PLANNING STATEMENT FOR THE INSTALLATION AND OPERATION OF AN ANAEROBIC DIGESTION FACILITY INCLUDING THE ERECTION OF SILAGE CLAMPS, DIGESTER TANKS, TECHNICAL BUILDING, GAS FLARE, WEIGHBRIDGE AND SITE OFFICE/WELFARE BUILDING AND THE INSTALLATION OF ANCILLARY PLANT AND EQUIPMENT, ALTERATIONS TO THE HIGHWAY ACCESS AND INTERNAL ROAD, INSTALLATION OF LAGOONS AND ATTENUATION POND, HIGHWAY IMPROVEMENTS AND LANDSCAPING AND ENVIRONMENTAL ENHANCEMENT MEASURES

AT

WORMSLADE FARM
CLIPSTON ROAD
KELMARSH
NORTHAMPTONSHIRE
LE16 9RX

Prepared by:

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November 2015
1. NON-TECHNICAL SUMMARY

1.1 This report is written as a submission in support of the planning application by Raw Biogas Ltd, to Northamptonshire County Council for the installation and operation of an anaerobic digestion facility at Wormslade Farm, Clipston Road, Kelmarsh, Northamptonshire LE16 9RX.

1.2 The proposals comprise the erection of silage clamps, digester tanks, technical building, gas flare, weighbridge and site office/welfare building, and the installation of ancillary plant and equipment, alterations to the highway access and internal road, the installation of lagoons and attenuation pond, highway improvements and landscaping and environmental enhancement measures.

1.3 The proposed application site is on agricultural land adjacent to existing agricultural buildings, forming part of Wormslade Farm which extends to approximately 80.40 hectares. Wormslade Farm is well located to a viable point of connection to the National Grid gas network.

1.4 This proposal is for the extraction of bio-gas from locally sourced farm produce such as grass silage, maize silage, rye silage and a small proportion of farm animal manures. No food waste will be imported to the site.

1.5 The proposal is to produce bio-gas from agricultural sources for upgrading to bio-methane for use in a gas-to-grid scheme whereby the bio-methane produced will be piped directly to the national gas grid located nearby the plant. The gas will then be available for domestic, commercial and industrial gas consumers.

1.6 The production of bio-methane for the national grid, ultimately to be used by businesses and householders is a more efficient use of the energy crops produced in the locality for this plan than if the gas was used to generate electricity on site. This also allows for greater (gas) energy flexibility and security for the UK by utilising the gas produced at Wormslade Farm in the national gas grid, and leaving green electricity production to wind, solar and anaerobic digestion plants that are not located closely to the gas grid for direct connection.

1.7 The site selection process therefore is founded on the premise that the site already has large agricultural buildings, and is ideally located for the production of bio-gas and direct connection to the high pressure gas pipeline located very near to the farm. The site is also excellent in terms of the availability, locally, of good quality feedstock which provides an alternative market for local farm produce, thus underpinning farm gate prices in the locality.

1.8 It is crucial to the successful operation of the plant that the regular, secure and local supply of feedstock is obtained. It is equally important to ensure the distribution of digestate locally. Local land agent advice obtained during the feasibility study leading up to this planning application confirms that there is sufficient availability of farmland to support the anaerobic digestion plant in this location.

1.9 The site is ideally positioned to receive the feedstock from the surrounding farmland, and for distributing the mainly liquid digestate back to the farmland as excellent fertiliser which will replace manufactured, often imported fertilisers on farms receiving the digestate. The site allows the more economical and sustainable
transportation of crops for feedstock and digestate back to the land which would not be possible if the plant were to be located in an urban location.

1.10 The proposed development of the anaerobic digestion plant facility has been the subject of a request for a screening opinion under the (Environmental Impact Assessment) (England and Wales) regulations 2011 with Northamptonshire County Council. The advice received for the Council is that the proposed development is not EIA development.

1.11 The supplier of the anaerobic digestion plant equipment and main contractor for the scheme is Envitec Biogas UK Ltd, a firm based in Rugeley, Staffordshire. The use of relatively local suppliers is a high priority for the developers and operators; RAW Biogas Ltd.

1.12 This report considers the application against national planning policy (NPPF)\(^3\) policies currently in place, and the Northamptonshire Minerals and Waste Local Plan\(^4\) document which was adopted in September 2014. Good Practice Measures-Principles for the Design of Minerals and Waste Development by Northamptonshire County Council has also been taken into account.

1.13 This proposal is in line with the recent Government announcement\(^1\) on 24 October 2014 stating that the European Union agreement is a major win for the UK, which has been leading efforts in Europe for an ambitious but flexible deal that cuts carbon emissions by 40% by 2030. The UK's Climate Change Act and Electricity Market Reforms have put the UK on a clear path to become a low carbon economy, which is further enhanced by these measures announced in October, with no expected additional cost impact for UK bill and tax payers.

1.14 This report concludes that the applicant has a site suited to the production of farm based bio-methane which can readily be piped into the UK gas grid for consumption by householders and businesses. This use of locally sourced farm produce will assist the UK to reach the commitment of reducing carbon emissions by 40% by 2030, and increase energy security for the UK. The proposal will help sustain the rural economy by diversifying agricultural production and markets for produce and increase good quality employment opportunities in the locality.

1.15 This proposal accords with national and local planning polices as well as helping to develop renewable energy production, in particular bio-methane production for injection into the National Grid and to help maintain energy security for the United Kingdom.
2. **INTRODUCTION**

2.1 The preparation of this report by Mid West Planning Ltd has been commissioned by Mr Stuart Homewood of Raw Biogas Ltd, the prospective lessee and operator of the proposed anaerobic digestion (A.D.) plant at Wormslade Farm.

2.2 This planning support statement is prepared by Philip Plant BSc (Hons) MRICS of Mid West Planning Limited in accordance with these instructions. Phil Plant is a member of the Royal Institution of Chartered Surveyors (RICS) and has over fourteen years’ experience in rural planning matters, advising both private and public sectors.

2.3 A number of site visits have taken place from May 2015 to 21 July 2015 at Wormslade Farm. Subsequent project meetings have taken place to develop the proposals prior to the submission of the Environmental Impact Assessment screening opinion request and the pre-application planning enquiry, both made to Northamptonshire County Council. The content of this report is based on the information received at the meetings and subsequent discussions and correspondence.

2.4 The anaerobic digestion plant will be operated as a farm-based anaerobic digestion plant utilising predominately agricultural crops sourced locally for feedstock for the digesters. A relatively small proportion on farm animal manure will be part of the permitted feedstock mix to allow for flexibility in operation and to secure local sourcing of the feedstock supply. The facility will not process any waste other than the stated agricultural manures. No food waste will be processed at the Wormslade Farm Anaerobic Digestion Plant.
3. BACKGROUND INFORMATION

Wormslade Farm

3.1 Wormslade Farm is land owned by The Trustees of Mr and Mrs Newton’s Children’s Settlement whose address is The Old Rectory, Church Langton, Market Harborough, Leicestershire, LE16 7SX. Raw Biogas Ltd is the prospective lessee of the site and will develop and operate the site.

The Anaerobic Digestion Plant Development

3.2 The proposal is for the erection of an anaerobic digester facility with associated infrastructure, landscaping and ancillary structures to produce bio-methane for injection into the nearby national Gas Grid. Details of the proposed layout are indicated on the submitted plan reference P15-WORMSLADE-AD-03-Proposed Site Layout Plan. Please see Appendix Two.

Pre-application Advice

3.4 An initial pre-application advice request was made to Northamptonshire Council by email on 15 January 2015 by Mid West Planning Ltd outlining the proposals and the operation of the plant, including details of the feedstock split of approximately 20% from farm animal manures and slurries, and approximately 80% from locally grown farm crops. The purpose of this initial enquiry was to confirm that if the proposal crystallised into a planning application, it would in fact be determined by Northamptonshire County council.

3.5 During the pre-application discussions that followed it was determined that the planning application would be a County matter rather than a matter for Daventry District Council. Mr Watson replied by email on 19 January 2015 confirming that because the proposed anaerobic digestion plant would require the importation of feedstocks, including manures, it would be a County matter, and that Daventry District Council has accepted this.

3.6 Northamptonshire Highways Department were also contacted by Mr Phil Watson, requesting advice about potential highway implications. Verity Chilver, Development Management Engineer at Northamptonshire Highways responded with a specification for the improvements required for the site access and Clipstone Road east of the access to the site. Improved visibility splays of 4.5m x 215m in each direction, and a minimum road width of 5.5m were recommended.

3.7 A formal pre-application enquiry was submitted to Mr Watson at Northamptonshire County Council on 9 October 2015. We understand that there has been a delay in obtaining a response to the enquiry and unfortunately the application has preceded this advice.

EIA Screening Opinion

3.8 A formal request for a screening opinion under the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 was made to Northamptonshire Council on 20 October 2015. The opinion of Northamptonshire County Council (Senior Planner, Claire Spokes) was that "the proposed development is not listed under Schedule 1 of the above regulations and therefore the requirement for an Environmental Impact Assessment (EIA) is not mandatory. The proposals do however fall within Schedule 2 to the regulations as a project for the disposal of non-hazardous waste.”
3.9 “The National Planning Policy Guidance provides indicative thresholds and criteria for the identification of Schedule 2 development requiring EIA. It is written in Annex A that EIA on installations for the disposal of non-hazardous waste is more likely to be required where new capacity exceeds 50,000 tonnes per annum (tpa). Based on the information you have submitted I understand a 36,000 tpa throughput of farmyard manure and crops grown locally by the landowner is proposed for the facility, with 30,000 tonnes of digestate being produced and applied as fertilizer to the land used for growing the feedstock crops.”

3.10 The letter goes on to state: “Schedule 3 of the Regulations outlines selection criteria for screening Schedule 2 development and establishing whether the project is likely to have significant effects on the environment by virtue of its characteristics, location and potential impacts. In this instance it is not considered that there are any such factors that would justify the requirement for an EIA. As such it is considered that on the basis of information provided in your submission, the proposal is not EIA development. Detailed assessment of the potential impact of the operations would however be expected in any subsequent planning application. Particular attention should be paid to the following aspects of the proposal:

- Local amenity (particularly odour, dust and noise)
- Highways and traffic
- Catchment area
- Landscape and visual amenity

Pre-application consultation with relevant technical bodies, in particular the Environment Agency and the Highways Authority, as well as Daventry District Council and the local parish councils is recommended.”

Public Consultation

3.11 Public consultation is an important part of the planning process, recommended by planning authorities and considered good practice. Raw Energy Ltd organised, with the assistance of Great Oxendon Parish Council and Clipstone Parish Council, a public consultation event on Monday 12 November 2015 between 3pm and 7pm. The meeting was publicised through both Parish Councils and by numerous posters displayed in and around the village. Approximately 120 people visited the exhibition which was attended by Bruce Galliford and Stuart Homewood of Raw Biogas Ltd and Phil Plant and Vicky Cawley of Mid West Planning Ltd to answer questions.

3.12 At the exhibition the details of the scheme were exhibited together with information about the need for renewable energy, in particular bio-methane for injection directly into the national Grid, and the need for increased energy security in the UK. A video loop showing an identical anaerobic digestion plant developed by Envitec Ltd in Oxfordshire was played throughout the event to allow visitors to see a similar anaerobic digestion facility in operation and to aid the answering of questions from the general public.

3.12 The visitors to the event were generally aware of global warming and the impact on the climate in the UK, and aware of energy security issues for the UK. Most people were either unsure or did not believe that gas produced by anaerobic digestion is a sustainable method of generating green gas in the UK.

3.13 The main concerns of people who attended the consultation event were increased traffic generation, visual impact of the facility and concerns about odour emissions.
These concerns arose largely as a result of an email circulated in the locality by the “Against Oxendon Wind Turbines” action group describing the number of daily vehicle movements as being 80 each way per day, the digesters being 8m tall, and reference to a food and industrial waste anaerobic digestion facility at Rothwell Lodge Farm with a “poor history on bad smells (odour).”

3.14 Raw Energy Ltd has taken into account these comments, which are largely unfounded and misleading, in the development of this planning application. The scheme has been significantly redesigned to include highway improvements on the road to Clipstone, including the junction improvements with the A 508. The layout of the facility has been greatly improved to reduce the height of the tallest component; the digester tanks, which have been dug into the ground further to reduce the visual impact as much as possible. In addition, the layout has been changed to give the opportunity for much greater landscaping to the northern side of the development, and the recommendation by the Landscape Architect to translocate the existing hedge to the new hedge-line to greatly shorten the establishment time for effective screening of the site from the road to Clipstone.

3.15 The Rothwell Lodge A.D. plant accepts segregated food wastes from homes and businesses which the Wormslade farm A.D. plant will not. The Rothwell Lodge site has a capacity of 49,000 tonnes of food and food processing waste, and also has an integrated plastics recycling facility to enable the recycling of food packaging recovered from the waste processed at the site, which the Wormslade site will not have.

3.16 Other, less frequent objections were based on the minimal gain to the local community, for example we were told that there was no mains gas in Great Oxendon village and therefore the local community would not benefit from the scheme directly.
4. THE NEED FOR RENEWABLE ENERGY TO COMBAT CLIMATE CHANGE AND TO ENSURE ENERGY SECURITY IN THE UK

4.1 Climate change is well researched and documented. It is widely accepted that there is a need for a huge reduction in worldwide greenhouse gas emissions. In the UK this will be achieved through both the conservation of energy by moving to low energy appliances and better insulated buildings, and through the production of all forms of renewable and low carbon energy.

4.2 The European Union has reached a historic deal to cut greenhouse gases by at least 40% domestically by 2030\(^1\). The target is part of a package of measures to make Europe’s energy system more secure, sustainable and competitive, announced in October 2014 by European leaders at the European Council meeting in Brussels. The agreement is a major win for the UK, which has been leading efforts in Europe for an ambitious but flexible deal that cuts carbon emissions whilst giving the UK and other Member States the flexibility to decide how they will decarbonise at least cost to consumers - while also improving energy security by reducing the EU’s reliance on imported energy. The UK’s Climate Change Act and Electricity Market Reforms have put the UK on a clear path to become a low carbon economy.

4.3 Former Department of Energy and Climate Change (DECC) Secretary Edward Davey said: "This is a historic moment. Europe has sent a clear and firm message to the world that ambitious climate action is needed now. True to our word, we have delivered a highly ambitious EU climate target while also significantly strengthening Europe’s energy security by making us less reliant on imported energy. This morning only five countries in Europe had climate targets post 2020, now 28 countries do. The UK has been leading the climate debate pushing for an ambitious deal in Europe and by building alliances and working constructively with our European partners, we’ve agreed a package of measures that meet all the UK’s top priorities. It lays down the gauntlet to the world to come forward with ambitious climate targets, reforms EU energy policy so it’s flexible and affordable and tackles energy security - reducing Europe’s energy import bill for fossil fuels by around €285 billion by 2030.”

4.4 Edward Davey continued to say; "It’s good for consumers because we can decarbonise at the lowest possible cost using a diverse mix of technologies. And it’s good for business as it provides the certainty they have been calling for to unlock billions in low carbon investment.”

4.5 The current DECC Secretary of State Amber Rudd’s recently (29 October 2015) leaked letter to member of the Cabinet sets out the obligation on HMG to deliver 15% of the UK’s final energy consumption across electricity, heat and transport from renewable sources by 2020. Failure to do so would result in HMG facing the real possibility of fines being imposed by the EU Court of Justice until the UK reaches the target level. We are currently on target to meet the obligation for interim milestones until 2018. The trajectory then increases substantially and leads to an overall shortfall in 2020.

4.6 Amber Rudd’s letter explains that the highest potential for additional renewable heat is from bio-methane injection into the gas grid, which would account for 0.4% of the target shortfall which currently stands at 2.1-4.5%. The result of this announcement is that it is likely that GMG will continue to support renewable heat from bio-methane.

Gas in the UK energy mix

Figure One: Table showing the increased percentage of gas energy (in green) used in the UK to 2015. (Source: Dept. of Energy and Climate Change. 2015)

4.8 In 2013 the UK obtained just 13% of its primary energy from low carbon sources. Bioenergy was the second largest component of low carbon, accounting for around a quarter of low carbon energy.

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<td>7.3%</td>
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<td><strong>Total</strong></td>
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<td><strong>12.9%</strong></td>
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</table>

Figure Three: Table showing the total percentage and the split of low carbon energy production in the UK. (UK Energy in Brief 2014. Dept. of Energy and Climate Change. 2014)

4.9 The generation of low-carbon energy is crucial to the rebalancing of energy supply in the UK. In the 1970’s the UK was a net importer of energy. Following development of oil and gas production in the North Sea, the UK became a net exporter of energy in 1981. Output fell back in the late 1980’s following the Piper Alpha disaster, with the UK regaining a position as a net exporter in the mid 1990’s. North Sea production peaked in 1999, and the UK returned to being an energy importer in 2004.

4.10 In 2013, according to the Department of Energy and Climate Change 47% of energy used in the UK was imported, up sharply from the 2010 level, due to the general
decline in oil and gas output from the North Sea. Alongside increasing demand for gas in the UK as demonstrated in the table above, the UK has transitioned from a stable net exporter to a totally dependent importer of gas in 2004, a situation that has only accelerated year on year to 2015. This level of energy importation leaves the UK in a vulnerable position; both economically and socially should global energy demand grow, or shortages of energy push prices higher. It therefore makes good sense to produce energy in the UK from a wide range of renewable sources to both reduce our carbon footprint, and to reduce our reliance upon imports from countries that are unstable.

