Site. Given that the Site was under construction, a location away from the Site was chosen. This resulted in lower measured background sound levels that prevail at the receptors and so is considered worst case.

Noise Impact Assessment

The Noise Impact Assessment has shown that the predicted daytime and night-time rating levels at the closest receptors due to the operation of the AD Facility fall below the adopted criteria.

Therefore, noise should not give rise to an adverse impact at the closest receptors and is in accordance with the following advice given in NPPF:

> *"avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of development; and,*
>
> *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."*

Additionally, the predicted specific sound pressure levels falls below the absolute criteria given in the EPR Guidelines.

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APPENDICES

1.0 INTRODUCTION

1.1 Background

Resource and Environmental Consultants (REC) Limited have been commissioned by Agrivert to complete a Noise Impact Assessment in order to support an Environment Agency Permit for a Anaerobic Digestion Facility *'the facility'* at Coursers Farm, Coursers Road, St Albans.

This Noise Impact Assessment has been completed in order to assess the noise impact of the proposed development upon the closest existing residential receptor.

All acronyms used within this report are defined in the Glossary presented in Appendix II.

1.2 Facility Location and Description

The facility is located on a parcel of agricultural land associated with Coursers Farm off Coursers Road in St Albans. The Site is located to the south west of the main building complex and is accessed off the entrance road to Coursers Farm. The Site is located in a predominately agricultural area with few residential dwellings located in the vicinity. The farm is commercial in nature and several commercial/industrial operations take place within the ownership of Coursers Farm.

The closest residential receptors to the Site are: Coursers Farm to the north east, 2 Coursers Road to the north and 3 Coursers Road to the north east. Additionally, Apton Plant to the east of the Site has been considered.

- 2 x 1500kW CHP and Gas Engine Unit;
- 1 x Flare Stack;
- 1 x Silage Feeder;
- 2 x Pumping and Heating Containers;
- 5 x Digester Tanks;
- 1 x Pump House;
- 1 x Biofilter;
- 1 x Wet Scrubber;
- 1 x Site Office and Meeting Room;
- 2 x Weighbridge;
- 1 x Reception Building; and,
- 1 x Silage Clamp.

REC has comprehensive knowledge of the processes and associated noise emissions from AD Facilities and the key sources of noise are from the CHP Gas Engines. The Flare Stack will operate only on an emergency basis for the purposes of burning excess biogas which cannot be handled by the CHP Gas Engine. The data used is based on a previous assessment, undertaken by REC, for the Coleshill AD Facility (90288r2 dated 18th June 2013) at the request of Agrivert.

This assessment has been undertaken with due regard to the supplied Site plan shown on the following planning drawings:

- Site Layout Plan (drawing number: 1000 C 001 Rev 6) dated 1st May 2015 and produced by Agrivert.

The Proposed Site Layout is shown in Figure I of Appendix III.

1.3 Limitations

The limitations of this report are presented in Appendix I.

1.4 Confidentiality

REC has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from REC; a charge may be levied against such approval.

2.0 ASSESSMENT CRITERIA

2.1 The Environment Agency for England and Wales

The Environment Agency for England and Wales has issued their own guidance on the management and control of noise at permitted Installations. Specifically Horizontal Guidance Note IPPC H3 (Parts 1 and 2) 'Horizontal Guidance for Noise' detail general issues relating to the regulation, assessment and control of noise relevant to all sectors.

The EPR horizontal guidance for noise indicates that the methodology contained in British Standard 4142: 1997 'Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas' should be used as the basis of the noise assessment. BS4142:1997 was superseded by BS4142:2014 in October 2014 and so this most current version of the guidance will be adopted in this assessment.

In addition to an assessment in accordance with BS4142:2014, Section 2.4 'Determination of BAT' offers the following absolute noise criteria levels for daytime and night-time periods:

- Daytime: 50dB free-field $L_{Aeq,16hr}$; and,
- Night-time: 45dB façade $L_{Aeq,8hr}$

2.1.1 BS4142: 2014 '*Methods for rating and assessing industrial and commercial sound*'

This standard describes methods for rating and assessing sound of an industrial or commercial nature which includes:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- Sound from the loading and unloading of goods and materials at industrial and / or commercial premises; and,
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial Site.

The procedure detailed in the standard compares the measured or predicted noise level 'the specific noise level' from any of the above detailed noise sources with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but rather to quantify what is typical.'

The specific noise level also acknowledges the following reference time intervals depending upon whether the noise source operates during daytime or night-time periods:

- Daytime (07:00 – 23:00): 1 hr; and,
- Night-time (23:00 – 07:00): 15 minutes.

There are a number of 'penalties' which can be attributed to the specific sound level depending upon the 'acoustic features' of the sound level under investigation as follows. These penalties vary in their weighting depending upon the severity of the acoustic feature, as follows:

Tonality

- +2dB: where the tonality is just perceptible;
- +4dB: where the tonality is clearly perceptible; and,
- +6dB: where the tonality is highly perceptible.

Impulsivity

- +3dB: where the impulsivity is just perceptible;
- +6dB: where the impulsivity is clearly perceptible; and,
- +9dB: where the impulsivity is highly perceptible.

Intermittency

- +3dB: where the intermittency is readily distinctive against the acoustic environment.

In addition to the above acoustic features, there is a penalty for 'other sound characteristics' of +3dB where a sound exhibits characteristics that are neither tonal nor impulsive, though are readily distinctive against the acoustic environment.

BS4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.

Assessment of the rating level relative to the background noise level can yield the following commentary:

- Typically the greater this difference (between the rating level and the background sound level), the greater the magnitude of impact;
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context; and,
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

With the above in mind, it is common that a Local Planning Authority will specify their own criteria for the rating level relative to the background sound level and, where this is the case, this criteria usually takes precedence over a simple comparison of the rating level against the background sound level.

2.1.2 Absolute Criteria

Under the heading 'Indicative BAT Requirements', the EPR guidelines for noise indicate that justification should be given where the rating level exceeds the numerical value of the background noise level ($L_{A90,t}$) or 50dB $L_{Aeq,t}$ by day (free-field) or 45dB $L_{Aeq,t}$ by night (façade) when assessed at local noise-sensitive receptors.

3.0 NOISE SURVEYS

3.1 Background Sound Survey

REC has conducted a full weekday and weekend Background Sound Survey in order to quantify the existing levels of background noise at a location considered representative of the closest noise sensitive receptor to the Installation.

- 11:16 Friday 22nd – 13:16 Monday 25th January 2016.

The following noise measurement position was chosen for the Background Sound Survey:

- Noise Measurement Position 1 (NMP1): Located to the south east of the Site, approximately 1.1km to the south east of the centre of the Site. This separation distance was required due to construction activities on Site and the requirement for generators to run security lighting through the night-time and weekend periods. This position is considered representative of the receptors, albeit worst case given the increased distance from Coursers Road. The main source of noise was noted to be distant road traffic noise from the A1(M) and the M25.

The location of the meter was pinpointed to be X: 520932 Y:203652 or grid reference TL 20932 03652.

Table 3.1 details the Average measured background sound levels. The daytime average is based on the hourly data and the night-time levels are based on the 15 minute data in accordance with BS4142:2014. A full representation of the hourly data is shown in Table A1 of Appendix IV.

Table 3.1: Summary of Average Measured Background Sound Level

Date	Period	Average Measured Background Sound Level $L_{A90,T}$ (dB)
Friday 22nd January 2016	Daytime (11:16 – 23:00)	56.8
	Night-time (23:00 – 07:00)	53.7
Saturday 23rd January 2016	Daytime (07:00 – 23:00)	54.9
	Night-time (23:00 – 07:00)	49.3
Sunday 24th January 2016	Daytime (07:00 – 23:00)	54.0
	Night-time (23:00 – 07:00)	51.4
Monday 25th January 2016	Daytime (07:00 – 13:16)	55.6

3.2 Meteorological Conditions & Equipment

Tables 3.2 and 3.3 detail the recorded meteorological conditions at the start and end of the background sound survey.

Table 3.2: Record of Meteorological Conditions at Start of Survey

Measured Wind Speed (m/s)	Wind Direction	Precipitation Occurred?	Fog or Mist Evident?	Was the Ground Wet, Frozen or Snow Covered?	Measured Temperature (°C)	Cloud Cover (%)
4.6	South	No	No	Damp ground	6.0	100

Table 3.3: Record of Meteorological Conditions at Termination of Survey

Measured Wind Speed (m/s)	Wind Direction	Precipitation Occurred During Survey?	Fog or Mist Evident?	Was the Ground Wet, Frozen or Snow Covered?	Measured Temperature (°C)	Cloud Cover (%)
7.2	South	Occasional Light Rain	No	No	12.0	75

The light rain was found to occur on Saturday evening for approximately 2 hours. By consulting the noise level data, no change in noise levels was recorded due to this, therefore it is considered negligible. Weather data between installation and collection was taken from internet based historical weather data.

Table 3.4 details the equipment used for the survey.

Table 3.4: Noise Measurement Equipment

Measurement Position	Equipment Description	Manufacturer & Type No.	Serial No.	Calibration Due Date
NMP3	Sound Level Meter	01dB-Metravib Fusion	10819	26th May 2017
	Pre-amplifier	GRAS 40CE	10714	
	Microphone	01dB-Metravib	217637	
	Calibrator	01dB-Metravib CAL-21	34554787	4th June 2016

4.0 NOISE IMPACT ASSESSMENT

4.1 BS4142:2014 Assessment

The main sources of noise associated with operation of the AD Facility are the CHP units and Mobile Plant.

REC have been provided with details of the CHP Unit, JMC 420 GS- B.L 1500kW, that provides a sound pressure level of 65dB at 10m for the container within which the plant is housed.

REC has used previously supplied and measured data in relation to a previous AD Facility undertaken which includes for the following:

- Heating System Pump: 35dB(A) at 1m;
- Exhaust Stack: 70.5dB(A) at 1m;
- Digester Loading Pump: 71.8dB(A) at 1m;
- Hydraulic Pump: 74.3dB(A) at 0.5m;
- Mixing Pit Pump: 70.2dB(A) at 0.5m;
- 360 Excavator within Reception Building: 107dB(A) L_W; and,
- Tipping of Material within Reception Building: 117dB(A) L_W.

Given the very low noise level from the Heating System Pump, this will not be considered in the assessment as it will not contribute to the overall noise level. With regards the reception building, internal to external calculations have been undertaken below. Therefore, the noise levels of the facades of the Reception Building have been calculated as follows assuming a 360 excavator and tipping of material within the building:

The direct sound pressure levels (Direct SPL) within the reception building as a result of the mobile plant have been calculated based on the following formula:

$$\text{Direct SPL} = L_W + (10 \times \text{Log} (1/ ((4*3.14) \times D^2)))$$

Where: *L_W is the sound power level of the source*
D is the distance of the source from the facade

Each Direct SPL of each item of plant on each façade have been logarithmically added together to provide the Direct SPL for each façade.

The reverberant sound pressure level (Reverb SPL) has been calculated as follows:

$$\text{Reverb SPL} = L_W + (10 \times \text{Log} (4 / R_C)$$

Where: *L_W is the sound power level of the source*
R_C is the room constant

These have again been logarithmically added together to provide the Reverb SPL for each façade for all sources. The Reverb SPL has then been logarithmically added to the Direct SPL for each façade.

Assuming a Sound Reduction Index of 24dB for a single steel skin for the reception building, the following equation has been used to determine the sound power level of each façade:

$$L_W = L_P + (10 \times \text{Log} (S))$$

Where: *L_P is the sound pressure level of the façade assuming -6 directivity*
S is the surface area of the facade

Table 4.1 details the calculated sound power levels of each façade. It is assumed that the door at the entrance to the tipping hall will be kept shut the majority of the time and when opened, for deliveries, etc, the machines inside will be switched off. The south façade has not been considered for the residential receptors as this is located with full line of sight removal from the receptors. The north façade has been taken for the Apton Plant receptor and is considered worst case.

Table 4.1: Calculated Sound Power Levels of Reception Building Facades

Façade	Assumed Surface Area (m^2)	Calculated Sound Power Level of Façade (dB)
North	573.3	89.7
East	444.6	88.5
West	444.6	88.5
Roof	1508.22	94.6

This assessment has used the different component parts associated with the Site. The calculated sound power levels from the reception building facades have been distance corrected in accordance with the following equation:

$$L_P = L_W - 20 \times \text{Log}(R) - 8$$

Where: *L_W is the sound power level; and,*
R is the distance to the receptor.

This has been completed for the combined facades at a nominal distance of 10m resulting in a sound pressure level of the reception building of 69.2dB at 10m.

The measured noise levels for the above plant have been calculated for the closest non-associated receptor using the following formulas:

Distance Attenuation: $L_{Aeq,T\,2} = L_{Aeq,T\,1} - 20 \times \log(D_2 / D_1)$

Where:
$L_{Aeq,T\,2}$ = Noise level under investigation
$L_{Aeq,T\,1}$ = Known noise level
D_2 = Distance from source to receiver
D_1 = Measurement distance of source

Soft Ground Attenuation: $\text{Correction} = 5.2\ I \times \log(6H - 1.5/(d+3.5))$

Where:
H = Height
d = Distance from source to receiver
I = Proportion of soft ground cover

The reference time intervals as detailed in BS4142:2014 are 1 hour for the daytime period and 15 minutes for the night-time period.

BS4142:2014 specifies applicable penalties in relation to tonal, impulsive and intermittent characteristics. The penalties have been applied to each specific plant item that the penalties

correspond to. Table 4.2 determines the applicable penalties for fixed and mobile plant respectively.

Table 4.2: Identification of Applicable Penalties – Fixed and Mobile Plant

Penalty	Applicable?	Attributable Penalty	Comment
Tonality	Yes	6dB	No 1/3 octave band data available for analysis however there is the potential of tonal noise from the CHP Unit and to a lesser extent with regards the pumps.
Impulsivity	No	-	From REC's experience of noise generated by CHPs, they produce steady-state noise continuously and impulsivity is not considered to be an issue.
Intermittency	Yes	3dB	From REC's experience of noise generated by CHPs, they produce steady-state noise continuously and intermittency is not considered to be an issue. However, the intermittent noise from the reception building may be perceptible.
Other Sound Characteristic	No	-	Not applicable as other penalties have been assigned.

4.1.1 Daytime BS4142 Assessment

The receptor locations are shown on Figure 2 of Appendix III.

Receptor 1 – Coursers Farm

Table 4.3 calculates the specific noise level at Receptor 1 (Coursers Farm) for the daytime period. Additionally, full (-10dB) or partial line of sight (-5dB) removal has been applied to certain plant items to account for on-site buildings, where applicable. The sound pressure level for the CHP has been increased by 3dB to account for 2 units.

Table 4.3: Calculation of Specific Noise Level at Receptor 1 - Daytime

Plant	Calculated L_W/ Measured Noise Level (dB)	Assumed Activity Duration (seconds)	Distance to Receptor (m)	Reference Time Period (seconds)	Soft Ground Attenuation and Line of Sight Removal (dB)	Calculated Specific Noise Level at Receptor (dB)
2 x CHP	68	3600	212	3600	-16.4	25.1
Exhaust Stack	70.5	3600	208	3600	-16.4	7.8
Digester Loading Pump	71.8	120	262	3600	-14.2	-5.5
Hydraulic Pump	74.3	3600	260	3600	-14.2	5.8
Mixing Pit Pump	70.2	3600	260	3600	-14.2	1.7
Reception Building	69.2	3600	206	3600	-13.8	29.1

Receptor 2 – 2 Coursers Road

Table 4.4 calculates the specific noise level at Receptor 2 (2 Coursers Road) for the daytime period. Additionally, full (-10dB) or partial line of sight (-5dB) removal has been applied to certain plant

items to account for on-site buildings, where applicable.

Table 4.4: Calculation of Specific Noise Level at Receptor 2 - Daytime

Plant	Calculated L_W/ Measured Noise Level (dB)	Assumed Activity Duration (seconds)	Distance to Receptor (m)	Reference Time Period (seconds)	Soft Ground Attenuation and Line of Sight Removal (dB)	Calculated Specific Noise Level at Receptor (dB)
2 x CHP	68	3600	209	3600	-5.7	36.0
Exhaust Stack	70.5	3600	191	3600	-5.5	19.4
Digester Loading Pump	71.8	120	275	3600	-16.9	-8.7
Hydraulic Pump	74.3	3600	318	3600	-17.2	1.0
Mixing Pit Pump	70.2	3600	318	3600	-17.2	-3.1
Reception Building	69.2	3600	231	3600	-6.6	35.4

Receptor 3 – 3 Coursers Road

Table 4.5 calculates the specific noise level at Receptor 3 (3 Coursers Road) for the daytime period. Additionally, full (-10dB) or partial line of sight (-5dB) removal has been applied to certain plant items to account for on-site buildings, where applicable.

Table 4.5: Calculation of Specific Noise Level at Receptor 3 - Daytime

Plant	Calculated L_W/ Measured Noise Level (dB)	Assumed Activity Duration (seconds)	Distance to Receptor (m)	Reference Time Period (seconds)	Soft Ground Attenuation and Line of Sight Removal (dB)	Calculated Specific Noise Level at Receptor (dB)
2 x CHP	68.0	3600	405	3600	-7.7	28.2
Exhaust Stack	70.5	3600	405	3600	-7.7	10.7
Digester Loading Pump	71.8	120	474	3600	-18.0	-14.5
Hydraulic Pump	74.3	3600	486	3600	-18.1	-3.5
Mixing Pit Pump	70.2	3600	486	3600	-18.1	-7.6
Reception Building	69.2	3600	413	3600	-17.7	19.2

Receptor 4 – Apton Plant

It is worth noting that BS4142:2014 is not applicable for the assessment of commercial noise on non-residential receptors. However, in order to complete a robust and worst case assessment, Apton Plant has been considered as a residential receptor.

Table 4.6 calculates the specific noise level at Receptor 4 (Apton Plant) for the daytime period. Additionally, full (-10dB) or partial line of sight (-5dB) removal has been applied to certain plant

items to account for on-site buildings, where applicable.

Table 4.6: Calculation of Specific Noise Level at Receptor 4 - Daytime

Plant	Calculated L_W/ Measured Noise Level (dB)	Assumed Activity Duration (seconds)	Distance to Receptor (m)	Reference Time Period (seconds)	Soft Ground Attenuation and Line of Sight Removal (dB)	Calculated Specific Noise Level at Receptor (dB)
2 x CHP	68.0	3600	84	3600	-11.0	38.5
Exhaust Stack	70.5	3600	215	3600	-5.7	18.1
Digester Loading Pump	71.8	120	65	3600	-8.6	12.2
Hydraulic Pump	74.3	3600	85	3600	-11.0	18.7
Mixing Pit Pump	70.2	3600	85	3600	-11.0	14.6
Reception Building	69.2	3600	120	3600	-8.5	39.1

Receptor 5 – Horse Menage and RS Machinery

It is worth noting that BS4142:2014 is not applicable for the assessment of commercial noise on non-residential receptors. However, in order to complete a robust and worst case assessment, the Horse Menage and RS Machinery have been considered as a residential receptors.

Table 4.7 calculates the specific noise level at Receptor 5 (Horse Menage and RS Machinery) for the daytime period. Additionally, full (-10dB) or partial line of sight (-5dB) removal has been applied to certain plant items to account for on-site buildings, where applicable.

Table 4.7: Calculation of Specific Noise Level at Receptor 5 - Daytime

Plant	Calculated L_W/ Measured Noise Level (dB)	Assumed Activity Duration (seconds)	Distance to Receptor (m)	Reference Time Period (seconds)	Soft Ground Attenuation and Line of Sight Removal (dB)	Calculated Specific Noise Level at Receptor (dB)
2 x CHP	68.0	3600	131	3600	-3.0	42.6
Exhaust Stack	70.5	3600	144	3600	-3.1	24.2
Digester Loading Pump	71.8	120	155	3600	-13.2	0.0
Hydraulic Pump	74.3	3600	147	3600	-13.1	11.8
Mixing Pit Pump	70.2	3600	147	3600	-13.1	7.7
Reception Building	69.2	3600	106	3600	-6.1	42.6

BS4142:2014 Daytime Assessment – All Receptors

Table 4.8 calculates the resulting rating level at all Receptors during the daytime period.

Table 4.8: Calculation of Rating Level at All Receptors for Daytime Period

Receptor	Calculated Combined Specific Noise Level at Receptor (dB)	Calculated Combined Rating Level, $L_{A,r}$ (dB)	Lowest Average Measured Background Sound Level, $L_{A90,1hr}$ (dB)	Criteria (dB)	Difference + / - (dB)
R1 – Coursers Farm	30.6	34.6	54.0	$L_{A,r} = L_{A90}$	-19.4
R2 – 2 Coursers Road	38.7	43.6	54.0		-10.4
R3 – 3 Coursers Road	29.2	34.5	54.0		-19.5
R4 – Apton Plant	41.9	46.5	54.0		-7.5
R5 – Horse Menage and RS Machinery	45.7	50.4	54.0		-3.6

Table 4.8 indicates that the rating level will fall comfortably below the criteria noise level for the daytime period, at all receptors, and as such no consideration of mitigation measures is required.

Under the heading 'Indicative BAT Requirements', the EPR guidelines for noise indicate that justification should be given where the rating level exceeds the numerical value of the background noise level ($L_{A90,t}$) or 50dB $L_{Aeq,t}$ by day (free-field) when assessed at local noise-sensitive receptors.

Table 4.9 compares the predicted specific sound pressure level for the daytime period at each receptor with the absolute criteria.

Table 4.9: Comparison of Specific Sound Pressure Level with EPR Absolute Criteria for Daytime Period

Receptor	Calculated Specific Sound Pressure Level at Receptor (dB)	Daytime Criteria (dB)	Difference +/- (dB)
R1 – Coursers Farm	30.8	50	-19.2
R2 – 2 Coursers Road	38.7	50	-11.3
R3 – 3 Coursers Road	29.2	50	-20.8
R4 – Apton Plant	41.9	50	-8.1
R5 – Horse Menage and RS Machinery	45.7	50	-4.3

Table 4.9 indicates that the EPR benchmark criteria will not be exceeded at all receptors during the daytime period.

4.1.2 Night-time BS4142 Assessment

For the night-time assessment, it is assumed that no deliveries or activity within the reception building will take place. Only the residential receptors have been assessed as non-residential receptors are not sensitive during the night-time period.

Receptor 1 – Coursers Farm

Table 4.10 calculates the specific noise level at R1 for the night-time period.

Table 4.10: Calculation of Specific Noise Level at Receptor 1 – Night-time

Plant	Calculated L_W/ Measured Noise Level (dB)	Assumed Activity Duration (seconds)	Distance to Receptor (m)	Reference Time Period (seconds)	Soft Ground Attenuation and Line of Sight Removal (dB)	Calculated Specific Noise Level at Receptor (dB)
2 x CHP	68	900	212	900	-16.4	25.1
Exhaust Stack	70.5	900	208	900	-16.4	7.8
Digester Loading Pump	71.8	120	262	900	-14.2	0.5
Hydraulic Pump	74.3	900	260	900	-14.2	5.8
Mixing Pit Pump	70.2	900	260	900	-14.2	1.7

Receptor 2 – 2 Coursers Road

Table 4.11 calculates the specific noise level at R2 for the night-time period.

Table 4.11: Calculation of Specific Noise Level at Receptor 2 – Night-time

Plant	Calculated L_W/ Measured Noise Level (dB)	Assumed Activity Duration (seconds)	Distance to Receptor (m)	Reference Time Period (seconds)	Soft Ground Attenuation and Line of Sight Removal (dB)	Calculated Specific Noise Level at Receptor (dB)
2 x CHP	68.0	900	209	900	-5.7	36.0
Exhaust Stack	70.5	900	191	900	-5.5	19.4
Digester Loading Pump	71.8	120	275	900	-16.9	-2.6
Hydraulic Pump	74.3	900	318	900	-17.2	1.0
Mixing Pit Pump	70.2	900	318	900	-17.2	-3.1

Receptor 3 – 3 Coursers Road

Table 4.12 calculates the specific noise level at R3 for the night-time period.

Table 4.12: Calculation of Specific Noise Level at Receptor 3 – Night-time

Plant	Calculated L_W/ Measured Noise Level (dB)	Assumed Activity Duration (seconds)	Distance to Receptor (m)	Reference Time Period (seconds)	Soft Ground Attenuation and Line of Sight Removal (dB)	Calculated Specific Noise Level at Receptor (dB)
2 x CHP	68.0	900	405	900	-7.7	28.2
Exhaust Stack	70.5	900	405	900	-7.7	10.7
Digester Loading Pump	71.8	120	474	900	-18.0	-8.5

Hydraulic Pump	74.3	900	486	900	-18.1	-3.5
Mixing Pit Pump	70.2	900	486	900	-18.1	-7.6

Table 4.13 calculates the resulting rating level at all Receptors during the night-time period.

Table 4.13: Calculation of Rating Level at All Receptors for Night-time Period

Receptor	Calculated Combined Specific Noise Level at Receptor (dB)	Calculated Combined Rating Level, $L_{A,r}$ (dB)	Lowest Average Measured Background Sound Level, $L_{A90,15mins}$ (dB)	Criteria (dB)	Difference + / - (dB)
R1 – Coursers Farm	25.3	31.2	49.3	$L_{A,r} = L_{A90}$	-18.1
R2 – 2 Coursers Road	36.1	42.0	49.3		-7.3
R3 – 3 Coursers Road	28.3	34.2	49.3		-15.1

Table 4.13 indicates that the rating level will fall below the criteria noise level for the night-time period, at all receptors, and as such no consideration of mitigation measures is required.

Under the heading 'Indicative BAT Requirements', the EPR guidelines for noise indicate that justification should be given where the rating level exceeds the numerical value of the background noise level ($L_{A90,t}$) or 45dB $L_{Aeq,t}$ by night (façade) when assessed at local noise-sensitive receptors.

Table 4.14 compares the predicted specific sound pressure level for the night-time period at each receptor with the absolute criteria.

Table 4.14: Comparison of Specific Sound Pressure Level with EPR Absolute Criteria for Night-time Period

Receptor	Calculated Specific Sound Pressure Level at Receptor (dB)	Night-time Criteria (dB)	Difference +/- (dB)
R1 – Coursers Farm	25.3	45	-19.7
R2 – 2 Coursers Road	36.1	45	-8.9
R3 – 3 Coursers Road	28.3	45	-16.7

Table 4.14 indicates that the EPR benchmark criteria will not be exceeded at all receptors during the night-time period.