Figure Three: Table showing the percentage of energy imported into the UK between 1970 and 2013. (UK Energy in Brief 2014. Dept. of Energy and Climate Change. 2014)

UK Gas Dependency

<table>
<thead>
<tr>
<th>Year</th>
<th>Net Gas Production</th>
<th>Net Gas Demand</th>
<th>Net Gas Export/Imports</th>
<th>Gas Export as a % of Demand</th>
<th>Gas Import Dependency</th>
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<td>96</td>
<td>82</td>
<td>3</td>
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<td>1999</td>
<td>94</td>
<td>88</td>
<td>6</td>
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<td>95</td>
<td>89</td>
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<td>74</td>
<td>84</td>
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<td>67</td>
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<td>64</td>
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<td>34%</td>
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<td>89</td>
<td>-27</td>
<td>35%</td>
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<tr>
<td>2015</td>
<td>33</td>
<td>68</td>
<td>-37</td>
<td>52%</td>
<td>0%</td>
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</tbody>
</table>

Figure Four: Table showing the percentage of gas import dependency in the UK 1998 to 2015. Dept. of Energy and Climate Change. 2015.
5. THE PROPOSED ANAEROBIC DIGESTION PLANT

Proposed Scheme for the Wormsdown Farm Anaerobic Digestion Plant

5.1 This proposal is for the development and operation of a farm-based anaerobic digestion plant at Wormsdown Farm, principally to produce bio-methane for supply direct to the national gas grid rather than on-site electricity production.

5.2 The proposed scheme will produce on average, around 450 cubic meters, but up to 600 cubic metres of bio-methane per hour which will be injected at high pressure into the gas main running alongside the A508 highway east of the site. When upgraded bio-methane is directly injected, the green energy source can be transported for later decentralised use at any location. For feeding biogas into an existing natural gas network, it must first be cleaned and conditioned.

5.3 The proposal is for the erection of an anaerobic digester facility with associated infrastructure, landscaping and ancillary structures to produce bio-methane for injection into the nearby national Gas Grid. Details of the proposed layout are indicated on the plan reference P15-WORMSLADE-AD-03-Proposed Site Layout Plan.

5.4 The main features of this development are summarised below:

- Two digester tanks each 31.31m diameter by 8.00m high with gas domes extending 4.94m high above; and associated feeders, mixing units and intake tank. It is understood that the floor level of these tanks will be set approximately 3.0m below the reduced ground level which is equal to approximately 4.6-6.7m below the original sloping field ground levels. Due to the difference in ground levels across the site the top of the gas dome is therefore likely to be about 2.1m lower than the ridge of the existing farm storage building and about 3.8m lower than the ridge of the nearby open barn.
- 4 silage clamps each 119.00m x 20.00m x 5.50m high with a safety barrier 1.00m high on top of the walls. Concrete apron 80m x 15m to open side of clamps.
- 3 bagged digestate stores set into earth banked lagoons (each 50.00m x 25.00m);
- 1 black water bagged system set into earth banked lagoons, and one white water attenuation pond.
- 1 Technical building to house the feeders and CHP Unit 37.20m x 14.28m x 4.4m to eaves and 5.5m max.
- Various items of ancillary plant and equipment including a gas flare stack(6.25m), a CHP container, biogas upgrading and control systems, a separation container, rack tanks, a recirculation container, network entry facility, odourant equipment, pumping station and manifolds for water management, a transformer, propane tanks and a weighbridge.
- An office/welfare building (8.00m x 8.00m x 4.07m height to ridge).
- A new farm entrance area with alterations to the entrance and visibility splays.
- Existing roadside hedge translocation at the site entrance to accommodate works to improve the highway visibility splays.
- A graded 1:10 bund with large scale landscape planting including a perimeter hedge with trees.
5.5 The Construction Phase
It is anticipated that the construction period would last for approximately 9 months. During that period construction vehicles and machinery would be active on the site including excavators, dump trucks, cranes and haulage lorries.

5.6 Landscaping would be completed during the first planting season following occupation of the proposed building and operation of the anaerobic digestion plant.

5.7 Midlands based bio-methane experts Envi-Tec Biogas UK Ltd of Rugeley will be suppliers and installers of the anaerobic digestion plant and equipment on behalf of the developer; RAW Biogas Ltd. Please see Appendix Three for details of similar installations by Envi-Tec Biogas Ltd.

5.8 Envi-Tec Biogas UK has prepared a series of plans of the buildings, equipment and layout, which are submitted as part of this planning application. The plans submitted are:

- Location Plan Ref: P15-WORMSLADE-AD-001
- Existing Site Layout Plan Ref: P15- WORMSLADE -AD-002
- Proposed Site Layout Plan Ref: P15- WORMSLADE -AD-003
- Technical Building Plan and Elevations Ref: P15- WORMSLADE-AD-004
- Digester Tank Plan and Elevations Ref: P15- WORMSLADE -AD-005
- Silage Clamp Plan and Elevations Ref: P15- WORMSLADE -AD-006
- Flare Stack Elevations Ref: P15- WORMSLADE -AD-007
- Site Scene Elevations Ref: P15- WORMSLADE -AD-008
- Office Plan and Elevations Ref: P15- WORMSLADE -AD-009

5.9 Detailed plans have been prepared showing the site layout, access road, and elevations of the silage clamps and other structures within the site. Site scene elevations (Ref P15- WORMSLADE-AD-08) of the site have been prepared showing the development from the north, south, east and west viewpoints in context and with the beneficial effects of the proposed landscaping scheme nearing maturity.

5.10 Mid West Planning Ltd has prepared a plan detailing the required highway improvements to the road to Clipstone and the junction with the A508. Please refer to plan (ref HI01-R1-Wormslade-A0-Highway Improvements).
6. **THE APPLICATION SITE AND THE SURROUNDING AREA**

6.1 The application site is adjoining the existing substantial range of farm buildings, on agricultural land forming part of Wormslade Farm, Kelmarsh, Northamptonshire.

![Aerial photograph of the site showing the buildings and access road as existing.](image_url)

**Site Selection**

6.2 Whilst the need for renewable and low carbon energy production is overwhelmingly accepted, consideration must be given to the type and the location of renewable and low carbon energy production. The Wormslade Farm site is considered acceptable for the farm crop and manure based anaerobic digestion plant due to good access to the highway network and feedstocks, the reasonable distance of separation with other land uses, including dwellings and non-farming activities, and the screening with existing hedges, trees and agricultural buildings at the site.

6.3 The Wormslade Farm site is also ideally located for bio-methane gas production being very close to the high pressure gas main, which runs along the eastern side of the A508. The gas main has the capacity to accept bio-methane injection at this location.

6.4 The site is well placed to receive farm produce from local farmers with a good highway network and excellent highway access as depicted in Figure One above. An important part of the feasibility study was to assess the availability of sufficient locally produced feedstock on land which would also be suitable for the application of the resulting spent feedstock, or “digestate” as a cost-effective replacement for artificial fertilisers. The Wormslade Farm landowner has 80.40Ha (198.65 acres) of
land adjacent to the application site which will be used for feedstock production and take digestate. Please see the plan showing the location of the land at Appendix Four. RAW Bio-gas Ltd will enter into contractual agreements with local farmers to supply feedstock and to use the digestate as a replacement fertiliser, on five year contracts. This will offer local farmers certainty for farm crop prices and fertiliser input costs which is an attractive offer to farmers who have faced volatile crop and fertiliser prices over recent years.

6.5 Local Land Agents, Fisher German have been commissioned by the applicants, RAW Biogas Ltd to manage the sourcing the supply of feedstocks and distribution of digestate in the locality. Fisher German has confirmed that there farmers willing to contract to supply the plant with sufficient land available locally to meet the feedstock and digestate supply requirements.

UK Sustainability Standards

6.6 Alternative sites such as those closely related to urban areas are usually favoured in planning policy for commercial development; however this particular renewable energy development is required to take place in a rural location where the feedstock can be sourced locally, and the digestate distributed locally with minimum distance for highway transportation. This requirement is based on two important elements to the success of the anaerobic digestion facility, firstly the economic argument that locally sourced feedstock will be more cost effectively purchased and transported to the site, and secondly that under the recently introduced UK Sustainability Standards for biogas production, operators of anaerobic digestion plants will be required to demonstrate under stringent criteria that their plants are sustainably operated.

6.7 The U.K. Department of Energy & Climate Change (DECC) has announced that starting in 2015, the bio-gas industry must show its fuel is sustainable to receive financial support. According to information released by the DECC, all producers of 1 megawatt (MW) capacity or higher that use solid biomass or biogas feedstock will be required to demonstrate that they are meeting certain sustainability criteria in order to claim support under the Renewables Obligation (RO). The Wormslade Farm anaerobic digestion plant will therefore need to meet this requirement for the supply of feedstock, use of the digestate, including production inputs such as fuel and fertiliser, transportation, and overall operation of the plant.

6.8 The U.K. Government will now require generators with a capacity of 1 MW or higher to provide an independent sustainability audit with their annual sustainability report showing that their operation produces energy that is truly low-carbon in an all-encompassing assessment of carbon levels from inputs such as fuels and fertilisers used in production of the feedstock, transportation of feedstock and digestate, and plant operation. Biomass fuel used by RHI participants must meet a lifecycle greenhouse gas (GHG) emissions target of 34.8g CO2 equivalent per MJ of heat, or 60% GHG savings against the EU fossil fuel average.

Landscape and Visual Impact

6.9 The site lends itself to the development of the anaerobic digestion plant as depicted on the site layout plan because it is possible to closely locate the anaerobic digestion plant to existing significant, well-established range of farm buildings. The application site is relatively low-lying and is seen from the north with the back-drop of the rising fields to the south and existing buildings to the west. Significant additional tree and hedge planting recommended by Allan Moss in his Landscape and
Visual Impact assessment will minimise the impact of the development on the landscape and help to reduce any effects on visual amenity or landscape quality.
7. **PLANNING POLICY**

**National Planning Policy**

7.1 The National Planning Policy Framework (NPPF) was introduced in March 2012 to streamline planning policy at the national level. At the heart of the NPPF is the presumption in favour of sustainable development – the “golden thread” running through the plan making a decision making process. The pursuit of sustainable development includes seeking improvements in the quality of the built environment, natural and historic environment through the gains obtained through the planning system.

7.2 Section 3, paragraph 28 “Supporting a prosperous rural economy”, concerns economic growth and job creation in rural areas.

To promote a strong rural economy, local and neighbourhood plans should:

- **support the sustainable growth and expansion of all types of business and enterprise in rural areas, both through conversion of existing buildings and well designed new buildings;**
- **promote the development and diversification of agricultural and other land-based rural businesses;**
- **support sustainable rural tourism and leisure developments that benefit businesses in rural areas, communities and visitors, and which respect the character of the countryside. This should include supporting the provision and expansion of tourist and visitor facilities in appropriate locations where identified needs are not met by existing facilities in rural service centres; and**
- **promote the retention and development of local services and community facilities in villages, such as local shops, meeting places, sports venues, cultural buildings, public houses and places of worship.**

7.3 Section 10; "Meeting the challenge of climate change, flooding and coastal change”, is most relevant to this proposal. Local Planning Authorities (LPAs) should accept the requirement for renewable or low carbon energy without the applicant having to demonstrate it, and adopt proactive strategies to mitigate and adapt to climate change in accordance with the provisions of the Climate Change Act 2008.

**Local Planning Policy**

7.4 Pre-application discussions with Northamptonshire County Council concluded that the proposals were “Waste Development” due to the fact that farm animal excrements would be used at the plant. Therefore the planning application would be determined by Northamptonshire County Council. Northamptonshire County Council (NCC) Minerals and Waste Local Plan was formally adopted 1 October 2014. The Plan period is from 1 January 2011 to 1 January 2031.

7.5 The Local Plan is applicable to all proposals for minerals and waste related development, made in Northamptonshire. This is regardless of whether or not the proposal relates to an allocated site (or location) identified in the Local Plan or to any other site. In this instance agricultural waste will be used. Agricultural waste is waste material generated from agricultural premises, which unlike all the wastes described above is not classed as “controlled waste” and hence has not historically been regulated. The vast majority of agricultural wastes are bulk materials such as animal waste slurries.

7.6 The Development and Implementation Principles Supplementary Planning Document (SPD) accompanies the Local Plan. There is also a document entitled “Good Practice Measures – Principle for the Design of Minerals and Waste Development. A copy of this document is at Appendix One.

7.7 A Local Assessment of Waste Management Needs (November 2013) was undertaken to inform the plan-making process in relation to the current situation and future Waste planning requirements. This included forecasts (or projections) of how much Waste is likely to be generated throughout the plan period for each waste stream: Municipal Solid Waste (MSW), Commercial and Industrial (C&I), Construction Demolition and Excavation (CD&E) and hazardous waste. Waste in the form of agricultural manures does not feature in this assessment however, the classification of farm animal excrement as waste has led to the application being dealt with as waste development.

7.8 Municipal Solid Waste (MSW), Commercial and Industrial (C&I), Construction Demolition and Excavation (CD&E) and hazardous waste are wastes that are targeted to be dealt with primarily in the central spine near to where they likely to arise. However, “waste generated in the rural hinterlands will normally be expected to go to the most appropriate facilities within the respective catchment for the waste for treatment”.

**Policy 12: Spatial strategy for waste management**

Northamptonshire’s waste management network, particularly advanced treatment facilities with a sub-regional or wider catchment, will be focused within the central spine and the sub-regional centre of Daventry. Development should be concentrated in Northampton, Wellingborough, Kettering, Corby and Daventry. Development in the smaller towns should be consistent with their local service role.

Facilities in urban areas should be co-located together and with complementary activities.

At the rural service centres, facilities with a local or neighbourhood catchment will provide for preliminary treatment in order to deal with waste generated from these areas.

In the rural hinterlands only facilities with a local or neighbourhood catchment providing for preliminary treatment, or that are incompatible with urban development, should be provided. Where it is the latter they should deal with waste generated from identified urban areas and be appropriately located to serve those areas.

Facilities in rural areas should, where possible, be associated with existing rural employment uses.

7.9 Policy 12 “Spatial strategy for waste management” confirms that Northamptonshire’s waste management network, particularly advanced treatment facilities, will be focussed within the central spine. Policy 12 does, however recognise that not all waste produced in the rural hinterlands will be compatible with urban development and that facilities in rural areas should, where possible, be associated with existing rural employment uses.

7.10 The development criteria for waste management facilities is set out in Policy 13 and includes the provision of waste management facilities outside of the central spine, including specific sites within rural areas.

Policy 13: Development criteria for waste management facilities (non-inert and hazardous)

Proposals for waste management facilities on non-allocated sites (including extensions to existing sites and extensions to allocated sites) must demonstrate that the development:
- does not conflict with the spatial strategy for waste management,
- promotes the development of a sustainable waste network and facilitates delivery of Northamptonshire’s waste management capacity requirements,
- clearly establishes a need for the facility identifying the intended functional role, intended catchment area for the waste to be managed, market base for any outputs, and where applicable the requirement for a specialist facility,
- is in general conformity with the principles of sustainability (particularly regarding the intended catchment area),
- facilitates the efficient collection and recovery of waste materials, and
- where intended for use by the local community, is readily and safely accessible to those it is intended to serve.

Development should also, where appropriate, and particularly in the case of advanced treatment facilities:
- ensure waste has undergone preliminary treatment prior to advanced treatment,
- integrate and co-locate waste management facilities together and with complementary activities,
- maximise the re-use of energy, heat and residues, and
- maximise the use of previously developed land (particularly existing and designated industrial land, and derelict, despoiled, or brownfield urban land) or redundant agriculture and forestry buildings (and their curtilages).

Locations for waste management facilities

5.58. The allocation of specific sites for waste management facilities, and the identification of specific locations where waste management uses would be acceptable in principle are addressed within policy in the following manner:

- Sites for integrated waste management facilities - sites on which an integrated facility should be sited, and which would comprise either a mix of advanced and preliminary treatment facilities, or a mix of preliminary treatment facilities. Three sites for integrated facilities have been identified; these are in or adjacent to, the main urban areas in the county and are within the central spine. Some of these sites already have a waste-related use.

- Sites for waste management use in or adjacent to urban areas - specific sites within urban areas where waste management uses or, where there is already a waste-related use, intensification or expansion of those uses would be acceptable.

- Industrial area locations for waste management uses - specific industrial estate locations within the main urban areas, smaller towns and some of the rural service centres where waste management facilities would be acceptable in principle.

- Sites for waste management use in rural areas - specific sites within rural areas where those waste management uses most appropriately located in these areas (particularly composting and anaerobic digestion) would be acceptable.
7.11 Policy 22 “Addressing the impact of proposed minerals and waste development” considers the various forms of local impact that has to be addressed before any development can be allowed to proceed. The various impacts that need to be addressed will also apply the operation of the development.

**Policy 22: Addressing the impact of proposed minerals and waste development**

Proposals for minerals and waste development must demonstrate that the following matters have been considered and addressed:
- protecting Northamptonshire’s natural resources and key environmental designations (including heritage assets),
- avoiding and / or minimising potentially adverse impacts to an acceptable level, specifically addressing air emissions (including dust), odour, bioaerosols, noise and vibration, slope stability, vermin and pests, birdstrike, litter, land use conflict and cumulative impact,
- impacts on flood risk as well as the flow and quantity of surface and groundwater,
- ensuring built development is of a design and layout that has regard to its visual appearance in the context of the defining characteristics of the local area,
- ensuring access is sustainable, safe and environmentally acceptable, and
- ensuring that local amenity is protected.

Where applicable a site-specific management plan should be developed to ensure the implementation and maintenance of mitigation measures throughout construction, operation, decommissioning and restoration works.

7.12 Sustainable transport is a key consideration of waste development. Policy 23 seeks to minimise transport movements and encourages developers to prepare a sustainable transport statement for submission with an application.

**Policy 23: Encouraging sustainable transport**

Minerals and waste related development should seek to minimise transport movements and maximise the use of sustainable or alternative transport modes. Where possible minerals and waste related development should be located, designed and operated to enable transport by rail, water, pipeline or conveyor.

Minerals and waste related development should be well placed to serve their intended markets or catchment area(s) in order to reduce transport distances and movements in order to support the development of sustainable communities that take responsibility for the waste that they produce and work towards self-sufficiency.

Proposals for new development or development that would result in a significant increase in transport movements should include a sustainable transport statement to demonstrate how the above has been taken into consideration.

7.13 Natural assets and resources are afforded protection and net gains are sought through minerals and waste development and operations. Policy 24 requires developers to undertake assessments to determine if natural assets and resources will be impacted by the development and to maximise the opportunities for environmental enhancements as a result of the scheme.
Policy 24: Natural assets and resources

Minerals and waste development should seek to achieve a net gain in natural assets and resources, through:
- protecting and enhancing international and national designated sites,
- delivery of wider environmental benefits in the vicinity where development would adversely affect locally designated sites or other features of local interest,
- protecting and enhancing green infrastructure and strategic biodiversity networks, in particular the River Nene and other sub-regional corridors, and
- contributing towards Northamptonshire Biodiversity Action Plan targets for habitats and species.

Proposals for minerals and waste development will be required to undertake an assessment (where appropriate) in order to:
- identify and determine the nature, extent and level of importance of the natural assets and resources, as well as any potential impacts, and
- identify mitigation measures and / or requirement for compensation (where necessary) to avoid, reduce and manage potentially adverse impacts.

7.14 Landscape character is often adversely affected by mineral and waste development. Policy 25 “Landscape character” requires developers to carry out a landscape impact assessment based on landscape character assessment and to come up with suitable measures to mitigate potentially adverse impacts and opportunities for enhancement measures.

Policy 25: Landscape character

Minerals and waste development should seek to reflect Northamptonshire’s landscape character. Development should mitigate potentially adverse impacts on the local character and distinctiveness of Northamptonshire’s landscape where necessary during the development, operational life, restoration, aftercare and after-use. Opportunities for enhancement should be maximised through restoration, aftercare and after-use.

Proposals for minerals and waste development will be required to undertake a landscape impact assessment (where appropriate) based on the landscape character assessment in order to identify:
- the presence of landscape values (including their nature, extent and level of importance) and determine any potential impacts,
- any necessary measures to mitigate potentially adverse impacts, and
- opportunities to protect and enhance particular features that create a specific aspect of local distinctiveness or character.

7.15 Policy 26 “Historic environment” seeks to protect Northamptonshire’s historic environment. The most effective protection of the historic environment is through appropriate site selection.

7.16 Policy 27 “Layout and design quality” requires developers of minerals and waste development to design facilities that support local identity and relate well to existing buildings. The use of materials and finishes used locally is encouraged, as is built-in safety and security.
Policy 27: Layout and design quality

The layout and overall appearance of waste management facilities, and where appropriate minerals development, will be required to demonstrate that the development:
- supports local identity and relates well to neighbouring sites and buildings,
- is set in the context of the area in which it is to be sited in a manner that enhances the overall townscape, landscape or streetscape (as appropriate),
- utilises local building materials as appropriate,
- incorporates specific elements of visual interest, and
- builds-in safety and security.

7.17 Policy 28 “Restoration and after use” recognised that often minerals and waste development is of a temporary nature and seeks to ensure that satisfactory reinstatement and after use obligations are imposed on developments of a temporary nature. This reflects the often imposed obligations for developers of renewable energy generating facilities such as wind turbines and solar farms to reinstate the land back to agricultural land after the end of the development’s useful life.

7.18 The Northamptonshire County Council Good Practice Measures document considers a wide range of issues relevant to the design and siting of minerals and waste development, which accords with the requirements of the policies above.

Daventry District Local Planning Policies

Daventry District Local Planning policies are held in the West Northamptonshire Joint Core Strategy Local Plan (Part 1) which was adopted in December 2014.

7.19 Two of the key objectives relevant to the proposals for the development of the anaerobic digestion facility at Wormslade Farm are Objective 12 – “Protecting and Supporting Rural Communities”, which seeks “to protect and support rural communities to ensure they thrive and remain vital”; and Objective 13 – “Rural Diversification and Employment”. This objective seeks to “support rural diversification and rural employment opportunities, in particular those related to agriculture, horticulture and forestry.”

7.20 Local planning policies relevant to these proposals include Policy SA “Presumption in favour of sustainable development”, which reflects the positive approach contained within the National Planning Policy Framework.

7.21 Policy S7 “Provision of jobs” confirms the Council’s commitment to provide 28,500 new jobs in the period 2008 – 2029 in order to maintain a broad balance between homes and jobs and to maintain a diverse economic base.

7.22 The West Northamptonshire Joint Core Strategy Local Plan (Part 1) considers the opportunities for renewable energy technologies. Paragraph 5.104 specifically refers to the potential for generation of renewable energy from energy crops and plant biomass. Paragraph 5.105 identifies some of the potential benefits and negative effects on local communities. As well as the generation of renewable energy, rural diversification, employment opportunities and business opportunities need to be balances against the potential negative effects including transport, landscape and the protection of the environment, (natural and historic) and residential amenity.
5.103 A study has assessed the potential for the full range of renewable energy technologies in West Northamptonshire. With the exception of Northampton, onshore wind energy forms the largest potential renewable resource for West Northamptonshire. At the micro scale, combinations of solar/photovoltaic and heat pumps also have significant potential, especially when combined with fabric improvements to improve the energy efficiency of buildings sought through the Code for Sustainable Homes and BREEAM (Building Research Establishment Environmental Assessment Method) for non-domestic buildings.

5.104 In the central areas of Northampton and Daventry, the greatest heat demand was identified, which could have potential for the development of decentralised energy networks. Daventry and South Northamptonshire were also identified as having potential for the generation of energy from biomass, in particular from energy crops and plant biomass. Northampton, as an urban area also has potential for the use of energy from waste, sewage gas and waste wood.

5.105 The deployment of larger scale low carbon and renewable energy schemes can have a range of positive or negative effects on nearby communities. They could provide landowners with the opportunity for rural diversification, deliver local jobs and opportunities for community based schemes and benefits. However, proposals can have a range of impacts that will vary depending on the scale of development, type of area where the development is proposed and type of low carbon and renewable energy technology deployed.

5.106 When considering planning applications for low carbon and renewable energy, an assessment will need to take account of impacts on landscape, townscape, natural, historical and cultural features and areas and nature conservation interests. Proposals should also use high quality design to minimise impacts on the amenity of the area, in respect of visual intrusion, noise, dust, and odour and traffic generation.

7.23 Policy R2 supports proposals that sustain and enhance rural employment opportunities where they are of an appropriate scale for their location and respect the environmental quality of the area.

Policy R2 - Rural Economy

Proposals which sustain and enhance the rural economy by creating or safeguarding jobs and businesses will be supported where they are of an appropriate scale for their location, respect the environmental quality and character of the rural area and protect the best and most versatile agricultural land. The following types of development are considered to be acceptable:

- The re-use of rural buildings
- Schemes for farm diversification involving small scale business and commercial development that contribute to the operation and viability of the farm holding
- Small scale tourism proposals, including visitor accommodation
- Proposals that recognise the economic benefits of the natural and historic environment as an asset to be valued, conserved and enhanced
- The expansion of businesses in their existing locations, dependent upon the nature of the activities involved, the character of the site and its accessibility
- Small scale employment development to meet local needs
- The use of land for agriculture, forestry and equestrian activity
8. CONSIDERATION OF THE ISSUES AGAINST PLANNING POLICY

The National Planning Policy Framework

8.1 At the heart of the National Planning Policy framework is the presumption in favour of sustainable development. Seldom is any development measured for sustainability as rigorously, and regularly, throughout the lifetime of the development as the anaerobic digestion plant will be under the UK Sustainability Standards. These standards ensure that the operation of the facility, including the importation of feedstock and the export and use of the digestate is continually assessed and meets the required threshold for sustainable operation. Therefore there is a guarantee that the facility will operate sustainably and as such the presumption in favour of the development should be upheld.

8.2 Section 3, paragraph 28 “Supporting a prosperous rural economy“, concerns economic growth and job creation in rural areas. This agriculturally based anaerobic digestion plant proposal will create work locally for farmers and agricultural contractors and estimated 2.5 full time equivalent jobs at Wormslade Farm. The Wormslade Farm facility will provide an alternative outlet for farm produce grown locally, such as maize silage, grass silage and cereal whole crops as well as for manures from local livestock operations.

8.3 The resultant digestate is an excellent fertiliser with low odour content and soil conditioner which will be used in agriculture locally. As artificial fertiliser prices rise and farming incomes fall due to low commodity prices on the world market, the digestate will increasingly become a sought after source of nitrogen, phosphate and potash fertiliser. The proposal diversifies agricultural production by providing an alternative outlet for farm crops and manures which sustains rural employment and the local rural economy and is therefore compliant with paragraph 28 of the NPPF.

8.4 Paragraph 97 of the NPPF states that LPAs should consider identifying areas where renewable and low carbon energy sources and infrastructure can be sited. LPAs are required to approve applications, (unless material considerations indicate otherwise) but only if the impacts of such development are (or can be made) acceptable. This is an existing anaerobic digestion plant site for farm crop and manure bio-methane production, albeit originally for the generation of electricity for the national grid. This proposal is to update the plant to modern, more efficient gas extraction facilities using two circular digester tanks rather than a single concrete rectangular tank. The proposal is to produce renewable energy; bio-methane to supply direct to the national gas grid, in line with Government policy seeking more renewable energy production, and also to help maintain and increase energy security for the UK in the present challenging political climate. The case for increasing low carbon energy production and for improving energy security is contained at 3.11 to 3.17 above.

8.5 The Wormslade Farm site is ideally situated for the production of agricultural crop based bio-methane because of:-

- Very close connection to the gas pipeline network.
- Agreement with the National Grid for connection to the network at this location.
- Existing large agricultural buildings at the site.
- Excellent highway connectivity and network.
- Minimal disruption to traffic in urban areas.

- Rural location essential for the sustainable sourcing, including transportation of feedstocks and digestate which is essential for meeting the UK Sustainability Standards.
- The facility can be readily assimilated into the landscape using existing features and a strong landscaping scheme combined with good design.
- The extent of any impact would be low and highly localised and of a nature where mitigation is available.
- Impacts on neighbouring residential properties and other land uses will be minimal due to this location.

Assessment of County and District Planning Policy Objectives”

8.6 Climate change is a significant issue facing everyone and can only be tackled by making changes, such as to how energy is produced. Decentralised renewable energy production is good for addressing climate change and for diversifying and strengthening the local rural economy by providing jobs for local people and income for local business such as farmers, agricultural contractors, rural service industries, and installers of anaerobic digestion plants, such as Envi-Tec Ltd. Investment in the private sector to create employment opportunities is a key issue identified in local planning policies.

8.7 The Northamptonshire County Council Minerals and Waste Local Plan policy 12 “Spatial strategy for waste management” acknowledges that not all waste applications are compatible with the central spine and urban areas. Agricultural anaerobic digestion plants are not compatible with urban development, due to partly to the land area required to accommodate the feedstock clamps and digestate storage vessels. Urban areas are not suitable due to the operational requirements of the plant such as the transportation of feedstock, often outside of normal working hours during harvesting times. Agricultural vehicles are not compatible with urban traffic flows. Consequently, farm crop based anaerobic digestion plants would conflict with other urban or urban fringe land uses and traffic flows. Because of these reasons a rural location, near to where feedstocks can be sourced, and land is available nearby to benefit from the digestate as organic fertiliser is the most appropriate location for such schemes.

8.8 The location of the anaerobic digestion plant at Wormslade Farm is associated with existing rural employment in the locality, and will help to sustain jobs in agriculture, agricultural contracting, and the supply industries such as machinery dealers, agricultural engineers, and other suppliers servicing these rural industries.

8.9 Policy 13 Development criteria for waste management facilities (non-inert and hazardous) requires there to be an identified need for the facility. Section 5 of this Statement addresses the issue of need for renewable energy sources, and if that need can be partly met by using material considered as waste (manures), through preliminary treatment (screening and mixing with other feedstocks) before the extraction of bio-gas, the facility is consistent with Policy 13 criterial requiring the maximisation of energy, heat and residues from waste material. The production of bio-methane through anaerobic digestion is safe and suitable for farm diversification projects. The Friends of the Earth Guildford and Waverly group has prepared a useful technical briefing about anaerobic digestion plants which describes the bacterial process and the use of energy crops such as maize and grass silage, and slurries and manures to produce bio-methane. The guidance note confirms that the
removal of impurities and injection of the gas to the gas grid is more efficient than on-site electricity production.

8.10 Non-allocated sites in rural areas (particularly composting and anaerobic digestion) are considered acceptable if they are appropriately located to the source of the waste under this policy. The Wormslade Farm site is appropriately located to receive the feedstock (including the waste element) and to distribute the resulting digestate back to the fields as liquid fertiliser. The digestate will meet PAS 110 accreditation requirements.

8.11 Policy 22 “Addressing the impact of proposed mineral and waste development” seeks to protect Northamptonshire’s natural resources, including heritage assets. An Ecological assessment of the site and impact of the proposals has been undertaken by Christopher Seabridge & Associates.

8.12 The marginal loss of ecological habitat including the loss of some trees will be off-set with the Landscaping Scheme, including the proposal to translocate the hedge to the northern site boundary and to plant substantial numbers of native species trees. Translocation will minimise the adverse effect of actually removing and replanting the hedge. Existing hedges will be reinforced with native species. A new attenuation pond will provide additional habitat variety for a range of species including insects, amphibians, small mammals and birds.

8.13 The potential impact from flood risk have been assessed by Senior hydrologist, Chris Nugent of Hydrological who has considered the impact of the development in terms of National Planning policy Framework and local Planning Policy. The site is located in Flood Zone 1 and therefore the Sequential and Exception tests are not required. The assessment then went on to consider the management of surface water and recommends the segregation of water not likely to be polluted, (white water) from water that could be polluted (black water). White water is from areas not likely to be in contact with feedstock (silage and manures) and is collected into the attenuation pond for gradual release into the adjacent ditch. Black water is collected and stored in sealed bagged storage lagoon. It can be used as digestate in the plant and then eventually goes to the digestate store before being used as liquid fertiliser.

8.14 The appearance of the digesters, silage clamps, liquid intake tank and buildings is of contemporary agrarian design which is emphasised through the use of concrete, juniper green profiled sheeting and the use of dark grey colours for the fabric covers of the digesters.

8.15 The proposed anaerobic digestion plant will require improvements to the existing access road and visibility splays on to Clipston Road. Clipston Road to the junction will require widening by up to 1 metre, and the radius to the junction increased to 14m and 15m respectively.

8.16 The location of the site away from residential dwellings was a factor in selecting this site. Loss of residential amenity was a serious consideration when selecting the site for the anaerobic digestion plant.

8.17 Landscape and Visual Impacts were assessed in Allan Moss’ Landscape and Visual Impact Assessment report. In terms of the “Assessment of Landscape Effects” the proposals were summarised in table 6. The effects on landscape over the long term
were found to be considered to “moderate adverse” at worst. The gain of new trees and hedging was considered to be “minor beneficial” effect in the long term.

<table>
<thead>
<tr>
<th>Effect</th>
<th>Sensitivity of Landscape Receiver</th>
<th>Magnitude of Landscape Effect</th>
<th>Duration &amp; Reversibility</th>
<th>Level of Landscape Effect</th>
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<tbody>
<tr>
<td>Loss of agricultural land</td>
<td>Local</td>
<td>Medium</td>
<td>Low</td>
<td>Long Term</td>
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<tr>
<td>Loss of hedges</td>
<td>Local</td>
<td>Medium</td>
<td>Low</td>
<td>Short Term</td>
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<tr>
<td>Gain of new trees &amp; hedgerow planting</td>
<td>Local</td>
<td>Low/Medium adverse</td>
<td>Low</td>
<td>Long Term</td>
</tr>
<tr>
<td>Changes to landscape character</td>
<td>Local</td>
<td>Medium</td>
<td>Medium</td>
<td>Long Term</td>
</tr>
</tbody>
</table>

8.18 The LVIA assessed the impact on public and privates views. Visual impacts from the road to Clipston are considered high adverse but localised, mainly due to the requirement for landscaping measure to become established. This is why the Landscape Architect has recommended the translocation of the hedge along this boundary to hasten the establishment of the field boundary hedge to reduce the impacts.

8.19 Views from residential properties are also considered. Mr Moss’ report states that :-

“Whilst the visual effects of the proposed development on residential properties at Great Oxendon may be raised by local residents, as explained in Section 10.0 there is no provision in planning law to protect such views. It is unlikely therefore that such issues would be regarded as key decision making issues. The overall level of visual effect on these properties is therefore considered to be Minor adverse.”

8.20 Notwithstanding the statement above, the developers have taken note of the concerns raised at the public consultation meeting held on 12 November at great Oxendon Parish Hall where local residents saw the draft proposals and commented about being able to see the plant from their homes in the village. The developers have taken this on board and reduced the height of the digester tanks, being the tallest component parts of the development by a significant amount in order to address this issue. Details of the height of the digester relative to the existing farm buildings can be seen clearly on plan ref:- Site Scene Elevations Ref: P15- WORMSLADE -AD-008.
8.21 Crops are grown on fields and transported, often long distances to their place of processing or consumption. The growing of crops for feedstock to supply an anaerobic digestion plant that has to meet the requirements of the UK Sustainability Standards. The UK Sustainability Standards will be used to measure the level of sustainability of various parts of the anaerobic digestion process including the growing of crops, fertiliser inputs, energy expended in growing and transportation to the facility and use of the resultant digestate. These Standards will ensure the reduction in carbon footprint for the renewable energy produced when compared with fossil fuel equivalents, and the long-term sustainability of the development in terms of operational performance, and will additionally help to ensure sustainable renewable de-centralised energy production in this locality.

8.22 The transport Statement which accompanies this application quantifies the number of large vehicle movements associated with feedstocks and digestate on a weekly basis over a period of year. The maximum number of vehicle movements is 21 per day, less than two per hour in a typical 12 hour harvest day. Vehicle movements on the nearby A508 have reduced very significantly over the past 14 years (28% for HGV and 13.25% for all vehicles) and therefore it is reasonable to assume that this road has the capacity to deal with the vehicles arising from this development.