5.0 CONCLUSION

Resource and Environmental Consultants Limited have been commissioned by Agrivert to complete a Noise Impact Assessment in order to determine the impact of an Anaerobic Digestion Facility at Coursers Farm, St Albans as part of the Environmental Permit.

This assessment has been undertaken to identify key noise sources associated with the AD Facility and to determine their potential impact upon the closest noise-sensitive residential receptors.

A noise survey has been completed in order to measure the background and ambient sound levels at a location which was considered representative of the closest residential receptors to the Site.

The Noise Impact Assessment has shown that the predicted daytime and night-time rating levels at the closest receptors due to the operation of the AD Facility should fall comfortably below the adopted criteria.

Therefore, noise should not give rise to an adverse impact at the closest receptors and is in accordance with the following advice given in NPPF:

> *"avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of development; and,*
>
> *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."*

Additionally, the predicted specific sound pressure levels falls below the absolute criteria given in the EPR Guidelines.

APPENDIX I LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between REC Limited and the Client as indicated in Section 1.2.

2. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.

3. REC cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by REC is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by REC in this connection without their explicit written agreement there to by REC.

APPENDIX II GLOSSARY OF ACOUSTICAL TERMINOLOGY

Noise

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq}, L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

An indication of the range of sound levels commonly found in the environment is given in the following table.

Table A1: Typical Sound Pressure Levels

Sound Pressure Level dB(A)	Location
0	Threshold of hearing
20 - 30	Quiet bedroom at night
30 - 40	Living room during the day
40 - 50	Typical office
50 - 60	Inside a car
60 - 70	Typical high street
70 - 90	Inside factory
100 - 110	Burglar alarm at 1m away
110 - 130	Jet aircraft on take off
140	Threshold of pain

Acoustic Terminology

Table A2: Terminology

Descriptor	Explanation
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 (2x10-5Pa).
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.
$L_{Aeq,T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
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 Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L_{10} & L_{90}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings.
Fast	A time weighting used in the root mean square section of a sound level meter with a 125millisecond time constant.
Slow	A time weighting used in the root mean square section of a sound level meter with a 1000millisecond time constant.

APPENDIX III FIGURES

Figure 1

Proposed Site Layout

Figure 2

Receptor Locations

APPENDIX IV MEASURED NOISE LEVEL DATA

Table A1: Measured Background Sound Levels at NMP1

Date and Time	Measured Sound Pressure Level	
	$L_{Aeq,1hr}$	$L_{A90,1hr}$
22/01/2016 11:16	59.5	56.3
22/01/2016 12:16	57.2	55.3
22/01/2016 13:16	57	55.6
22/01/2016 14:16	59.3	57.7
22/01/2016 15:16	59.2	57.2
22/01/2016 16:16	59	57.2
22/01/2016 17:16	58.2	56.3
22/01/2016 18:16	59.8	58.2
22/01/2016 19:16	59.9	58.7
22/01/2016 20:16	58.7	57.1
22/01/2016 21:16	58.1	56.4
22/01/2016 22:16	57.3	55.5
22/01/2016 23:16	56.2	54.6
23/01/2016 00:16	56	54.3
23/01/2016 01:16	54.6	52.3
23/01/2016 02:16	53.8	51.7
23/01/2016 03:16	55	52.9
23/01/2016 04:16	55.2	53.2
23/01/2016 05:16	55.9	54.2
23/01/2016 06:16	58.5	56.2
23/01/2016 07:16	60.1	59
23/01/2016 08:16	60.5	59.2
23/01/2016 09:16	58	56.6
23/01/2016 10:16	55.6	54.1
23/01/2016 11:16	56	54.1
23/01/2016 12:16	57.2	56.1
23/01/2016 13:16	56.4	54.1
23/01/2016 14:16	55.5	53.8
23/01/2016 15:16	59.6	55.1
23/01/2016 16:16	61	55.7
23/01/2016 17:16	56.3	55.1
23/01/2016 18:16	55.6	54.4
23/01/2016 19:16	55	53.6
23/01/2016 20:16	54.8	53.4
23/01/2016 21:16	54.3	52.2
23/01/2016 22:16	53.7	51.8
23/01/2016 23:16	54.9	52.5
24/01/2016 00:16	53.5	50.9
24/01/2016 01:16	51.3	48.7
24/01/2016 02:16	50.7	46.8
24/01/2016 03:16	49.2	46.2
24/01/2016 04:16	51.3	47.5
24/01/2016 05:16	51.5	49.1
24/01/2016 06:16	53.4	51.1
24/01/2016 07:16	54.1	52.1
24/01/2016 08:16	55.6	53.8
24/01/2016 09:16	56.8	55.1
24/01/2016 10:16	56.9	55.3
24/01/2016 11:16	57.1	55.5
24/01/2016 12:16	56.3	54.6
24/01/2016 13:16	55.6	53.9
24/01/2016 14:16	56	54.5
24/01/2016 15:16	56.1	54.1
24/01/2016 16:16	56	54.6
24/01/2016 17:16	56.3	55.1
24/01/2016 18:16	56.1	54.7
24/01/2016 19:16	56	54.5
24/01/2016 20:16	55.4	53.6
24/01/2016 21:16	53.9	52.4
24/01/2016 22:16	52.2	50.6

24/01/2016 23:16	52.5	50.8
25/01/2016 00:16	51.6	49.7
25/01/2016 01:16	51	49
25/01/2016 02:16	50.9	49.1
25/01/2016 03:16	51.7	50
25/01/2016 04:16	53.4	51.7
25/01/2016 05:16	56.4	54.2
25/01/2016 06:16	57.9	56.9
25/01/2016 07:16	60.5	56.4
25/01/2016 08:16	56.7	54.9
25/01/2016 09:16	57.7	55.5
25/01/2016 10:16	57.8	55.6
25/01/2016 11:16	57.5	55.8
25/01/2016 12:16	58.2	55.5

1.0 ODOUR ASSESSMENT - ADDENDUM TECHNICAL NOTE

1.1 Background

Resource and Environmental Consultants (REC) Ltd was commissioned by Agrivert Ltd to undertake a Dispersion Modelling Assessment (Ref: AQ100905r1, submitted on 28th February 2016) of potential atmospheric emissions from an Anaerobic Digestion (AD) plant on land at Coursers Farm, St Albans.

Following the submission of the assessment to the Environment Agency (EA), a number of comments have been provided. Further modelling was required following the submission of the original report, in which potential odour impacts at local non-residential receptors were assessed. This Addendum Technical Note details the outcome of this additional modelling and is to be read in conjunction with the original assessment report.

1.2 Methodology

The proposed AD facility may result in odour emissions during normal operations. These were assessed in accordance with the stages described within the original assessment.

1.2.1 Sensitive Receptor Locations

The identified sensitive receptors and associated sensitivity are summarised in Table 6 of the original assessment. In addition to those already identified, local non-residential receptors were included within the addendum assessment to assess potential odour impacts at these locations, as shown in Table 1. Reference should be made to Figure 1 for a graphical representation of the receptor locations.

Table 1 Sensitive Receptors

Receptor		NGR (m)		Sensitivity
		X	Y	
R1	Coursers Farm Ground (Residential)	520496.2	204690.5	High
R2	Coursers Farm First (Residential)	520496.2	204690.5	High
R3	3 Coursers Road Ground (Residential)	520566.7	204906.5	High
R4	3 Coursers Road First (Residential)	520566.7	204906.5	High
R5	5 Coursers Road Ground (Residential)	520424.7	204808.8	High
R6	5 Coursers Road First (Residential)	520424.7	204808.8	High
R7	2 Coursers Road Ground (Residential)	520384.7	204780.1	High
R8	2 Coursers Road First (Residential)	520384.7	204780.1	High
R9	Apton Plant (Non-residential)	520428.2	204490.4	Medium
R10	RS Machinery (Non-residential)	520450.7	204583.2	Medium
R11	Horse Menage (Non-residential)	520444.6	204602	Medium

The sensitive receptors identified in Table 1 represent worst-case locations. However, this is not an exhaustive list and there may be other locations within the vicinity of the site that may experience odour impacts as a result of atmospheric emissions from the facility that have not been individually identified above.

1.3 Predicted Concentrations

Dispersion modelling of potential odour emissions was undertaken using the input data specified within the original assessment for the proposed AD plant. Predicted odour concentrations at discrete receptor locations are summarised in Table 2. It should be noted that all odour concentrations are presented as a 98th%ile of 1-hour mean values over the relevant assessment year.

Table 2 Predicted Odour Concentrations

Receptor		Predicted 98th%ile 1-hour Mean Concentration (ou_E/m^3)				
		2010	2011	2012	2013	2014
R1	Coursers Farm Ground (Residential)	0.30	0.31	0.33	0.31	0.31
R2	Coursers Farm First (Residential)	0.28	0.29	0.31	0.30	0.29
R3	3 Coursers Road Ground (Residential)	0.07	0.08	0.08	0.08	0.08
R4	3 Coursers Road First (Residential)	0.07	0.08	0.08	0.08	0.07
R5	5 Coursers Road Ground (Residential)	0.13	0.15	0.14	0.13	0.15
R6	5 Coursers Road First (Residential)	0.13	0.14	0.14	0.13	0.14
R7	2 Coursers Road Ground (Residential)	0.16	0.18	0.17	0.16	0.18
R8	2 Coursers Road First (Residential)	0.16	0.17	0.17	0.15	0.17
R9	Apton Plant (Non-residential)	2.34	1.19	2.34	2.30	1.65
R10	RS Machinery (Non-residential)	1.43	1.06	1.41	1.30	1.21
R11	Horse Menage (Non-residential)	1.16	0.97	1.24	0.98	0.99

As indicated in Table 2, predicted odour concentrations were below the EA odour benchmark of 3.0ou_E/m^3 at the additional non-residential receptor locations for all modelling years.

1.4 Impact Significance

The significance of predicted odour impacts at the sensitive receptors is summarised in Table 3. It should be noted that the Institute of Air Quality Management (IAQM) guidance has been compiled on the assumption that the odour in question is at the offensive end of the spectrum. As shown Table 1 of the original assessment, odours from the proposed plant would fall into the 'moderately offensive' category. As such, the IAQM assessment criteria is likely to overestimate the significance of impacts.

Table 3 Predicted Odour Impacts

Sensitive Receptor		Odour Exposure Level as 98th%ile of 1-hour Means (ou_E/m^3)	Receptor Sensitivity	Significance of Impact
R1	Coursers Farm Ground (Residential)	Less than 0.5	High	Negligible
R2	Coursers Farm First (Residential)	Less than 0.5	High	Negligible
R3	3 Coursers Road Ground (Residential)	Less than 0.5	High	Negligible
R4	3 Coursers Road First (Residential)	Less than 0.5	High	Negligible
R5	5 Coursers Road Ground (Residential)	Less than 0.5	High	Negligible
R6	5 Coursers Road First (Residential)	Less than 0.5	High	Negligible
R7	2 Coursers Road Ground (Residential)	Less than 0.5	High	Negligible
R8	2 Coursers Road First (Residential)	Less than 0.5	High	Negligible
R9	Apton Plant (Non-residential)	1.5 - 3	Medium	Slight
R10	RS Machinery (Non-residential)	0.5 - 1.5	Medium	Negligible
R11	Horse Menage (Non-residential)	0.5 - 1.5	Medium	Negligible

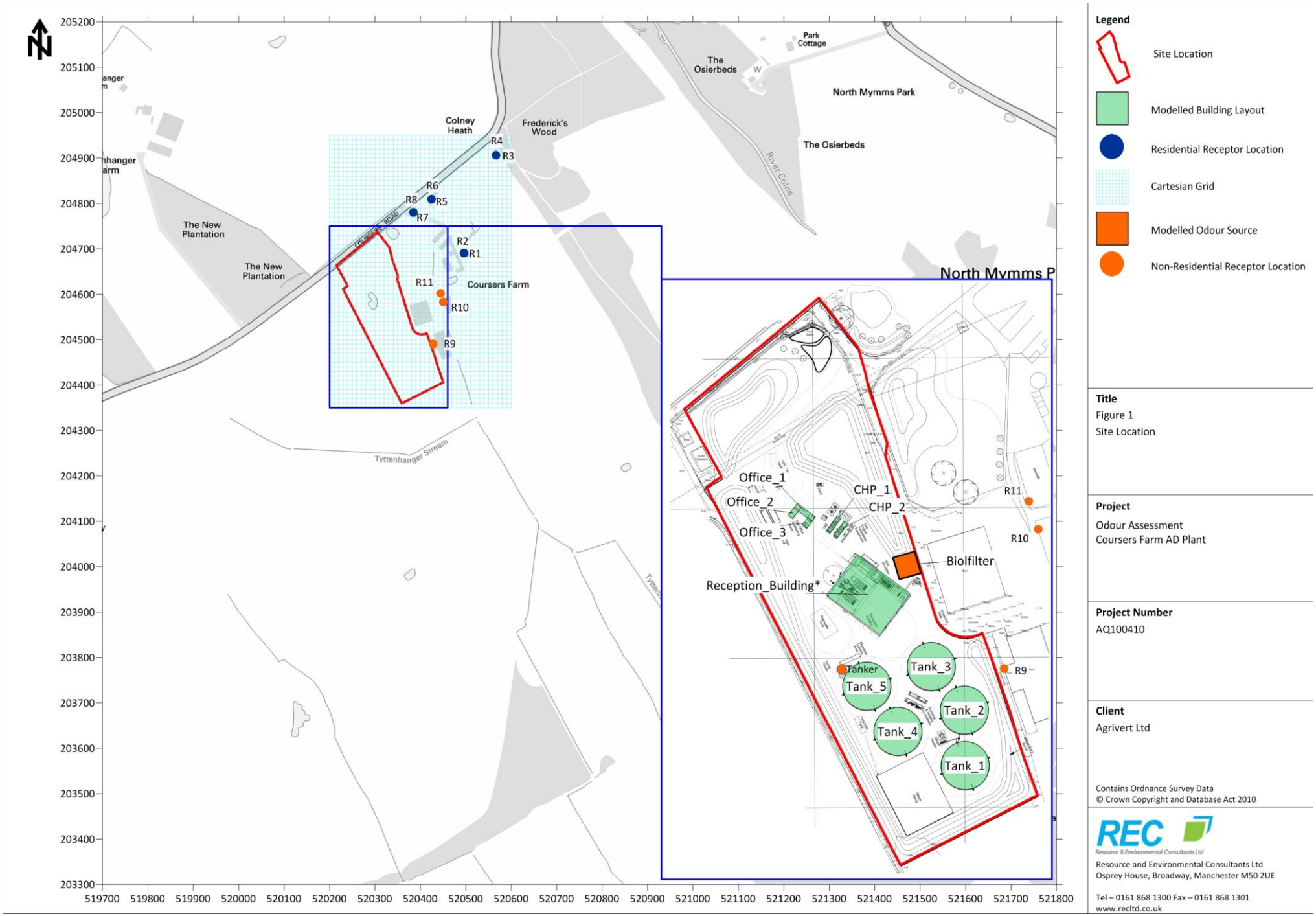
As indicated in Table 3, the significance of odour impacts as a result of the development was predicted to be **negligible** at all modelled locations with the exception of one of the closest non-residential receptors, where the likely significance of odour impacts is predicted to be **slight**. As such, impacts are considered **not significant**, in accordance with the stated methodology within the IAQM Guidance.

1.5 Summary

Predicted odour concentrations were below the relevant EA odour benchmark level at all receptor locations for all modelling years. The significance of predicted impacts was defined as **negligible** at all sensitive receptors with the exception of one non-residential location, where the significance of odour impacts was predicted to be **slight**, in accordance with the Institute of Air Quality Management (IAQM) publication the 'Guidance on the Assessment of Odour for Planning'[1]. The overall odour effects as a result of the proposed AD are considered to be **not significant**. As such, potential odour emissions from the facility are not considered to represent a constraint to the proposed development.

Note prepared by Gabor Antony, Principal Air Quality Consultant at REC Ltd, on 20th May 2016

[1] Guidance on the Assessment of Odour for Planning, IAQM, 2014.



Legend

- Site Location
- Modelled Building Layout
- Residential Receptor Location
- Cartesian Grid
- Modelled Odour Source
- Non-Residential Receptor Location

Title

Figure 1
Site Location

Project

Odour Assessment
Coursers Farm AD Plant

Project Number

AQ100410

Client

Agrivert Ltd

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North London Anaerobic Digestion Facility

Site Environmental Permit: Supporting Statement

February 2016

Table of Contents

1) Document Scope

The following information is supplementary to that provided on the permit application forms. The letter/number notation relates to the different sections of the application forms. EPB2 refers to the environmental permit application form B2 and EPB3 refers to the environmental permit application form B3 both of which accompany this application.

2) Introduction

Agrivert Ltd. (Agrivert) is proposing to operate a bespoke Part A Installation Environmental Permit for the operation of an Anaerobic Digestion Facility with the use of resultant biogas in two CHP units. It is anticipated that the facility will generate in the region of 3MW of electricity output. The total quantity of feedstock that can be accepted at the site will be no more than 75,000 tonnes of biodegradable organic waste per annum (including processing liquids).

The proposed Anaerobic Digestion (AD) plant will be located within Coursers Farm, part of the Tyttenhanger Estate in Hertfordshire. The land was previously used for the grazing of livestock and is adjacent to an agricultural unit known as Coursers Farm which is a farm and horse stables. The wider Coursers Farm site includes many small businesses including a hire centre and ABC Fencing Ltd. The site is subject to a long term lease agreement between Agrivert and Tyttenhanger Estate.

The AD plant will be designed, built, owned and operated by Agrivert Limited. Agrivert has a dedicated Commercial Team to source food waste from Local Authorities and Commercial Customers including (waste management and food processing companies).

3) EPB2: Question 1a – Pre Application Discussions

On the 7th January 2016 Agrivert held pre-application discussions, prior to the finalisation of this Environmental Permit Application, with Environment Officers Bunmi Aboaba and Holly Watson at Agrivert's West London Anaerobic Digestion Facility. The Agenda of this meeting can be seeing in **Attachment 1 (i)** EA Pre Application Coursers Farm AD Agenda.

Following on from this meeting, on the 5th February 2016, Agrivert's Commercial Director Harry Waters made a presentation at London Colney Parish Council to brief them on the operations of the Anaerobic Digestion facility and the permit to be applied for. The content of the presentation can be seen in **Attachment 1 (ii)** London Colney Presentation and FAQ.

Agrivert are proposing to make an additional presentation to Colney Heath Parish Council in March 2016; however a date is yet to be confirmed.

4) EPB2: Question 3b – Technical Ability

4.1. Agrivert Competency

Agrivert Ltd ("Agrivert") has 20 years' experience in the organic waste management sector. In the UK Agrivert manages organic waste recycling contracts in excess of 250,000 tonnes per annum. Agrivert works with 32 Local Authorities across the UK to process their organic waste. Agrivert holds a financially sound and pre-established leading position in the organic waste market.

Agrivert has established expertise and experience in securing finance, designing, building and operating plants to process organic waste, as well as being able to create sustainable agricultural/amenity markets for the end product. The design concept allows a diverse intake of waste streams, providing flexibility to their customers.

Agrivert's composting and AD facilities produce a desirable, sanitised, stable, low odour fertiliser that is Animal By-Products Regulated (ABPR) and Publicly Available Standard (PAS) PAS100/PAS110 accredited. Agrivert operates three PAS110 compliant AD facilities - two in Oxfordshire and a third AD facility in Surrey, with a further two plants under construction in 2016. Agrivert also operate two In-Vessel Composting (IVC) facilities and three green waste sites.

4.2. Operations

The North London AD plant will have a dedicated team of operatives to run the plant supported by Agrivert's Operations Manager and Commercial Team. The Commercial Team works to source feedstock and manage waste volumes for the plant. The Operations Team (plant manager and 2 operatives) will report to the Operations Manager.

Agrivert's Site Managers are trained and hold WAMITAB Certificates as seen in **Attachment 2**.

North London AD's design and processes are based on the four plants Agrivert has already delivered in the UK which have 10 years successful proven operational history.

4.3. Technically Competent Person

Agrivert's Site Managers are technically competent and trained to the requirements of the WAMITAB/CIWM operator competency scheme. Before the site is commissioned, any new Site Manager will obtain appropriate qualification/units relevant to anaerobic digestion facility as described in the WAMITAB/CIWM operator competency scheme guidelines, Version 6 - January 2014.

5) EPB2: Question 3d – Environmental Management System

5.1 Agrivert's Environmental Management System

Agrivert has a fully integrated Business Management System (BMS) that incorporates ISO 9001:2008 for Quality and also meets the requirements of ISO 14001:2004 for the Environment, and OHSAS 18001:2007 for Health & Safety. The BMS is audited internally and externally (carried out by the UKAS accredited audit company ISOQAR), to ensure the procedures and processes of the Company are effective and relevant. In its latest external ISO 9001 quality audit, Agrivert received no non-conformances.

These international standards are widely recognised by our customers as indicators of the importance Agrivert places upon protecting the environment, producing a quality service and product with high regard to the health and safety of all those that come into contact with our operations.

To ensure compliance to the standards Agrivert has developed a series of Process Control flow charts (APC), Quality Procedures (QP), Work Instructions (WI), Quality Documents (AQD) and safe systems of work to ensure any work carried out is done to a consistent standard.

By ensuring all the Agrivert's staff adhere to the system requirements we can continue to guarantee a high standard of work and service. To ensure Agrivert's system continues to run compliantly, a series of internal audits are carried out regularly throughout the year to highlight any areas of weakness. Agrivert expects its workforce to adhere to all known procedures and bring to their manager's attention any concerns they may have that could prevent any failures of the system.

The Agrivert Environmental Management System is fully integrated with compliance to our permits and can be seen in **Attachment 3**.

6) EPB2: Question 5a – Site plans

The following site plans have been included in the **Attachment 4**;

i. Location Plan
ii. Site Plan
iii. Permit boundary, Point Source and Emissions Plan
iv. Site Layout Surface Areas
v. Process Flow Layout
vi. Reception Building Clean & Dirty Areas
vii. Site Location Plan with 1000m radius

7) EPB2: Questions 5b – Site Condition Report

A Site Condition Report has been prepared to support this Permit application. This Report can be found in **Attachment 5**.

8) EPB2: Question 5c – Non-Technical Summary

The proposed Anaerobic Digestion plant is located within Coursers Farm part of the Tyttenhanger Estate within Hertfordshire, between St. Albans and Potters Bar. The site lies within the Green Belt and Watling Chase Community Forrest. It is located approximately 2km north of Junction 22 (London Colney) of the M25 Motorway, 2km southwest of Hatfield and less than 1km southwest of the village of London Colney. It is located within the District of Hertsmere and the Parish of Ridge.

The site extends to approximately 5.2 hectares and the approximate centre of the site is OS grid reference TL 20337 04539.

HGV's leaving the site are required to turn left on to Coursers Road and travel to the west as there is a 7.5 tonne weight restriction imposed on Coursers Road further to the east. The site is located 2km from Junction 22 and 4km from Junction 23 of the M25; and within close proximity to the A1(M), A414, M10 and the M1.

Anaerobic Digestion (AD) refers to the process where organic material is biologically treated in the absence of oxygen using naturally occurring micro-organisms to produce biogas, which is used to generate renewable energy, which is subsequently fed into the National Grid. The process also produces a nutrient rich bio-fertiliser that can be used as both a fertiliser and a soil improver. Heat is produced as a by-product, which is partly utilised on site within the AD process (to heat the pasteurisers and digester tanks).

The facility will process and manage up to 75,000 tonnes of biodegradable organic waste per annum (including processing liquids). The facility will compromise the following elements:

- 2 x Primary and 2 x Secondary Digester tanks;
- 1 x Storage tank
- Pumping Containers;
- 3 x Pasteurisation tanks;
- 2 x CHP Units with associated ancillary equipment;
- Silage Clamp;
- Reception Building;
- Biofilter;
- Site Office.

It is anticipated that there will be approximately 54 two-way HGV movements a day, during peak digestate spreading. Outside of these times, there will be approximately 54 two way HGV movements and 6 staff movements per day. The capacity at the AD facility will be met primarily from food waste collected from households in the local area and wider Hertfordshire area. The facility allows Authorities flexibility to collect segregated wastes. A small quantity of silage will be delivered to the proposed AD facility each year for use as an energy crop. This is required to help balance the digester biology. Liquid wastes include compost leachate, waste cooking oils and drinks manufacturing waste and rainwater collected from on-site surface water attenuation and the harvesting of rainwater that falls on

the roof of the reception building [and clean water within the site boundary] can also be used in the AD process.

The biogas produced from the waste material will be fed through two Jenbacher gas engines to generate electricity. The electricity is transmitted directly into the National Grid via a high voltage connection. It is anticipated that the facility will generate in the region of 28GWh of electricity per annum, which is the equivalent power for approximately 6,240 households in addition to that used for the operation of the AD facility itself.

An Environmental Impact Assessment has been undertaken using the Environment Agency's H1 methodology. Overall it is concluded that the activities will not result in significant impacts upon environmental receptors, and that in general environmental controls and operational practices employed in the facility comply with the requirements of Best Available Techniques (BAT). The activities bring about environmental improvements through the facility's contribution to renewable energy generation.

A full non-technical description of the operation of the facility can be found in **Attachment 6**.

9) EPB2: Question 6 – Environmental Risk Assessment

9.1 Residential and ecological receptors

The nearest residential receptors surrounding the site are situated at 2 Coursers Road, 5 Coursers Road and 3 Coursers Road and Coursers Farm approximately 0.1km, 0.15km, 0.2km and 0.3km to the northeast respectfully. A commercial property (Lawsons St Albans - Building Materials Supplier) is located 0.5km to the northwest.

The ecological desk study identified that there are no internationally designated sites present within 5km, however there are two statutorily designated sites within a 2km radius of the site boundary. These are Redwell Wood Site of Special Scientific Interest (SSSI) a broadleaved, mixed and yew woodland situated within 2km of the site; and Colney Heath Local Nature Reserve (LNR) contains a remnant of the heath vegetation community that used to be extensive in Hertfordshire, and is located within 0.5km of the site boundary.

For details see **Attachment 7(i) – Ecological Report prepared by EDP January 2012.**

An assessment of the impact of the facility on relevant sensitive receptors was carried out by REC Ltd. Details can be seen in **Attachment 7(ii) - Air Quality Assessment February 2016, Attachment 7(iii) Odour Assessment February 2016,** and **Attachment 7(iv) – Noise Impact Assessment February 2016.**

9.2 Screening Assessment

The table below sets out the screening assessment for the environmental issues that are included in the H1 guidance. Issues not screened out in this assessment will require a more detailed environmental risk assessment.

Table 1 Screening Assessment

Consideration	Receptors	Environmental Risk Assessment?	Discussion/Detailed Impact Assessment Conclusion
Odour	Human receptors	See Attachment 7 (iii) **Odour February 2016**	A detailed assessment has shown that predicted odour concentrations were below the relevant benchmark level of 3.0ouE/m3 at all sensitive receptors in the vicinity of the site for all modelling years. Maximum levels were predicted in close proximity to the odour sources, particularly the biofilter, with concentrations reducing sharply over a short distance. As such, odour nuisance is not anticipated as a result of normal operation of the plant. It is considered cumulative impacts will not be significant due to the low odour levels predicted to arise from the proposals. Odour Management Plan (OMP) has been prepared for the site and can be seen in **Attachment 9**
Noise	Human receptors	See Attachment 7 (iv) **Noise Impact Assessment February 2016**	A detailed assessment has shown that the calculated noise rating level from the proposed AD Facility will have no potential significant effects and mitigation measures are unwarranted.
Fugitive emissions	Human and ecological receptors Rivers and streams Drainage systems/sewers Groundwater	See **Table 2 Fugitive Emissions Risk Assessment**	Fugitive emissions will not result in significant impacts on the environment with proposed infrastructure and system controls in place.
Accidents	Human and ecological receptors Rivers and streams Drainage systems/sewers Groundwater	See **Table 3 Accidents Risk Assessment**	The accident risk assessment showed that the overall risk from the facility is low to medium provided that emergency procedures are implemented and followed. Therefore, operational procedures which identify the actions to be taken to minimise the potential causes of accidents and the consequences in the event of an accident occurring will be implemented. All personnel will be provided with suitable training to ensure they are familiar with the sites emergency procedures.

Consideration	Receptors	Environmental Risk Assessment?	Discussion/Detailed Impact Assessment Conclusion
Surface water	Rivers and streams Drainage systems/sewers	No	Wastewater from welfare facilities will discharge to a package sewage treatment plant for full treatment before passing to the Coursers farm network. Excess rainwater from rainwater tank (Clean water) which operates with a high level alarm discharged to the landlord's surface water following testing. Further explained in section 12.
Air	Human and ecological receptors	See Attachment 7 (ii) **Air Quality Assessment February 2016**	A detailed assessment has shown that predicted concentrations of all pollutants considered for the protection of human health were below the relevant EQSs at all locations within the assessment extents for all meteorological data sets modelled. Impacts on baseline concentrations at sensitive receptor locations were considered unlikely to be significant. Impacts were predicted based on a worst-case assessment scenario of the facility constantly emitting the maximum anticipated level of each pollutant throughout an entire year. As such, predicted concentrations and deposition rates are likely to overestimate actual impacts. The immediate control of the CHP units will be by manual and automatic engine tuning for optimum engine combustion conditions. This will be supported by continual performance monitoring and maintenance which will indicate when a CHP unit falls out of the required operational specification. When this occurs, corrective action will be implemented, either by remote control or site attendance. The maintenance regime for the units will ensure that maximum availability is achieved.
Site Waste	Land Rivers and streams Drainage systems/sewers	No	There is no permanent waste deposition within the facility. All waste streams disposed of off-site will be sent to appropriately permitted facilities. Until PAS 110 is achieved for digestate, it will be spread on land as a waste (under deployment from EA) – **see table 4 – Waste Impacts**

Consideration	Receptors	Environmental Risk Assessment?	Discussion/Detailed Impact Assessment Conclusion
Global warming potential	Global atmosphere (direct and indirect emissions)	No	A CHP plant for the generation and use of power and heat from a renewable biogas source represents a positive impact with respect to global warming potential. The process makes use of biogas and avoids the release of methane, a more potent greenhouse gas. The heat produced by the CHP gas engines, will be used to heat the digesters. Measures to improve energy efficiency on site will be applied. See **EPB3: Question 6 – Resource efficiency and climate change**
Groundwater	Groundwater e.g. source protection zones.	No	No emission points to groundwater. Appropriate site bunding provided. Emission to groundwater only in the unlikely event of a rainwater harvesting tank overflow. Rainwater harvesting tank is fitted with a high level alarm which initiates water sampling before any discharge occurs.
Justifying and cost and benefit analysis of control measures (if needed)	N/A	See **Section 9.4**	

9.3 Environmental Risk assessments of selected risks

Table 2 Fugitive Emissions Risk Assessment

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
To Air						
Biogas emissions from gas transfer systems, gas engine or gas storage in floating roof digesters	Residential and commercial properties	Wind-blown, dispersion in atmosphere	The gas system utilised is subject to regular preventative maintenance to minimise the potential for leaks occurring. The system is also protected with a comprehensive array of pressure and flow sensors and with isolation valves to minimise the potential for release if a leak is detected. A flare is utilised for the safe disposal of surplus gas in the event of plant breakdown, or a surplus of gas above the level that can be safely stored or utilised.	Low to moderate risk	Potential odour nuisance	Low residual risk
VOC	Residential and commercial properties	Air	As part of the odour control system, the Reception Building is held under negative pressure which controls VOCs.	Low to moderate risk	Potential odour nuisance	Low residual risk
Dust/ bioaerosols	Residential and commercial properties	Wind-blown, dispersion in atmosphere	Site surfaced with concrete and tarmac to prevent dust forming in dry conditions. Cleaning and clearing on site daily and when issues arise. The process is an enclosed, liquid AD system that does not generate dust or bioaerosols. Waste tipping area is located in the Reception Building to control any fugitive emissions of dust arriving with the waste.	Low	Nuisance	Low residual risk

Vermin or other pests	Residential and commercial properties	Air	Pest control, using expert contractors. Regular checks. Food waste contained by closed vehicles, speed doors and bunkers.	Low	Nuisance	Low residual risk
To Water, Groundwater or Land						
Storage and digestion of waste	Ground, surface water, groundwater	Spillage from storage tanks or digesters	Plant offers a completely sealed liquid management system. Area of storage tanks and digesters is appropriately bunded. If a major failure resulted in 25% of the volume of all tanks above ground on site escaping then it would be contained within the bund. Regular inspection and maintenance of infrastructure in place.	Moderate risk	Pollution of groundwater beyond the facility	Low residual risk with infrastructure and systems controls
Storage of oil and chemicals (new and waste)	Ground, surface water, groundwater	Spillage, leaks during use and deliveries of materials	Provision of secondary containment (double skinned tank) with isolated drainage, to collect potential spills. Regular inspection and maintenance of infrastructure.	Low to moderate risk particularly during filling and transfer of materials	Pollution of watercourse and groundwater beyond the facility	Low residual risk with infrastructure and systems controls
Vermin or other pests	Residential and commercial properties	Land	Pest control, using expert contractors. Regular checks. Food waste contained by closed vehicles, speed doors and bunkers.	Low	Nuisance	Low residual risk
Litter (mainly arriving in food waste deliveries)	Residential and commercial properties	Air	Vehicles must be covered. Written agreements and ongoing communications with clients.	Medium	Nuisance	Low residual risk with systems controls

Table 3 Accidents Risk Assessment

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Major fire	Local population and ecological receptors	Windblown dispersion.	Process inputs are not flammable in normal conditions. Biogas stored in the absence of oxygen to prevent fire and explosions Plant constructed to DSEAR specifications Fire detection systems installed at CHP engines. Automatic cut off valve to biogas supply installed. Follow Site Emergency Plan and inform relevant authorities	Very unlikely	Severe	Low to medium provided procedures are followed
Minor fire	Local population. Ecological receptors	Windblown dispersion.	See above for major fire	Unlikely	Significant	Low to medium provided procedures are followed.
Failure to contain firewater	Local water courses. Ground and groundwater.	Surface water Diffusion into ground.	Fire prevention measures as above. Plant offers a completely sealed liquid management system and the site is bunded to CIRIA C736 Standards	Unlikely	Significant	Low to Medium
Vandalism	Local population. Ecological receptors. Local water courses. Ground and groundwater.	Windblown dispersion. Surface water drainage system. Diffusion into ground.	Security measures are in place including perimeter fence with controlled access gates. Regular inspection of perimeter fences.	Somewhat unlikely	Noticeable	Low to Medium

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Flood	Local water courses. Ground and groundwater.	Surface water Diffusion into ground.	There are 6 small surface water bodies and dry courses within 500m radius of the site and the site is located within Zone 1 flood plain "land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%)." Drainage features have been specified in accordance with recommendations made in the Flood Risk Assessment undertaken for the development. Inform EA. Take appropriate corrective and preventative actions to minimise environmental impact	Unlikely	Severe	Low
Fuel / oil spills from vehicles	Local water courses. Ground and groundwater.	Surface water Diffusion into ground.	Supervised off-loading. Hardstanding in all areas used by vehicles. Plant offers a completely sealed liquid management system. Clean up according to COSHH data sheets and appropriate disposal arrangements.	Somewhat unlikely	Noticeable	Low to medium
Both CHP failure – release of biogas	Local population	Windblown dispersion	Service contract – on call 24 hours Automatic flaring of excess biogas when pressure reaches a high level.	Unlikely	Minor	Low
Significant leak of biogas	Local population.	Windblown dispersion.	Regular maintenance and inspections. Pressure is monitored 24/7 by operations control centre. Any alarms initiated are actioned immediately. DSEAR risk assessment will be carried out before plant is commissioned and appropriate zoning implemented. Treat gas through flare if possible. Inform EA and emergency services. Invoke Site Emergency Plan.	Very unlikely	Minor	Low

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Failure of storage tanks	Local water courses. Ground and groundwater.	Surface water Diffusion into ground.	Plant offers a completely sealed liquid management system. Area of storage tanks and digesters is appropriately bunded. If a major failure resulted in 25% of the volume of all tanks above ground on site escaping then it would be contained within the bund. Regular inspection and maintenance of infrastructure in place. Clean up minor spillage according to COSHH data sheets and appropriate disposal arrangements.	Unlikely	Minor	Low
Overfilling of digesters or storage tank	Local water courses. Ground and groundwater.	Surface water Diffusion into ground.	Process monitored continuously – Fail safe system stops material being pumped in. Raise email alarm sent to operator in charge. Overflow material would be enclosed in bund area.	Unlikely	Minor	Low
Failure of below ground storage tanks and pipework	Ground and groundwater.	Diffusion into ground	Regular checks of underground tanks Secondary contained with a leak protection membrane. Poured in situ concrete tank Inspection hole into leak detection layer.	Unlikely	Severe	Low
Power failure	Air Local water courses. Ground and groundwater.	Process failure leading to fugitive emission	If power is down for an extended period, bring in generator to flare biogas. Critical systems are designed to connect to a temporary generator. Biogas production is reduced during power failures. Emergency lighting in Reception Building.	Unlikely	Minor	Low

Table 4 Waste Impacts

Waste Stream No	Description of Waste Stream	Storage method	Amount produced per year	Nature of waste	Disposal or recovery option
1	Digestate (until PAS110 is secured) Waste code: 19 06 06	Covered lagoons	70,000 m3	Biodegradable non hazardous	Land spreading (R10) Score: 16
2	Plastics packaging	Concrete floor with appropriate drainage	To be confirmed when facility is fully operational	Other non-hazardous waste	Landfill (D5) Score: 60
3	Waste lubrication oil	Double skinned tank	16,000 liters	Hazardous waste	Various recovery options depending on selected contractor (R1 – R12) Score: between 30 and 60
4	Maintenance waste Batteries, oil filters etc.	Appropriate waste containers	Minor quantities	Hazardous waste	Waste unsuitable for recovery will be disposed to landfill (D5) Max score: 300
5	Office waste	Sealed commercial bins	To be confirmed when facility is operational	Biodegradable non hazardous	Mostly recovered. Waste unsuitable for recovery will be disposed to landfill (D5) Max score: 120

9.4 BAT Assessments

Indicative BAT Assessment for Fugitive Emissions to Air

BAT Requirements extracted from Sector Guidance Note IPPC S5.06 (Guidance for the Recovery and Disposal of Hazardous and Non Hazardous Waste).

1. **Dust – The following general techniques should be employed where appropriate:**
    - **Covering of skips and vessels**
    - **Avoidance of outdoor or uncovered stockpiles (where possible)**
    - **Where dust creation is unavoidable, use of sprays, binders, stockpile management techniques, windbreaks and so on**
    - **Regular wheel and road cleaning (avoid transfer of pollution to water and wind blow)**
    - **Closed conveyors, pneumatic or screw conveying (noting the higher energy needs), minimising drops. Filters on the conveyors to clean the transport air prior to release**
    - **Regular housekeeping**
    - **Enclosed silos (for storage of bulk powder materials) vented to fabric filters. The recycling of collected material should be considered under Section 2.6.**
    - **Enclosed containers or sealed bags used for smaller quantities of fine materials**

Fugitive emissions of dust to air are prevented through detailed site design and operational experience – the site is constructed with a concrete surface to prevent dust forming in dry conditions. The main causes of dust are considered to be caused through incoming vehicles or operations within the crop storage area. The mesophilic AD process is a wet process that does not generate dust or bioaerosols. The waste tipping area is located in the Reception Building to control any fugitive emissions of dust arriving with the waste. Site Design has limited the potential for litter and mud to be released outside the site boundary – the site has sealed hard standing running surfaces which prevent mud forming in wet conditions. Any litter arriving with waste deliveries is contained in the Reception Building within the depackaging process.

2. **VOC's**
    - **When transferring volatile liquids, the following techniques should be employed – subsurface filling via (anti-syphon) filling pipes extended to the bottom of the container, the use of vapour balance lines that transfer the vapour from the container being filled to the one being emptied, or an enclosed system with extraction to suitable abatement plant.**
    - **Vent systems should be chosen to minimise breathing emissions (for example pressure/vacuum valves) and, where relevant, should be fitted with knock-out pots and appropriate abatement equipment.**
    - **Maintenance of bulk storage temperatures as low as practicable, taking in to account changes due to solar heating etc.**
    - **The following techniques should be used (together or in any combination) to reduce losses from storage tanks at atmospheric pressure:**
        - **Tank Paint with low solar absorbency**
        - **Temperature Control**

- **Tank Insulation**
- **Inventory Management**
- **Floating Roof Tanks**
- **Bladder Roof Tanks**
- **Pressure/vacuum valves, where tanks are designed to withstand pressure fluctuations**
- **Specific release treatment (such as adsorption condensation)**

BAT was followed with site design for controlling VOCs on site. The management of VOCs is carried out in accordance with site-specific work instructions. The AD process, by its nature, is a sealed gas-tight process in normal operation. As part of the odour control system, the Reception Building is held under negative pressure which controls VOCs. The tanks are constructed from concrete which is then covered in a layer of insulation and a further layer of metal cladding. Temperature is controlled through a radiator system which continually circulated warm water around the tanks maintaining them at a constant and controlled temperature.

3. For information on Odour, see Section 2.2.6 on Page 72.

See BAT Analysis for Odour below.

4. A leak detection and repair (LDAR) programme should be established for the installations handling solvents and similar volatile materials. In addition:

- **Non-intrusive tank volume measurements should be used**
- **When cleaning filters, filter pot lids should be replaced as soon as possible**
- **Filter slops should be stored in sealed drums**
- **Contaminated waters have potential for odours and should be stored in covered tanks**
- **Drum storage (see Section 2.1.3 on page 32) should be regularly inspected**
- **Maintenance schedules should ensure regular cleaning/desludging of tanks to avoid large scale decontamination activities. All odorous materials being transferred directly to sealed containers.**
- **Tanker washing should be conducted under a permit to work scheme. If the load is likely to give rise to odour, then the first wash should be with water/aqueous waste and discharged direct to abated storage systems before opening the tanker manways. Open tanker barrel for the minimum amount of time. All washings to be directed to abated storage systems.**

BAT was followed with site design for efficient and safe maintenance of the site containment facilities. All tanks are fitted with a leak detection system which enables site operatives to assess whether the tanks are beginning to leak, regular checks are undertaken. The maintenance programme for containment facilities is carried out in accordance with site management and maintenance schedule. See examples of checks in **Attachment 8 Management and maintenance schedule.**

Indicative BAT Assessment for Fugitive Emissions to Water

BAT Requirements extracted from Sector Guidance Note IPPC S5.06 (Guidance for the Recovery and Disposal of Hazardous and Non Hazardous Waste).

1. For subsurface structures:

- **Establish and record the routing of all installation drains and subsurface pipework;**
- **Identify all sub-surface sumps and storage vessels;**
- **Engineer systems to minimise leakages from pipes and ensure swift detection if they do occur, particularly where hazardous (i.e. Groundwater-listed) substances are involved;**
- **Provide secondary containment and/or leakage detection for sub-surface pipework, sumps and storage vessels;**
- **Establish an inspection and maintenance programme for all subsurface structures, e.g. pressure tests, leak tests, material thickness checks or CCTV.**

The routing of all installation drainage and sub-surface pipework are established and recorded. See Drainage Philosophy in Section 12) and **Attachment 4 – Site plans**

2. All sumps should:

- **Be impermeable and resistant to stored materials;**
- **Be subject to regular visual inspection and any contents pumped out or otherwise removed after checking for contamination**
- **Where not frequently inspected, be fitted with a high level probe and alarm as appropriate;**
- **Be subject to programmed engineering inspection (normally visual, but extending to water testing where structural integrity is in doubt).**

All sumps are impermeable and resistant to stored materials. Where accessible, they are regularly visually inspected by operatives and pumped out after checking for contamination. Sumps that are not accessible to visual inspections are fitted with a high level probe and alarm linked to the control system. All sumps are water tested after construction, visually inspected during the life of the plant and will be water tested again in the event that their structural integrity is in doubt.

3. For surfacing:

- **Design appropriate surfacing and containment or drainage facilities for all operational areas, taking into consideration collection capacities, surface thickness, strength/reinforcement; falls, materials of construction, permeability, resistance to chemical attach, and inspection and maintenance procedures;**
- **Have an inspection and maintenance programme for impervious surfaces and containment facilities;**

- **Unless the risk is negligible, have improvement plans in place where operational areas have not been equipped with:**
  - **An impervious surface**
  - **Spill containment kerbs**
  - **Sealed construction joints**
  - **Connection to a sealed drainage system**

The site surfacing is detailed in **Section 12.** The surfacing is subject to visual inspections by operatives during the working day to maintain constant vigilance over any damage or necessary maintenance.

4. All above-ground tanks containing liquids whose spillage could be harmful to the environment should be bunded. Further information on bund sizing and design, see "Releases to water references" on page 131. Bunds should:

- **Be impermeable and resistant to the stored materials;**
- **Have no outlet (that is, no drains or taps) to drain to a blind collection point**
- **Have pipework routed within bunded areas with no penetration of contained surfaces;**
- **Be designed to catch leaks from tanks or fittings;**
- **Have capacity greater than 110% of the largest tank or 25% of the total tankage, whichever is larger;**
- **Be subject to regular visual inspection and any contents pumped out or otherwise removed under manual control after checking for contamination;**
- **Where not frequently inspected, be fitted with a high-level probe and an alarm, as appropriate;**
- **Where possible, locate tanker connection points within the bund, otherwise provide adequate containment;**
- **Be subject to programmed engineering inspection (normally visual, but extending to water testing where structural integrity is in doubt).**

The site bunding is detailed in **Section 12.**

Indicative BAT Assessment for Noise and Vibration

BAT Requirements extracted from Sector Guidance Note IPPC S5.06 (Guidance for the Recovery and Disposal of Hazardous and Non Hazardous Waste).

Describe the main sources of noise and vibration (including infrequent sources): the nearest noise-sensitive locations and relevant environmental surveys which have been undertaken; and the proposed techniques and measures for the control of noise.

The main sources of noise and the nearest noise-sensitive locations are detailed in the Noise Impact Assessment for the site (as seen in **Attachment 7(iv)**).

1. **The Operator should employ basic good practice measures for the control of noise, including adequate maintenance of any parts of plant or equipment whose deterioration may give rise to increases in noise (for example, bearings, air handling plant, the buildings fabric and specific noise attenuation kit within plant or machinery).**

Noise is managed in accordance with the Agrivert Work Instruction "Noise Mitigation and Monitoring" as seen in **Attachment 10(i)**.

2. **The Operator should employ such other noise control techniques necessary to ensure that the noise from the installation does not give rise to reasonable cause for annoyance, in the view of the Regulator. In particular, the Operator should justify where the Rating Levels ($L_{Aeq,T}$) from the installation exceed the numerical value of the Background Sound Level ($L_{A90,T}$)**

The CHP engines on site are fitted with an exhaust gas silencer and enclosed in a steel container to prevent noise nuisance. All incoming vehicles will unload waste within the enclosed reception building with closed doors. Delivery vehicles waiting to enter the reception building will do with their engines off.

A detailed assessment has shown that the calculated noise rating level from the proposed AD Facility falls below the criteria level adopted and as such consideration of noise mitigation measures is unwarranted as seen in **Attachment 7 (iv) Noise Impact Assessment February 2016**.

Noise is managed in accordance with the Agrivert Work Instruction "Noise Mitigation and Monitoring" as seen in **Attachment 10(i)**.

3. **Further justification will be required should the resulting field rating level (LAR,TR) exceed 50dB by day and a façade rating level exceed 45dB by night, with day being defined as 0700 to 2300 and night 2300 to 0700.**

The calculated specific noise levels do not exceed 50dB by day or 45 dB by night.

4. **In some circumstances "creeping background" (i.e. creeping ambient) may be an issue. Where this has been identified in pre-application discussions or in previous discussions with the local authority, the Operator should employ**

such noise control techniques as are considered appropriate to minimise problems to an acceptable level within the BAT criteria.

No “creeping background” issues have been identified.

5. Noise surveys, measurements, investigations (e.g. on sound power levels of individual items of plant) or modelling may be necessary for either new or existing installations, depending upon the potential for noise problems. Where appropriate, the Operator should have a noise management plan as part of its management system.

A Noise Impact Assessment was carried out for the site by REC Consultants in February 2016 and can be seen in **Attachment 7 (iv)**, and noise generated by the CHP units will be closely monitored at commissioning. Historically we know that the noise levels are within acceptable tolerances, as noise has been monitored on similarly designed plants and we have also collected noise data from one of our existing AD sites. Noise is managed in accordance with the Agrivert Work Instruction “Noise Mitigation and Monitoring” as seen in **Attachment 10(i)**.

Indicative BAT Assessment for Odour

BAT Requirements extracted from Sector Guidance Note IPPC S5.06 (Guidance for the Recovery and Disposal of Hazardous and Non Hazardous Waste).

1. The requirements for odour control will be installation-specific and depend on the sources and nature of the potential odour. In general:

Installation-specific requirements for odour control have been identified and will be implemented.

2. Where odour can be contained, for example within buildings, the Operator should maintain the containment and manage the operations to prevent its release at all times.

Sealed vessels are used for the AD process. Wastes are handled in enclosed reception building where access is gained through speed doors. As part of the odour control system, the Reception Building is held under negative pressure. The air is extracted and treated through a wet scrubber and wood chip and bark biofilter (which removes odours) before venting to the atmosphere. The liquid waste storage tanks and mixing tank, used to contain the wastes at the front end, are located underground and enclosed within the reception building to prevent odour release.

A water scrubber was chosen following BAT analysis at similar AD sites which identified that water scrubbers were more robust and efficient at reducing odorous particles than chemical scrubbers. Through BAT analysis it was identified that there are numerous environmental and operational benefits of not dosing chemicals.

Design Parameters for Air Extraction are detailed in the **Odour Management Plan (OMP) seen in Attachment 9.**

3. Where odour releases are expected to be acknowledged in the Permit (i.e. contained and treated prior to discharge or discharged for atmospheric dispersion):

- **For existing installations, the releases should be modelled to demonstrate the odour impact at sensitive receptors. The target should be to minimise the frequency of exposure to ground level concentrations that are likely to cause annoyance.**
- **For new installations, or for significant changes, the releases should be modelled and it is expected that the Operator will achieve the highest level of protection that is achievable with BAT from the outset.**
- **Where there is no history of odour problems then modelling may not be required although it should be remembered that there can still be an underlying level of annoyance without complaints being made.**
- **Where, despite all reasonable steps in the design of the plant, extreme weather or other incidents are liable, in the view of the Regulator, to increase the odour impact at receptors, the Operator should take appropriate and timely action, as agreed with the Regulator, to prevent**

further annoyance (these agreed actions will be defined either in the Permit or in an odour management statement).

An Odour Assessment (February 2016) were carried out (**Attachment 7 (iii)**)**.** It has shown that predicted odour concentrations were below the relevant benchmark level of 3.0ouE/m3 at all sensitive receptors in the vicinity of the site for all modelling years. As such, odour nuisance is not anticipated as a result of normal operation of the plant. It is considered cumulative impacts will not be significant due to the low odour levels predicted to arise from the proposals.

4. Where odour generating activities take place in the open, (or potentially odorous materials are stored outside) a high level of management control and use of best practice will be expected.

Silage storage in the silage clamp for use in the process has a potential to be odorous. Silage stored in the open is sheeted once delivered to site and remains sheeted until required. The front edge of silage re-sheeted if not required for more than one week. Its management is explained in further detail in the Odour Management Plan seen in **Attachment 9**.

5. Where an installation releases odours but has a low environmental impact by virtue of its remoteness from sensitive receptors, it is expected that the Operator will work towards achieving the standards described in this Note, but the timescales allowed to achieve this might be adjusted according to the perceived risk.

The odour standards in this Note will be met from the outset.

6. The objective is to prevent emissions of odorous releases that are offensive and detectable beyond the site boundary. This may be judged by the likelihood of complaints. However, the lack of complaint should not necessarily imply the absence of an odour problem.

Monitoring of odorous releases will be carried out in accordance with the site OMP. The monitoring plan is proactive, and investigation of odour complaints is only one of a range of methods used.

7. Assessment of odour impact should cover a range of reasonably foreseeable odour generation and receptor exposure scenarios, including emergency events and the effect of different mitigation options.

A full range of scenarios and suitable mitigation measures are included in the site OMP and can be seen in **Attachment 9 "Odour management for Failures".**

8. For complex installations, for example where there are a number of potential sources of odorous releases or where there is an extensive programme of improvements to bring odour under control, an odour management plan should be maintained.

An OMP will be implemented and maintained for the site.

9. Emphasis should be placed on pre-acceptance screening (see Section 2.1.1 on Page 20) and the rejection of specific wastes, for examples, mercaptans, low molecular weight amines, acrylates or other similarly high odorous materials, that are only suitable for acceptance under special handling requirements. These may include dedicated sealed handling areas with extraction to abatement.