8.23 A landscape impact assessment has been carried out in accordance with the requirements of Policy 24. Please refer to the LVIA by Mr Allan Moss.

8.24 Policy 25 “Landscape character” requires the Landscape Assessment to consider landscape values, including their significance, and potential mitigation of impacts and to also consider opportunities to protect and enhance particular features of the landscape character. The LVIA has identified landscape character and landscape
value and susceptibility before assessing the impact of the proposal and making recommendation for mitigation and protection of the landscape.

8.25 Policy 26 “Historic environment” seeks to protect heritage assets that are identified as being at risk from the minerals or waste development. Assets on the site of proposed development as well as the setting of those heritage assets nearby should be considered. In light of the location of the development it is considered that the proposal will not affect Listed Buildings or Scheduled Monuments. A recent archaeological dig on the field immediately to the south of the application site revealed very little and therefore at this stage the applicant respectfully suggests that a pre-commencement planning condition is considered, requiring a sequential approach to investigations, starting with a desk based assessment of the area.

8.26 Layout and design quality criteria set out in Policy 27 is met through the use of buildings and structure of agricultural appearance and the use of materials often found on local farms such as green profiled steel sheets, concrete and fibre-cement roofs. The development has to be functional and this limits the opportunities for innovative or traditional materials, however the good quality layout including pond and trees will help to assimilate the development into the landscape.

8.27 These proposals have a design life expectancy of some 25 years, therefore they are considered permanent. The developers considered the option of demolition and reinstatement of the site back to agriculture, but recognised that in 25 years the trees and hedges will be nearing maturity and very little would be achieved by bulldozing the embankments to reinstate the field. Ecological and environmental harm would most likely outweigh the benefits of reinstatement.

8.28 The West Northamptonshire Joint Core Strategy Objective 12 Protecting and Supporting Rural Communities (“to protect and support rural communities to ensure they thrive and remain vital”). Objective 13 Rural Diversification and Employment” seeks to support rural diversification and rural employment opportunities, in particular, those related to agriculture, horticulture and forestry.

8.29 Policy SA “Presumption in Favour of Sustainable Development” advocates a presumption in favour of sustainable development where any adverse effects can be mitigated for by the applicant, or the benefits of the proposal outweigh any such significant effects. This proposal is for the sustainable production of renewable energy from farm crops and manures derived from local sources which is recognised as a positive activity because not only with this proposal contribute to the requirement for more renewable heat production (gas to grid is considered renewable heat production), to meet the obligation HMG has to the European Union to increase renewable energy consumption to 15% of total consumption, by 2020, it will also provide alternative markets, and certainty in pricing for local farmers, therefore sustaining agriculture in the locality. Jobs will be sustained and created as a result of the proposals, both during the construction phase and during the operational phase of the development.
9. CONCLUSION

9.1 Potential adverse effects are considered to be relatively low at this location and the adverse effects that do arise can be mitigated for as part of the scheme design which includes lowering the overall height of the tallest components keeping odour to a minimum and by storing digestate in bags rather than open lagoons. High quality design is a key principle of the Good Practice Measures document, in particular consideration of the landscape and use of high quality materials and finishes when designing the facility. The proposal is agrarian in design, with silage clamps, dirty water lagoons, buildings identical to agricultural buildings in terms of design and the use of materials commonly found on farm buildings, and cylindrical structures similar to those used on livestock farms.

9.2 The modern and efficient production of bio-methane from farm crops and manures is virtually odourless. This is confirmed in the Friends of the Earth technical briefing (para 94). There is no significant increase in noise levels over and above those normally encountered on a working farm, mainly from the loaders feeding the plant and vehicle movements which are activities associated with rural farming activities; therefore there will be no significant impact on nearby residential amenity.

9.3 The site will benefit from leakage detection technology for the liquid digestate stores and surface water tanks to ensure protection of local water resources. All surface water will be segregated according to whether it is clean or potentially dirty water. Clean surface and roof water will be directed to soakaways and dirty water to the liquid digestate storage facilities. Silage clamps will contain effluent storage tanks and the effluent will be pumped to the digester tanks as feedstock. Therefore the facility will have no impact on the integrity of the water environment.

9.4 The plant is expected to require approximately 46,000 tonnes of feedstock crops each year. The UK Sustainability Standards, and economics dictate that preference will be for local farmers to produce maize, grass and whole crop cereals for ensiling for use as feedstock rather than bringing feedstock from further afield. As and when required, manures and slurries will also be sourced from local livestock farmers.

9.5 This proposal is to develop modern, efficient gas extraction facilities using two circular digester tanks and ancillary cutting edge technology for cleaning and processing the gas produced. The proposal is to pressurise the bio-methane and inject it directly into the nearby national gas grid to supply domestic and business consumers.

9.6 Whilst the principle of the requirement for renewable and low carbon energy production is well established, planning policy requires developers to choose sites for renewable energy production carefully to minimise impacts from the development on the landscape character, visual impact and the amenity of nearby residents. Potential adverse impacts of the development on wildlife and the setting of heritage assets such as listed buildings, ancient monuments and archaeological assets are also important material considerations in determining applications. It is considered that this proposal at Wormslade Farm meets these requirements.

9.7 The request made to Northamptonshire County Council in October 2015 for a Screening Opinion under The Town and Country Planning (Environmental Impact Assessment) Regulations 2011 concluded that that the development is not Environmental Impact Assessment development.
9.8 It is essential that a rigorous site selection process has been adopted to ensure that the anaerobic digestion plant is well located to agricultural land to enable local supply of feedstock and the satisfactory disposal of the liquid and solid digestate to meet the recently introduced UK Sustainability Standards. These standards ensure that such facilities are truly sustainable and operate using locally sourced feedstocks grown using digestate rather than manufactured fertilisers. Under these standards each operator needs to demonstrate, through regular audited returns, that the plant uses sustainably sourced feedstocks. This ensures supplies are sourced locally and grown using digestate to replace artificial fertilisers.

9.9 The site is capable of assimilating the development into the landscape due to the close proximity of existing buildings forming a backdrop to the development and existing screening of the site from the A508 highway in easterly and westerly directions. Additional landscaping including the planting of a new native species trees along the eastern (A508) side and the north side of the development will help to screen the development. In order to help with quick establishment of screening it has been recommended that the Clipston Road hedge be translocated to the new position following the establishment of suitable visibility splays and junction improvements with the A508.

9.10 The site is sufficiently distant from residential dwellings and protected buildings to not have a significant impact on nearby residential amenity arising from odour, dust or noise form the site.

9.11 The proposal is measurably sustainable, not least through the recently introduced UK Sustainability Standards, and therefore is considered sustainable development for the purposes of the National Planning Policy Framework and Northamptonshire’s Minerals and Waste Local Plan. The proposal accords also with the West Northamptonshire Joint Core Strategy Objectives 12 and 13, and policies S7 and txt at paragraph 5.104 to 5.106.

9.12 The proposal accords with national and local planning policies in terms of the development objectives, the assessment of potential impact and mitigation and protection measures both through the design and through suitable worded planning conditions governing both the development and the operation of the facility.

Phil Plant
Mid West Planning
November 2015
10. REFERENCES


APPENDIX ONE

GOOD PRACTICE MEASURES–PRINCIPLES FOR THE DESIGN OF MINERALS AND WASTE DEVELOPMENT
# Good Practice Measures - Principles for the Design of Minerals and Waste Development

<table>
<thead>
<tr>
<th>High quality design</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Consideration of landscape and townscape character (Northamptonshire Environmental Characterisation Process - ECP) and rural proofing.</td>
</tr>
<tr>
<td>- Reflect scale, mass and design of existing buildings.</td>
</tr>
<tr>
<td>- Low key external appearance in context with surrounds. Includes shape and size of built form (e.g. buildings, roof pitch and other structures), colour treatments on facades, fencing and gates (neutral or those that blend into the landscape, avoid colours that are light-reflective), as well as the use of high quality materials (materials should be fit-for-purpose yet still consistent with the styling of the various other components of the built form, for e.g. specific to fencing the use of powder coated mesh, palisade or vertical bars are considered high quality whereas chain link, galvanised steel palisade, concrete posts and barbed wire are not).</td>
</tr>
<tr>
<td>- Innovative design and technologies addressing the SPD design principles.</td>
</tr>
<tr>
<td>- The level of investment in high quality and innovative design measures and technologies should reflect the life of the building and nature of operations and be of a scale that is both reasonable and practicable. That is, long-term or permanent buildings and structures require higher quality of design and innovation than those of a temporary nature. However, temporary buildings, structures and plant are still required to incorporate the SPD design principles.</td>
</tr>
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<table>
<thead>
<tr>
<th>Holistic design</th>
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<tbody>
<tr>
<td>- Consistent architectural treatment applied to all components of built form, such as matching styles for fencing and gates that also complements main components of built form and landscape.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Local distinctiveness</th>
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<tbody>
<tr>
<td>- Consideration of landscape and townscape character (Northamptonshire Current Landscape Character Assessment - LCA and ECP).</td>
</tr>
<tr>
<td>- Consideration of local architectural styling.</td>
</tr>
<tr>
<td>- Use of appropriate materials, locally sourced where possible (for example materials, colour treatments, landscaping, etc) which reflect the local built and natural environment.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental protection and enhancement</th>
</tr>
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<tbody>
<tr>
<td>- Avoid adverse environmental impacts and where necessary employ mitigation measures to reduce environmental nuisance and pollution, or alternatively compensatory measures (on or off site) for residual impacts that cannot be mitigated for.</td>
</tr>
<tr>
<td>- Minimise building and infrastructure footprint to reduce adverse biodiversity and amenity impacts.</td>
</tr>
<tr>
<td>- Maximise habitat creation and nature conservation opportunities. Consideration of Biodiversity Action Plan (BAP) and Biodiversity Character Assessment (BCA).</td>
</tr>
<tr>
<td>- Application of appropriate soil handling strategies.</td>
</tr>
</tbody>
</table>

### Good practice measures

**Principles for the Design of Minerals and Waste Development**

- Protection and enhancement of waterways (specifically quality and availability of water resources).
- Retain existing or important trees and hedgerows where possible.
- Conservation and enhancement of significant environmental and archaeological features (includes individual sites or features and the wider environment) (Historic Landscape Character Assessment HLCA and ECP).

### Sustainable development

- Waste minimisation and sustainable waste management methods.
- Maximise use of existing features including buildings, infrastructure and components.
- Sustainable procurement.
- Design for deconstruction.
- Materials resource efficiency.
- Use of energy efficient technologies.
- Minimise greenhouse gas emissions.
- Ensure no increase in flood risk.
- Use of materials with reduced pollution potential and low life cycle impacts.
- Use of materials and components that are able to be re-used or recycled including the use of 10% (by value) recycled products in construction projects.
- Use of locally sourced materials.
- Sustainable water management methods (e.g. SuDS).

### Strategic site layout

- Strategic location of buildings (specifically operational and storage areas), plant, buffers, etc to assist in protection of amenity.
- Consideration of broad landscape impact and context, including views from existing rights of way and other important vantage points.

### High quality landscaping and boundary treatments

- Complement and enhance local landscape character (LCA and East Midlands Green Infrastructure Strategy - GI), in doing so avoid creation of monotonous uninteresting boundaries.
- Establish or enhance connectivity between landscape and townscape.
- Where appropriate landscape features (both hard and soft) may act as screening or visual buffers (e.g. sensitive ground modelling where appropriate, off-site planting, vegetative screens, etc).
- Use native species of local provenance.
- Retain existing or important trees and hedgerows where possible.
- Maximise opportunities for habitat creation, corridor connectivity and enhancement of the historic environment and biodiversity (BAP targets and BCA).
- Provision of adequate space, management and maintenance resources.
- Provision of management measures relating to pest and erosion control.

### Effective buffers

- Buffers may be either physical or visual and, where appropriate, may include combinations of landscape features, boundary treatments, and other low level functions.
<table>
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<th>Good practice measures</th>
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<tbody>
<tr>
<td>Principles for the Design of Minerals and Waste Development</td>
</tr>
</tbody>
</table>

(e.g. car parks). Requires provision of adequate space to allow for buffers between development and sensitive areas.

- Consider the use of buffers to create habitats and contribute towards BAP targets
- Public access opportunities in buffer zones should be maximised where possible and safe to do so (e.g. public rights of way).
- It may be possible to combine design components of the built form and strategic site layout to allow for the development to act as a physical buffer between sensitive areas and more intrusive land-uses, such as residential and heavy industry and major transport or infrastructure networks, or agricultural land and urban sprawl.
- Buffers may be required during development and/or operations to protect historic assets and other historic sites or buildings, including the protection of sites that may be adversely affected by dewatering (this would also apply to some biodiversity sites), as well as the use of buffers for the longer term protection of the setting of historic sites, buildings or areas from any adverse impacts of landscape change.

### Lighting

- Minimise environmental nuisance associated with light pollution through consideration of strategic site layout (locate highly lit areas located on less sensitive aspects), or mitigation measures such as screening. Maximise benefits associated with lighting such as opportunity for lighting to be included as part of the design or architectural treatment.

### Site access

- High quality landscaping and boundary treatments.
- High standard of maintenance and general “house keeping” of public access areas, car parks, wheel wash facilities, vehicle access, reception, security buildings, signage and associated landscaping features (may assist in increasing public perception of operations).
- Retain public rights of way where possible. Compensatory measures may need to be investigated where retention is not a viable option.

### Sustainable transport

- Reduce reliance on road transport through use of alternate transport methods (such as rail, waterways and conveyor).
- Increase efficiency of transport methods.
- Maximise opportunities for increasing use of sustainable transport methods (e.g. staff access to public transport, bicycle access and related facilities).

### Integrated development

- Co-location of facilities where possible.
- Locate facilities in proximity to related industry or source, where possible.

### Public safety

- Access and movement: places with well-defined routes, spaces and entrances that provide for convenient movement without comprising security.
- Structure: places that are structured so that different uses do no cause conflict.
- Surveillance: places where all publicly accessible spaces are overlooked.
- Ownership: places that promote a sense of ownership, respect, territorial responsibility and community.
Good practice measures
Principles for the Design of Minerals and Waste Development

- Physical protection: places that include necessary, well designed security features.
- Activity: places where the level of human activity is appropriate to the location and creates a reduced risk of crime and a sense of safety at all times.
- Management and maintenance: places that are designed with management and maintenance in mind, to discourage crime in the present and the future.
- Consideration of potential arson risk through design, security and site management measures.
APPENDIX TWO

PROPOSED SITE LAYOUT PLAN
(NOT TO SCALE)
APPENDIX THREE

ENVITEC BIOGAS WEBSITE EXTRACT
EXAMPLES OF ANAEROBIC DIGESTION PLANTS BUILT BY ENVITEC BIOGAS UK

Rogerstone
Capacity: 499 kWe
Feedstock: Food waste from the RF Brookes and effluent sludge
Location: Insorce Energy - Rogerstone, Caerphilly, Gwent
Commissioned: 2011
Input: 18,000 tonnes per annum

Stowell Farms
Capacity: 499 kWe
Feedstock: Farm slurry and sustainable crops
Location: West Stowell
Commissioned: 2012
Input: 15,000 tonnes per annum
Output: Combined heat & power
Buttermilk Hall Farm
Capacity: 1067 kWe
Feedstock: Sustainable crops (maize)
Location: Baldock Road, Buntingford, SG9 9RH.
Commissioned: 2012
Input: 20,000 tonnes per annum
Output: Combined heat and power
Further information: See http://hallwickenergy.com

Trinity Hall Farm
Capacity: 1067 kWe
Feedstock: maize and farm residues
Commissioned: 2012
Location: Trinity Hall Farm, Leighton Buzzard, Hertfordshire
Input: 20,000 tonnes a year
Highlights: Long-term, stable income from Feed in Tariffs, short return on investment, soil improvement, crop diversity
Melrose Farm
Capacity: 499 kWe
Feedstock: pig slurry, maize silage and grass silage
Commissioned: 2012
Input: 8000 tonnes pig slurry plus 8000 tonnes silage a year
Highlights: five-year return on investment expected, business planning predictability, slurry lagoon storage eliminated, long-term revenues from Feed in Tariffs

Station Works
Capacity: 1067 kWe
Feedstock: maize and farm residues
Location: Station Works, Thaxted, Essex
Commissioned: 2012
Input: 20,000 tonnes a year
Highlights: Long-term, stable income from Feed in Tariffs, short return on investment, soil improvement, crop diversity

EnviTec Biogas UK Ltd. Colton Road, Rugeley
Staffordshire, WS15 3HF
© 2014 EnviTec Biogas AG
PLAN SHOWING LANDOWNER LAND AVAILABLE FOR FEEDSTOCK PRODUCTION AND DIGESTATE USE.
DESIGN AND ACCESS STATEMENT IN RELATION TO THE PLANNING APPLICATION FOR THE INSTALLATION AND OPERATION OF AN ANAEROBIC DIGESTION FACILITY INCLUDING THE ERECTION OF SILAGE CLAMPS, DIGESTER TANKS, TECHNICAL BUILDING, GAS FLARE, WEIGHBRIDGE AND SITE OFFICE/WELFARE BUILDING AND THE INSTALLATION OF ANCILLARY PLANT AND EQUIPMENT, ALTERATIONS TO THE HIGHWAY ACCESS AND INTERNAL ROAD, INSTALLATION OF LAGOONS AND ATTENUATION POND, HIGHWAY IMPROVEMENTS AND LANDSCAPING AND ENVIRONMENTAL ENHANCEMENT MEASURES

AT

WORMSLADE FARM
CLIPSTON ROAD
KELMARSH
NORTHAMPTONSHIRE
LE16 9RX

Prepared by:

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November 2015
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Design and Access Statement – Proposed Anaerobic Digestion Plant at Wormslade Farm. November 2015
1. **INTRODUCTION**

1.1 This report has been produced by Philip Plant of Mid West Planning Ltd and is based on the guidelines as set out in the CABE publication: ‘Design and Access Statements: How to write, read and use them’ 2006.