Pre-acceptance screening will assess specific wastes for highly odorous materials and they will only be accepted if the odours can be successfully contained within the Reception Building.

10. Scrubber liquors should be monitored to ensure optimum performance, i.e. correct pH, replenishment and replacement.

Scrubber liquors will be monitored to ensure optimum performance. Clean water is held on site to be added to the wet scrubber if required.

Indicative BAT Assessment for Accidents

BAT Requirements extracted from Sector Guidance Note IPPC S5.06 (Guidance for the Recovery and Disposal of Hazardous and Non Hazardous Waste).

1. **A formal structures accident management plan should be in place which covers the following aspects:**

These aspects are covered in the site's Environmental Risks Assessment in **Table 3 Accidents Risk Assessment.**

2. **A – Identification of hazards to the environment posed by the installation using a methodology akin to a HAZOP study.**

HAZOP study was undertaken. These aspects are covered in the site's Environmental Risks Assessment in **Table 3 Accidents Risk Assessment.**

3. **B – assessment of risks.**

These aspects are covered in the site's Environmental Risks Assessment in **Table 3 Accidents Risk Assessment.**

4. **The depth and type of assessment will depend on the characteristics of the installation and its location.**

These aspects are covered in the site's Environmental Risks Assessment in **Table 3 Accidents Risk Assessment.**

5. **C – identification of the techniques necessary to reduce the risks.**

These aspects are covered in the site's Environmental Risks Assessment in **Table 3 Accidents Risk Assessment.**

10) EPB3: Question 1 – What activities are you applying for?

10.1. Proposed regulated activities

Agrivert is proposing to operate a bespoke Part A Installation Environmental Permit for the operation of an Anaerobic Digestion Facility with the use of resultant biogas in two CHP units. It is anticipated that the facility will generate in the region of 3MW of electricity output. The total quantity of feedstock that can be accepted at the site will be no more than 75,000 tonnes of biodegradable organic waste per annum. The facility will comply with Animal By-Products Regulations (ABPR).

The assessment has been carried out and the proposed facility falls outside the scope of any relevant Standard Rules Permits.

The listed activities proposed within this permit application are in accordance with this new set of regulations. Schedule 1 listed activities and associated Directly Associated Activities (DAAs) are summarised in **Table 5 - Proposed Regulated Activities** below.

Table 5 - Proposed Regulated Activities

EPR or Schedule 1 Reference	**Description of Activity**	**Annex IIA or IIB**	**Activity Capacity**
Part A(1) Section 5.4 Part A(1)(b)(i)	Recovery of non-hazardous waste with a capacity exceeding 100 tonnes per day involving (i) biological treatment;	R3: recycling or reclamation of organic substances which are not used as solvents R13: for temporary storage	The total annual throughput up to 75,000 tonnes of liquid and solid organic waste (including processing liquids): Daily treatment capacity of 280t/day (based on 5.5 Days) Maximum waste storage is 29,885m^3
Directly Associated Activities			
Name of DAA	**Description of the DAA**	**Annex IIA or IIB**	**Activity Capacity**
Physical pre-treatment of waste	Mechanical treatment of waste including screening, mixing and blending	D9 Physico–chemical treatment which results in compounds or mixtures which are discarded	2 x Bunkers (80m^3) Mixing Tank 860m^3 And Floor capacity 100m^3 Total Capacity 1120m^3
Combustion of resultant biogas	The combustion of fuel (biogas and gas oil) for the purpose of	R1: Use principally as a fuel or other means to generate energy	Biogas 10t/day

	generating electricity and heat for use within the installation and export to the national grid.		
Biogas storage	Storage of biogas in floating roof digesters		Maximum size of biogas storage – Approx. 9142m^3
Gas Flare	Use of an auxiliary flare required only for short periods of breakdown or maintenance of facility.	D10: Incineration on land	N/A
Raw Materials Storage	Storage of silage Storage of lubrication oil used in the CHP engines		Silage Storage Clamp capacity – 3000 tonnes Lubrication oil tanks capacity – 5000 litres
Digestate Storage	Storage of digestate prior to transport off-site to spread to land or for storage off-site	R13: for temporary storage	Digestate tanks capacity - 5587 m^3
Waste Oil Storage	Storage of used lubrication oil used in CHP engines		2500 litres
Waste Liquid Storage	Storage of liquids within the Reception Building or within the Silage Storage Tank		700 m^3 (2 liquid tanks) 100 m^3 Silage Leachate Tank 800 m^3 Total
Scrubber and Biofilter	Waste reception building odour control unit		N/A
Temporary boiler[1]	The combustion of gas oil for the purpose of generating heat for use within the installation.	R1: Use principally as a fuel or other means to generate energy	

Note 1 – During the commissioning of the AD site, a temporary boiler will be required to facilitate on site operations until such time as the site becomes fully operational.

It is proposed to install a temporary hot water boiler situated within a container with a rated value of 367kW (1.25 Mbtu) and a maximum working pressure of 4 bar (58psi). The boiler and its associated chimney are approximately 5m in height. The dimensions of the boiler container are 3.3m long x 2m wide x 2.13m in height. The boiler arrives fully packaged, complete with controls and burner and is suitable for use with 35 sec oil. It utilises 4inch flow and return pipework and includes a 3 phase circulating pump. A boiler will occasionally be hired should maintenance works be required.

10.2. Waste storage capacity

The following capacity is available across the site and is indicative of the total amount of waste that can be retained onsite on any given day.

Table 6 Waste Storage Capacity

Element	Capacity	Total Capacity
Waste reception bunkers (2)	80m^3 per bunker	160m^3
Liquid Tanks (2 tanks)	250m^3 and 450m^3	700m^3
Mixing Tank	860m^3	860m^3
Primary Digesters (2 tanks)	5,587m^3 per tank	11,174m^3
Secondary Digesters (2 tanks)	5,587m^3 per tank	11,174m^3
Pasteurisation Tanks (3 tanks)	30 m^3 per tank	90m^3
Storage Tank	5,587m^3 per tank	5,587m^3
Silage Clamp Leachate Tank	100m^3	100m^3
	Total	29,845m^3

The silage clamp located to the south end of the site has the capacity to hold 3,000 tonnes of silage at any one time. The Silage clamp has been designed to meet the SSAFO regulations.

10.3. Waste Accepted on site

Agrivert is proposing to accept the following waste types onto the site for the biological treatment. This is in line with the EA/WRAP Quality Protocol for Anaerobic digestate (January 2014).

Table 7 - Types of waste accepted

EWC	Permitted Waste
02	**Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing**
02 01	**Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing**
02 01 01	Sludges from washing and cleaning – biodegradable only
02 01 02	Animal-tissue waste
02 01 03	Plant-tissue waste
02 01 06	Animal faeces, urine and manure (inc. spoiled straw), effluent, collected separately and treated offsite
02 01 07	Wastes from forestry
02 01 99	Spent mushroom compost or discarded mushrooms from commercial mushroom cultivation only
02 02	**Wastes from the preparation and processing of meat, fish and other foods of animal origin.**
02 02 01	Sludges from washing and cleaning – biodegradable only
02 02 02	Animal-tissue waste
02 02 03	Materials unsuitable for consumption or processing
02 03 04	Sludges from on-site effluent treatment – biodegradable only
02 02 99	Sludges from gelatine production; animal gut contents
02 03	**Wastes from fruit, vegetables, cereals, edible oils, cocoa, coffee, tea and tobacco preparation and processing; conserve production; yeast and yeast extract production, molasses preparation and fermentation**
02 03 01	Sludges from washing, cleaning, peeling, centrifuging and separation
02 03 04	Materials unsuitable for consumption and processing
02 03 05	Sludges from on-site effluent treatment – biodegradable only
02 03 99	Sludges from production of edible fats and oils; seasoning residues; molasses residues;

	residues from production of potato, corn or rice starch
02 04	**Wastes from sugar processing**
02 04 03	Sludges from on-site effluent – biodegradable only
02 04 99	Wastes from sugar processing – biodegradable wastes only allowed if no chemical agents added and no toxic residues
02 05	**Wastes from the dairy products industry**
02 05 01	Materials unsuitable for consumption or processing including solid and liquid dairy products, milk, food processing wastes, yoghurt, whey
02 05 02	Sludges from on-site effluent treatment – biodegradable only
02 06	**Wastes from the baking and confectionary industry**
02 06 01	Materials unsuitable for consumption or processing including food condemned, food processing wastes, biscuits, chocolate, yeast, bread, bakery wastes
02 06 03	Sludges from on-site effluent treatment
02 07	**Wastes from the production of alcoholic and non-alcoholic beverages (except coffee, tea and cocoa)**
02 07 01	Wastes from washing, cleaning and mechanical reduction of raw materials including brewing waste, food processing waste, fermentation waste
02 07 02	Wastes from spirits distillation including spent grains, fruit and potato pulp, sludge from distilleries
02 07 04	Materials unsuitable for consumption or processing including brewing wastes, food processing waste, fermentation waste, alcoholic drinks, fruit juice
02 07 99	Malt husks, malt sprouts, malt dust; spent grains; hops; yeast and yeast like residues, sludges from production process
03	**Wastes from wood processing and the production of panels and furniture, pulp paper and cardboard**
03 01	**Wastes from wood processing and the production of panels and furniture**
03 01 01	Waste bark and cork
03 01 05	Sawdust, shavings, cuttings, wood, particle board and veneer other than those mentioned in 03 01 04
03 03	**Wastes from pulp, paper and cardboard production and processing**
03 03 10	Fibre rejects, fibre-, filler- and coating-sludges from mechanical separation
03 03 11	Sludges from on-site effluent treatment other than those mentioned in 03 03 10

04	**Wastes from the leather, fur and textile industries**
04 01	**Wastes from the leather and fur industry**
04 01 01	Wastes from leather industry
04 02	**Waste from the textile industry**
04 02 10	Organic matter from natural products (for example grease, wax)
15	**Waste packaging, absorbents, wiping cloths, filter materials and protective clothing not otherwise specified**
15 01	**Packaging (including separately collected municipal packaging waste)**
15 01 01	Paper and cardboard packaging
15 01 03	Wooden packaging
15 01 05	Composite packaging – biodegradable packaging only
19	**Waste from waste management facilities, offsite waste water treatment plants and the preparation of water intended from human consumption and water for industry use**
19 02	**Wastes from physical/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)**
09 02 03	Premixed wastes composed only of non-hazardous wastes
19 02 06	Sludges from physico/chemical treatment other than those mentioned in 19 02 05
19 02 10	Combustible wastes other than those mentioned in 19 02 08 and 19 02 09 – glycerol not designated as hazardous
19 05	**Wastes from aerobic treatment of solid waste**
19 05 01	Non-composted fraction of municipal and similar wastes
19 05 02	Non-composted fraction of animal and vegetable wastes
19 05 03	Off-specification compost from source segregated biodegradable waste
19 05 99	Liquor/leachate from a composting process; Digestate from an aerobic digestion process
19 06	**Wastes from anaerobic treatment of waste**
19 06 03	Liquor from anaerobic treatment of municipal waste
19 06 04	Digestate from anaerobic treatment of municipal waste (source segregated waste only)
19 06 05	Liquor from anaerobic treatment of animal and vegetable waste

19 06 06	Digestate from anaerobic treatment of animal and vegetable waste
19 08	**Wastes from waste water treatment plants not otherwise specified**
19 08 09	Grease and oil mixture from oil/water separation containing only edible oil and fats
19 08 12	Sludges from industrial biological treatment of industrial waste water other than those mentioned in 19 08 11
19 12	**Wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified**
19 12 12	Other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11
20	**Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions.**
20 01	**Separately collected fractions (except 15 01)**
20 01 01	Paper and cardboard
20 01 08	Biodegradable kitchen and canteen waste
20 01 25	Edible oil and fat
20 01 38	Untreated wood where there is no non-biodegradable coating or preserving substance present
20 02	**Garden and park wastes (including cemetery waste)**
20 02 01	Biodegradable waste
20 03	**Other municipal wastes**
20 03 01	Mixed municipal wastes – separately collected biowastes
20 03 02	Waste from markets – allowed only if source segregated biodegradable fractions e.g. plant material, fruit and vegetables

11) EPB3: Question 2 – Emissions to air, water and land

A plan showing all emission points is located in **Attachment 4 (iii)** Permit Boundary Point Source & Emissions.

11.1 Emissions to Air

The North London AD facility will have three primary point source emissions to air:

- Two 10.5 m high stacks from CHP engines (Emission points A1, A2)
- One 10 m high stack from which gases from the flare will be emitted (Emission point A3)
- One 5 m high temporary boiler chimney (Emission point A4)

In addition to the above point source emissions there will be 5 Pressure Relief Valves (PRVs) which will only operate under abnormal conditions, to prevent excess build-up of biogas within the system. A PRV will be fitted on each of the two primary digester tanks, on the two secondary digester tanks and one storage tank.

Table 8 - Point source emissions to air

Emission point reference and location	Source	Parameter	Quantity	Unit
A1 A2 (Attach 4 (iii) Permit Boundary Point Source & Emissions)	Engine 1 and Engine 2 exhaust stack	Nitrogen Oxides	21.6[1]	Tonnes/year
		Sulphur Dioxide	15.1[1]	Tonnes/year
		nmVOCs	3.25[1]	Tonnes/year
		VOC	43.2[1]	Tonnes/year
		Carbon Monoxide	60.5[1]	Tonnes/year
A3 (Attach 4 (iii) Permit Boundary Point Source & Emissions)	Flare stack	Nitrogen Oxides	Emergency use only	
		Sulphur Dioxide		
		nmVOCs		
		VOC		
		Carbon Monoxide		
A4 (Attach 4 (iii) Permit Boundary Point Source & Emissions)	Temporary auxiliary boiler	Nitrogen Oxides	Gas oil boiler. Temporary use only.	
		Sulphur Dioxide		
		nmVOCs		
		VOC		
		Carbon Monoxide		
V1, V2, V3, V4, V5 (Attach 4 (iii)	Primary and secondary digesters and	Hydrogen Sulphide	Emergency use only	
		Methane		

Permit Boundary Point Source & Emissions)	storage tank pressure release valves (PRV)	Carbon Dioxide	

Note 1 - The pollutant mass emission rates from the biogas engines for use in the assessment were derived from the Biogas Engines Emission Limit Value. See Air Quality Assessment Coursers Farm February 2016 and Odour Assessment Coursers Farm February 2016. This represents a conservative assessment approach with emissions from the engines assumed to be the maximum permitted. Emissions from the biogas engines were assumed to be constant, with the plant in operation 24-hours per day, 365-days per year. This is considered to be a worst-case assessment scenario as plant shut-down or periods of reduced work load are not reflected in the modelled emissions.

Visible Plume

The CHP unit is expected to run continuously for substantial periods of time and will therefore rarely require starting from cold in cold weather. On this basis, it is not considered likely that regular visible plume emissions will arise and no further analysis has been carried out.

Table 9 - Proposed limits

Emission point reference and location	Source	Parameter	Quantity	Unit
A1 A2 (Attach 4 (iii) Permit Boundary Point Source & Emissions)	Engine 1 and Engine 2	Nitrogen Oxides	500	mg/m^3
		Sulphur Dioxide	350	mg/m^3
		nmVOCs	75	mg/m^3
		VOC	1000	mg/m^3
		Carbon Monoxide	1400	mg/m^3
A3 (Attach 4 (iii) Permit Boundary Point Source & Emissions)	Flare	Nitrogen Oxides	No proposed limits – emergency use only	
		Sulphur Dioxide		
		nmVOCs		
		VOC		
		Carbon Monoxide		
A4 (Attach 4 (iii) Permit Boundary Point Source & Emissions)	Temporary auxiliary boiler	Nitrogen Oxides	No proposed limits – Temporary use only.	
		Sulphur Dioxide		
		nmVOCs		
		VOC		
		Carbon Monoxide		
V1, V2, V3, V4, V5 (Attach 4 (iii) Permit Boundary Point Source & Emissions)	Primary and secondary digesters and storage tank pressure release valves (PRV)	Hydrogen Sulphide	No proposed limits – emergency use only	
		Methane		
		Carbon Dioxide		

11.2. Control of Sulphur Dioxide emissions from the engines

The biogas produced by the digesters is naturally high in sulphides. Sulphides are a problem for gas engines and must be reduced where possible. This is controlled in 4 stage process

- **Stage 1** Small and controlled amounts of air are pumped into the biogas store. This process oxidises some of the sulphides.
- **Stage 2** Ferrous Chloride is then added periodically to the digester. This process converts sulphides into iron sulphates which form ‘stalactite’ crystals on netting within the digesters.
- **Stage 3** A net is suspended across the top of the digesting liquid, on which sulphur crystals grow. As they gain sufficient weight, they fall from the net back into the digestate and remain in their solid form rather than exiting the digester as a gas. The elemental sulphur which drops into the digestate improves its fertiliser value.
- **Stage 4** The biogas is additionally ‘scrubbed’ through an activated carbon filter and passed through a condenser before being processed by the gas engines.

11.3. Emissions to surface water or groundwater

There will be no point source emissions to surface water or groundwater from the activities on site other than under the rare circumstances resulting in a high level overflow from the rainwater harvesting – as explained 12) EPB3: Question 3 Operating techniques section 12.6.

11.4. Emissions to sewer

Table 10 Point source emissions to sewer

Emission point reference and location	Source	Parameter	Quantity	Unit
Discharge to Package Sewage Treatment Plant for full treatment	Wastewater from site welfare facilities will discharge to a package sewage treatment plant on-site	N/A	N/A	N/A

There are no limits proposed for this release as it is well within the capacity and capability of the package sewage treatment plant which was appropriately sized to accommodate the offices.

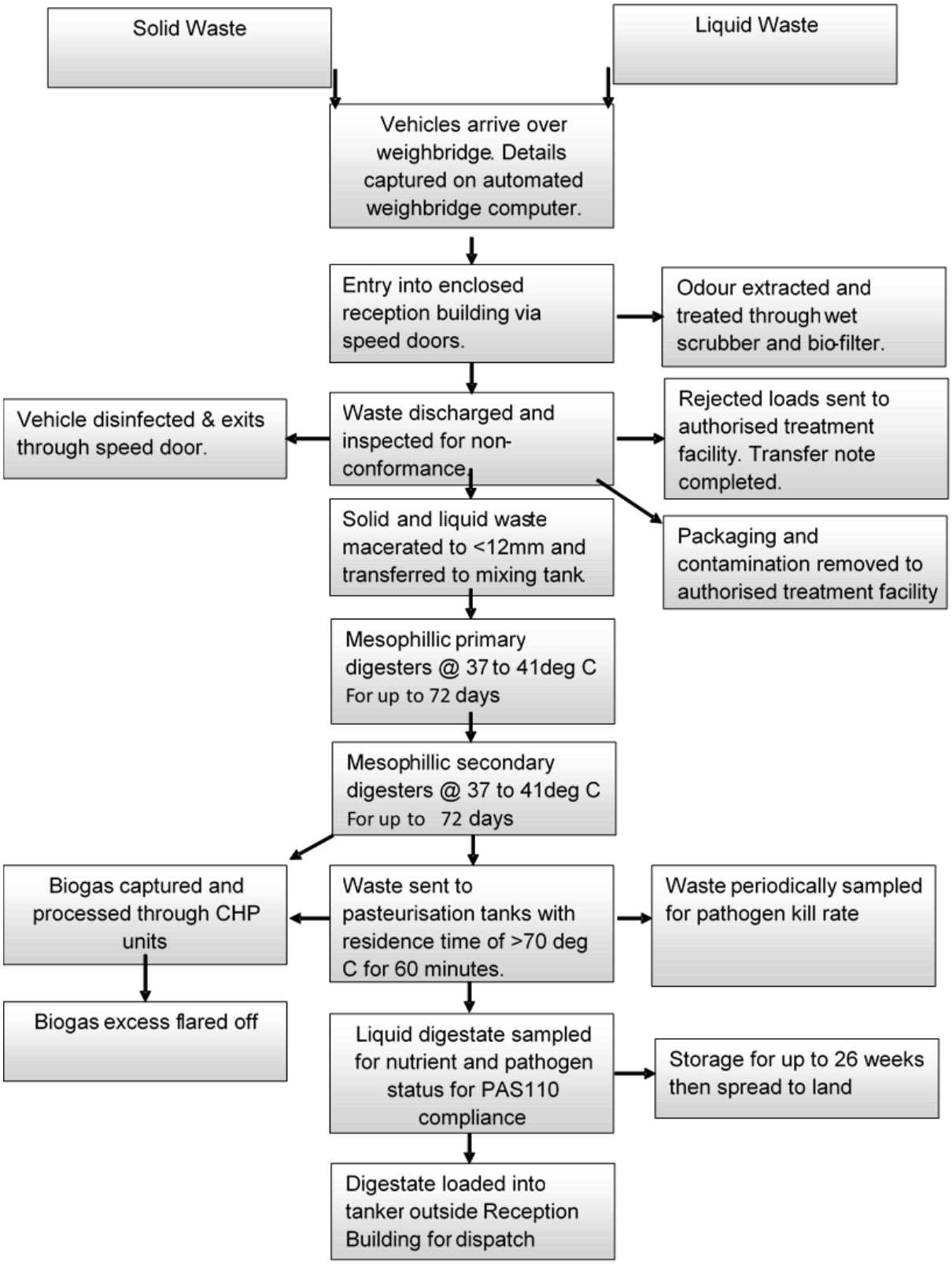
11.5. Emissions to land

There will be no point source emissions to land from the permitted activities on site.

12) EPB3: Question 3 – Operating Techniques

12.1 Process description

Figure 1 Process Flow



Reception

Solid Waste

Solid waste can be delivered to the site in a wide range of vehicles (mainly RCV's and HGV's). The delivery vehicle enters the site and is weighed over the weighbridge. It then proceeds to the enclosed reception building where access is gained through speed doors. The building is equipped with 2 recessed tipping bunkers to accommodate different waste streams and vehicle types.

Once inside the building, the door is closed to retain negative air pressure. This is to ensure any odour is controlled.

Solid waste is handled in a different manner to liquid wastes due to its drier consistency and potential for contamination, i.e. plastics. Solid waste is tipped into a reception bunker with a moving floor. Once the load has been tipped, the rear of the vehicle is washed down if necessary. The vehicle then exits through another speed door. The moving floor of the reception bunker conveys the solid waste to a screw conveyor. This lifts the material into one of the two macerators, which removes contaminants and reduces particle size, a requirement of the Animal By-Products Regulations (ABPR). Within the macerator solid material is mixed with liquid wastes and/or water to the required consistency. It is then pumped into a mixing tank.

Liquid Waste

Liquid waste is delivered in a tanker, entering the site over the weighbridge in the same manner as the solid waste. The tanker then connects to a discharge pipeline within the reception building and commences discharge to one of two underground storage tanks. Odours from delivering tankers are extracted from the building and treated through a scrubber and biofilter. Once the load has been discharged, a wash down of the rear of the tanker and the pipe work is carried out if necessary and then the tanker exits through another speed door. The speed door closes and the reception building regains negative air pressure.

Biofilter and Scrubber

The main body of the reception building is kept slightly below atmospheric air pressure. The air is extracted and treated through a water scrubber and wood chip and bark biofilter (which removes odours) before venting to the atmosphere. The liquid waste storage tanks and mixing tank, used to contain the wastes at the front end, are located underground and enclosed within the reception building to prevent odour release.

Energy Crop

Stabilising energy crop silage is stored on site in a silage clamp and is delivered to the energy crop feed bunker by loading shovel. The crop bunker is located next to the two primary digesters and comprises a moving floor and screw conveyor system which gradually feeds the silage into two of the digesters, providing a constant and controlled feed. This can help to balance the digester biology, as well as providing a good source of energy. All effluent from the energy crop storage area is directed to a submerged tank, this effluent is then pumped in to the Reception building and used as a process liquid.

Pre-Treatment

Pre-treatment and Blending

Pre-treatment is the most important phase to ensure problem-free and stable digestion that produces high gas yields, particularly when dealing with contaminated materials and animal by-products.

1. Screening

The solid waste may contain contaminants such as plastics and soft food waste packaging (inevitable in commercial and kerbside collected waste). It is undesirable for this material to enter the digester; therefore all material from the recessed bunkers are fed into one of two macaerators. This specialist machine serves three purposes:

- Opening of soft and hard packaging, including plastics, paper, tins and glass;
- Removing plastics and other soft packaging via a separate contras discharge chute; and
- Reducing the particle size of all the material to below 12mm, to ensure maximum efficiency in gas release and Animal By-Product Regulations (ABPR) compliance.

The resultant thick, organic soup is pumped into a settling and mixing tank, where the small pieces of heavy contaminants (e.g. glass, grit, metals) settle out by gravity (in line with BAT).

2. Mixing

Liquid wastes are added directly to the macerators. The rate at which liquid waste is added will vary with the composition and dry matter of the solid waste. The higher moisture content and reduced viscosity enable the heavy contaminants to settle in the mixing tank to provide a de-gritting stage. This tank is periodically emptied by specialist contractors. The tank is continuously stirred using mounted SUMA stirrers to ensure consistency of product.

3. Control by Blending

Anaerobic conditions can be maintained and controlled by carefully blending the input material. Regular sampling and analysis from the primary and secondary digesters allows criteria such as pH levels and organic loading rates to be maintained at optimum levels. Feed-stocks are balanced to prevent inhibition of the biology and control gas production rates.

The facility is designed to accept a wide variety of wastes. To complement this, silage is used as a moderating feedstock. As well as providing stabilisation properties, silage also produces good gas yields and therefore a source of energy if waste inputs are not available (such as on public holidays).

Digestion

Digestion

The first phase of digestion is completed in the primary digesters. This is where the majority of the methane is extracted. Each digester has a capacity of circa 5587m^3 and is stirred by 2 propeller stirrers situated on the sides of the circular tank.

Each tank is heated by a hot water system comprising stainless steel coils attached to the tank walls. As the biogas is released it is stored in the void above the digestion mass and is sealed by a twin membrane roof. The gas is kept at a low pressure by a moving roof membrane that fills and empties as the biogas levels rise and fall. The outer membrane of the digester is constantly air inflated, protecting the inner membrane elements from the weather.

The stirrers operate on a periodic basis in order to keep the digester contents moving in a sufficient manner to ensure that the mix optimises methane yield, but without excessive energy usage. Should one stirrer fail, the process is maintained by the other stirrers. During a planned shutdown, the stirrers are able to be lifted and replaced within 8 hours with minimal disruption to the process.

The substrate is displaced from the primary digester by the pumping regime and fed into the secondary digester. On leaving the primary digesters it passes through a macerator. This ensures that the particle size is less than 12mm in one plane in order to comply with the pasteurisation requirements of the ABPR and reinvigorates the digestion process, aiding breakdown of substrate and releasing the remaining biogas.

The substrate in the secondary digester is stirred, but with less intensity than the primary digesters. All digestion and storage tanks serve as gas holders. There is sufficient storage within the top of each tank for 8 hours of un-replenished production of biogas. In reality, the ongoing biogas production means that the gas available to the engines, if all feeding were to stop, would be sufficient to last for several days, but at reduced levels.

Pasteurisation

Pasteurisation

Pasteurisation of the digestate is carried out in order to kill potential pathogens within the food waste and achieve ABPR compliance. To be compliant, all animal by-product material must be reduced to a particle size of below 12mm (which is achieved in the macerator system as described above) and held at a temperature of 70ºC for a minimum of one hour.

Agrivert employ post-digestion pasteurisation with the following advantages:

- All feedstock within the plant, including energy crop silage (which is added directly to the digester, separately from the food waste), is pasteurised, which is best practice for achieving PAS110 standard and AD Quality Protocol (an industry-standard quality assurance accreditation).
- The digestion process will eliminate many pathogens that may be present in the organic waste feedstock, reducing the burden on the pasteurisation stage.
- The waste material will be heated in the digester to >40ºC, so less time and energy will be required to raise the temperature to >70ºC for pasteurisation.
- If a problem were to arise with the pasteurisation system, the digesters would continue to operate normally (receiving waste) until the problem was resolved.

The material from the secondary digester tank is introduced into one of three pasteurisation units in batches. Batching ensures that nothing is despatched to final storage without being fully pasteurised.

The three pasteurisation units are heated using some of the heat from hot water from the gas engines. Once the pasteurisers are at + 70ºC, the tank is held at this temperature for a minimum of 1 hour. An auxiliary boiler can be brought in to ensure compliance with the ABPR is always achieved in the unlikely event of two pasteurisation units failing. The automated system ensures that waste does not leave the pasteurisation units until temperature has been achieved for the required time. This is recorded electronically and can be audited by the Animal Health and Veterinary Laboratories Agency at any time.

There are three temperature probes inside the units to monitor the temperature and ensure temperature is achieved for the entire period. The unit is equipped with stirrers which ensure the batch is consistently stirred and that no cool zones are able to develop. Once temperature has been achieved, the batch then passes onto storage. Sampling points for ABPR purposes are provided at the inlets and outlets of all three pasteurisation unit.

The ABPR represents such a critical element of the process that the three pasteurisation units consist of two duty and one assist / standby pasteurisation unit. Two of these tanks are capable of pasteurising the entire input feedstock of the plant.

Energy Production

Energy Production

The biogas produced by the digesters is naturally high in sulphides. Sulphides are a problem for gas engines and must be reduced where possible. The first stage of reduction is carried out within the digesters where there are three forms of sulphide control:

- Limited amounts of oxygen are allowed into the methane store, in order to oxidise some of the sulphides;
- Ferrous Chloride is added periodically to the digester to enable the sulphides to become sulphates, which produces a complementary sulphate solid trace fertiliser; and
- A net is suspended across the top of the digesting liquid on which sulphur crystals grow. As they gain sufficient weight, they fall from the net into the liquid and remain in their solid form rather than exiting the digester as a gas. This elemental sulphur which drops into the digestate improves its fertiliser value.

Once these three stages have been completed, the biogas has had a significant reduction in overall sulphur content and is normally ready for use in the gas engine. However, to ensure optimised levels of sulphur, all biogas is 'scrubbed' through an automated carbon filter. The biogas is dehumidified and compressed prior to introduction into the carbon filter.

The Gas Engine

The gas engines are carefully sized to operate at maximum efficiency and to create the necessary power. Such gas engines are very reliable but have comprehensive maintenance agreements in place to minimise downtime. The gas engine receives the biogas and uses it as a fuel in powering a conventional generator unit to produce electricity. The output of the generator is dependent on the draw of biogas (and the resulting rpm of the gas engine). Should there be too much biogas for the gas storage and the gas engine, then it is flared at a remote flare stack. If this is a persistent issue, then additional gas engines can be added to increase electricity production.

The hot water from the gas engine cooling system and exhaust gas heat exchanger is used to heat the pasteurisation units, to keep the digesters at the required temperature for mesophilic digestion and to dry the biogas.

Excess heat can be utilised in a variety of manners dependent upon location, for example it could be used to heat nearby greenhouses or other industrial buildings or converted into additional electricity via heat exchangers on the exhaust stack. The gas engine exhaust is piped through a flue that rises on the outside of the insulated container. The noise of the gas engine is suppressed within a sound insulated engine container. The power generated by the gas engine is transmitted directly into the National Grid via transformers and a high voltage connection.

Digestate Storage and Recycling

Digestate Storage

The facility will provide digestate storage capacity of 5587 m^3. This will be supplemented with off-site storage, capable of storing up to 6 months' worth of digestate. This is because it can only be spread to land at certain times of the year, and is considered in accordance with BAT.

Recycling

Sealed tankers are used to transport the digestate from the site to be spread to land or to farm lagoons for storage.

When the season and weather are suitable for recycling to land (respecting the Nitrate Directive), the digestate is applied using specialised spreaders.

Application rates are strictly monitored in accordance with the requirements of the crop, and to comply with the Nitrate Vulnerable Zone (NVZ) regulations. The digestate is a valuable bio-fertiliser, with a higher rate of first year nitrogen availability than many organic fertilisers. It also contains valuable sources of potash, phosphate and sulphur. The main spreading seasons are in the spring, the late summer and autumn. This is to coincide with the cropping windows where nutrients are most required and soil conditions are most appropriate.

12.2. Chemical Reactions in the anaerobic digestion process

Food waste is converted into digestate and biogas through a mesophilic biological digestion process.

Initially this is done through the hydrolysis and fermentation of the cellulosic, protein and lipid compounds in the waste by micro-organisms (anaerobes). Carbohydrates, proteins and lipids are hydrolysed to sugars which are then further decomposed to carbon dioxide, ammonia and also carboxylic acids and carbon dioxide.

At later stages, the organic acids formed in the hydrolysis and fermentation stage are converted by acetogen micro-organisms to acetic acid, acetic acid derivatives, carbon dioxide and hydrogen. Other organisms convert carbohydrates directly to acetic acid using carbon dioxide and hydrogen.

Finally, micro-organisms (methanogens) convert these organic acids and their derivatives into methane and carbon dioxide.

This process requires heat to maintain the biological activity, which is provided by the CHP gas engines through a heat exchanger system.

12.3 Types and amounts of raw materials

Table 11 Types and amounts of raw materials

Description of raw material and composition	Maximum amount stored	Annual throughput	Description of how the raw material is used	Justification /Viable alternatives	Fate	Any main hazards	Environmental Impacts
Ferrous Chloride	35 m^3	Approximately 100-300 tonnes	Added periodically to convert sulphides (which are not desirable for the gas engines) into sulphates.	Ferrous Chloride was selected to convert the sulphides into a useful product; a complementary sulphate solid trace fertiliser.	Digestate	Corrosive, causes burns	Slightly toxic to living resources
Silage	3000 tonnes	Up to 8,000 tonnes	Used as a moderating feedstock in the AD process, and to replace waste inputs in the event of an unplanned disruption to waste deliveries. This material enables higher gas yield and is an important balancing agent within the AD process.	Agrivert has great experience in utilising this material at other digestion plants. Feedstock is supplied by Agrivert.	Digestate	None	Silage leachate may be hazardous for aquatic environment due to high nutrient content leading to eutrophication. Stored in the bunded area.
Biogas Methane (60-65%) Carbon dioxide (35-40%) Other (<1%)	Approx. 9142 m^3	8,585,063 m^3	Combusted to produce electricity and heat. Biogas was selected as fuel because it is readily available as a by-product of the anaerobic digestion of food and green waste	No alternative – the purpose of the plant is to produce energy from biogas	Electrical and heat energy Air emissions of carbon monoxide, carbon dioxide, sulphur dioxide and nitrogen oxides	Extremely Flammable, Harmful if inhaled	Can cause odour issue if released Renewable energy production. Reduction in global warming impact by conversion of methane (GWP 23) into carbon dioxide (GWP 1).

Lubrication Oil Mineral Oil (100%)	5000 litres	Approximately 8000 litres/unit/year	To reduce friction between moving surfaces in engine	Use in accordance with engine manufacturer specification	Waste – recovered	None	May cause physical fouling of aquatic organisms. Minimisation of environmental impact through recovery. Stored in secondary contained tank
Transformer oil Highly refined mineral oil (100%)			To reduce friction between moving surfaces in engine	Should oil require replacement appropriate replacement options will be assessed	Waste – recovered	None	May cause physical fouling of aquatic organisms. Minimisation of environmental impact through recovery
Water	$5m^3$ scrubber water tank $400m^3$ Rainwater Harvesting Tank	Up to 10,000 m3	Use in the process	Main water will be used to top up $5m^3$ scrubber water tank Rainwater will be recovered and used in the process. It is being considered to use a borehole if the amount of water from the rainwater harvesting is insufficient.	Digestate	None	None

12.4 Engines In-Process Control

The immediate control of the CHP units will be by manual and automatic engine tuning for optimum engine combustion conditions. This will be supported by continual performance monitoring and maintenance which will indicate when a CHP unit falls out of the required operational specification. When this occurs, corrective action will be implemented, either by remote control or site attendance. The maintenance regime for the units will ensure that maximum availability is achieved.

Agrivert will contract the management operation of the engines at North London AD, this is envisaged to be contracted to Clark Energy who undertake management of all Agrivert's CHP's.

All regular maintenance will be completed according to the time scale specified by the equipment manufacturer. A high level of preventative maintenance is designed to avoid unscheduled down time, maximising the plant availability and its ability to control emissions and maintain an efficient level of operation between overhauls. The record sheets completed would highlight any issues that may require operator intervention outside the routine maintenance programme.

Work at the plant will only be carried out by trained, electrical and mechanical specialists. It is possible to conclude service contracts with GE Jenbacher, their subsidiaries or authorised and specialised companies. As part of this contract, the maintenance contractor will remove any waste generated by the maintenance activity for appropriately licensed recycling and/or disposal.

12.5. Venting and Control Measures for Abnormal Conditions

Venting and Emergency Relief

During normal operation of the plant gas is fed into the engines at approximately the same rate as it is generated. There is sufficient capacity within the gas storage roofs to manage the natural daily fluctuation in gas production. In the event that there is more gas being produced than can either be fed or safely stored, the Flare Stack is used on site to control gas build up in the event that the gas generated exceeds the capacity of the gas engines (for example, in the event of engine failure).

Excessive gas build-up is an abnormal condition and does not arise during normal operation of the plant.

Protection during abnormal operating conditions

The site Control System provides early warning of abnormal operating conditions, for example level sensors in the tanks will detect leaks or overfilling. Control measures are in place for leaks or overfilling include secondary containment, a leak detection membrane around each tank and isolation of leaks by closing valves.

In the event of engine malfunction or breakdown, the site Control System will immediately telephone the site manager, who will in turn contact the contractors responsible.

The digesters, due to the nature of the biological processes require continual supply of waste material and as such do not undergo temporary stoppages or shutdowns.

In the event of pasteuriser malfunction or breakdown, the current batch of digestate is held inside until the pasteurizer until it can resume operations.

12.6. Drainage philosophy

Surface Water Drainage Arrangements (Water Management Plan)

It is a requirement under Environment Agency Standard rules SR2012 No11 (Anaerobic digestion facility including use of the resultant biogas) that the anaerobic digestion sites are designed to incorporate an impermeable layer across the site to ensure that there is no potential for contaminants to be released into sub surface aquifers or into surface waterways should a tank rupture. “All storage and process tanks shall be located on an impermeable surface (a permeability of at least 10^{-9} m/s) with sealed construction joints within a bunded area. The bunded area shall have a capacity at least 110% of the largest vessel or 25% of the total tankage volume, whichever is the greater.” Agrivert’s bunds are designed to CIRIA C736 standards with the required level of impermeability ($1x10^{-9}$ m/s) and incorporate sealed construction joints with secondary containment and leak detection; this is considered BAT for containment.

Agrivert’s AD plants are designed to ensure that any liquid that falls within the site is contained within either a sealed and lined tank or within an impermeable bund. All of Agrivert’s tanks are constructed from cast in-situ concrete and incorporate a leak detection membrane; this ensures the robustness and integrity of each tank (mixing tank, liquid tanks, digestion and storage tanks) and greatly reduces the risk of tank rupture when compared to metal tanks. We consider that in relation to tank construction, cast in-situ concrete tanks represent BAT.

In terms of pollution caused by on-site liquids, the use of concrete tanks ensures that any material which may have the potential to contaminate surface water is stored securely within their respective tanks (i.e. material which is classified ABPR). The leak detection membrane also ensures that staff can visually assess whether a tank is leaking. They can then quarantine this tank and remove the material from it to a suitable treatment plant. This means that any material falling on to the roofs of buildings and on to the concrete roadways and within the bund can be classified as non-contaminated liquids.

Non-contaminated rain water will fall within the bund and will be stored here until such a time as it can be pumped in to the Rainwater Harvesting tank. The bund shall be regularly inspected to ensure that it is regularly emptied. Connections and fill points will be within the bunded area and no pipework should penetrate the bund wall. Underground tanks shall have secondary containment with appropriate leak detection.”

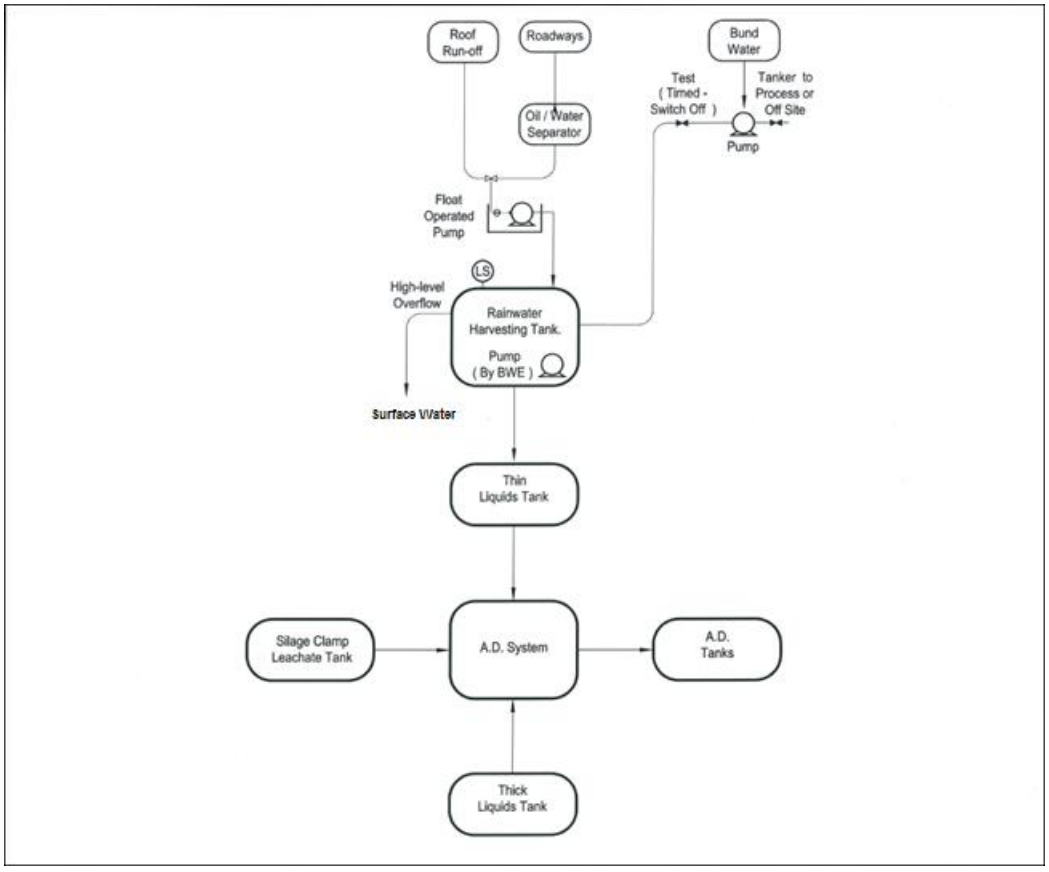
Along with the impermeable surface of the bund, the topography within it takes water to sump points where it can be managed.

The weighbridges will be level access as vehicles enter the site with a ramp down into the bund as they drive off the weighbridge towards the Reception Building. The whole site is therefore effectively within the bund.

The Anaerobic Digestion process requires a significant quantity of water (up to $150m^3$/day) to keep waste moving through the system. The design of the bund and the site drainage system ensures the retention of all rain water flow on site for use through the process. Liquids are an important part of the AD process which is the reason why Agrivert will look to retain a suitable volume of rainwater within the site.

A Drainage Flow Chart has been prepared to illustrate the sites drainage arrangements and can be seen in Figure 2 below.

Figure 2 - Drainage Flow Chart



Contamination

Agrivert's facilities are designed to ensure that contaminated liquids are stored within sealed tanks with leak detection. It is considered that the only potential for contamination of surface water within the site comes from either the contents of a tank leaking or from the spillage of fuels. These have been discussed in more detail below.

Contaminated Liquids

The biodegradable material in the system falls under the Animal By-Products Regulations until pasteurised and is the major potential source of contamination on-site other than hydrocarbons from Roadways and Car parks.

All ABPR material is stored within sealed concrete tanks with leak detection which ensures both primary and secondary containment and greatly reduces the potential for any ABPR liquid to escape from the tank. More detail in relation to tank failure is set out in Worst Case Scenario Section Below.

All liquids that fall on to the roadways are passed through a CONDER CNS B Hydrocarbon Separator prior to being fed into the Rainwater Harvesting tank.

An underground Silage Effluent tank will capture any run off from the silage clamp and surrounding aprons. The silage clamp is designed to comply with SSAFO regulation requirements to ensure that all effluent from the clamp is diverted towards the tank. The leachate tank has been sized as per SSAFO plus additional volume to accommodate rainfall falling on the areas immediately surrounding the clamp.

In terms of spillages of vehicle fuel through an accident on site, spill kits are kept on site. In addition all yards and roadways drain to the hydrocarbon interceptor before entering the Rainwater Harvesting tank from where it is used through the process. In the event of minor spillages from vehicles on grassed areas, the impermeable surface and highly bunded site ensures the potential for contamination to leave the site is low.

Non-contaminated Liquids

All rainwater falling on to the roof of the Reception Building will be directed towards the Rainwater Harvesting tank where it will be stored prior to being utilised within the AD process. It is considered that the potential for this to become contaminated is extremely low given the lack of opportunity for rainwater to come in to contact with contaminants.

All water on-site is therefore predominantly clean rainwater and the bund acts as attenuation for the rainwater falling within it; this is then pumped to the Rainwater Harvesting tank by a key switch operated, timer controlled pump.

A fertiliser end product is produced through the AD system. This has been pasteurised in accordance with the ABP Regulations and is no longer considered to be a waste under the EU End of Waste Criteria. This is metered into road going tankers within the bunded site and taken off site in sealed tankers either to the field for immediate spreading or to secondary storage on farm lagoons.

Worst Case Scenario – Tank Failure Event

Agrivert designs its tanks in accordance with Best Practice and utilises cast in situ concrete tanks which we consider ensure the integrity of the tank throughout the operational period of this facility. All of the tanks are fitted with a leak detection membrane which surrounds the base and the sides of the tank to above ground level. The site staff check the leakage ports across the site weekly. Should any material begin to leach into the space between membrane and tank the site staff would note an increase in level. They would then be able to sample and test the liquid to determine if it was groundwater or a leak from the tank. If it was from the tank then they would be able to isolate that tank, remove any liquid within it and undertake any repairs. In the unlikely event that it was groundwater, then they could install a submersible pump with float switch to extract it into one of the site liquid tanks. The volume of flow through this route could be regularly monitored and tested to ensure that it remained purely groundwater and within manageable proportions. In this way the leakage would be managed as an inward flow ensuring no contamination to groundwater.

The base of the digester/storage tanks are constructed at a depth of approximately 600mm below existing ground level. A layer of sand is laid to create an even surface; this is then covered with a layer of insulation, followed by a layer of leak detection membrane and a thin binding layer of concrete to create an even foundation for the reinforcement. Steel reinforcing bars are then constructed to create a mesh which acts as reinforcement for the

cast in situ concrete. A PVC water bar is cast into the concrete base at the wall joint location to ensure there are no leaks when completed. Structural damage to the tanks is unlikely and during operation the levels of the tanks are monitored via a computer system. Since all tanks are the same size this checks that the drop in level of one tank equates with the rise in level of the receiving tank. Any discrepancy will prompt investigation.

Agrivert have successfully utilised identical tanks at all of its AD sites and have never had a containment issue in the leak detection membrane. Agrivert are unaware of any incidents involving cast in situ concrete tanks within our Industry and as such this is considered BAT and further considered that it is highly unlikely that tank failure will occur.

In the unlikely event of a tank failure resulting in contaminated liquid escaping from the tanks then it would be contained within the bund. A vacuum tanker will be used to extract this material from the sumps within the bund. The material will then either be reprocessed on site by introduction through the Thin or Thick Liquid tanks or disposed of at a suitably licenced facility. Agrivert carries out routine testing on the biology of all tanks and in the event of an incident the microbial content would be known.

Rainwater Harvesting Tank

1. The Rainwater Harvesting tank on-site is used for the purpose of using the collected rainwater from the site within the AD Process.

The Rainwater Harvesting Tank receives the clean Bund Water via a timed pump, Roadways water via a float operated pump after passing through an Oil/Water Separator and Roof Run off water via gravity feed.

Whilst the potential for rainwater to come in to contact with contaminants is negligible, the Rainwater tank is sampled and checked at regular intervals for ammonia as a tertiary pollution prevention measure. Should any ammonia be noted within the tank then its overflow will be closed until the tank contents have been used through the AD process or tankered off site to a suitable secondary treatment facility. Should the reading show no sign of ammonia then this water will be free to discharge in the event of an overflow, through a restricted outlet which will control the rate of flow to a watercourse thereby providing a quaternary level of protection.

The rainwater harvesting tank will be fitted with a high level alarm. This serves to alert the site manager to any potential discharge to the surface water. The high level alarm will initiate the sampling system described above.

The water within the Rainwater Harvesting tank can take one of two pathways;

1. To Thin Liquids Tank
2. High Level Overflow to Surface Water

1. Thin Liquids Tank

The thin liquids tank (within the Reception Building) has a leak detection membrane. The Anaerobic Digestion process requires a significant quantity of water (up to 150m^3/day) to

keep waste moving through the system and the Thin Liquids Tank holds the lower viscosity liquids to enter into the AD System. The clean water within the Rainwater Harvesting Tank will be pumped into this tank for use in the system.

2. High Level Overflow to Surface Water

In the event of the Rainwater tank overflowing the clean water will discharge to surface water course through a restricted outlet which will control the rate of flow. A discharge consent will not be required as it is clean rainwater.

Bund Water

The bund design is in accordance with CIRIA C736 which among other things requires a level of permeability of $1x10^{-9}$m/s. This criteria means that with a 0.1m layer of impermeable material it would take ≈ 3.2 years for contamination to pass through it and reach groundwater. We operate a clean bund policy which means that any contaminating spill will be cleaned up as soon as possible which usually means within a few days.

Rainwater falling on the bund will not leave the area until it is visually checked for turbidity and pH. As set out earlier, given Agrivert's design principles there is negligible opportunity for contaminated material to come in to contact with bund water. Should a change in colour of water be identified on site the site manager will immediately begin testing. Testing prior to pumping is the responsibility of the Site manager who is responsible for the whole site and compliance with the Permit. Any contaminated water will either be recirculated through the process or tankered off site to a secondary treatment location. Agrivert will ensure that on site operations throughout the duration of this contract do not give rise to any form of contamination at surrounding watercourses.

As the intent is to use the water for process, the Rainwater Harvesting Tank is likely to be empty most of the time.

Following testing of the bund water it can leave the bund via a pump in two ways;

1. Timed Switch (if uncontaminated to Rainwater Harvesting)
2. Tanker to Process or Off Site (if contaminated or liquid tanks are at capacity)

1. Timed Switch

Following the checks for contamination; if the bund water is clean the pump will take water from the bund to the Rainwater Harvesting tank. This pump is on a key switch which activates a timer. The timer will run for 10 minutes, so that if forgotten about, the pump will be switched off automatically to avoid transferring un-checked and potentially contaminated water.

The system proposed is safer than having a shut off valve as it relies on a timer switch to run the pump. It fails safe, while a pen stock or similar valve must be closed by someone. Pumping using a timed operation limits the risk of a large scale event and provides additional

buffer capacity to ensure no pollution escapes the site. Agrivert have operated identical AD sites for over 5 years with similar drainage philosophies and without incident and as such we feel this is BAT. It eliminates the potential for human error associated with manual shut off valves; which may be forgotten about.

2. Tanker to Process or Off Site

Following the checks for contamination; if the bund water is found to be contaminated or there is insufficient capacity within the Rainwater Harvesting tank, then a temporary above ground pump will take it directly to the Thin Liquids Tank within the Reception Building for processing within the AD system. If there was insufficient capacity for it within the Thin Liquids Tank then it would be disposed of by a suitably licensed carrier and disposal facility. This would be an extremely rare event as we operate with no leaks into the bund for any prolonged period.

Roadways

The Roadways water is retained on site and passed through a hydrocarbon interceptor (Oil / Water Separator) for reuse in the AD System. The water is monitored as hydrocarbons will inhibit the anaerobic digestion process. The water from yard and roadway areas will flow through the hydrocarbon interceptor then to the Rainwater Harvesting tank before being pumped to the Thin Liquids Tank. There are no direct roadway drains off site.

The interceptor to be used for road drainage at the site is proposed to be a CONDER CNS B Bypass Separator details of which can be seen in **Attachment 11(i)**. This interceptor was decided upon based on Pollution Prevention Guidelines 3 for the Risk of infrequent light contamination and potential for small spills only e.g. car park.

The separator will fully treat all flows, for the area served, generated by rainfall rates of up to 6.5 mm/hour (≈1 in 30 years). This covers most rainfall events. Flows above this rate are allowed to bypass the separator and flow into the Rainwater Harvesting tank.