1.2 Philip Plant holds a Bachelor of Science with Honours Degree in Rural Enterprise and Land Management and is a member of the Royal Institution of Chartered Surveyors.

1.3 Philip Plant is a Director of Mid West Planning Limited and is a former employee of ADAS and Acorus Rural Property Services. Mid West Planning Ltd has been established for over five years and specialises in rural planning consultancy to both the private and public sectors.

1.4 The preparation of this report by Mid West Planning Ltd has been commissioned by the applicant; Mr Stuart Homewood of Raw Biogas Ltd. Raw Biogas Ltd has entered into contractual arrangements with the landowner to lease the site for the development on a long lease.

Plate One: Location of application site at Wormslade Farm

1.5 The site is located in open countryside at Wormslade Farm, Clipston Road, Kelmarsh, Northamptonshire, LE16 9RX. Wormslade Farm extends to approximately 80.40 Ha (198.65 acres) of owned land. Please see Plate One
above which shows the location of the site to the west of the A508 highway, and south of Clipston Road.

2. USE

2.1 The farmland within the application site is all currently in arable production. In immediate proximity to the west and south of the site is a range of agricultural buildings including the grain storage and drying facility which is shown in Plate Two.

**Plate Two:** Photograph showing the existing grain storage and drying building.

**Plate Three:** Photograph of the Dutch Barn to the south of the site.
2.2 The Friends of The Earth (Guildford and Waverly) has produced a very informative technical briefing about anaerobic digestion which explains how the process works and what the main issues are including feedstocks and digestate. This document is submitted with this application for information purposes.

2.3 The proposed anaerobic digestion facility will use feedstock from the landowners remaining 75 hectares which is adjacent to the site and in very close proximity, as well as locally sourced farm produce to generate bio-gas which will be cleaned and injected as bio-methane into the National Grid gas network which is located to the east of the A508. Gas-to-grid gas production is more efficient than generating electricity with it and is one reason why this site is perfectly located for efficient renewable energy production and distribution.

2.4 The recently introduced UK Sustainable Standards for the operation of the anaerobic digestion facility ensure that the operation, including the supply of feedstocks and disposal of the digestate is carried out to the highest standards of sustainable production. These standards are in place to ensure that renewable energy production is in fact sustainably achieved. In order to meet these standards the operator of the facility will have to prepare audited reports about where the feedstock is sourced, where the digestate is disposed of, and how the plant is run. Only using locally sourced feedstock and using the digestate as a fertiliser replacing artificial fertilisers will meet the required level of sustainability, therefore it is essential to source feedstock from the immediate locality. This will also result in fewer road miles than crops such as wheat, barley and oilseed rape, which are currently taken to places much further afield for processing and consumption.
2.6 Please refer to the Planning Statement for details about the reasons for renewable energy generation, and for planning policy considerations relating to this development.

3. **AMOUNT & SCALE**

3.1 The application site is approximately 5.33 Ha. (13.17 acres). The proposal is to develop a mainly farm crop based anaerobic digestion plant which will produce an average of approximately 450 cubic metres of bio-methane per hour and 600 cubic metres per hour maximum output. Crops will include in approximate proportions, 16,000 tonnes of maize silage, 16,000 of rye wholecrop silage, 5,000 tonnes of grass silage and up to 5,000 tonnes of agricultural animal excrement (waste).

3.2 The main features of this development are summarised below:

- Two digester tanks each 31.31m diameter by 8.00m high with gas domes extending 4.94m high above; and associated feeders, mixing units and intake tank. It is understood that the floor level of these tanks will be set approximately 3.0m below the reduced ground level which is equal to approximately 4.6-6.7m below the original sloping field ground levels. Due to the difference in ground levels across the site the top of the gas dome is therefore likely to be about 2.1m lower than the ridge of the existing farm storage building and about 3.8m lower than the ridge of the nearby open barn.
- 4 silage clamps each 119.00m x 20.00m x 5.50m high with a safety barrier 1.00m high on top of the walls. Concrete apron 80m x 15m to open side of clamps.
- 3 bagged digestate stores set into earth banked lagoons (each 50.00m x 25.00m);
- 1 black water bagged system set into earth banked lagoons, and one white water attenuation pond.
- 1 Technical building to house the feeders and CHP Unit 37.20m x 14.28m x 4.4m to eaves and 5.5m max.
- Various items of ancillary plant and equipment including a gas flare stack(6.25m), a CHP container, biogas upgrading and control systems, a separation container, rack tanks, a recirculation container, network entry facility, odourant equipment, pumping station and manifolds for water management, a transformer, propane tanks and a weighbridge.
- An office/welfare building (8.00m x 8.00m x 4.07m height to ridge).
- A new farm entrance area with alterations to the entrance and visibility splays.
- Existing roadside hedge translocation at the site entrance to accommodate works to improve the highway visibility splays.
- A graded 1:10 bund with large scale landscape planting including a perimeter hedge with trees.

3.3 Plan reference P15-WORMSLADE-AD-003 submitted with this planning application shows the extent and arrangement of the proposed anaerobic digestion facility. An extract from this plan is at Plate Five below.
3.4 The plan also shows the proposed alterations to the access road and the extent of the new translocated hedge and new tree planting proposals. The recommendations contained within the Landscape and Visual Impact Assessment have been adopted in the planting scheme. Appropriate indigenous species should be used for all the new tree and hedgerow planting proposed in order to respect the character of the surrounding countryside and to maximise wildlife potential. A proportion of quicker growing species such as Aspen could be incorporated into the woodland mix in order to speed up the screening effect, but climax species such as Oak and Field Maple should be the dominant species for the long term.

4. LAYOUT

4.1 The site plan (P15-WORMSLADE-AD-003) contained below at Plate Five shows the general arrangement layout of the site. For full details please refer to the site plan.

Plate Five: Extract from site layout plan.
5. **APPEARANCE**

5.1 The development is well connected to the existing range of buildings at Wormslade Farm which help to screen the development from views from the west. Views from the east are also well screened by the existing hedge alongside the A508. There are no views from the south due to the form of the land adjacent to the site.

5.2 Additional planting will further enhance the screening of the development. Views from the Clipston Road to the north of the site are distant views of the farmyard and are obscured very effectively from the hedgerows and trees that exist.

5.3 The proposed anaerobic digestion facility is well screened from the nearest residential and public vantage points (south and west) by the existing tree cover and will be further screened by the proposed translocation of the existing hedge and the planting of a new native mixed species trees on shallow gradient (1:10) banking as shown at Plate Six.

5.4 Envi-Teck Ltd has prepared "Site Scene Elevations" (P15-WORMSLADE-AD-08) of the views from the east and west viewpoints which give a reasonable assessment of the visual impact the scheme may have. These elevational plans demonstrate the efforts made by the developers to minimise the visual impact and impact on the landscape by reducing the level of the bases of the digesters resulting in significant reduction of overall height to less than the existing buildings and structures on site.

5.5 The reduction in height of the tallest structures will also allow the landscaping proposals to reach a point whereby the translocated hedge and new tree planting will screen the development more quickly than otherwise possible.

Plate Six: Site scene elevations.
6. **ACCESS & PARKING PROVISION**

6.1 Access to the site will be along the Clipston Road. Pre-application consultation with Verity Chilver, Development Management Engineer at Northamptonshire Highways Department resulted in advice about the required visibility splay from the site on to Clipston Road, and the widening of the road to the junction with the A508. Any works necessary at the site access and any carriageway widening proved to be required would need to be carried out by the developer under a Section 278 Agreement with the local highway authority.

6.2 The junction with the A508 will require improvement which will be of benefit to the community, particularly Clipston village.

6.3 The application includes a Transport Statement which identifies the reduction of HGV movements by 28%, and all vehicle movements by around 13.25% between 2000 and 2014. The Transport Statement identifies the number of vehicle movements likely to occur as a result of the development throughout the year. During the operational period, the proposal will not result in any significant additional traffic generation (maximum less than 2 per hour in peak harvest periods in a 12 hr day) than is normally associated with a large commercial farming enterprise and is considered acceptable in terms of highway capacity.

6.4 Fully inclusive access provision will be required as a part of the building regulation application process as the site will be open to the public. As such the proposed office/welfare room incorporates level access to the main openings and ramps to the emergency means of escape doors. Disabled toilet facilities are also included in the design of the office/welfare building.

6.5 Parking provision will be made for three cars or light vans used by workers at the facility adjacent to the technical building. Three parking places will also be situated near to the office/welfare building for visitors to the site. In addition, parking for two HGVs or tractors and tankers will be made available at suitable locations on the hard standing within the site area.

**Phil Plant BSc (Hons) MRICS**  
Planning Consultant  
Mid West Planning Ltd.

November 2015.
Anaerobic Digestion

a technical briefing

for local group campaigners

NOVEMBER 2012
INTRODUCTION - WHAT IS ANAEROBIC DIGESTION?

Anaerobic Digestion (AD) is a biological process in which bacteria digest organic matter in a sealed vessel so it is deprived of air. The decomposition of the organic matter produces biogas. The composition of biogas varies, but typically comprises 55% biomethane, 40% CO₂ and 5% other gases, including hydrogen sulphide (H₂S) and traces of ammonia (NH₃). Within an anaerobic digester this process is contained - which means that the biogas can be collected and used to generate renewable energy.

The digester is run to maximise the proportion of biomethane in the biogas.

AD is a natural process that occurs, for example, when you see bubbles coming up in a garden pond. It has been used in the UK since Victorian times for sewage and waste water treatment – sewage gas was used in 1895 in Exeter to light the City’s streetlights. The Anaerobic Digestion Portal¹ states there are currently 91 sewage works in the UK using AD.

AD should not be confused with in-vessel composting (IVC), which is an aerobic process. Both involve bacterial action but the bacteria, processes, feedstocks and outputs are very different. While green garden waste can be disposed of using IVC, the AD process is not suitable for disposing of green garden waste due to the levels of lignates. The regulatory regimes, machinery and risk factors are also different.

GENERAL LAYOUT OF AN ANAEROBIC DIGESTER

The diagram below illustrates a generic AD plant and the process.

1. A wide range of organic matter can be used, although digesters like stability so consistent supply of material with limited variation is desirable. The organic matter is generally referred to as “feedstock”. This is discussed further below.
2. A 50,000 tonnes per annum AD plant might require an 11 metre high cylinder with a base diameter of 30 metres. However, the design of AD plants is changing all the time. Some

¹ See page 19 “Other Sources of Information”
new and innovative designs incorporate fully recyclable plastic tanks as well as an increased emphasis on low carbon build and operation. More attention is also being paid to the aesthetics – for example some AD tanks are horizontal rather than vertical and these tanks are mostly buried underground, removing the need for 9-12 metre towers.

**THE ANAEROBIC DIGESTION PROCESS**

3. Once in the digester vessel, the feedstock is stirred or agitated to enable the organic matter and bacteria to mix. There are four key processes performed by different bacteria:
   - Hydrolysis
   - Acidogenesis
   - Acetogenesis
   - Methanogenesis

4. The AD process is not fast. Organic matter can be in the digester for 30 to 60 days (known as the retention time). There are advantages to having as high a retention time as possible (e.g. more gas collected and less smelly digestate), but these are offset by the higher capital costs of bigger tanks. In simple terms this means that doubling the retention time from 30-60 days requires double the tank capacity. Typically, longer retention times apply to slurries where an animal has already digested the material and the AD process is in effect secondary digestion.

5. The other driver of digester size is the volatile solids loading. This varies according to the design of digester and the feedstock.

6. The tank needs heating as the bacteria thrive at elevated temperatures. There are two possible regimes –
   - **Mesophillic**, which thrive at around 39°C and
   - **Thermophillic**, which are happier at 55-60°C. The heat required to raise the organic material/contents of the digester to this temperature is significant, as are the thermal losses. This has significant energy and cost implications. The overwhelming majority of plants operate in the **mesophillic** range.

7. If a digester loses temperature the biogas yield falls as bacterial activity diminishes. If the temperature loss is substantial or protracted bacteria start to die. If the biogas yield falls recovery takes time, possibly months, as the numbers of bacteria have to grow through reproduction. An AD operator is in fact a bacteria farmer – success depends upon being able to provide feed and a convivial environment for the “bugs”.

8. To ensure that the various species of bacteria have constant access to nutrients, digester contents are agitated either by mechanical pumps or (increasingly) by bubbling gas through them. Traditional stirring is very energy intensive so the gas based system has the advantage of being cheaper and having no moving parts and is thus more reliable. The very latest agitation technology involves a patented system of using the gas generated to aggressively agitate the digestate, rather than passive bubbling. This technology is said to generate higher gas yields by virtue of the frequency and strength of agitation.

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2 For those particularly interested in the chemistry there is currently (July 2012) a very full explanation of the chemical processes available on Wikipedia.

3 Volatile solids are the parts of the feedstock that are converted to biogas by the bacteria. The proportion of the volatile solids is different for each type of feedstock. There is a reference list of yields on [http://biogas-info.co.uk/index.php/biogas-yields.html](http://biogas-info.co.uk/index.php/biogas-yields.html)
9. This note is mainly concerned with mesophillic rather than thermophillic digestion as the latter is less common. However there are a number of AD plants using the thermophillic process. One appears to be the Vertal plant in Mitcham which happens to be where about 50% of the food waste collected by Waverley Borough Council is taken. This is not advertised as a thermophillic plant on the Vertal website but the food waste feedstock takes only 3 days to digest so we have concluded that it must be4.

**STABLE ANAEROBIC DIGESTION**

10. Keeping the bacteria healthy requires many things. The more obvious are:-

- Maintaining the correct temperature
- Keeping pH within bounds – around pH 7 is ideal for the methanogenic phase, where the majority of gas is produced.
- Providing a constant amount of food, at a rate that all the bacteria can work at. This is more complicated than it may sound. Variation in the loading of Volatile Fatty Acids (VFAs) causes imbalances
- Maintaining the carbon to nitrogen ratio within a specific range

11. If something goes wrong bacteria will quickly die and biogas yields will fall. It is also likely that the composition of the biogas will alter, reducing energy yield and potentially causing ammonia which can lead to an odour issue with the digestate and other problems.

12. While much can be achieved through computer control to stabilize the process, external daily temperature variation, which can be as much as 20°C, also has a significant impact on the process. Some of the most modern digesters incorporate insulation to counter some of the effects of external temperature swings and reduce energy consumption on heating the tanks.

**WET AND DRY DIGESTERS**

13. One common way of classifying digesters is into “wet” and “dry”. Whether a digester is a wet digester or a dry digester is determined by the feedstock being used. Food waste and cattle slurry are wet, maize silage is dry.

14. In most wet digesters, the feedstock is at a dry matter content of under 20% (more often under 10%) and it is simply pumped into the digester vessel. In a dry digester the dry matter content is over 25%. The feedstock is typically loaded into the digester floor by a loading shovel and left to decompose. The biogas is collected and, when the decomposition is complete, the digestate is removed by a loading shovel. Dry digesters are in fact very similar to IVC plants.

15. Wet digesters are larger than dry digesters with the same yield, but a dry digester is generally more expensive to construct and operate.

16. Wet digesters operate on a continuous process with a constant yield. Dry digesters tend to operate on a batch process with a varying yield.

17. Wet digesters are far more common, not least because most feedstock has dry matter content under 25%, and it is easier to reduce the dry matter content by adding water than reduce it by removing water. This has implications for the volumes and concentrations of digestate.

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As a Friends of the Earth local group will be seeking more information on this particular digester as clearly the energy required to heat the feedstock to the required temperatures must be very significant.
FEEDSTOCK

18. While digesters can use almost any organic material (except lignates) it is useful to classify them into types. Different feedstocks have different handling requirements and fall under different legislation. An AD operator is basically a bacteria farmer. Keeping bacteria healthy is what generates biogas. Digesters cannot process lignates, i.e. woody materials (including straw) as the cell walls are too strong for the bacteria to break down. This is why AD plants do not process garden or forestry waste. Different feedstocks produce different volumes of biogas and mixing feedstocks (e.g. food waste with manure) can make a substantial difference to biogas output. Different feedstocks also require different pre-treatments and come under different legislative regimes.

SLURRY AND MANURE

19. AD requires bacteria and the best source of bacteria is manure. By far the most common manure used in AD is cow manure, usually from dairy herds, with pig manure coming second. The cattle are usually kept in concrete floored buildings, and the manure is removed with a minimum amount of straw in it. If stale bedding (i.e. manure and urine impregnated) is used the straw presents a problem and has to be chopped before being used for AD.

20. Cattle manure yields about 20m$^3$/tonnes biogas, or about 5 KWh per tonne. The average dairy cow produces 20 tonnes of manure a year.

21. Generally the pre-treatment required for slurry is simply a macerating pump. If farmyard manure is also used then the chopping load will be higher as it is desirable to remove the straw as this is not digested. The digestate produced from farmyard manure is used in exactly the same way as cattle slurry, under the same spreading regimes.

22. There is some evidence to show that the Nitrogen, Phosphorous and Potassium (NPK) from digestate is taken up better by plants than it is from straight slurry, although the complexities of fertilising soil should not be underestimated\(^5\). The small number of AD plants operating in the UK means that only a small amount of trial data is available.

ENERGY CROPS

23. Leaving the ethics of growing energy crops aside for the purposes of this technical note, from an operator’s point of view certain crops are particularly suitable for anaerobic digestion. The most common are maize, wheat and sugar beet. Maize is turned into silage, usually in clamps but bales are more efficient. Wheat is harvested before it is ripe, then baled and wrapped. This then becomes “whole crop” wheat silage. Sugar beet is grown and harvested in the normal way, and then chopped or pulped before being fed to the digester.