In terms of spillages of vehicle fuel through an accident on site, spill kits are kept on site in the event of minor spillages but the impermeable surface and highly bunded site ensures the potential for contamination to leave the site is low. This would ensure that nominal amount of contamination can make its way in to the roadway drainage system and the Separator has been designed to accommodate this type of event.

Roof Run-Off

Rainwater run-off from the Reception Building roof will also be collected for use within the AD process. Down pipes from roof gutters would discharge into underground pipes taking this water to an initial sediment chamber then in to the Rainwater Harvesting tank via gravity.

Other Flow Chart Explanations

Other features on the Drainage Flow chart (as seen in figure 2) are explained below;

Silage Clamp Leachate Tank

The Silage Clamp Leachate Tank is housed underground below the Silage Crop and collects the run off of the crop. The site is designed to ensure that this effluent flows towards the tank

and does not drain into the bund. This tank is encased in a leak detection membrane with inspection port as per the above ground tanks.

Thick Liquids Tank

The Thick Liquid Tank receives liquids which are high viscosity and this feeds into the AD System via the Reception Tank. The Thick liquid tank is located within the Reception Building, is constructed from cast in situ concrete with a leak detection membrane.

AD System

The AD System is the processing system for the food waste. It consists of a Reception Tank which blends the thick liquid and food waste slurry from the hammer mill. The Reception Tank is encased by a leak detection membrane with inspection port.

AD Tanks

From the Reception Tank a pump takes the blended waste to 4 tanks which contain the substrate for digestion (2 Primary Digesters, 2 Secondary Digesters). After digestion the digestate is pumped to the pasteurisers and then on to the Storage Tank. These tanks are all within the impermeable bund area and their bases are individually wrapped with leak detection membranes.

Foul Water

Foul water from welfare facilities is not included on the Drainage Flow Diagram as it has no connection to any part of the Surface Water Drainage Arrangements. The foul water from the welfare facilities comprising 2 toilets (male and female/disabled) and two showers will go to a Bio Disc BE-BLmade by Klargester (its specifications can be seen in **Attachment 11**). The package sewage treatment system and has been appropriately sized for the site and can cope with greater numbers than the staff and visitor numbers to the AD facility. Following treatment the foul water from the site will then connect to the wider Coursers Farm network.

Surface Water Drainage Conclusion

As discussed within the previous sections, Agrivert facilities are specifically designed in accordance with the appropriate British/ European Standards and best practice to ensure that they can be efficiently operated to the highest environmental standards. Agrivert's tanks are constructed from cast in situ concrete, to ensure their integrity remains intact throughout the duration of their operational life and have appropriate secondary containment through a leak detection membrane. The containment bund surrounding the site will be constructed to CIRIA C736 requirements in terms of impermeability and ensures that no surface water, whether it be contaminated or not, can access ground water sources.

Contaminated liquids are all contained within the AD process sealed concrete tanks. Underground substrate and digestate pipework is contained within bentonite lined trenches which gives $1x10^{-9}$ m/s containment if a pipe ruptures. The contaminated material is considered to be any ABPR material or any spillage of fuel from delivery vehicles. All ABP material is contained in sealed tanks with leak detection, in the unlikely event of the tank leaking, it would be quarantined and its contents removed and treated whilst maintenance is undertaken. Any fuel spillages will be treat using on site spill kits.

As set out above, any water falling on the site (within the Bund or on to the roof of the Reception Building) is considered to have a negligible potential to be contaminated and is such deemed as being non-contaminated liquid. This liquid is stored within the bund or within the roadway system before passing towards the rainwater harvesting tank; from here it is then directed towards the AD system. The AD process may require up to 150m^3 of liquids each day and therefore it is unlikely that there will be any need for discharge out of the site. However as advised earlier, this will be clean water and as such Consent will not be required.

Foul water will be directed to an existing sewage network within the Coursers Farm site. The water, which will be solely generated from within the site office compound will pass to a Klargester and then on to the wider sewage network.

It is therefore considered that through robust site design, the potential for contaminated liquids to come in to contact with uncontaminated liquids is negligible and that the proposed water management plan strives to achieve BAT through all processes.

Tank Bunding Calculations

Tank bunding calculations are contained in Table 12 below and summarised as follows:

- 25% of the volume of all tanks above ground on site is 7,537 m^3.
- 110% of the above ground capacity of the largest tank is 6,633 m^3.

The required bunding volume is therefore defined by 25% of the total tank volume since it is the larger.

The designed bunded area which forms a continuous bund for the AD plant tanks is defined below:

Total bunded area based on the circumference of the bund half way up the inner bund side = 19,868 m^2

Built development (containers, silage clamp, buildings etc.) which displace containment capacity total 3,315 m^2

25% of total tank volume = 7,537 m^3. Therefore 2 tanks would have failed and their base area would be available as containment. The base of the remaining 3 tanks displace containment capacity totalling 2,504 m^2.

Therefore, total area available for containment

= 19,686 – 3,315 – 2,504 = 14,049 m^2.

Since the total bund area available is 14,049 m^2 and the volume to be contained is 7,537m^3 then the average bund wall height would be 7,537/14,049 = 0.536 m.

Additional capacity for a 10 year return period rainfall event, in line with the C736 guidelines, requires 0.050m. C736 also requires 0.75m, for dynamic affects associated with a tank failure, giving a total of 1.336 m.

Table 12 – Tank Bunding Calculations

Description	Units	Primary Digester 1	Primary Digester 2	Secondary Digester 1	Secondary Digester 2	Storage 1	Total
Tank number		1	2	3	4	5	
Type		RC	RC	RC	RC	RC	
Location		Above ground	Above ground	Above ground	Above ground	Above ground	
Internal Wall Height	m	8	8	8	8	8	
Internal Diameter	m	32	32	32	32	32	
Internal Base area	m^2	804	804	804	804	804	4,164
Gross Internal Volume	m^3	6,434	6,434	6,434	6,434	6,434	33,029
Freeboard	m						
Freeboard Volume	m^3	0	0	0	0	0	
Central Column Diam.	m	0.6	0.6	0.6	0.6	0.6	
Volume of Central Column	m^3	2.3	2.3	2.3	2.3	2.3	
Useable Volume	m^3	6,432	6,432	6,432	6,432	6,432	
Top Surface of Base below finished Ground level	m	0.5	0.5	0.5	0.5	0.5	
Volume below ground level	m^3	402	402	402	402	402	
Spillable Tank Contents	m^3	6,030	6,030	6,030	6,030	6,030	30,148
Bunding required at 25% of total volume	m^3						7,537
Bunding required at 110% of largest tank	m^3	6,633	6,633	6,633	6,633	6,633	< cf ^
Tank Wall Thickness	m	0.30	0.30	0.30	0.30	0.30	
External Tank Base Area	m^2	835	835	835	835	835	4,173
Tertiary Storage Volume	m^3	0					
					6,633	110% Largest	
Av Bund Height Reqd	m	0.536	25% Total		7,537	25% Total	
C736 Freeboard	m	0.75					
C736 Rainfall event	m	0.05					
Overall Bund Height	m	1.336					
Area required for bunding	m^2						14,049
Area available for bunding	m^2						19,868
Built development such as silage clamp, containers, building etc. within bund	m^2						3,315

* RC – Reinforced Concrete

The CHP units located within this area have their own self-contained bund.

13) EPB3: Question 4 – Monitoring

13.1. Point source emissions monitoring to air (Please refer to Attachment 4 Site Plans (iii) - Permit Boundary Point Source & Emissions

Emission point reference	Parameter	Proposed monitoring technique	Frequency
A1 A2	Nitrogen Oxides	Independent testing (third party contractor, MCERTS certified)	Annual
	Sulphur Dioxide		
	nmVOCs		
	VOC		
	Carbon Monoxide		

Monitoring of emissions will be compliant with Technical Guidance Note M1.

Moreover, regular monitoring of the engine emissions for CO and NO_x will be conducted under the maintenance regime using hand held meters (e.g., Testo meters). This is essentially the combustion calibration check to ensure correct set-up of the engine combustion conditions for optimum efficiency and emissions. All data acquired will be recorded and held available for review by the Agency during routine compliance inspections.

There is no monitoring proposed for other point source emission points to air.

Sampling Assessment

Sampling will be carried out using mobile access platform

- Safe access – via mobile access platform
- Access for equipment – via mobile access platform
- Space for equipment & Staff – mobile access platform sized to provide suitable reach
- Provision of essential services i.e. electricity – electricity is located within close proximity

Monitoring of Engines operation

To control the combustion within the engine an electronic engine management system is used. The key parameters recorded by the control systems that are used to manage the operation of the CHP (and hence may be considered to be surrogate environmental monitors) are summarised below:

- biogas flow;
- methane content of biogas;
- oxygen content of biogas;
- hydrogen sulphide content of biogas;
- gas pressures;

- cylinder temperatures and pressures; and,
- oil temperature and pressures.

These measurements are used by the engine management system to adjust the engine ignition timing, air flow from the turbocharger and temperatures in the system. The engine is designed to operate in lean burn mode thereby reducing emissions of oxides of nitrogen (NO_x). If any of the measured process parameters exceeds levels specified in the process control manuals, an alarm is raised and the operators informed. In a serious fault condition (low biogas pressure, electrical distribution failure), the plant would shut down to prevent uncontrolled emissions and the biogas would automatically divert to the adjacent flare. For less serious fault conditions, once the fault is cleared, the engine would automatically restart. If the alarm is raised, the automatic telemetry will contact the operator and maintenance contractor to inform them of the fault condition.

If the gas flow or methane content is sufficient, the plant will operate normally. If there are problems with fuel supply or maintenance of the engine, the flare would be used.

During start up and shut down, engine emissions may change but the time taken for the plant condition to stabilise is relatively short, and any peak emissions would therefore also be short term. Typically the engine takes 15 minutes to reach stable operating conditions from a cold start. Start-ups will be relatively infrequent events owing to continuous running under normal circumstances.

13.2. Point source emissions monitoring to sewer

The Site cabins and welfare facilities will be discharged to the package sewage treatment plant seen in **Attachment 11(ii)**. No monitoring is proposed for this release as it is well within the capacity and capability of the package sewage treatment plant.

13.3. Monitoring of Process Variables

Process variables will be continuously monitored as they are critical to the efficient operation of the Anaerobic Digestion.

The site Control System (a bespoke computer program) will allow the Site Manager and Operatives to monitor and control operations on site (both during site operational hours and remotely outside of operational hours).

The following list, which is not exhaustive, illustrates the type of site processes that are monitored and controlled by the system.

- Liquid and biogas levels
- Biogas quality
- Pressure in storage and digester tanks
- Pumping plans
- Feed-in plans
- Generation and consumption of biogas
- Oxygen and Methane levels
- Water temperature
- Pasteurisation
- Stirrer controls in storage and digester tanks
- Temperature
- Gas Engine productivity

When predetermined levels are reached, the Control System will generate a warning message (for example, pump failure, high methane content, flare coming in to use in) which is immediately sent to the Site Manager's phone. The Site Manager will then contact the relevant contractor to rectify the issue.

14) EPB3: Question 6 – Resource efficiency and climate change

14.1. Energy Efficiency

Efficiency in Energy Generation

The AD process converts the chemical energy in the food waste into chemical energy of the biogas, which is then changed into heat energy and electrical energy by the CHP engines.

Agrivert has selected to install 2 new Jenbacher 420 GS-B.L spark ignition engines for the facility with a nominal electrical output of 1.487 MWe and thermal output of 1.480MW

The equipment used for power generation on the proposed site has the following features to provide Best Available Technique for energy efficiency:

- Sized to operate at maximum efficiency
- High working temperature difference
- High percentage of fuel combustion
- Comprehensive maintenance agreements in place to minimise downtime

When running at 100% capacity and at start up, the two engines consume a total of 7016 kW of energy input.

The performance data show that each new Jenbacher unit has an efficiency of 84.6% (42.4% electrical and 42.2% thermal) operating at full load.

There are only limited data against which to benchmark the performance of spark ignition engine CHP units. On this basis, and in light of the fact that the efficiency of these units is comparable with other similar units operating elsewhere on similar duty, such a benchmarking exercise is not considered necessary. However, comparison of this technology to other available options shows that spark ignition engine CHP units are the most efficient option for this particular application (as discussed below).

Agrivert chose to install spark ignition engines at this site as these are considered BAT for the conversion of biogas to electricity when compared to Gas Turbines and Compression Ignition Engines. Gas turbines cannot produce the electrical efficiencies of spark ignition engines for this operational scenario. Typically, a gas turbine will only produce an electrical efficiency of approximately 23% at 75% load, whereas a spark ignition engine will produce around 40%. Further to this, gas turbine recovered heat characteristics are not suitable for heat provision to the digesters because the temperature is too high. This makes gas turbines less of an appropriate option for this particular application. Compression ignition engines are very similar to spark ignition engines. However, they have a lower heat recovery potential and higher capital cost (SGN S1.01, Combustion Activities, draft), which discounts them as an appropriate option.

Use of generated energy

It is expected that 28GWh of electricity will be generated per year. From that, 3GWh will be used within the permitted facility and the remaining 25GWh will be transmitted directly into the National Grid via a high voltage connection.

Hot water from the CHP gas engine cooling systems will be used in the following areas of the plant where it is necessary, greatly reducing energy consumption on site:

1) Pasteurisation tanks

2) Digesters (keeping them at the required temperature for mesophilic digestion)

Any surplus heat is cooled through standard cooling radiators.

A heat exchanger will be used to use heat from the output of the pasteuriser to heat up feed stock to the digesters.

In consideration of the Environment Agency's Horizontal Guidance Note H2 on Energy Efficiency Agrivert will regularly review their energy consumption at North London AD Facility. It is anticipated that the site's use of off-site energy will be greatly reduced once the plant has been fully commissioned and the plant can operate using its own generated electricity.

In addition consideration may be given to integrate waste heat into the other businesses located on Coursers Farm and the Tyttenhanger Estate

Indicative BAT Assessment for Basic Energy Requirements (1)

BAT Requirements extracted from Sector Guidance Note IPPC S5.06 (Guidance for the Recovery and Disposal of Hazardous and Non Hazardous Waste).

1. The Operator should provide the energy consumption information in terms of delivered energy and also, in the case of electricity, converted to primary energy consumption.

Table 13 Energy export and onsite consumption

Energy Generation / Export	**GWh Delivered (per annum)**	**GWh Primary (per annum)**	**% of Total**
Predicted energy generation as electricity	28	28	100%
Predicted energy usage as electricity to operate the facility	3	3	10.7%
Predicted energy export as electricity to Grid	25	25	89.3%

2. The Operator should provide the following Specific Energy Consumption (SEC) information.

Plant average electrical consumption is 349 kWh/h (Electricity generated is 3185 kWh/h).
Average heat required by the biogas plant including heat exchanger is 814 kWh/h (Thermal energy production per hour is 3240 kWh/h)

3. The Operator should provide associated environmental emissions.

There are two aspects to the emissions impact that will occur from the facility, which are polluting emissions and global warming emissions. The polluting emissions are addressed in **Section 11)** The global warming emissions resulting from CO_2 emissions are considered to have zero global warming potential as the emissions arise from a renewable energy source. This is in line with current Environment Agency guidance H2 which states that such emissions should be treated as carbon neutral.

Indicative BAT Assessment for Basic Energy Requirements (2)

BAT Requirements extracted from Sector Guidance Note IPPC S5.06 (Guidance for the Recovery and Disposal of Hazardous and Non Hazardous Waste).

1. Operating, maintenance and housekeeping measures should be in place.

All plant will be subject to planned preventative maintenance programme. This will ensure it is maintained to maximise operational efficiency. Examples of the maintenance arrangements are provided under in **Attachment 8**.

Monitoring and preventative maintenance will contribute to energy efficiency, by directly ensuring the plant is operating effectively, but also by maximising plant availability. Plant availability provides a dual role in maximising energy efficiency, as it both creates renewable energy but also avoids the need for consumption of non-renewable energy.

2. Basic low-cost physical techniques should be in place to avoid gross inefficiencies. These should include insulation, containment methods, (such as seals and self-closing doors), and avoidance of unnecessary discharge of heated water or air (e.g. by fitting simple control systems such as timers and sensors).

Suitable thermal insulation has been implemented during the design and construction phases of the installation.

The heat recovery system pipe work will be insulated and all cooling and heat recovery systems which use water will be closed circuit systems.

The CHP units will be housed in self-contained units.

3. Energy-efficient building services should be in place to deliver the requirements of the Building Services section of the guidance note H2 Energy efficiency for IPPC.

Plant design and energy optimisation of services in buildings will meet BAT requirements.

4. Energy management techniques should be in place, according to the requirements of Section 2.3 on page 75 noting, in particular, the need for monitoring of energy flows and targeting of areas for reductions.

Further savings in energy consumption will be made through energy management, which will be achieved through staff internal training, monitoring activities and management supervision. Monitoring activities include daily checking of CHP pressure, temperatures, spark plug and air filters, and a regular review of electricity usage.

5. An energy efficiency plan should be provided

Energy efficiency plan will be developed and implemented.

Indicative BAT Assessment for further energy efficiency requirements

BAT Requirements extracted from Sector Guidance Note IPPC S5.06 (Guidance for the Recovery and Disposal of Hazardous and Non Hazardous Waste).

1. The following techniques should be implemented where they are judged to be BAT based on a cost/benefit appraisal according to the methodology provided in Appendix 4 of the Guidance Note H2 Energy efficiency for IPPC.

Energy supply techniques

2. The following techniques should be considered:
- **use of Combined Heat and Power (CHP)**
- **generation of energy from waste**
- **use of less polluting fuels**

The purpose of the proposed plant is to generate energy from food waste. Use of the CHPs are considered the most efficient form of electricity and heat generation from biogas; therefore alternative energy supply techniques do not require further consideration.

3. The Operator should provide justification that the proposed or current situation represents BAT, irrespective of whether or not a CCA or DPA is in place, where there are other BAT considerations involved

See **Section 15.1.**

4. Where there is an on-site combustion plant other guidance is also relevant. For plants greater than 50MW, Operators should consult the IPC guidance on power generation. Operators should consult the IPC guidance on power generation (reference IPC S2 1.01 Combustion Processes: Large boilers and furnaces 50MW (th) and over and supplement IPC S3 1.01 Combustion Processes). Operators of plant of 20-50MW should consult the Local Authority Air Pollution Control guidance. On IPPC installations this guidance will be generally applicable to plant under 20MW also.

Not applicable. Plant is below 20MW.

14.2 Use of raw materials

Indicative BAT Assessment for raw materials selection

BAT Requirements extracted from Sector Guidance Note IPPC S5.06 (Guidance for the Recovery and Disposal of Hazardous and Non Hazardous Waste).

1. The Operator should maintain a list of raw materials and their properties.

Raw materials inventory can be found **Table 10 Types and amounts of raw materials.**

2. The Operator should have procedures for the regular review of new developments in raw materials and for the implementation of any suitable ones with an improved environmental profile.

Procedures concerning above will be developed.

3. The Operator should have quality-assurance procedures for controlling the impurity content of raw materials.

The primary approach of Agrivert to quality assurance for raw materials is to purchase materials from dedicated suppliers according to pre-established material specifications, including environmental requirements. This ensures the required materials are supplied to a prescribed standard, while minimising the management time for quality assurance. However, further to this, auditing of the suppliers and materials is carried out to provide added assurance that the specified standards are maintained and therefore the environmental impact caused by the materials is minimised, i.e., the environmental requirements of the materials specification ensure the environmental impact of the materials is minimised.

4. The Operator should complete any longer-term studies needed into the less polluting options and should make any material substitutions identified.

Raw materials use will be regularly reviewed.

5. The substitutions should be employed, where applicable.

Raw materials use will be regularly reviewed.

14.3. Waste minimisation audits

Agrivert has a company-wide control philosophy to maximise efficiency, thereby minimising waste. Waste production is avoided where possible. This philosophy will be adhered to the North London AD plant by careful maintenance procedures and regular inspections.

A Waste Minimisation Audit will be carried out at least every 4 years. An appropriate methodology and improvement plan will be implemented following each audit, according to audit findings. Opportunities for improved efficiency and waste reduction will be identified through the audit process.

14.4 Waste handling, recovery and disposal

All waste will be stored and handled to secure prevention of emissions. Appropriate physical measures will be in place. All waste documentation will be maintained on site for the relevant period of time, including waste transfer notes and waste consignment notes.

Waste production will be avoided wherever possible by careful maintenance and regular inspections of the plant, and management controls. Where waste needs to be removed off site, it will be sent for recovery or where this is not technically or economically possible it will be disposed of, while avoiding or reducing the impact on the environment. Waste will only be sent to appropriately authorised facilities. Duty of Care checks will be carried out on all waste contractors.

The arrangements for waste management for the waste streams are discussed in **Table 4 Waste Impacts.**

15) EPB3: Appendix 5 – Specific questions for the hazardous and non-hazardous waste recovery and disposal sector

15.1. Indicative BAT requirements for Pre-Acceptance

BAT Requirements extracted from Sector Guidance Note IPPC S5.06 (Guidance for the Recovery and Disposal of Hazardous and Non Hazardous Waste).

1. **From the waste disposal enquiry the Operator should obtain information in writing relating to:**

    - **The type of process producing the waste**
    - **The specific process from which the waste derives**
    - **The quantity of waste**
    - **Chemical analysis of the waste (individual constituents and as a minimum their percentage contributions)**
    - **The form the waste takes (solid, liquid, sludge etc.)**
    - **Hazards associated with the waste**
    - **Sample storage and preservation techniques**

Agrivert will produce (prior to waste acceptance at the site) a procedure that will ensure BAT requirements are achieved at the North London AD Facility. This procedure for our existing Wallingford AD Facility in Oxfordshire can be seen in **Attachment 10 (ii)** (Agrivert procedure "Standard Operating Procedures for Anaerobic Digestion Systems").

2. **Unless a sample and analysis has already been completed by a third party and the Operator has sufficient written information from them, then the Operator should in every case obtain representative sample(s) of the waste from the production process/current holder and compare it against the written description to ensure that it is consistent.**

A representative sample of the waste is obtained and compared against the written description to ensure it is consistent. This process will be detailed as in **Attachment 10 (ii)**.

3. **Other than for pure product chemicals or laboratory smalls, the chemical analysis should relate to an actual analysis and not simply be based on product data sheets or an extrapolation of information on product data sheets. For example, taking the concentrations as specified and applying a dilution factor is not acceptable.**

Chemical analysis results will be based on actual analysis of representative samples, not product data sheets.

4. **Wastes should not be accepted at the installation without a clear method or defined treatment and disposal route being determined in advance and costed before the waste is accepted at the installation.**

The treatment route is AD for all wastes accepted at site.

5. The Operator should ensure that the sample is representative of the waste and has been obtained by a person who is technically competent to undertake the sampling process.

Agrivert will produce (prior to waste acceptance at the site) a procedure that will ensure BAT requirements are achieved at the North London AD Facility. This procedure for our existing Wallingford AD Facility in Oxfordshire can be seen in **Attachment 10(ii)** (Agrivert procedure "Standard Operating Procedures for Anaerobic Digestion Systems").

6. The type of information that would demonstrate the reliability of the samples includes:

- **Location of sampling point, for example, effluent tank**
- **Capacity of vessel sampled (for samples from drums an additional parameter would be the total number of drums)**
- **Method of sampling, e.g. sampling tap (mid flow). "top" sample**
- **Number of samples and degree of consolidation**
- **Operating conditions at time, e.g. normal operations, shut down, maintenance and/or cleaning**
- **Preservation techniques**

Agrivert will produce (prior to waste acceptance at the site) a procedure that will ensure BAT requirements are achieved at the North London AD Facility. This procedure for our existing Wallingford AD Facility in Oxfordshire can be seen in **Attachment 10 (ii)** (Agrivert procedure "Standard Operating Procedures for Anaerobic Digestion Systems").

7. Samples should be clearly labelled and any hazard identified.

Agrivert will produce (prior to waste acceptance at the site) a procedure that will ensure BAT requirements are achieved at the North London AD Facility. This procedure for our existing Wallingford AD Facility in Oxfordshire can be seen in **Attachment 10(ii)** (Agrivert procedure "Standard Operating Procedures for Anaerobic Digestion Systems").

8. Sample tracking systems within the installation should be established and auditable

No samples kept at the installation – these undergo a technical appraisal at a suitable laboratory, arranged by Agrivert's Commercial Team (based off-site) when received from Clients.

9. Analysis should be carried out by a laboratory with robust quality assurance and quality control methods and record keeping

All Testing is carried out by Sciantec Analytical Laboratory who have a robust internal quality system. At the heart of the system is accreditation by UKAS to the internationally recognised standard for competence – ISO/IEC 17025:2005. ISO 17025:2005 is the British, European and International Standard for quality assurance in analytical laboratories. In the UK,

laboratories claiming compliance with this standard are inspected and accredited by UKAS. Accreditation also means that the laboratory's management systems meet the principles of ISO 9001:2000. The full standard covers quality control procedures and method specific procedures.

Sciantec is also approved by DEFRA under the Animal By-Products Regulations 2001, by the Agriculture Industries Confederation under the Trade Assurance Scheme for Combinable Crops (TASCC) and by the GAFTA Trade Assurance Scheme.

Laboratory quality control and assurance standards are essential if data generated is to have meaning and value. Sciantec has systems and protocols in place to assure the quality of all its analytical data. Quality assurance follows the sample from receipt, throughout the analysis, to the point at which results data are reported. It also covers the laboratory's analytical and data management systems.

Sciantec also participates fully in a range of proficiency testing schemes demonstrating its on-going competence. Samples containing unknown levels of compounds are sent out three or four times a year, analysed for the specified analytes and then results returned to the PT Scheme Co-ordinator. At the annual inspection by UKAS, the laboratory's results from each PT round will be assessed for on-going competence.

If Agrivert were to use alternative laboratories, their performance, experience and accreditation would be checked prior to use and a suitable number of duplicate samples would be sent to check the accuracy and repeatability of results.

10. Analysis required will vary depending upon the nature of the waste, the process to be used and what is known about the waste already. Results of analysis should be kept within the tracking system. These details should include:

- **Check on constituents declared by waste producer/holder to ensure permit compliance, treatment plant specification and final disposal**
- **All hazardous characteristics**
- **Physical appearance**
- **Colour**
- **pH**
- **Presence, strength and description of odour assessment (note COSHH implications)**

Agrivert will produce (prior to waste acceptance at the site) a procedure that will ensure BAT requirements are achieved at the North London AD Facility. This procedure for our existing Wallingford AD Facility in Oxfordshire can be seen in **Attachment 10 (ii)** (Agrivert procedure "Standard Operating Procedures for Anaerobic Digestion Systems").