24. A comprehensive explanation of the use of energy crops including a comparison of yields can be found in the IEA Energy publication “Biogas from Energy Crop Digestion” by Rudolf Braun, Peter Weiland and Arthur Wellinger\(^6\)


Waste Silage

25. The easiest way for a farmer to boost the yield of an AD plant it to put in higher yielding gas feedstocks. The most obvious material to use is silage, which is a well used cattle feed, usually produced on farm and stored close to the cattle sheds\(^7\). There is a relatively high wastage in clamp made silage, typically 5 -10%, as once the clamp is opened it is vulnerable to attack by the weather and air. For a 750 cow herd, housed for half the year, 5% silage wastage represents 350 tonnes. While this silage waste may not be palatable for cattle, the bugs in an AD plant are less choosy. The alternative, wrapping bales of silage, is not perfect as wrapping is susceptible to damage. Putting an additional 350 tonnes of maize silage through the digester would generate an additional 385,000KWh.

26. Silage however requires more processing than farmyard manure. As well as transporting it from the clamp to the digester, it will need more chopping to reduce fibre lengths (some chopping will have been performed in making the silage). It may also be necessary to add water to control the dry matter content of the overall feedstock, easing pumping and keeping the volatile solids loading within bounds.

27. The digestate produced by using silage can be spread back onto the growing areas under existing systems, thereby recycling at least some of the NPK\(^8\).

Vegetable Wastes

28. Many vegetable wastes such as potato peelings and sugar beet pulp are potentially excellent feedstocks, having a high biogas yield.

29. Several vegetable processors are investigating AD plants, and some have been built. These AD plants are usually located on-site or near the vegetable processing company where the waste arises thus saving transport costs. There is also an on-site energy demand and a source of heat.

30. The treatment required for this waste is similar to that for silage (i.e. chopping and dry matter content control). The digested wastes can usually be returned to the farm, often as fertiliser to the vegetable growers supplying the AD plant. Unfortunately it is unlikely that there will be a return load of digestate on the vehicle bringing the feedstock as vegetable production is seasonal but AD plants run all year. This can significantly increases the space required to store feedstock and digestate on site.

31. Alternatively, those operating silage/manure digesters may contract to take in vegetable waste (possibly in place of energy crops). This may or may not add to the transport burden of the vegetable processor.

Dairy Wastes

32. Dairy products generate waste from the parts of the milk not used. These are excellent AD fuels. Typically the AD becomes part of the waste water treatment at the dairy processing plant.

33. Dairy products also form a significant part of the waste from supermarkets, as once they are out of date they have to be removed from the food chain. While they are an excellent fuel, removing the cartons that they are stored in adds complexity and cost to the AD plant.

\(^7\) A dairy cow typically consumes 50Kg silage per day. [http://www.dardni.gov.uk/ruralni/pub41_dpdb.pdf](http://www.dardni.gov.uk/ruralni/pub41_dpdb.pdf)

\(^8\) Nitrogen, Phosphorous and Potassium (Potash)
34. The huge advantage of using food waste is that (at the moment at least) processing food waste generates an additional revenue source as a result of being taken out of landfill. This revenue, known as a gate fee, ranges from around £36/tonne to £60/tonne depending upon location and the sort of waste. Packaged food waste attracts a higher gate fee because of the need for more pre-processing and additional equipment. AD plants taking in food waste are subject to higher plant costs, planning issues are more complicated and expensive and they are also subject to more extensive regulation and controls, which again makes the cost of these facilities considerably higher.

35. Food waste comes in a variety of types:

- **Source segregated, unpackaged domestic kitchen waste.** This is collected on behalf of councils by waste collections businesses. Some counties and boroughs have separate waste collections for kitchen scraps, and these are perfect for AD, yielding about $150m^3$ biogas/tonne. Others do not collect separately, so the food waste is enmeshed in the municipal waste and is generally not (yet) separated at waste transfer stations. Recent government changes to the Landfill Tax have meant that it is currently unlikely that non segregated waste will be processed through AD facilities. Kitchen scraps are deemed to contain animal by-products – i.e. meat and meat products, which means that any plant processing this type of food waste will fall under Animal By-product Regulations (ABPR) and needs to follow strict rules relating to the receipt and processing of the feedstock.

- **Unpackaged Commercial Food Waste.** Typically collected from restaurants, hotels, prisons, hospitals and schools. It is likely to come in skips or wheelie bins, and may have been bulked up. The collection contracts usually lie outside of local government responsibility and private operators compete for contracts. Little, if any, central data exists on locations and tonnage. Within this category is also the waste from food processors such as bakers. This waste makes excellent feedstock due to high biogas yields, but care needs to be taken by the AD operator to ensure that the feed to the digester remains constant. There can also be problems with pH, preservatives (which may kill bacteria), salt and the like. These issues are not likely to be problematic for commercial scale digesters as the volumes of contaminants are relatively low. However, although the food is unpackaged, there are material issues with contamination with anything from glass to cutlery. It also comes frequently with plastic bags – the biggest problem in recycling, followed by textiles. This feedstock is also subject to ABPR.

- **Abattoir Waste.** There are many AD plants that run on abattoir waste, although in the UK this is complicated by the precautions against BSE – so brain tissue and spinal cords of cattle have to be incinerated and cannot be treated in any other way. Animal blood is an excellent AD fuel, but other parts may need significant amount of processing (macerating and grinding) to make them suitable. Again, any AD processing abattoir waste will fall under ABPR.

- **Packaged Food Waste.** This is almost entirely out of date supermarket food, of which there is a bewildering array including sandwiches, soft drinks, and packed meat. While this is generally a good feedstock, taking advantage of it requires a de-packaging process (which adds at least £200,000 to the capital costs of the AD plant) and the subsequent removal of the packaging from the AD plant also adds to operational costs. Again, the operator has to be careful about maintaining digester stability. This feedstock is also almost certain to fall within ABPR.
GLYCEROL

36. Glycerol (also known as glycerine) is a by-product of the bio-diesel industry. It is a very high yielding fuel, (over 500m$^3$ biogas/tonne) and has the advantage of containing no nitrogen. It is therefore often used by AD operators to maintain the carbon to nitrogen ratio. Most AD plants have the capacity to use a little glycerol.

37. When the biodiesel industry started glycerol was free. It now commands prices of £100 to £400 per tonne as it is a useful industrial chemical so it is not a cheap fuel.

38. Because glycerol is so high powered a fuel, it has to be used with caution as the large amount of volatile fatty acids produced can lead to “foaming” within the AD reactor. Generally levels of glycerol are kept to less than 5% (by mass) of the feed stock.

ENERGY PRODUCTION

39. Any significant AD plant must have a connection to the grid, be it electric or gas. Occasionally there are opportunities for the energy to be channelled through a ‘private wire’ to a neighbouring facility such as a factory.

40. Hypothetically there is no need for a grid connection if the AD plant is connected directly to an energy user. However in practice the energy user will already have a grid connection and will be unwilling to swap the reliability of the national networks with its multiple power stations for the risk of failure of one (or even two) small generators. As a result in almost all cases the grid will end up acting as a back-up and buffer by accepting surplus supply and relieving surplus demand. This can make for very complicated (and expensive) power purchase agreements (PPA) with the energy purchaser and the grid owner.

ELECTRICITY PRODUCTION

41. The most common use of biogas is to generate electricity by feeding it into a reciprocating piston engine, which in turn drives a generator. The advantages of this process are that it is simple, uses proven technology and produces energy in a form that can either be used locally or sold into the national grid. However, more recently the advent of biogas turbines may improve the cost and reliability of electricity and heat generation.

42. Supply of the resulting electricity into the grid is relatively straightforward, although the grid operators are (anecdotally) generally ‘reluctant’ to provide new grid connections for small plants. Not surprisingly, domestic grid connections are inadequate. The cost of a grid connection is significant and, if substantial additional power lines are required, can become exorbitant.

43. There are fundamental disadvantages to electricity production from AD:-

- **Low Efficiency.** Small reciprocating engines driving generators are an inefficient method of producing electricity. Typically less than 40% of the energy available in the biogas is delivered into the grid as electricity. The remainder is converted to low grade heat, in the engine exhaust, the cooling of the engine and irrecoverable heat losses. While some of this heat can be recovered for use in heating the AD process through heat exchangers, these too have inherent inefficiencies. Even if more heat is recovered from the process than is needed in the AD (although this is unlikely if pasteurisation is involved) it is often hard to find a viable use for it.
• **Low Voltage.** Small generators on AD plants operate at low voltages. This means that to raise the voltage to grid transmission levels requires the use of transformers, a further cost and efficiency loss.

• **Engine Damage.** Biogas contains H2S and NH3, both of which attack the oils and indeed the metals of the engine. While this can be contained, a high level of monitoring of the engine oil is necessary. If the digester gets a little out of kilter it can increase the levels of the attacking gases, with concomitant increased wear.

• **Inability to Store the Energy.** As electricity cannot be stored, there will be increasing pressures on the generation of electricity and the ability of the grid system to absorb it at all times.

44. Unlike landfill gas, biogas from AD should not contain significant levels of siloxanes, which increase engine wear.

45. The most efficient electricity producing AD plants are those on dairy farms and food processing plants, where there is use for hot water and electricity within the production process. On a dairy farm there are also plenty of acres to use the digestate.

46. Most food waste processing plants with AD currently generate electricity, there are very few producing gas for grid injection, although this is set to increase. Typically a plant processing 50,000 tonnes/year of food waste will produce about 1.5 to 2 MW electricity, and consume most of the heat produced by the generators in the AD and pasteurisation heating.

**Bio-Methane Production**

47. The alternative to turning biogas into heat and electricity is to remove the impurities and inject the resultant bio-methane into the gas grid. This has the attraction of avoiding the inefficiencies inherent in changing the energy from gas to electricity.

48. There are a variety of technologies available to remove the CO2, NH3 and H2S from the biogas. The biogas upgrade industry is fledgling across Europe with 3 main types of process – Pressure Swing Absorption (PSA), Cryogenic and Membrane technology. They are expensive and there are differing views regarding reliability and cost of operation. Prices for example for 100 cubic metres of biogas per hour range from c£300k for membrane technology to £900k for PSA. In addition the grid injection costs are added although these are falling.

49. The first challenge is to find a connection in the intermediate pressure gas grid, rather than the domestic one. Laying pipe is expensive, so proximity to the intermediate pressure gas grid is very important.

50. Then there is a specification for gas quality in the grid. Clearly any gas being injected has to meet this. In the UK, where parts of the gas grid are still iron, the specification contains a very low target for oxygen content compared to the rest of Europe (where the gas pipes are plastic). The grid companies are generally helpful in finding ways to achieve the target, but it is not straightforward. Currently, the Health and Safety Executive require a very low oxygen threshold – 0.1%, but are granting exemptions for oxygen content of up to 1% and this is likely to be adopted in the near future as a general standard.

51. Having upgraded the biogas to at least 97% biomethane, the gas has to be injected into the gas grid system. Until very recently, OFGEM would only allow this to be done with injection equipment that is used on North Sea gas interconnectors – there was simply no regulatory framework for biomethane injection. Depending upon the region this injection equipment could cost up to £1.5m per facility. However, OFGEM have now agreed a
framework for biomethane injection, which will see the price come down initially to around £300,000. There is scope for further improvement but this is a good start.

52. The final piece of complexity can be adjusting what is known as the “Wobbe Index”. This requires the addition of varying amounts of propane at the point of injection to ensure that the energy (the calorific value) content of the gas (which varies with pressure and temperature) matches the billing system. Biomethane is very close in composition to North Sea gas, but the latter has additional gases which enhance the calorific value (CV). Biomethane can only reach this CV by the addition of propane, which is both a fossil fuel and adds significant cost. For example, the propination plant can cost up to £200,000 to buy and install and then the running costs are £20-40,000 per annum. However, National Grid in conjunction with Bio Group has established an alternative option for certain areas, where propination can be avoided. In the UK’s first AD plant built to put green gas into the grid, the biomethane is first mixed with North Sea gas to dilute it in the system, such that the issue of lowering CV is overcome. This cannot work everywhere, but where it does, it is both environmentally and economically preferable.

53. The gas clean up and injection process does not yield heat for the AD process. This means that the heat for the digester and pasteuriser has to be provided. Either some of the gas produced is burned, or waste heat is extracted from some other source – for example the exhaust from a kiln or industrial process. In a plant in Suffolk, heat is generated in the spring and summer using solar thermal panels to enhance the biogas boiler and maximise efficiency. As a rule of thumb in traditional AD systems, the heating requirement is 30% of the yield. In other words, for every 10KWh of methane produced in the AD, only 7KWh will be injected into the grid, the other 3KWh being used to heat the digester and pasteuriser. Using other renewable sources changes the profile of this. The advantages of co-locating with a heat source are therefore substantial.

54. The estimates provided by AD operators of the volume of the original feedstock which will emerge as digestate can vary. One operator puts this figure at 85%. What is beyond doubt is that it is always a very significant percentage and causes transportation and disposal issues. There are also tight regulatory constraints around the use and timing of use of digestate, which is applied to land.

55. A 2MW electrical plant processing 50,000 tonnes of food waste will produce in excess of 40,000 tonnes of digestate containing 120 tonnes of nitrogen. This will require an area in the order of 685 hectares or 1,700 acres of arable land to be spread on. Ignoring woods, towns and other non-agricultural land, that is a circle with a radius of one mile. The more dispersed this land bank is, the further the digestate will have to be hauled (by road) with concomitant increases in cost, congestion, CO₂ emissions etc.

56. Typically the digestate is 10% solids and 0.3% nitrogen, 0.05% phosphorous and 0.3% potash (potassium). Values vary widely, depending on the feedstock. The digestate also contains useful fibre and other trace elements. In a simple world it is a good, possibly excellent, fertiliser. As southern England is said by some to be rapidly approaching pre-desertification, it is very important that organic matter is re-introduced to soils and compost and digestate have an important role in this.

57. Unfortunately this not a “simple world”. Most of the farmland in England is in Nitrate Vulnerable Zones (NVZ), and weather complicates agricultural processes of spreading fertiliser on the land. Moreover, all farms already have a fertiliser programme and
changing to using digestate requires different spreading equipment – which is a cost that most farmers are unwilling to bear. The combined effect of farming cycles and the NVZ regulations mean that digestate can only be put to land around 10-12 weeks of the year.

58. Finally digestate is a waste product, and the Environment Agency requires form filling to enable it to be spread on land, or even moved. While the form filling is not particularly complex, it adds cost and time to a weather dependant process. However, in addition to the forms themselves, various soil samples and product testing has to be undertaken which adds to cost. The processing of the forms and issuance of the appropriate EA permits also takes at least 8 weeks.

59. A solution to this is the PAS110 standard – digestate that conforms to this is NOT viewed as a waste by the EA, and thus spreading it is easier (see below for more on PAS110). At the moment PAS110 does not permit use of digestate as a horticultural fertiliser (so it can’t be used on domestic vegetable patches). The list of allowed uses is being refined and developed all the time. However, legislation is being planned in Europe which would reclassify all digestate as a waste – notwithstanding PAS 110, and this would cause massive problems to the traditional AD sector. Again in Suffolk, pioneering work is being done using biomass and capturing the CO2 from the gas upgrade so that the digestate itself is being upgraded to water that can be used in agriculture all year round. Near the Suffolk coast, the area has less rainfall per annum than Jerusalem, so water conservation and sustainability are key issues, and AD can be used as a contribution to the solution.

**NITRATE VULNERABLE ZONES (NVZ)**

60. Historically the enthusiastic application of nitrogen based fertilisers to farmland caused elevated nitrate levels in waterways. This affected the biology of the waterways, to the detriment of many fish species. The solution to this has been to limit the application of nitrogen in areas where this is a problem, and these are known as nitrate vulnerable zones. NVZs have been successful in improving water quality and aquatic life, but they make digestate disposal more complex.

61. In a NVZ there is a limit to the amount of nitrogen that can be applied. For grassland it is 250Kg/Ha, for other agricultural land it is 175Kg/Ha. There are also constraints on proximity to water courses etc. Nitrogen fertiliser can only be applied between January and September and if the land is to be grazed by cattle there is a block ban on grazing after an application of slurry, typically 2-6 weeks.

62. The AD plant needs access to a substantial land bank to spread its digestate. A 22,500 tonne/year AD plant will require around 750 acres of grassland or 1,000 of arable land. This is not a problem for slurry and energy crop plants (where the land is being used to produce the feedstock), but is a significant challenge for food waste plants. Spreading costs (which are borne by the AD plant operator) rise dramatically with distance that digestate has to be hauled. There are thus strong arguments for building food waste processing AD plants in rural areas and many farmers welcome the opportunity to reduce their chemical costs through the use of digestate.

63. The application of low nitrogen content fertiliser is protracted and complex. It must be integrated into the rest of the farm management. Many farm fields cannot be worked by tractors in late winter as the ground is too soft. If the field is a hay or silage field, applying in late spring will damage crops. This means that in practical terms there are probably

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9 The extent of NVZs can be seen on [http://defranvz.adas.co.uk/a4website.pdf](http://defranvz.adas.co.uk/a4website.pdf)

10 There is some local variation on this.
only 3 or 4 windows of opportunity in any 12 month period to apply digestate to any one field.

64. During the non-application season all digestate will have to be stored (other than when the new technology referred to above is applied). For a 22,500 tonne/year plant this could require storage for 10 million litres of digestate.

**ANIMAL BY-PRODUCTS REGULATIONS (ABPR)**

65. ABPR are run by DEFRA, and they control the treatment of any waste (including food waste) that contains or might contain animal by-products. In practice, all food waste falls under ABPR.

66. The rules are complex. The most significant requirements are:
   - That all operations involving food waste have to be conducted in air tight buildings with bio-filters.
   - All the digestate must be pasteurised before it can be released for use as a fertiliser. The success of the pasteurisation is monitored by DEFRA, who test digestate for certain specific types of bacteria, including salmonella. Until the test is passed, the batch cannot be released, which further complicates the storage of digestate.

67. The practical effect of ABPR on the design and operation of the AD plant is as follows:-
   - A pasteuriser has to be included as part of the plant - this has to be capable of raising all digestate to a given temperature and holding it there for a required period of time. For instance a temperature of 68°C would need to be held for an hour and the waste has to have a particle size of less than 12mm.
   - The heat load is significantly increased – although this can be mitigated through the use of a heat exchanger to recycle heat from the digestate as it exits the pasteuriser to that coming in
   - The site operator tests outputs on an agreed basis with the EA and has digestate samples tested at independent labs. The operator maintains records and self regulates on an ongoing basis, with the duty to re-process batches which fail the testing procedure. These records are audited by the EA as part of their regular inspections.

**GROUND DAMAGE AND COMPACTION**

68. Current nitrogen fertilisers are typically 35% nitrogen by mass. Sufficient fertiliser for one hectare for a year weighs a total of 714Kg. Applying the same quantity of nitrogen from digestate at 0.3%N requires 8,333Kg of digestate i.e. almost 12 times as much weight. The potential impact is 12 times as much ground compaction during spreading and, in the early season, the potential for substantial wheel ruts. It also requires 12 times as much energy (and therefore cost) to spread the digestate.

69. The ground compaction and wheel-rut problems can be solved, in part, by using low ground pressure machinery. While this exists it is expensive, still relatively rare and also unlikely to be in use on the farms close to the AD plant. It is therefore entirely possible that an AD plant operator will have to buy their own digestate spreading equipment.

**DIGESTATE DE-WATERING**

70. One way to improve digestate’s utility as a fertiliser is to remove surplus water. At the AD plant to be built at Selborne Brickworks in Hampshire the proposal is to use a process
called ‘reverse osmosis’ to get the water to a suitable quality to meet EA licence standards.

71. Separating solids from the digestate is relatively straightforward. The first step is to use a mechanical belt or screw press. This removed the larger solid components, typically at 25% dry matter (i.e. for each Kg of solid, there is also 3 Kg of water). The second step is to pass the liquid component through the reverse osmosis process, which will remove around 80% of the water, and that water will be close to potable. The remaining matter is a thick liquid with a relatively high level of nitrates.

72. Unfortunately a de-watering plant is expensive, typically costing between £250,000 and £500,000. Its performance is largely dependent upon the feedstock’s composition and the retention time of the digester. The plant is not cheap to operate either, requiring significant power and regular replacement of filters and membranes. It may even be necessary to add an aerobic digestion stage.

PAS110

73. A standard for digestate has been defined, it is called PAS110. Digestate meeting this standard is not a waste, and can therefore be transported and spread without further reference to the Environment Agency or DEFRA. The Soil Association has recently accepted PAS110 digestate as an organic fertiliser.

74. PAS110 limits the uses of digestate, specifically excluding horticulture and thus the retail market. There are plans to extend its application, but these are progressing slowly. In any case, the price of a 25Kg bag of compost is around £2.50 (or £100/tonne). Allowing a margin of 50% for the retailer and transport costs of £25/tonne leaves the AD operator £25 to bag, label, palletise and load one tonne of separated digestate. Operators maintain this is not financially viable.

OTHER ISSUES

LICENSING AND REGULATION

75. Operating an AD plant requires licensing. The administrative burdens of operating even a simple AD plant are significant. The licenses required depend upon the plant type and location.

76. The simplest is the purely agricultural plant. The farm will already be regulated by the Environment Agency and (if it has livestock) DEFRA (although there are restrictions on the processing of ABPR waste on cattle farms). The existing licenses will need amending, but this is not a major problem. Similarly an industrial plant will have existing licenses, and all that is required is to amend them.

77. A food waste processing plant taking animal waste has to obtain and maintain ABPR approvals through regular Animal Health inspections if the plant is to run under ABPR.

78. Waste management permits are not hard to get, but the process is complex. The process can take 6 months and cost £15,000 or more. The annual charges for the license will vary depending upon the site, but are substantial. The application cannot be submitted until planning permission is granted.

11 Submarines use reverse osmosis to make their drinking water. The RO membrane is impenetrable by bacteria and larger molecules.
79. In the case of an AD plant producing electricity, the energy grid operators will regulate the connection from the plant, possibly using third party contractors. They may well also monitor the actual performance of the plant in terms of efficiency and availability.

80. Other regulators involved are likely to include the Health and Safety Executive, District and County Councils, Environmental Health, OFGEM (which regulates the energy connections and markets and pays subsidies) and DECC.

**SIZE OF OPERATING PLANT**

81. At its simplest a digester comprises two or more large storage tanks, one of which is the digester vessel. Most digesters are cylindrical, and there are trade-offs between height and diameter. For a 10,000 tonne/year plant the digester may comprise one 25m diameter vessel, 8m high with a further 5m high gas holding membrane on top. Digestate storage would require another two vessels of similar size. New innovations include burying tanks, using recyclable materials and minimising visual intrusion.

82. If the plant is processing food waste it will require a feedstock processing building, which will also contain the pasteurisers and dewatering equipment. This will be at least 1,200m of floor area, with an eaves height of 8-10m and can have a ridge height of 12-15m.

83. The buildings are similar to modern agricultural buildings and an AD plant is a substantial construction, particularly when you add in offices, weighbridges, generators, and in some circumstances gas holders, flares and access roads.

**LOCATION OF AD PLANTS**

84. There is much debate about where best to site AD plants. There are a number of sometimes conflicting requirements. For straightforward agricultural plants growing and digesting energy crops there is a fair amount of flexibility. For those plants disposing of food waste the issues are more complex.

85. In general terms the key requirements for a successful and efficient AD plant are:
   - on site access to the energy grid - an intermediate or high pressure gas grid connection being the preferred option – see above
   - proximity to a bank of agricultural land to dispose of digestate – see above
   - in the case of food waste plants, access to the road network
   - a complimentary activity e.g. a manufacturing or agriculture or forestry process

**COMPLIMENTARY ACTIVITIES/CO-LOCATION**

86. For environmental (resource efficiency), financial and operational reasons it is desirable that the AD plant be co-located with complimentary activities. These will usually be energy users with a requirement for electricity, gas or low level heat.

87. The most appropriate type of complimentary activity probably depends on whether the AD plant is near a gas grid connection or will be using the biogas to produce electricity for the electricity grid.

88. A very example of a good complimentary activity for an AD plant with a gas grid connection is a brickworks. An AD plant adjoining a brickworks can produce biogas for
use in the brick kilns. The brickmaking process will itself then produce a lot of surplus heat which can be captured to warm the digestate. As previously explained, all AD plants require some heat to warm the digestate and they usually take some of the energy they are producing to do this. This is what is called the ‘parasitic load’. In the case of a brickworks, which obviously requires very high temperatures to make bricks, there may be more surplus heat than is required to heat the feedstock. Other possible users of low level heat could be for wood drying (for sustainable biomass) or to provide the heating for commercial greenhouses.

89. In the case of an AD plant on the electricity grid the best fit may be to co-locate with a heat producer because the surplus heat can be captured to warm the digestate and reduce the parasitic load.

90. However there may be operational and safety reasons, such as fire hazards, which mean that an AD plant cannot be included on certain sites.

91. In our experience the planning system currently lacks sufficient flexibility to be able to recognise the best sites for heat producers and heat users including AD plants. In the case of AD plants the current system is geared towards on trying to fit them into existing waste facility sites which often offer no opportunity for co-location or processes and result in energy being wasted.

ACCESS TO THE ROAD NETWORK

92. 25,000 tonnes of food waste in 20 ton loads (i.e. articulated tippers) represents 12 round trips per working day as not all tippers will be full. Disposing of the digestate is another 8 round trips per working day.

93. For planning purposes it is a requirement that any plant be located close to the HGV network – essentially the “A” road infrastructure. Typically the required proximity is 2Km.

ODOUR

94. Today well run AD plants are virtually odourless on the exterior. There can be a very faint odour when you are within a few feet of a plant but what you can smell is actually the biogas. However some of the early plants, through a combination of inappropriate design and bad operation, have a well-documented history of odour problems.

95. Odour problems in general only arise if waste is stored in buildings for several days and/or the odour treatment is insufficient. Food waste will always smell and it is how this is controlled and treated that is the key – the operation of a plant is key in this regard. Friends of the Earth local group members who have visited large AD food processing plants say that other than internally in the main food waste reception hall odour was not noticeable. If the AD process itself causes odour then this means that the sealed process is leaking, or that it is not digesting and undigested waste is being taken out of the back end of the plant.

NOISE

96. Most AD operations are relatively quiet and the noise is controlled by planning permission. Building design and mitigation measures can render the noise negligible at the site boundary (which is where it counts). AD plants built on existing industrial sites probably have an advantage as there is already a high background noise level.

12 Holdsworth Farm and Ludlow being good examples of this.
97. Flaring of gas is not essential. Flaring is a back up and can be used to avoid the need for gas holders as temporary storage devices. Where it is used, bottom down flares – essentially upside down patio heaters – are used, so there is no visible sign of flaring. The emissions are not problematic and although undesirable when flaring does take place it is a green gas not a fossil fuel. Bio Group has developed a system that does not require either a flare or a gas holder in its new plant in Stockport.

**BIO-AEROSOLS**

98. Although there is no evidence that they are a problem with anaerobic digesters, residents often worry about the potential health impacts of bio-aerosol. This concern can arise because residents find reports on the internet of problems with bio-aerosols on open composting sites where bio-aerosols can be released when the compost windrows (which are in the open) are turned by a digger. There is extensive guidance on bio-aerosols at composting sites\(^{13}\) \(^{14}\) and the research concludes that at a distance of 100m to 200m even from an open composting site bio-aerosols are at background levels.

99. There is less planning and environmental guidance on bio-aerosols at AD plants. The Environment Agency permitting regime appears to have added to public confusion and concern. If there is a sensitive receptor (which includes a dwelling) within 250m of an AD plant it will require a “bespoke” EA license which involves a higher level of monitoring and regulation - but this requirement has been interpreted by some members of the public as meaning that the EA does not permit any receptors to be located within 250m of an AD plant, and that is simply not the case.

100. AD plants using food waste as a feedstock will have a closed processing building, running at under-pressure and exhausting its air through a bio-filter. Some operators treat air emissions from within the reception hall with ozone. This process deals with odour, and thus will also deal with spores and bacteria (which are many, many times larger than a single molecule).

101. In addition AD plants also fall under Health and Safety regulations.

**BIOSECURITY**

102. The regulatory regime reflects the significant concerns about the risk of food waste getting back into the food chain. Any livestock farmers adjoining a proposed AD plant are also likely to be wary. While the extreme fear is foot and mouth, any decomposing food that ended up on grazed land is a potential source of (at the least) bacterial infection. The regulations governing the transport of food are very tight, but one problem is that there is a low faith in the efficacy of government regulation (particularly in the farming community which is well aware that the last Foot and Mouth outbreak was actually caused by the DEFRA laboratory near Pirbright in Surrey).

**THE SAFETY OF AD PLANTS**

103. Everyone knows that gas can explode, and those that read up on the subject will also find that H\(_2\)S is about as toxic as hydrogen cyanide. In the past there have been fatalities at

\(^{13}\) http://publications.environment-agency.gov.uk/PDF/GEHO0809BQUO-E-E.pdf

\(^{14}\) http://www.hse.gov.uk/foi/internalops/sectors/manuf/03-10-11/index.htm

(c) Guildford and Waverley Friends of the Earth

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AD plants arising from both explosions and gas poisoning. More recent innovations mean that tanks are sealed and therefore not accessible and regulations on equipment and operations with regard to gas are tightly monitored in the UK.

104. Today the safety is designed into the plant from the outset as the plant has to meet specific regulations that are equivalent to building regulations for gas plants. The planning application will have to cover the safe operation of the plant and will in some part cover this. In addition there are requirements for gas producing plants to have specific gas safety training before for example the National Grid will allow connections.

105. The reality is that the biogas in an AD plant is at a very low pressure, typically well under 10mb which is less than a tenth of the pressure of a domestic gas supply. Moreover, the biogas is at least 40% CO₂, and there is no air present (by definition). It is therefore impossible for it to explode within the system. If there is a leak, the amount leaking is small and is more likely to diffuse than ignite. Biomethane is also more difficult to ignite than petrol, because of the way it behaves.

Carbon Emissions

106. Estimates of the contribution to carbon emissions reduction for every ton of food waste treated by anaerobic digestion vary over quite a large range and estimates of the savings also vary! We are doing further research into this and hope to expand this section in the form of a short addendum to this briefing note at some point.

Other Sources of Information

Wikipedia – Anaerobic Digestion currently (August 2012) contains a detailed explanation of the process

For relevant EA and EU legislation on waste Houses of Parliament POSTNOTE Number 387 September 2011 ‘Anaerobic Digestion’ is useful.

The main dedicated policy document relating to AD is the Anaerobic Digestion Strategy and Action Plan published by DECC in 2011

There is a website dedicated to AD developed with support from DECC and DEFRA (but claimed to be independent of both) to help all sectors interested in development AD see http://www.biogas-info.co.uk/

A trade body called the Anaerobic Digestion and Biogas Association has a useful website http://www.abdiogas.co.uk/

For a good guide to community AD see the website of Plan Local www.planlocal.org.uk and the short films they have produced (these are better and more realistic guides to AD than the one on the Local United website).
Standard rules SR2012 No9

On-farm anaerobic digestion facility using farm wastes only, including use of the resultant biogas

Part A installation – capacity over 100 tonnes of waste per day

Introductory note

This introductory note does not form part of these standard rules

These rules are limited to premises used for agriculture and to wastes arising from on-farm, including dairies and are available to operators with an anaerobic digestion capacity of over 100 tonnes of waste or a combination of waste and non-waste – both solid and liquid - on any one day. For anaerobic digesters operating below this threshold, standard rules for waste recovery operations are available.

When referred to in an environmental permit, these rules will allow the operator to carry out the anaerobic digestion of wastes and the combustion of the resultant biogas in gas engines with an aggregate rated thermal input of up to 5 megawatts. The rules also allow use of gas turbines, boilers, fuel cells and treatment and/or upgrading the biogas to biomethane.

Permitted wastes do not include hazardous wastes. The total quantity of waste or a combination of waste and non waste including both solid and liquids must not exceed 100,000 tonnes per year.

Any wastes controlled by the Animal By-Products Regulations must be treated and handled in accordance with any requirements imposed by those Regulations.

These standard rules do not allow any emission into surface waters or groundwater except clean water from roofs and parts of the site not used for waste activity including storage of wastes. However, under the emissions of substances not controlled by emission limits rule, biogas condensate, treated digestate and waste waters may be discharged to a sewer subject to a consent issued by the local water company.

These rules do not apply to installations with more than one operator.

End of Introductory Note
Rules

1 Management

1.1 General management

1.1.1 The operator shall manage and operate the activities:
   (a) in accordance with a written management system that identifies and minimises risks of pollution, including those arising from operations, maintenance, accidents, incidents, non-conformances closure and those drawn to the attention of the operator as a result of complaints; and
   (b) using sufficient competent persons and resources.

1.1.2 Records demonstrating compliance with condition 1.1.1 shall be maintained.

1.1.3 Any person having duties that are or may be affected by the matters set out in these standard rules shall have convenient access to a copy of them kept at or near the place where those duties are carried out.

1.1.4 The operator shall comply with the requirements of an approved competence scheme.

1.2 Energy efficiency

1.2.1 The operator shall:
   (a) take appropriate measures to ensure that energy is used efficiently in the activities;
   (b) review and record at least every 4 years whether there are suitable opportunities to improve the energy efficiency of the activities; and
   (c) take any further appropriate measures identified by a review.

1.3 Efficient use of raw materials

1.3.1 The operator shall:
   (a) take appropriate measures to ensure that raw materials and water are used efficiently in the activities;
   (b) maintain records of raw materials and water used in the activities;
   (c) review and record at least every 4 years whether there are suitable alternative materials that could reduce environmental impact or opportunities to improve the efficiency of raw material and water use; and
   (d) take any further appropriate measures identified by a review.

1.4 Avoidance, recovery and disposal of wastes produced by the activities

1.4.1 The operator shall take appropriate measures to ensure that:
   (a) the waste hierarchy referred to in Article 4 of the Waste Framework Directive is applied to the generation of waste by the activities; and
   (b) any waste generated by the activities is treated in accordance with the waste hierarchy referred to in Article 4 of the Waste Framework Directive; and
   (c) where disposal is necessary, this is undertaken in a manner which minimises its impact on the environment.
1.4.2 The operator shall review and record at least every four years whether changes to those measures should be made and take any further appropriate measures identified by a review.
2 Operations

2.1 Permitted activities

2.1.1 The operator is only authorised to carry out the activities specified in table 2.1 below ("the activities").

<table>
<thead>
<tr>
<th>Table 2.1 Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description of activities</strong></td>
</tr>
<tr>
<td>Section 5.4 Part A(1) of the Environmental Permitting Regulations – Recovery of Waste</td>
</tr>
<tr>
<td>R13: Storage of wastes pending the operations numbered R1 and R3</td>
</tr>
<tr>
<td>R3: Recycling or reclamation of organic substances that are not used as solvents</td>
</tr>
<tr>
<td>R1: Use principally as a fuel or other means to generate energy.</td>
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</tbody>
</table>

2.1.2 All process plant and equipment shall be commissioned, operated and maintained, and shall be fully documented and recorded, in accordance with the manufacturers recommendations.

2.2 The site

2.2.1 The activities shall not extend beyond the site, being the land shown edged in green on the site plan attached to the permit.
2.2.2 The activities shall not be carried out within:
   (a) 10 metres of any watercourse;
   (b) a groundwater source protection zone 1, or if a source protection zone has not been
defined then within 50 metres of any well, spring or borehole used for the supply of water
for human consumption. This must include private water supplies;
   (c) a specified Air Quality Management Area.