11. Further analysis may include other parameters relevant to the treatment method or waste stream e.g.:

- **Presence of oxidants**
- **Acidity and alkalinity**

- **COD**
- **Ammonia**
- **Flashpoint**
- **Presence of sulphide**
- **Presence of cyanide**
- **List I and List II substances**
- **Other substances of environmental significance**

Liquid wastes are tested for antibacterial properties, and pH to prevent damage to the digesters. As outlined in **Attachment 10(ii)** (Agrivert procedure "Standard Operating Procedures for Anaerobic Digestion Systems").

12. Also, for example in the case of oil recovery

- **Chlorine**
- **Sulphur**
- **Metals**
- **PCB's**

Not relevant – no waste oil or other higher risk wastes accepted.

13. Installations accepting waste oils should have the facility to hold and test loads for PCB's or a surrogate test for chlorine at a level of detection to assess compliance with the requirements of the Waste Oils Directive.

Not relevant – no waste oil accepted.

14. Following characterisation of the waste, a technical assessment should be made of its suitability for treatment or storage to ensure Permit conditions are being met.

Agrivert will produce (prior to waste acceptance at the site) a procedure that will ensure BAT requirements are achieved at the North London AD Facility. This procedure for our existing Wallingford AD Facility in Oxfordshire can be seen in **Attachment 10(ii)** (Agrivert procedure "Standard Operating Procedures for Anaerobic Digestion Systems").

15. There must be a clear distinction between sales and technical staff roles and responsibilities. If non-technical sales staff are involved in waste disposal enquiries, then a final technical assessment prior to approval should be made. It is this final technical checking that should be used to avoid build-up of accumulations of waste.

The North London plant will have a dedicated team of operatives to run the plant supported by Agrivert's Operations Manager and Commercial Team. The Commercial Team works to source feedstock and manage waste volumes for the plant. The operations team (plant manager and 2 operatives) will report to the Operations Manager and the Commercial Team (Director, Manager and 2 Contract Managers).

16. All records relating to pre-acceptance should be maintained at the installation for cross-reference and verification at the waste acceptance stage. These records should be kept for a minimum of 3 years.

Agrivert will produce (prior to waste acceptance at the site) a procedure that will ensure BAT requirements are achieved at the North London AD Facility. This procedure for our existing Wallingford AD Facility in Oxfordshire can be seen in **Attachment 10 (ii) (Agrivert procedure "Standard Operating Procedures for Anaerobic Digestion Systems").**

15.2 Indicative BAT requirements for Acceptance

BAT Requirements extracted from Sector Guidance Note IPPC S5.06 (Guidance for the Recovery and Disposal of Hazardous and Non Hazardous Waste).

Load Arrival

1. On arrival loads should:

- **Be weighed, unless alternative reliable volumetric systems to specific gravity data are available**
- **Not be accepted into site unless sufficient storage capacity exists and site is adequately manned to receive waste**
- **Have all documents checked and approved, and any discrepancies resolved before the waste is accepted**
- **Have any labelling that does not relate to the contents of the drum removed before acceptance on site.**

All vehicles are weighed in and out of the facility, with the net weight making up the recorded delivery rate. This is done automatically by the weighbridge system.

Operatives will assess that there is adequate space in the Reception Building before waste is accepted for final delivery. This check is visual and is carried out throughout the working day. Waste is only accepted if the site is adequately manned to receive waste.

Duty of Care documents are approved at the pre-acceptance stage, and held electronically (submitted to Agrivert's Commercial Team and scanned if required). The delivery is visually checked for any discrepancies before the load is accepted.

Drum labels with information not relating to the contents of the drum are removed before acceptance on site.

2. Hazardous wastes should only be received under the supervision of a suitably qualified person (HNC qualified chemist or higher)

Not relevant – no hazardous waste accepted.

Load Inspection

3. Visual insection. Where possible, confirmatory checks should be undertaken before offloading where safety is not comprimised. Inspection must in any event be carried out immediately upon offloafing at the installation.

Agrivert will produce (prior to waste acceptance at the site) a procedure that will ensure BAT requirements are achieved at the North London AD Facility. This procedure for our existing Wallingford AD Facility in Oxfordshire can be seen in **Attachment 10(ii)** (Agrivert procedure "Standard Operating Procedures for Anaerobic Digestion Systems").

4. Check every container to confirm quantities against accompanying paperwork. All containers should be clearly labelled and should be equipped

with well-fitting lids, caps and valves secure and in place. Any damage, corroded or unlabelled drums should be put into a quarantine area and dealt with appropriately. Following inspection, the waste should then be unloaded into a dedicated sampling/reception area.

Containers delivered to site will normally be emptied into the waste bunker immediately on acceptance. Any stored containers will be clearly labelled with well-fitting lids, caps and valves secured in place. Drums found to be damaged, corroded or unlabelled will be put into a quarantine area and dealt with appropriately.

5. At this stage the waste tracking system unique reference number should be applied to each container. Each container should also be labelled with the date of arrival on-site and primary hazard code.

Containers delivered to site will normally be emptied into the waste bunker immediately on acceptance. Any stored containers will be labelled with the reference number and date of arrival on site. No hazardous wastes are accepted.

6. Where containers are bulked, the earliest date of arrival of the bulked wastes should be transposed from the origional container onto the bulk container.

Not relevant – no bulking of wastes on site.

7. The inspection, unloading and sampling areas should be marked on a plan and have suitably sealed drainage systems (see Section 2.8 on page 89)

The inspection, unloading and sampling areas are marked on the Reception Building Plan (**Attachment 4 (vi) –Reception Building Clean & Dirty Areas**) and have sealed drainage systems.

<u>Sampling – Checking – Testing of Wastes - Storage</u>

8. Other than pure product chemicals and laboratory smalls, no wastes should be accepted at the installation without sampling, checking and testing being carried out. Reliance solely on the written information supplied is not acceptable, and physical verification and analytical confirmation are required. All wastes, whether for on-site treatment or simply storage, must be sampled and undergo verification and compliance testing.

Agrivert will produce (prior to waste acceptance at the site) a procedure that will ensure BAT requirements are achieved at the North London AD Facility. This procedure for our existing Wallingford AD Facility in Oxfordshire can be seen in **Attachment 10 (ii)** (Agrivert procedure "Standard Operating Procedures for Anaerobic Digestion Systems"), which provides guidance on sampling, checking and testing of wastes. This procedure is required to achieve and maintain PAS110 accreditation.

9. The Operator should ensure that waste delivered to the installation is accompanied by a written description of the waste describing:

- **The physical and chemical compostition**
- **Hazard characteristics and handling precautions**
- **Compatability issues**

- **Information specifiying the origional waste producer and process**

Documents will be held electronically and checked against the weighbridge key assigned to each delivery vehicle. These include a written description of the waste describing its composition and the original waste producer and process. Wastes with hazard characteristics or compatibility issues are not accepted at the site.

10. On-site verification and compliance testing should take place to confirm:

- **The indentity of the waste**
- **The description of the waste**
- **Consistenct with pre-acceptancevinformation and proposed treatment method**
- **Compliance with permit**

All waste loads arriving on site have been pre-tested or audited prior to acceptance and the documents are held electronically. If waste arrives on site which is not compliant with the site permit or not in accordance with pre-acceptance information, the waste will be rejected. The contractual requirement to accept vehicles in a swift and efficient manner does not allow detailed sampling of vehicles beyond visual sampling however random sampling (especially of new customers) takes place.

11. The Operator should have clear and unambiguous criteria for the rejection of wastes, together with a written procedure for tracking and reporting such non-conformance. This should include notification to the customer/waste producer and the Regulator. Written/computerised records should form part of the waste tracking system information.

BAT is achieved with Agrivert procedures “AQD 203b New Customer Account Form” seen in **Attachment 10 (iii)** and “Standard Operating Procedures for Anaerobic Digestion Systems” **(Attachment 10(ii)**) which provide clear and unambiguous criteria for the rejection, tracking and reporting of non-conforming loads. It is not possible to prevent a partial offload of a contaminated load due to the sealed nature of the delivery vehicles, and this is commonplace in Energy from Waste plants. A small quantity is offloaded for inspection, and in the event of contamination the vehicle will not be allowed to offload at the Reception Building. The offloaded contaminated material will then be quarantined and removed from site.

12. Documentation provided by the driver, written results of the acceptance analysis, details of offloading point or off-site transfer location should be added to the tracking system documentation.

Documents will be held electronically and checked against the weighbridge key assigned to each delivery vehicle.

13. A record of the sampling regime for each load and justification for the selection of this option should be maintained at the installation

Records will be available at the installation.

14. Wastes must not be deposited within a reception area without adequate space

Operatives will assess that there is sufficient space in the Reception Building before waste is accepted for final delivery. The bunker tipping system allows up to 160m^3 of waste to be tipped and this buffers natural delivery peaks and troughs. This check is visual and is carried out throughout the working day. The operatives are responsible for carrying out these checks. Excessive volumes are prevented by only accepting known tonnages, which have been established during pre-acceptance programming.

15. Wastes in containers should be unloaded into a dedicated reception area pending acceptance sampling. Such storage should be for a maximum period of 5 days. During this period there should be no bulking up or mixing of drums or decanting the contents into bulk storage. Wastes should ebs tored within this reception area according to compatibility in line with HSE Guidance Note HSG71. Appropriate storage must be achieved immediately upon offloading.

Containers delivered to site will normally be emptied into the waste bunker immediately on acceptance. Any stored containers will be inspected immediately and (if accepted) stored in an appropriate area and not bulked up, mixed or decanted into bulk storage. No ABPR waste will be stored in containers outside of the Reception Building.

16. Should the inspection or analysis indicate that the wastes fail to meet the acceptance criteria (including damaged or unlabelled drums), the such loads should be stored in a dedicated quarantine area and be dealt with appropriately. Such storage should be for a maximum of five working days. Written procedures should be in place for dealing with wastes held in quarantine, together with a maximum storage volume.

Wastes that fail the acceptance criteria will be rejected. However in the event of loads failing the acceptance criteria after being offloaded, these will be quarantined. These will be stored inside and removed within 5 days, but the intention is to remove them within the same working day.

17. If the cause of the failure to meet acceptance criteria is due to incompatibility, then the wastes should be segregated immediately to remove the hazard.

No incompatible wastes will be accepted at the site, but the quarantine area of the Reception Building is available in the event of a contaminated load being delivered. By pre-testing waste prior to initial acceptance for inhibition qualities, we ensure that the biology within the AD system and the quality of the outgoing digestate is correctly maintained.

18. Tankered wastes should be sampled prior to acceptance. There should be no storage pending sampling.

Wastes will be sampled at source and sent to a laboratory for analysis.

19. The driver of the vehicle carrying the waste may arrive at the installation with a sample that has been taken at some stage beforehand. This should be the exception and only be relied on if:

- **There are health and safety and environmental control considerations, for example, water reactive substances which would make sampling difficult, and**
- **The following written information has been supplied – the physical and chemical composition, hazard characteristics, incompatible substances and handling precautions, information specifying the origional waste producer and process, and**
- **The waste has been taken directly from the production site to the waste treatment installation.**

This would only be done in exceptional cases and only if BAT requirements are met.

20. The installation should have a designated sampling point or reception area. These should be in close but safe proximity to the laboratory/checking facility and the sampling point should be visible (or covered by CCTV), if sampling is not directly supervised by, for example, laboratory staff.

BAT achieved with site design.

21. The offloading, sampling point/reception and quarantine areas should have an impervious surface with self-contained drainage, to prevent any spillages entering the storage system or escaping off-site. Most spills and leaks during sampling are on a small scale, resulting from released from the back valve of a tanker if the sample is being obtained this way. Attention should be given to ensureing that incompatable substances do not come in to contact resulting from spills from sampling, for example, with a sump serving the sampling point. Absortbents should be made available.

The offloading, sampling/reception and quarantine areas are marked on the Reception Building Plan **Attachment 4 (vi)** and have an impervious surface with self-contained drainage. Spill kits are held on site to aid in clearing spills quickly.

<u>Sampling of Bulk Liquid Wastes</u>

22. Deliveries in bulk road tanker should be accompanied by a 'Wash-out' certificate or a declaration of the previous load so that contamination by this route can be checked.

Tankers are only used for foodstuffs, not other products or wastes that could cause contamination.

23. Samples are usually taken by the tanker driver from one of three points on the tanker:

- **Top Hatch**

- **Back Valve**
- **Sight Glass**

An initial litre of material is removed from the tanker via the top hatch, back valve or sight glass, visually inspected and sent away for retrospective analysis. This is done on an ad hoc basis where there is a cause for concern.

24. The key requirement is to obtain a sample that is representitive of the load, that is, the sample takes account of the full variation and any partitioning within a bulk load such that 'worst-case' scenarios are accounted for. Taking a sample through a top hatch of the surface of the liquid may not be representitive, but may be useful in establishing whether there may be a layer of, for example, solvent or some other immiscible substance, which may be unsutiable for treatment. Top samples should be otained from the cross-section of the load, that is, a core sample.

Samples are taken from the core of the load, for example top samples are obtained from the cross-section of the load taking account of the full variation and any partitioning.

25. A gantry should be used to avoid the need to take samples from the back valve of tankers, which is likely to result in a small spillage.

Where possible, we will avoid having to take samples from the back valve of tankers.

Sampling Drummed Waste

26. The contents can only be identified with certainty if every container is sampled. Acceptance should involve sampling every container. However, analysis of composite samples is acceptable with such a sampling regime. A representitive sample must be obtained by taking a core sample to the base of the container. Operators should ensure that lids, bungs and valves are replaced immediately after sampling.

Agrivert will produce (prior to waste acceptance at the site) a procedure that will ensure BAT requirements are achieved at the North London AD Facility. This procedure for our existing Wallingford AD Facility in Oxfordshire can be seen in **Attachment 10(ii)** (Agrivert procedure "Standard Operating Procedures for Anaerobic Digestion Systems") which provides guidance on taking representative samples.

Drum Labelling

27. For drummed waste, controls should ensure each drum is given a unique label to facilitate a record of:

- **The location of each drum**
- **The duration of storage**
- **The chemical identity of the drums contents**
- **The hazard clasification for each drum**

Containers delivered to site will normally be emptied into the waste bunker immediately on acceptance. Any stored containers will be labelled with the reference number, date of arrival on site and the nature of the contents and their location will be recorded.

28. Drums should be handled and stored so that the label is readily visible

Containers delivered to site will be normally be emptied into the waste bunker immediately on acceptance. Any stored drums will be handled and stored so that the label is readily visible.

Acceptance of Laboratory Smalls

29. The procedure for accepting laboratory smalls on-site should be essentially identical to that for drummed waste. They differ from the 'normal' waste inputs to site in that they are in a pure concentrated form.

Not relevant – no laboratory smalls accepted on site.

30. In situations where the Operator has undertaken the identification and packaging on behalf of the customer, then the on-site verification can be restricted to opening the drums to check that the containers remain undamaged. In such cases the load must be accompanied by documentation confirming the checking and packaging. In situations where the drum has been packed by the customer, then full checking and verification should be undertaken.

Not relevant – no laboratory smalls accepted on site.

Waste Rejection Procedures

31. Lab smalls must not be accepted at a facility where there is insufficient sutiably qualified personnel to process these wastes within the above timescales

Not relevant – no laboratory smalls accepted on site.

32. If on opening a drum it is found that it contains incompatible substances, or that the substances have not been packed adequately, then the drum should be sorted and repacked immediately and the non-conformance procedure followed.

Not relevant – no laboratory smalls accepted on site.

33. Sorting and repackaging of laboratory smalls should take place in a dedicated area/store. Once wastes have been stored according to hazard classification, with due consideration for any potential incompatibility problems, and repacked, then these drums should not be stored within the dedicated laboratory smalls area but should be removed to the appropriate storage area.

Not relevant – no laboratory smalls accepted on site.

34. The operator should have clear and unambiguous criteria for the rejetion of wastes, together with a written procedure for tracking and reporting such non-conformance. This should include notification to the customer/waste producer and the Environment Agency. Written/computerised records should form part of the waste tracking system information. The operator should also have a clear and unambiguous policy for the subsequent storage and disposal of such rejected wastes. This policy should achieve the following:

- **Identifies the hazards posed by the rejected wastes**
- **Labels rejected wastes with all information necessary to allow proper storage and segragation arrangements to be put in place**
- **Segregates and stores rejected wastes safely pending removal**

Agrivert will produce (prior to waste acceptance at the site) a procedure that will ensure BAT requirements are achieved at the North London AD Facility. This procedure for our existing Wallingford AD Facility in Oxfordshire can be seen in **Attachment 10(ii)** (Agrivert procedure "Standard Operating Procedures for Anaerobic Digestion Systems") which provides clear and unambiguous criteria for the rejection, tracking and reporting of non-conforming loads. This procedure is required to achieve and maintain PAS110 Accreditation.

Records

35. The waste tracking system should hold all the information generated during pre-acceptance, acceptance, storage, treatment and/or removal off-site. Records should be made and kept up to date on an ongoing basis to reflect deliveries, on-site treatment and despatches. The tracking systen should operate as a waste inventory/stock control system and include as a minimum:

- **Date of arrival on-site**
- **Producer details**
- **All previous holders**
- **A unique reference number**
- **Pre-acceptance and acceptance analyis results**
- **Package type and size**
- **Inteded treatement/disposal route**
- **Record accurately the nature and quantity of wastes held on site, including all hazards and identification of primary hazards**
- **Where the waste is physically located in relation to a site plan**
- **Where the waste is in the designated disposal route**
- **Identification of Operators staff who have taken any decision re acceptance or rejection of waste streams and decided upon recovery/disposal options**

A transfer note is held for each load being delivered to site, showing the date of arrival on site, producer details, details of all previous holders, the unique reference number, and the type and size of any packaging. We also hold waste analysis results, and information on the nature of the wastes delivered to site.

The intended treatment/disposal route is Anaerobic Digestion for all waste accepted at the site.

The actual quantity of waste is calculated by the weighbridge system to ensure accuracy.

Waste cannot be accurately located after it enters the bunker due to the continuous flow process.

The site diary contains records of any decisions that were required regarding acceptance or rejection of waste arriving on site, including identification of the staff member taking the decision.

36. All records relating to pre-acceptance should be maintained and kept readily availableat the installation for cross-referencing and verification at the waste acceptance stage. Records should be held for a minimum of two years after the waste has been treated or removed off-site. Records should be held in an area well removed from hazardous activities to ensure their accessibility during an emergency.

All records relating to pre-acceptance will be available electronically for a minimum of two years after waste treatment, and can be accessed with site computers or with personal laptops/iPads.

37. The system adopted should be capabel of reporting on all of the following:

- **Total quantity of waste present on-site at any one time, in appropriate units, for example, 205 litre drum equivilents**
- **Breakdown of waste quantities being stored pending on-site treatment, classified by treatment route**
- **Breakdown of waste quantities on-site for storage only, that is, awaiting onward transfer**
- **Indiction of where the waste is located on site relative to a site plan**
- **Comparison of the quantity on site against total permitted**
- **Comparison of time the waste has been on-site against permitted limited**

These records should be held in a designated area, as agreed with the Agency, well removed from hazardous activities to ensure their accessibility during any emergency.

The waste tracking system enables us to produce reports including the total quantity of waste and total quantity of each EWC code via weighbridge tickets. Reports on the quantity of material received on site are produced monthly, and monitored against the permitted maximum. All waste is in bulk and non-hazardous. There is a single treatment route, including depackaging, for all wastes received on site. No waste is stored for onward transfer. There is no permitted time limit for waste being held on site. All records are held in the site office and eventually in the head office archive.

38. Back-up copies of computer records should be maintained off-site

At the end of every office day (Monday to Friday) a designated member of staff, currently our Financial Controller, takes the backup tape from the previous night. The designated member of staff is responsible for storing each tape securely at their home until it is required again.

General

39. Wastes should not be accepted at the installation without a clear defined method of recovery or disposal being determined and costed and ensuring there is sufficient capacity available. These checks should be performed before the waste acceptance stage is reached.

The treatment route is AD for all wastes accepted at the installation, and loads are scheduled in advance to ensure there is sufficient capacity available.

40. The Operator should ensure that the installation personnel who may be involved in the sampling, checking and analysis procedures are suitably qualified (HNC qalified chemist or higher) and adequately trained, and that the training is updated on a regular basis.

Suitable level of training achieved and maintained through WAMITAB scheme.

41. Analysis should be carried out by a laboratory with suitably accredited test methods

All laboratories used will have UKAS accreditation.

42. Samples should be retained on-site for a minimum of two days after the waste has been treated or removed off-site including all residues from its treatment.

Waste streams are sampled prior to arrival at site.

43. Once analysis has confirmed that the waste is acceptable, the Operator should only then create a batch for treatment or a load for off-site removal. Once a batch has been assembled for treatment, the operator should create a composite sample for analysis prior to treatment. Scope of analysois depends upon intended treatment but should be specified.

Waste streams are sampled prior to arrival at site.

44. There must be a clear destinction between sales and technical staff roles and responsibilities. If non-technical sales staff are involved in waste enquiries than a final technical assessment prior to approval should be made. It is this final checking that shoud be used to avoid build-up of accumulations of wastes and to ensure that sufficient capacity exists.

Agrivert's Commercial Department are responsible for the management of incoming waste to the AD facility, ensuring that the AD facility has the appropriate level of waste delivered to ensure biological stability whilst maintaining process viability. The Commercial Department all have a detailed technical knowledge of the AD process and ensure that all new incoming waste sources are tested prior to being accepted at site.

All incoming waste deliveries are inspected by Agrivert's Site Operatives to ensure that the waste accords with the incoming Waste Transfer Note and Agrivert's incoming waste planner (which advises sites weekly of their incoming clients and waste types).

15.3 Indicative BAT requirements for Waste Storage

BAT Requirements extracted from Sector Guidance Note IPPC S5.06 (Guidance for the Recovery and Disposal of Hazardous and Non Hazardous Waste).

Offloading/discharge of waste

1. The Operator should have in place a system to ensure that the correct discharge point or storage area is used. The options include:

- **Ticket systems**
- **Supervision by site staff and if relevant CCTV**
- **Keys**
- **Colour-coded points/hoses or fittings of a specific size**

The waste delivery is supervised by site staff and there is internal and external CCTV to record vehicle deliveries.

2. Offloading and quarantine points should have an impervious surface with self-contained drainage, to prevent any spillage entering the storage system or escaping off-site (see Section 2.8 on Page 89).

The Reception Building is fully sealed and benefits from an impervious surface equipped with internal sealed drainage. All tanks are fully sealed and lined with a leak detection membrane.

3. Damaged hoses and connections must not be used.

Damaged hoses and connections will not be used, and daily site inspections will identify these.

4. Only couplings of the correct size for the connection should be used and the coupling should be able to withstand the maximum shut valve pressure of the transfer pump.

Drivers are instructed during induction to only use couplings of the correct size for the connection. A range of coupling sizes are held on site anticipating delivery vehicles arriving with incorrect couplings. The coupling is able to withstand the maximum shut valve pressure of the transfer pump.

Record Keeping

5. The Operator should have an internal tracking system which should satisfy the objectives and minimum standards given at Section 2.1.2 on Page 25 for all wastes.

Waste is tracked by weighbridge data backed up by waste transfer notes.

General Storage Requirements

6. Storage areas are often the most visible aspects of the installation. Storage areas should be located away from watercourses and sensitive perimeters,

for example, those which may be adjacent to public rights of way, housing or schools, and within the security-protected area of the installation to prevent vandalism.

All storage areas are located away from watercourses and sensitive perimeters and located either in sealed concrete tanks or, in the case of the Reception Building, within a secure building accessed by speed doors.

Security is in place during out-of-work hours, when the sites perimeter fence is fully locked.

7. Storage areas should be located to eliminate or minimise the double handling of wastes within the installation.

The storage areas are located in a manner whereby waste is only handled (managed) once during the process until its final export as digestate and waste packaging.

8. Storage areas should clearly be marked and signed with regard to the quantity and hazardous characteristics of the wastes stored therein.

The storage areas (tanks) are clearly marked and signed. Due to the continuous flow nature of the process, quantity is not recorded. The waste is not hazardous. All wastes within the storage areas are treated as ABPR wastes and signed accordingly. The quantity of waste in each storage area is controlled by level sensors which are accessed via the Control System. Waste delivered through the Reception Building will be held no longer than 72 hours before being processed.

9. The total maximum storage capacity of the site should be clearly and unambiguously stated in writing, accompanied with details of the method used to calculate the volumes held against this maximum and set out in the site plan. The stated maximum capacity of the storage areas should not be exceeded and the site plan updated to reflect any changes before they are implemented.

Maximum storage capacities are controlled by visual inspection and strict programming of deliveries, the tank capacities are monitored continually by level sensors on the Control System. In the event that levels reach the maximum capacity of the storage area in liquid tanks, the Control System will alert the operator and cease loading that tank.

10. All containers should be clearly labelled with the date of arrival, relevant hazard code(s), chemical identity and composition of the waste and a unique reference number or code enabling identification through stock control and cross-reference to pre-acceptance and acceptance records. All labelling should be resilient enough to stay attached and legible throughout the whole time of storage at the installation.

Containers delivered to site will normally be emptied into the waste bunker immediately on acceptance. Any stored containers of waste or raw material containers are labelled with the reference number, date of arrival on site, description of contents and identification of any hazardous characteristics. Containers will have labels that are resilient enough to stay attached and legible throughout their storage at the installation.

11. Storage area drainage infrastructure should ensure that all contaminated run-off is contained, that drainage from incompatible wastes cannot come into contact with each other and the fire cannot spread between storage/treatment areas via the drainage system.

The Reception Building storage area is fully sealed with contained drainage that recycles all run-off back into the process.

12. Procedures must be in place for the regular inspection and maintenance of storage areas, including drums, vessels, pavements and bunds. Inspections should pay particular attention to signs of damage, deterioration and leakage. Records should be kept detailing action taken. Faults must be repaired as soon as practicable. If containment capacity or capability of bund, sump or pavement is compromised, (unless effecting a repair is more expedient and working with wastes in close proximity does not compromise safety), then waste must be immediately removed until the repair is completed.

There are visual inspections by operatives during the working day to maintain constant vigilance over any damage or necessary maintenance. Examples of checks are included in the **Attachment 8 Management and maintenance schedule**. If containment is compromised then waste will be immediately removed until repairs are completed, unless it is safe and more expedient to carry out repairs without removing the waste.