2.2.3 The gas engine stack must be a minimum of 3 metres in height and must not be located within:
   (a) 500 metres of a European Site or a Site of Special Scientific Interest (excluding any site
designated solely for geological features);
   (b) 200 metres from the nearest sensitive receptor in cases where the stack does not have an
"effective" stack height of 3 metres or more, or the stack is less than 7 metres in height.

2.3 Waste acceptance

2.3.1 Waste shall only be accepted if:
   (a) it is of a type and quantity listed in tables 2.1 and 2.3 of these rules;
   (b) it conforms to the description in the documentation supplied by the producer and holder;
   (c) the waste is biodegradable; and
   (d) wastes that are animal by-products or contain animal by-products must be handled and
processed in accordance with any requirements and restrictions imposed by the animal by-
products legislation

2.3.2 Records demonstrating compliance with rule 2.3.1 shall be maintained.

<table>
<thead>
<tr>
<th>Table 2.3 Waste Types</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Waste Codes</strong></td>
</tr>
<tr>
<td>02</td>
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<td>02 01</td>
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<td>02 01 01</td>
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<td>02 05</td>
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<td>02 05 01</td>
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<tr>
<td>02 05 02</td>
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</tbody>
</table>
2.4 Operating techniques

2.4.1 The activities shall be operated using the techniques and in the manner described in Table 2.4 below.

<table>
<thead>
<tr>
<th>Table 2.4 Operating Techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measures</td>
</tr>
<tr>
<td>1) All waste solids, liquids and sludges shall be securely stored. In the event of a leak, spill or failure, material can be contained and recovered.</td>
</tr>
<tr>
<td>2) All storage and process tanks shall be fit for purpose and shall be regularly inspected and maintained in accordance with paragraph 2.1.2. In the event of a leak, spill or failure, material can be contained and recovered.</td>
</tr>
<tr>
<td>3) Digestate shall be stored within containers or lagoons and should be of a design and capacity fit for purpose. The lagoon shall have a free board of 750mm.</td>
</tr>
<tr>
<td>4) Gas engine stack height shall be no less than 3 metres.</td>
</tr>
<tr>
<td>5) All biogas condensate shall be discharged into a sealed drainage system or recirculated back into the digester.</td>
</tr>
<tr>
<td>6) Emissions of unburned biogas and the operation of the auxiliary flare shall be minimised. Any significant emissions of unburned biogas (including the operation of the pressure relief valves) and the operation of the auxiliary flare shall be recorded.</td>
</tr>
</tbody>
</table>
3 Emissions and monitoring

3.1 Emissions to air, water or land

3.1.1 There shall be no point source emissions to air, water or land, except from the sources and emission points listed in table 3.1

3.1.2 The limits given in table 3.1 shall not be exceeded.

<table>
<thead>
<tr>
<th>Emission Point and Source</th>
<th>Parameter</th>
<th>Limit (including units)</th>
<th>Monitoring Frequency and Standard or Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stacks on engines</td>
<td>Oxides of Nitrogen</td>
<td>500 mg/m³</td>
<td>Annual monitoring</td>
</tr>
<tr>
<td></td>
<td>Carbon monoxide</td>
<td>1400 mg/m³</td>
<td>Monitoring equipment, techniques, personnel and organisations employed for the engine stack emissions monitoring programme (including the measurement of exhaust gas temperature) shall have either MCERTS certification or MCERTS accreditation (as appropriate).</td>
</tr>
<tr>
<td></td>
<td>Sulphur dioxide</td>
<td>350 mg/m³</td>
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<tr>
<td></td>
<td>Total volatile organic compounds</td>
<td>1000 mg/m³</td>
<td></td>
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<tr>
<td></td>
<td>including methane</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Emission levels at Normal Temperature and Pressure and 5%O2, unless otherwise agreed in writing by the Environment Agency Uncertainty allowance as stated in EA guidance LFTGN08 v2 2010.</td>
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<tr>
<td></td>
<td>To ensure effective plume breakaway, minimum stack gas exit velocity shall be no less than 15 m/s or the gas exit temperature shall be no less than of 200°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stacks on boilers burning biogas</td>
<td>Oxides of Nitrogen</td>
<td>No limit set</td>
<td>None specified</td>
</tr>
<tr>
<td>Auxiliary flare</td>
<td>Oxides of Nitrogen</td>
<td>No limit set</td>
<td>Record of operating hours.</td>
</tr>
<tr>
<td>Pressure relief valves</td>
<td>Biogas</td>
<td>No limit set</td>
<td>Weekly visual or remote monitoring to ensure valves are correctly seated.</td>
</tr>
</tbody>
</table>

3.1.3 Periodic monitoring shall be carried out at least once every 5 years for groundwater and 10 years for soil, unless such monitoring is based on a systematic appraisal of the risk of contamination

3.2 Emissions of substances not controlled by emission limits

3.2.1 Emissions of substances not controlled by emission limits (excluding odour) shall not cause pollution. The operator shall not be taken to have breached this rule if appropriate measures, including, but not limited to, those specified in any approved emissions management plan, have been taken to prevent or where that is not practicable, to minimise, those emissions.
3.2.2 The operator shall:
   (a) if notified by the Environment Agency that the activities are giving rise to pollution, submit
       to the Environment Agency for approval within the period specified, an emissions
       management plan;
   (b) implement the approved emissions management plan, from the date of approval, unless
       otherwise agreed in writing by the Environment Agency.

3.2.3 All liquids in containers, whose emission to water or land could cause pollution, shall be provided
      with secondary containment, unless the operator has used other appropriate measures to prevent
      or where that is not practicable, to minimise leakage and spillage from the primary container.

3.3 Odour

3.3.1 Emissions from the activities shall be free from odour at levels likely to cause pollution outside the
      site, as perceived by an authorised officer of the Environment Agency, unless the operator has
      used appropriate measures, including, but not limited to, those specified in any approved odour
      management plan, to prevent or where that is not practicable, to minimise, the odour.

3.3.2 The operator shall:
   (a) maintain and implement an odour management plan;
   (b) if notified by the Environment Agency that the activities are giving rise to pollution outside
       the site due to odour, submit to the Environment Agency for approval within the specified
       period, a revised odour management plan;
   (c) implement any approved revised odour management plan from the date of approval,
       unless otherwise agreed in writing by the Environment Agency.

3.4 Noise and vibration

3.4.1 Emissions from the activities shall be free from noise and vibration at levels likely to cause pollution
      outside the site, as perceived by an authorised officer of the Environment Agency, unless the
      operator has used appropriate measures, including, but not limited to, those specified in any
      approved noise and vibration management plan, to prevent or where that is not practicable, to
      minimise, the noise and vibration.

3.4.2 The operator shall:
   (a) if notified by the Environment Agency that the activities are giving rise to pollution outside
       the site due to noise and vibration, submit to the Agency for approval within the period
       specified, a noise and vibration management plan;
   (b) implement the approved noise and vibration management plan, from the date of approval,
       unless otherwise agreed in writing by the Environment Agency.

3.5 Monitoring

3.5.1 The operator shall, unless otherwise agreed in writing by the Environment Agency, undertake the
      monitoring specified in table 3.1.

3.5.2 The operator shall maintain records of all monitoring required by these standard rules including
      records of the taking and analysis of samples, instrument measurements (periodic and continual),
      calibrations, examinations, test and surveys and any assessment or evaluation made on the basis
      of such data.
4 Information

4.1 Records

4.1.1 All records required to be made by these standard rules shall:

(a) be legible;

(b) be made as soon as reasonably practicable;

(c) if amended, be amended in such a way that the original and any subsequent amendments remain legible or are capable of retrieval; and

(d) be retained, unless otherwise agreed by the Environment Agency, for at least 6 years from the date when the records were made, or in the case of the following records until permit surrender:
   (i) off-site environmental effects; and
   (ii) matters which affect the condition of land and groundwater

4.1.2 The operator shall keep on site all records, plans and the management system required to be maintained by these standard rules, unless otherwise agreed in writing by the Environment Agency.

4.2 Reporting

4.2.1 The operator shall send all reports and notifications required by these standard rules to the Environment Agency using the contact details supplied in writing by the Environment Agency.

4.2.2 Within one month of the end of each quarter, the operator shall submit to the Environment Agency using the form made available for the purpose, the information specified on the form relating to the site and the waste accepted and removed from it during the previous quarter.

4.3 Notifications

4.3.1 (a) In the event that the operation of the activities gives rise to an incident or accident which significantly affects or may significantly affect the environment, the operator must immediately—

   (i) inform the Environment Agency,

   (ii) take the measures necessary to limit the environmental consequences of such an incident or accident, and

   (iii) take the measures necessary to prevent further possible incidents or accidents;

(b) in the event of a breach of any standard rule the operator must immediately

   (i) inform the Environment Agency, and

   (ii) take the measures necessary to ensure that compliance is restored within the shortest possible time;

(c) in the event of a breach of standard rule which poses an immediate danger to human health or threatens to cause an immediate significant adverse effect on the environment, the operator must immediately suspend the operation of the activities or the relevant part of it until compliance with the standard rules has been restored.

4.3.2 Any information provided under standard rule 4.3.1 shall be confirmed in writing within 24 hours.
4.3.3 Where the Environment Agency has requested in writing that it shall be notified when the operator is to undertake monitoring and/or spot sampling, the operator shall inform the Environment Agency when the relevant monitoring and/or spot sampling is to take place. The operator shall provide this information to the Environment Agency at least 14 days before the date the monitoring is to be undertaken.

4.3.4 The Environment Agency shall be notified within 14 days of the occurrence of the following matters except where such disclosure is prohibited by Stock Exchange rules:

(a) Where the operator is a registered company:
   • any change in the operator's trading name, registered name or registered office address; and
   • any steps taken with a view to the operator going into administration, entering into a company voluntary arrangement or being wound up.

(b) Where the operator is a corporate body other than a registered company:
   • any change in the operator's name or address; and
   • any steps taken with a view to the dissolution of the operator.

(c) In any other case:
   • the death of any of the named operators (where the operator consists of more than one named individual);
   • any change in the operator's name(s) or address(es); and
   • any steps taken with a view to the operator, or any one of them, going into bankruptcy, entering into a composition or arrangement with creditors, or, in the case them being in a partnership, dissolving the partnership.

4.4 Interpretation

4.4.1 In these standard rules the expressions listed below shall have the meaning given.

4.4.2 In these standard rules references to reports and notifications mean written reports and notifications, except when reference is being made to notification being made “without delay”, in which case it may be provided by telephone.

*accident* means an accident that may result in pollution.

*anaerobic digestion* means a process of controlled decomposition of biodegradable materials under managed conditions where free oxygen is absent, at temperatures suitable for naturally occurring mesophilic or thermophilic anaerobe and facultative anaerobe bacteria species, which convert the inputs to a methane-rich biogas and whole digestate.

*agriculture* means as defined in The Agriculture Act 1947 including:- "horticulture, fruit growing, seed growing, dairy farming and livestock breeding and keeping, the use of land as grazing land, meadow land, osier land, market gardens and nursery grounds, and the use of land for woodlands where that use is ancillary to the farming of the land for other agricultural purposes, and ‘agriculture’ shall be constructed accordingly”

*animal by-products legislation* refers to animal by-products which are subject to the requirements and controls in Regulation (EC) 1069/2009 (as amended) and its corresponding implementing Regulation (EC) 142/2011 (as amended). These are enforced through The Animal By-Products (Enforcement) (England) Regulations 2011 and The Animal By-Products (Enforcement) (No2) (Wales) Regulations 2011. You will need to add NI and Scot legislation if QP covers the UK.

*animal by-products* are defined in Article 3 of Regulation (EC) 1069/2009 as ‘entire bodies or parts of animals, products of animal origin or other products obtained from animals that are not intended for human consumption’. This includes catering waste, used cooking oil, former foodstuffs, butcher and slaughterhouse waste, blood, feathers, wool, hides and skins, fallen stock, pet animals, zoo and circus animals, hunt trophies, manure, ova, embryos and semen not intended for breeding purposes.

*animal waste* means any waste consisting of animal matter that has not been processed into food for human consumption
“authorised officer” means any person authorised by the Environment Agency under section 108(1) of The Environment Act 1995 to exercise, in accordance with the terms of any such authorisation, any power specified in Section 108(4) of that Act.


“digestate” means material resulting from an anaerobic digestion process

“domestic purposes” has the same meaning as in section 218 of the Water Industry Act 1991.

“emissions of substances not controlled by emission limits” means emissions of substances to air, water or land from the activities, either from the emission points specified in these standard rules or from other localised or diffuse sources, which are not controlled by an emission limit.

“European Site” means candidate or Special Area of Conservation and proposed or Special Protection Area in England and Wales, within the meaning of Council Directives 79/409/EEC on the conservation of wild birds and 92/43/EEC on the conservation of natural habitats and of wild flora and fauna and the Conservation of Habitats and Species Regulations 2010. Internationally designated Ramsar sites are dealt with in the same way as European sites as a matter of government policy and for the purpose of these rules will be considered as a European Site.

“food production purposes” means the manufacturing, processing, preserving or marketing purposes with respect to food or drink for which water supplied to food production premises may be used, and for the purposes of this definition “food production purposes” means premises used for the purposes of a business of preparing food or drink for consumption otherwise than on the premises.

“Gas engine effective stack height” means:

a) If away from buildings actual stack height is no less than 3 meters.

b) If attached to or on top of a building the stack tip must be no less than 3 meters above roof ridge.

c) If there are other buildings within a distance of 5L from the point of discharge, the top of the stack must be no less than 3 meters above the roof ridge of the highest building. L is the lesser of the two measurements of building height and maximum width of the building.

“groundwater” means all water, which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.

“groundwater source protection zone” has the meaning given in the document titled “Groundwater protection: Principles and practice” published by the Environment Agency in 2012.

“impermeable surface” means a surface or pavement constructed and maintained to a standard sufficient to prevent the transmission of liquids beyond the pavement surface, and should be read in conjunction with the term “sealed drainage system” (below).

“MCERTS” means the Environment Agency’s Monitoring Certification Scheme.

“nearest sensitive receptor” means the nearest place to the permitted activities where people are likely to be for prolonged periods. This term would therefore apply to dwellings and associated gardens (including farmhouses) and to many types of workplaces. We would not normally regard a place where people are likely to be present for less than 6 hours at one time as being a sensitive receptor. The term does not apply to the operators of the permitted facility, their staff when they are at work or to visitors to the facility, as their health is covered by Health and Safety at Work legislation.

“pollution” means emissions as a result of human activity which may—

(a) be harmful to human health or the quality of the environment,

(b) cause offence to a human sense,

(c) result in damage to material property, or

(d) impair or interfere with amenities and other legitimate uses of the environment.

“quarter” means a calendar year quarter commencing on 1 January, 1 April, 1 July or 1 October.

“sealed drainage system” in relation to an impermeable surface, means a drainage system with impermeable components which does not leak and which will ensure that:

(a) no liquid will run off the surface otherwise than via the system;
(b) except where they may lawfully be discharged to foul sewer, all liquids entering the system are collected in a sealed sump.

“secure storage” means storage where waste cannot escape and members of the public do not have access to it.

“site” means the location where waste storage and treatment activities can take place.

“specified AQMA” means an air quality management area within the meaning of the Environment Act 1995 which has been designated due to concerns about oxides of nitrogen.

“SSSI” means Site of Special Scientific Interest within the meaning of the Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000).

“year” means calendar year commencing on 1st January.

End of standard rules
Dear Phil,

TOWN AND COUNTRY PLANNING (ENVIRONMENTAL IMPACT ASSESSMENT) (ENGLAND AND WALES) REGULATIONS 2011: REGULATION 5 SCREENING OPINION

FARM BASED ANAEROBIC DIGESTION GAS TO GRID PLANT AND ANCILLARY HIGHWAY IMPROVEMENT WORKS, LANDSCAPING AND CONNECTION TO NATIONAL GRID GAS NETWORK AT WORMSLADE FARM, CLIPSTON ROAD, KELMARSH, LE16 9RX

Thank you for your correspondence of 20 October 2015 requesting a screening opinion in respect of the above development. The proposals you have outlined are for the erection and operation of a farm based anaerobic digestion plant and associated works on 8 hectares of current agricultural land at Wormslade Farm, Kelmarsh.

The proposed development is not listed under Schedule 1 of the above regulations and therefore the requirement for an Environmental Impact Assessment (EIA) is not mandatory. The proposals do however fall within Schedule 2 to the regulations as a project for the disposal of non-hazardous waste.

The National Planning Policy Guidance provides indicative thresholds and criteria for the identification of Schedule 2 development requiring EIA. It is written in Annex A that EIA on installations for the disposal of non-hazardous waste is more likely to be required where new capacity exceeds 50,000 tonnes per annum (tpa). Based on the information you have submitted I understand a 36,000 tpa throughput of farmyard manure and crops grown locally by the landowner is proposed for the facility, with 30,000 tonnes of digestate being produced and applied as fertilizer to the land used for growing the feedstock crops.

Schedule 3 of the Regulations outlines selection criteria for screening Schedule 2 development and establishing whether the project is likely to have significant effects on the

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Please ask for: Claire Spokes
Tel: (01604) 366119
Our ref: 15/00004/SCR
Your ref: Date: 27 October 2015
environment by virtue of its characteristics, location and potential impacts. In this instance it is not considered that there are any such factors that would justify the requirement for an EIA. As such it is considered that on the basis of information provided in your submission, the proposal is not EIA development. Detailed assessment of the potential impact of the operations would however be expected in any subsequent planning application. Particular attention should be paid to the following aspects of the proposal:

- Local amenity (particularly odour, dust and noise)
- Highways and traffic
- Catchment area
- Landscape and visual amenity

Pre-application consultation with relevant technical bodies, in particular the Environment Agency and the Highways Authority, as well as Daventry District Council and the local parish councils is recommended.

Yours sincerely,

Claire Spokes
Senior Planner