13. There should be daily inspection of the condition of containers and pallets and written records should be kept of these inspections. If a container is found to be damaged, leaking or in a state of deterioration, it should immediately be over-drummed or the contents transferred to another container or processed.

Containers and pallets are stored inside the sealed Reception Building which successfully mitigates any damage. Storage areas are inspected daily and any concerns recorded.

14. Over-drumming should be seen as an emergency measure and take place, if appropriate, in a designated location equipped with Local Exhaust Ventilation (LEV) as necessary. All appropriate information should be transferred onto the label of the new container. Large quantities of wastes in over-drums should be avoided by re-drumming once the incident leading to over-drumming has been dealt with. Pallets damaged to the extent that the stability of the containers is or may become compromised should be replaced. "Plastic shrink wrap" should only be used to provide secondary stability to drum/container storage in addition to the use of sound pallets.

Not relevant – no over drumming used on site.

15. There should be vehicular, for example, forklift, and pedestrian access at all times to the whole of the storage area such that the transfer of containers is not reliant on the removal of others that maybe be blocking access, other than drums in the same row. Drums should not be stored on other drums more than two high and allow access for inspection on all sides. That is, four

x 205 litre drums on a pallet, stacked no more than two x 205 litre drums high in rows.

BAT achieved with site design. Reception Building layout enables areas of storage which do not affect the operational ability of the waste acceptance area.

16. All spillages of hazardous wastes should be logged, where spillages >200 litre then additionally the Regulator should be informed.

BAT is achieved with Agrivert Procedure QP26 "Accident and Incident Reporting and Investigation as seen in **Attachment 10 (iv)**.

17. Activities that create a clear fire risk should not be carried out within the storage area, even if it is not formally classified as hazardous. Examples including grinding, welding or brazing of metalwork, smoking, parking of normal road vehicles except while unloading, charging of the batteries of fork lift trucks.

Fire risk is minimised in the waste storage area. In the event that grinding, welding or brazing is necessary to be conducted in situ, this is controlled by a risk assessment, method statement and Permit to Work. The whole site is a non-smoking site. Normal road-going vehicles do not park in the Reception Building, and designated parking areas are clearly marked. No recharging of batteries takes place on site, however should this be required, a designated area away from all waste storage will be identified and utilised. Please see further information in **Attachment 14 Fire Prevention Plan**.

<u>Turnover</u>

18. Storage within the reception area should be for a maximum of five working days. Following receipt, wastes should be treated or removed off-site as soon as possible. The total storage time will depend upon the characteristics of a particular site and the waste types being stored. For example, on a site in a sensitive location handling hazardous wastes, however, may be held on-site for longer periods. However, all waste should be treated or removed off site within a maximum of six months for the date of receipt.

Wastes are processed as received in all possible circumstances to clear the majority within the day of delivery. No waste will be stored for more than two days unless in a safe palletised or containerised form within the Reception Building. These particular wastes are fed into the process as and when required due to their normally higher calorific value. All waste is processed within six months and removed off site within that period. The bunker tipping system forces a FiFo methodology preventing wastes from lingering within the reception building

19. Storage under cover for drummed waste has the advantage of reducing the amount of potentially contaminated water that may be produced in the event of any spillage and extending the useful life of the container. It is preferable that wastes are stored under cover. This should also apply to any container that is held in storage pending sampling and emptied containers. Covered areas must have adequate provision for ventilation by means of wall or roof

vents or construction of the area, for example, open barn. Any such warehousing should meet the requirements of HSG71 (see Ref 4).

Waste that is stored in the Reception Building is kept under cover and the building is appropriately ventilated.

20. Containers should be stored in such a manner that leaks and spillages could not escape over bunds/edge of the sealed drainage area.

Containers are stored within the Reception Building and any leaks and spillages will be controlled by the internal drainage system. The Reception Building is bunded and has significant falls to drain to contain any spills.

21. Containers should be stored with well-fitting lids, caps and valves, secured and in place.

Any containers on site have well-fitting lids, caps and valves that are secured in place. Any food waste containers are held in covered storage within the Reception Building, which is fully enclosed and benefits from an internal drainage system.

22. Storage areas for containers holding substances that are known to be sensitive to heat and light or reactive with water or moisture should be under cover and protected from water, heat and direct sunlight.

The Reception Building ensures that any susceptible wastes in containers are protected from heat and light, and their containers will protect them from water or moisture. All are protected from direct sunlight.

23. Storage areas for containers holding flammable or highly flammable wastes should meet the requirements of HSG51, HSG71 and HSG76 (see Ref 4).

Storage areas are not used for flammable or highly flammable wastes.

Aged Stock

24. It is important to avoid accumulations of waste, which may in turn lead to deterioration in the container resulting in spillage or, in extreme cases, the deformation of the container to such an extent that it cannot be moved.

BAT achieved with site containment design. Storage areas are inspected daily and any concerns recorded for remedial action to be taken by site management.

Segregation

25. In addition to the requirement of this document, the segregation of wastes should meet the requirements of HSG71 and be justified by risk assessment.

No hazardous wastes accepted.

26. HSG71 provides no guidance on the use of fire walls to achieve separation or segregation of different types of waste in outdoor storage. Fire walls which are impervious to liquid, at least 2m high, and capable of withstanding an intense fire on one side without collapse, can be used to reduce the 3m

separation required for some combinations of materials marked as 'keep apart'. No more than two sides of a storage area should be provided with fire walls, because it would prevent good ventilation.

Not relevant – all wastes accepted are stored indoors. Please see further information in **Attachment 14 Fire Prevention Plan**.

Storage of Aerosols

27. Storage of aerosols should take place under cover in closed containers or cages. Aerosols should not be stored in open containers.

Not relevant – no aerosols accepted.

Storage of Laboratory Smalls

28. Written procedures for the segregation and packing of laboratory smalls should be produced identifying:

- **How the hazards associated with each package are identified.**
- **How the risks of adverse reactions occurring between individual packages are assessed, and by whom.**
- **The level of competence, qualification and training required by those undertaking this assessment**
- **How incompatible substances (i.e. those that could react to generate heat, fire or hazardous reaction products) are prevented from being stored within the same drum.**
- **How wastes are to be packed and stored.**
- **How the wastes are to be recovered or disposed.**

Not relevant – no laboratory smalls accepted.

29. Incompatible substances should not be stored within the same drum.

Not relevant – no laboratory smalls accepted.

30. Sorting and repacking of laboratory smalls should take place in a dedicated area/store. Once the wastes have been sorted according to hazard classification, with due consideration for any potential incompatibility problems, and repacked, then these drums should not be stored within the dedicated laboratory smalls area but should be removed to the appropriate storage area.

Not relevant – no laboratory smalls accepted.

Compatibility Testing

31. In order to prevent any adverse or unexpected reactions and releases before transfer involving the following activities, testing should take place prior to the transfer:

- **Tanker discharge to bulk storage**
- **Tank to tank transfer**
- **Transfer from container to bulk tank**
- **Bulking into drums/IBC's**
- **Bulking of solid waste into drums or skips**

The proposed mixes of wastes and reagents are fully assessed.

32. Any evolved gases and cause of odour should be identified. If any adverse reaction is observed, an alternative discharge or disposal route should be found.

In the event of an adverse reaction being observed, an alternative discharge or disposal route will be found.

Transfer from Tanker, Drums and Other Containers in Bulk Storage

33. Due consideration should be taken of the implications of scale-up from laboratory compatibility testing to bulk transfer and the Guidance is given in HSG143 (see Ref 4).

The proposed mixes of wastes and reagents are fully assessed.

34. Wastes in containers should be transferred into storage vessels by dip pipe to minimise splash, fume and odour.

Not relevant – no containers of waste accepted.

35. Transfer/discharge should only take place after compatibility testing has been completed and then only with the sanction of an appropriate manager. Approval should specify which batch/load of material is to be transferred, the receiving storage vessel, equipment required, including spillage control and recovery equipment, and any special provisions relevant to that batch/load.

Transfers of material are approved by the site manager and carried out in accordance with Agrivert site-specific work instructions. The proposed mixes of wastes and reagents will have been fully assessed.

36. During bulking to tankers, vapour balance lines connected to appropriate abatement equipment should be used.

Not relevant – no bulking into tankers.

37. Tankers must not be used as reaction vessels. Blending by bulking into tankers should only take place following a risk assessment and once suitable verification and compatibility testing has been carried out.

Not relevant – no bulking into tankers.

38. If flammable chemicals are being transferred, particular caution has to be taken to avoid the generation of static electricity, with the subsequent risk of

ignition. Guidance on the safe use and handling of flammable liquids is provided by the Health and Safety Executive and is contained within HSG140, including Guidance on the issue of static electricity build up. There may be other regulatory requirements to consider such as the Dangerous Substances and Explosive Atmospheres Regulations.

Not relevant – no storage of flammable chemicals

39. A representative sample of the receiving tank/vessel/container should be mixed in a proportional ratio with a sample of incoming waste stream that it is proposed to add to the tank/vessel/container. The two samples should take account of the "worst-case" scenario of likely constituents. The particular test parameters will be driven by the wastes being bulked. As a minimum, records of testing should be kept including any reaction giving rise to:

- **Increase in temperature**
- **Viscosity of change**
- **Separation or precipitation of solids**
- **Evolution of gases**
- **Evolution of odours**

Not relevant - no incompatible substances are accepted on site.

<u>Bulking up into drums (including drum, tank, tanker or small container transfers into drums)</u>

40. Bulking/mixing should only take place under instruction from and under direct supervision of a suitable manager/chemist and should be under Local Exhaust Ventilation (LEV) in appropriate cases. Odorous materials should not be bulked up. If bulking different batches then a composite sample must be compatibility tested prior to bulking. Containers should be kept lidded/sealed as much as possible.

Not relevant – no bulking up into drums.

41. HSG140 advises that gravity dispensing is avoided, unless physical protective devices are provided to prevent loss of the whole tanker contents.

Not relevant – no bulking up into drums.

42. Where tankers are discharged into drums, it must be possible to close the valve at the tanker end quickly and safely in case of spillage. The valve at the dispensing end must close automatically if it is released. A minimum of two people will be needed for this operation or the operation of the tanker valve is access to the tanker valve is difficult.

Not relevant – no bulking up into drums.

<u>Bulking of Solid Waste</u>

43. Bulking of different batches must not take place without compatibility testing. In appropriate cases, LEV should be used to control odour and dust. Drums

should be manipulated using mechanical means, for example, forklift with rotating drum handling fitting. Liquid waste must not be added to solid wastes other than in 'purpose-designed and built' reaction vessel, that is, decanting of liquids into a skip containing bulked solids must not take place.

BAT achieved with site design. No incompatible substances are accepted on site.

Bulk Storage Vessels

44. Bulk storage vessels should be located on an impervious surface that is resistant to material being stored, with sealed construction joints within a bunded area with a capacity at least 110% of the largest vessel or 25% of the total tankage volume, whichever is greater.

The storage areas are bunded. A full description is given in **Section 12) EPB3: Question 3 – Operating Techniques.**

45. Vessels supporting structures, pipes, hoses and connections should be resistant to the substances (and mix of substances) being stored. There should be a routine programmed inspection of tanks, mixing and reaction vessels including periodic thickness testing. In the event of damage or significant deterioration being detected, the contents should be transferred to appropriate storage. These inspections should preferably be carried out by independent expert staff, and written records should be maintained of the inspection and any remedial action taken.

Vessels, supporting structures, pipes, hoses and connections are resistant to the substances (and mix of substances) being stored. These are subject to visual inspections by operatives during the working day to maintain constant vigilance over any damage or necessary maintenance.

46. Vessels should not be used beyond the specified design life or used in a manner or for substances that they were not designed. Vessels should be inspected at regular intervals, with written records kept to prove that they remain fit for purpose. See HSE Guidance Note PM75.

All vessels are constructed from cast in situ reinforced concrete to provide a design life far beyond the life of the plant. Vessels are subject to visual inspections by operatives during the working day to maintain constant vigilance over any damage or necessary maintenance.

47. As a general rule, no open-topped tanks, vessels or pits should be used for storage or treatment of hazardous or liquid wastes. Exceptions would require justification in the permit application.

No open-topped tanks, vessels or pits used for hazardous or liquid wastes.

48. No uncontrolled venting to atmosphere should be allowed, and all vents should be linked to suitable scrubbing and abatement systems. Vapour balance lines should be connected to suitable abatement systems.

There is no uncontrolled venting to atmosphere. Air from within the Reception Building is treated through an active water scrubber before being passed through a suitably sized biofilter.

49. Tank and vessel optimum design should be considered in each case, taking into account waste type, storage time, overall tank design and mixing system to prevent sludge accumulation and to ease desludging. Storage and treatment vessels should be regularly desludged.

All tanks and vessels are designed to handle the waste they contain and the storage time they are used for. The mixing tank is designed to accumulate grit, and has access for grit removal by specialist confined space entry crews. De-sludging (removal of grit) takes place at least once every six months.

50. Tank and vessels should be equipped with suitable abatement systems and level meters with both audible and visual high-level alarms. These systems should be sufficiently robust and regularly maintained to prevent foaming and sludge build up affecting the reliability of the gauges.

Digesters and storage tank are equipped with pressure release valves. Level meters are installed within the tanks to monitor waste levels and provide early warning of any leaks within the tanks. There is a membrane around all relevant tanks for leak detection and liquid containment should any structure fail. All level sensors can be cleaned to prevent sludge build-up. Point source air extraction removes air from within tanks and vessels towards treatment within an active scrubber and biofilter. Foaming within the tanks is controlled by effective process control including low organic loading rates and effective stirring.

51. Storage vessels holding flammable or highly flammable wastes should meet the requirements of HSG51, HSG140, HSG716 and HSG176 (See Ref 4).

No storage vessels hold flammable or highly flammable wastes.

52. All connections between vessels must be capable of being closed via suitable valves. Overflow pipes should be directed to a contained drainage system, which may be the relevant bunded area, or to other vessels provided suitable control measures are in place.

All connections between vessels can be closed either automatically via pneumatic valves or via manual valves. In the event of an overflow of a storage tank in the Reception Building, the liquid is contained within the bunded area in the Reception Building.

53. Underground or partially underground vessels without secondary containment should be scheduled for replacement with above-ground structures, for example, double skinned vessels with leak detection.

All underground or partially underground vessels have secondary containment in the form of a leak detection membrane.

54. Plant and equipment taken out of use should be decontaminated and removed.

Plant and equipment taken out of use will be decontaminated and removed or appropriately stored.

55. Pipework should preferably be routed above ground; if below ground it should be contained within suitable inspection channels.

Underground gravity drains will be of PVC-U to the following standards;

BS EF1401-1:1998 - Plastic piping systems for non-pressure underground drainage and sewerage - PVC-U.

Gravity drains will be pressure tested prior to commissioning and thereafter re-tested on a bi-annual basis to ensure no leakage to groundwater.

56. Silos should be equipped with dust abatement systems, level monitors and high-level alarms.

Not relevant – no silos on site.

57. Storage bunkers should have extraction systems for particulate abatement or spray damping.

Not relevant – no storage bunkers on site.

<u>Tank and Process Piping Labelling</u>

58. All vessels should be clearly signed as to their contents and capacity and should have a unique identifier. Tanks should be appropriately labelled.

Each tank is allocated a name/number, capacity and can be monitored on the electronic Control System.

59. Labelling should differentiate between wastewater and raw processed water, combustible liquid and combustible vapour and direction of flow.

Tanks and process pipework are clearly marked with direction of flow and any associated combustion or explosion hazards. There is no distinction between wastewater and process water – all liquids are re-used within the process.

60. Written records of all tanks should be kept detailing:

- **Unique identifier**
- **Capacity**
- **Constriction including materials**
- **Maintenance schedules and inspection results**
- **Fittings (including joints and gaskets etc.)**
- **Waste types that may be stored/treated in the vessel including flashpoint limit.**

Written records of all tanks are kept. These records include unique identifiers, capacity, construction and materials, maintenance schedules, results of inspections, fittings and the

waste types that may be stored or treated in the vessel including any relevant hazard information (such as flashpoints).

61. A suitable pipework coding system should be used, for example, RAL European standard colour coding.

All pipework is suitably coded.

62. All valves should be tagged with a unique identifier shown of the process and instrumentation diagram. All connections should be correctly sized and maintained in an undamaged state.

All valves are tagged with a unique identifying number which reflects the number on the control system screen. All connections are correctly sized and must be maintained in an undamaged state to enable them to be used.

Other storage requirements

63. Waste or raw materials in non-waterproof packaging should be kept under cover.

All wastes and all raw materials in non-waterproof packaging are kept under cover.

Container Movement

64. Drums and other mobile containers should only be moved between different locations (or loaded for removal off-site) in accordance with written procedures. The waste tracking system should then be amended to record these changes.

Not relevant – no containers accepted.

15.4 Indicative BAT requirements for Waste Treatment

BAT Requirements extracted from Sector Guidance Note IPPC S5.06 (Guidance for the Recovery and Disposal of Hazardous and Non Hazardous Waste).

General Principles

1. Provide adequate process descriptions of the activities and the abatement and control equipment for all of the activities such that the Regulator can understand the process in sufficient detail to assess the operator's proposals and in particular to be able to assess opportunities for further improvements. This should include:

- **Diagrams of the main plant items where they have environmental relevance, for example, storage, tanks, treatment and abatement plant design etc.**
- **Details of chemical reactions and their reaction kinetics/energy balance**
- **Equipment inventory, detailing plant type and design parameters, for example, flashpoints**
- **Waste types to be subject to the process**

- **Control system philosophy and how the control system incorporates environmental monitoring information**
- **Process flow diagrams (schematics)**
- **Venting and emergency relief provisions**
- **Summary of operating and maintenance procedures**
- **A description of how protection is provided during abnormal operating conditions such as, runaway reactions, unexpected releases, start-up, momentary stoppages and shut-down for as long as is necessary to ensure compliance with release limits in permits**
- **Additionally, for some applications, it may be appropriate to supply process instrumentation diagrams for systems containing potentially polluting substances**

A description of the AD process is provided in **the Section 8)** The main environmental controls are listed in the Environmental Risks Assessment (**Section 9)**. The waste types are listed in the **Section 10).**

2. Provide an assessment of the efficiency of the treatment process in relation Schedule 5 (of the PPC Regulations) pollutants in terms of the removal or partition of substances within the process, for example:

- **The precipitation of metals from solution for removal in the filter cake**
- **The degree of transfer between the incoming waste and the emissions (to air, solid waste to land and liquid effluent to sewer of, for example, pesticides or solvents)**

The quantity of incoming waste, and the quantities and types of the emissions resulting from treatment of the waste, are detailed in **Section 10)** and **Section 11).**

3. The Operator should analyse these parameters using the following steps:

- **Process mapping – identify the pathways within the process for the specific substance or substances**
- **Mass Balance**
- **Action Plan – if the study indicates that losses from a process are contributing to:**
  - **The breach of an Environmental Quality Standard**
  - **The breach of benchmark**
  - **A significant environmental impact**

Our technology provider has completed full process mapping and a site-specific study of mass balance.

4. Then an action plan should be prepared and implemented

Following assessment it is not foreseeable that losses from the process will contribute to the breach of an Environmental Quality Standard or benchmark, or to a significant environmental impact.

5. For each treatment process, the objectives and reaction chemistry should be clearly defined. There must be a defined end-point to the process so that the reaction can be monitored and controlled. The suitable inputs to the process must be defined, and the design must take into account the likely variables expected within the waste stream.

The proposed treatment process and the likely variables within the waste stream have been clearly defined.

6. For each new reaction, proposed mixes of wastes and reagents should be assessed prior to the treatment in a scale laboratory test mix of the wastes being to a predetermined batch 'recipe'. It should also take into account the potential scale-up effects, for example, increased heat of reaction with increased reaction mass relative to the reactor volume, increase residence time within the reactor and modified reaction properties. See HSG143 for further Guidance.

The proposed mixes of wastes and reagents have been fully assessed.

7. The reactor vessel and plant should be specifically designed, commissioned and operated to be fit for purpose. Such designs should include consideration of chemical process hazards and a hazard assessment of the chemical reactions, prevention and protective measures together with consideration of process management i.e. working instructions, staff training, plant maintenance, checks, audits and emergency procedures.

BAT achieved with site design. BAT was followed with site design for controlling dust on site. The process management is carried out in accordance with Agrivert company-wide and site-specific work instructions.

8. In order to track and control the process of change, there should be a written procedure for proposal, consideration and approval of changes to technical developments, procedural or quality changes.

BAT achieved with Agrivert procedure QP02 "Control of Documents and Records" as seen in **Attachment 10 (v)**.

9. All treatment/reaction vessels should be enclosed and should be vented to atmosphere via an appropriate scrubbing and abatement system (subject to explosion relief).

The Reception Building is enclosed and the air vented to atmosphere is first treated via the scrubber and biofilter. All AD tanks are enclosed. In the rare event that some venting of biogas to atmosphere is unavoidable, this will take place via the flare stack, and records kept.

10. Where appropriate, reactor vessels (or mixing vessels where the treatment is carried out) should be charged with pre-mixed wastes and reagents. For example, reactor vessels should be 'pre-limed' or charged first with the

reacting alkali to control the reaction using, for example, calcium hydroxide solution made up prior to charging the reactor vessel. The decanting of sacks or drums to the vessel should be avoided. Failure to charge the vessel can lead to:

- **Concentration 'hot spots' at the surface of the reaction liquor**
- **Loss of reaction control**
- **Emissions of fume from the instantaneous reaction at the interface**
- **The open hatch venting any fume and by-passing appropriate abatement**

BAT achieved with site design. The monitoring of site processes is carried out in accordance with site-specific work instructions.

11. The reaction should be monitored to ensure that the reaction is under control and proceeding towards the anticipated result. For this purpose, vessels used for treatment should be equipped appropriately e.g. High-level, pH and temperature monitors. These should be automatic and continuous and linked to a clear display in the control room or laboratory together with an audible alarm. Risk assessment may require process monitors to be linked to cut-off devices.

BAT achieved with site design. The monitoring of site processes is carried out in accordance with site-specific work instructions.

Specific Substances

Volatile Organic Compounds (VOC)

12. Chemical process waters will contain VOC's (another specific example is contaminated groundwater), resulting in a high COD which may mean that the waste is unsuitable for direct discharge to sewer. Techniques such as drying are not an option and attention should focus on displacement methods of treating.

AD offers a completely sealed liquid management system. All incoming wastes are immediately captured in the reception tanks and bunkers. Following reception the whole process is totally enclosed and no liquids (except wastewater from welfare facilities and excess rainwater discharged to an existing package sewage treatment plant) leave the plant other than the treated digestate destined as liquid fertiliser, which is collected and transported in sealed tankers.

13. For example, the waste stream could be treated by air stripping counter-current flow across a packed column. Stripped VOC in air flow can be removed by carbon absorption or similar technique. For other techniques to control VOC emissions, see Section 2.2.4 on page 69.

Not relevant

Cyanides

14. It is important that the pH of the system remains greater than 10. If the pH is too low, then cyanogen chloride and hydrogen chloride can be formed. Hence caustic is generally added in excess to prevent the pH from falling too low. The reaction is very rapid and the resulting cyanate cannot readily be reduced back to cyanide. Any discharge of cyanate to a water course will not enable free cyanide to be generated.

Not relevant – no cyanide is accepted on site.

15. Since the treatment of cyanide is by oxidation, the destruction can be checked by the measurement of redox potential (electropotentials). Addition of sodium hypochlorite to an effluent sump can therefore be controlled. If there is an excess hypochlorite present, the chlorine gas can be released; and if there is a lack of hypochlorite, then residual cyanide is present. Discharge of aqueous effluent to watercourses should therefore be monitored continuously for cyanide content, free chlorine and pH.

Not relevant – no cyanide is accepted on site.

Chromium (IV) Compounds

16. Chromium (IV) is the highest oxidation state of the metal. An example of it is chromic acid or chromium oxide (CrO_3) which is acidic, toxic, water-soluble and an oxidising agent. Treatment by straightforward neutralisation would be ineffective and the initial step is the reduction to Chromium (III) to the trivalent state. The conversion of Cr^{6+} to less hazardous Cr^{3+} can be achieved by the addition of a reducing agent, for example, sodium metabisulphite or waste pickling acid, which is rich in ferrous iron. The trivalent metal can then be precipitated in the normal way.

Not relevant – no chromium is accepted on site.

Strong Acids

17. For concentrated acids (70% w/w) there is a market for blended or re-concentrated acids. It has become viable to use 50% (w/w) acids, although this requires a greater energy input. It is anticipated that the growth area for this market may be seen as a preferred option for some acid wastes, but is dependent on the volume and contamination of the waste.

Not relevant – no concentrated acid is accepted on site.

Phenolic Solutions

18. A process has been developed treating aqueous wastes containing phenol (3-5% w/w) by catalytic oxidation, using an oxidising agent and a metal catalyst, on a 3 tonne batch basis in a stainless-steel, double skinned vessel. The treatment procedure must take account of the exothermic nature of the reaction. Feedstock can be diluted before treatment. The process temperature, pH and redox potential are continually monitored.

Not relevant – no phenol is accepted on site.

Attachment 1 – Pre Application

Attachment 2 – WAMITAB Certificates

Attachment 3 – Environmental Management System

Attachment 4 – Site Plans

i. Location Plan
ii. Site Plan
iii. Permit boundary, Point Source and Emissions Plan
iv. Site Layout Surface Areas
v. Process Flow Layout
vi. Reception Building Clean & Dirty Areas
vii. Site Location Plan with 1000m radius

Attachment 5 – Site Condition Report

i. Site Condition Report
ii. Ground Investigation
iii. Phase 1 Habitat Survey

Attachment 6 – Non-Technical Summary

Attachment 7 - Environmental Risk Assessment Reports

iv. Ecology Report
v. Air Quality Assessment
vi. Odour Assessment
vii. Noise Impact Assessment

Attachment 8 - Management and maintenance schedule

Attachment 9 - Odour Management Plan

i. Odour Management Plan
ii. Design Parameters for Air Extraction
iii. Odour Management for Failures

Attachment 10 - BAT Analysis Information

i. Noise Mitigation and Monitoring
ii. Standard Operating Procedures for AD Systems
iii. AQD 203b New Customer Account Form
iv. QP26 Accident & Incident Reporting & Investigation
v. QP02 Control of Documents & Records

Attachment 11 - Other Information

i. Conder CNS B Bypass Separator Range
ii. Klargester BioDisc BE-BL Package Sewage Treatment Plant

Attachment 12 - OPRA Spreadsheet

Attachment 13 – Permit Application Checklist

Attachment 14 – Fire Prevention Plan