Design and Access Statement

Erection of an anaerobic digestion plant and all associated works at Lower Leighton, Welshpool, Powys, SY21 8HH

Prepared for Farm Biomethane Limited

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Lower Leighton
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Farm Biomethane Limited

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December 2025

Planning Authority

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Publication title	Design and Access Statement
Version	1.0
Date	December 2025

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CONTENTS

1. Introduction

Farm Biomethane Ltd are applying for planning permission for the installation of an Anaerobic Digestion Plant at Lower Leighton, Welshpool.

This Design and Access Statement outlines the various elements of the proposed development in order it is clear as to how the design has evolved.

2. Use of the Proposed Development

When fully operational, the proposed development will utilise feedstock to generate biomethane for injection into the National Gas Grid. The digestate will be processed to remove the solid and liquid fractions which will be exported off site to be spread on agricultural land.

Anaerobic digestion is the conversion of biodegradable material to produce methane. It is already widely established in many countries in Europe to treat biodegradable organic wastes and the UK has already seen the construction of a significant number of AD plants for treating sewage sludge, agricultural slurry and other organic materials.

Biogas will be generated from cow slurry, manure and rye silage from local farms.

2.1 Sustainability, Renewable Energy and Climate Change Assessment

Over the last 5 years, energy security and more latterly food security have moved up the UK Government's agenda becoming areas of significant concern. The UK is reliant on imports of both, with only 62% of energy and 60% of food being produced domestically, with the interruption of both of these, as demonstrated by the current war in Ukraine, having a direct impact on living standards and industry. Farm Biomethane Ltd (the applicant) has identified that through a national aggregation scheme, managed regionally, renewable low-carbon energy can be harvested from resources which are abundant in the UK (straw and livestock manures) in the form of biomethane.

2.1.1 Renewable Energy

The biomethane produced by the proposed development has the potential to have a substantial benefit in terms of renewable energy production with the associated reduction in fossil fuel use. For example, currently 74%5 of UK housing stock uses mains gas as its source for central heating with the residential sector responsible for 20%6 of UK greenhouse carbon emissions in 2021. Although there is a slow shift away from gas as a heat source to more renewable sources, the rate of transition is slow. As such, biomethane has a valuable role to play in displacing the use of natural gas in our national gas grid, reducing carbon emissions and helping the UK meet its obligations under the Paris Agreement 2016 to limit global warming to 1.5oC by the end of this century.

2.1.2 Use of Nutrients

The Proposed Development would provide a safe and scalable pathway to manage manure and litter from livestock farms as they are generated. Manures would be brought to the site on a regular basis, being part of an enclosed/controlled environment as soon as they enter the reception hall. Managing manure in this way will avoid the use of temporary field heaps which release ammonia and odour to atmosphere, and if poorly sited, allow run-off of slurry to surface and ground-waters. In addition to the environmental impacts of managing manures in this way, these traditional storage techniques are an inefficient use of nutrients.

The benefit of processing as proposed is that it not only conserves nutrients for reuse but can also enhance their availability to plants in some cases. For example, a biogas plant owned and operated by Agri-Food and Biosciences Institute in Northern Ireland has for many years operated on a high concentration of cattle slurry. This plant has consistently demonstrated that on average 20% more nitrogen is available for plant uptake when compared with the raw cattle slurry. Applying this increase in availability of nitrogen to all manures in the UK would substantially reduce the amount of synthetic fertilisers which need to be imported to meet the domestic agronomic needs.

2.1.3 Water

Once operational, the Proposed Development will not require any additional water to operate other than potable water for staff use. Water required for operation would be sourced from the recirculated liquid from the digestion process, water harvested from the drying process, and water harvested from rainfall falling on the site.

3. Description of the Proposed Development Site

3.1 Development Site

The site of the proposed development is located to the West of Lower Leighton Farm and measures approximately 5.9 hectares. The site is gently sloping to the south west and is bounded on its north, south, east and west by existing mature hedgerows.

Access to the site is from the county highway.

Due to the existing buildings and mature hedgerows surrounding the proposed development, long and short distance views towards the digester plant will not be adversely affected. The application site and surroundings are shown on the submitted plans.

Lower Leighton comprises of a number of modern portal framed buildings which have seen the farmyard complex extend in all directions. As such, the site has the character and appearance of a modern and substantive farm holding.

3.2 Development Setting

The landscape surrounding the site comprises predominately flat farmland with medium to large scale fields bounded by hedgerows with scattered blocks of woodland.

The site currently has the existing slurry towers for the dairy farm at Lower Leighton, which will be used as the digestate lagoons for the proposed development.

The site falls within the administrative boundary of Powys County Council and is approximately 1.3 miles from Welshpool.

Directly adjacent to the development site is a dairy farm. It is proposed that manure and slurry from this farm would be used as feedstock for the proposed development.

4. Description of Buildings and Plant

The key elements of the proposed development are as follows:

- Silage clamps
- 1 manure reception pit
- Building for solid feedstock with air treatment and biofilter
- 1 weighbridge
- 2 solid feeding systems (one with crusher)

- 2 digesters
- 1 post-digester
- Membrane upgrading unit
- 1 CHP
- Biogas boiler
- Gas flare
- Pasteurisation unit
- 4 phase separation
- 1 building for solid fraction storage
- 3 lagoons
- Bunded area
- Grid entry unit
- 1 office building

4.1 Proposed Site Layout

The proposed site layout is shown on drawing 79211 / RR / 002. The site has been arranged with the office and reception building adjacent to the main site access road in order that all delivery vehicles and visitors have to report to the reception before they are allowed on site. The main car park has also been located adjacent to the site office to ensure that private vehicles do not use the internal access roads.

The feedstock buildings are located to the south of the site and north of the site office to enable manure, slurry and silage delivery vehicles not having to move across the site to unload. Immediately north of the feedstock buildings is the AD plant within a bunded area. The AD plant is set out so that the feedstock runs through the site in a sequential manner, minimising the necessary pipework, ending at the post digesters to the north of the site.

The CHP building is located adjacent to the boiler and heat recovery containers.

To the north west of the site is the gas upgrade area from where biomethane is then pumped to the compression equipment and on to the national gas grid.

4.2 AD Plant

The proposed AD plant can be subdivided into separate processes as follows:
- Pre-digestion processing
- Anaerobic digestion
- Digestate separation

4.2.1 AD Plant Description

The majority of the tanks will be massed poured steel reinforced concrete structures. They will be fabricated in sections off site, with final construction taking place on site. All of the tanks on site would be coloured to match the surrounding buildings. The tanks would be topped with gas PVC accumulators.

Adjacent to the tanks would be small technical buildings which would be used to house the numerous pumps and plant, which would be clad in the same colour as the tanks.

4.2.2 Bunded Area

The plant has been designed with adequate spacing between all elements to allow vehicular maintenance access to all equipment.

The whole of the AD plant site would be surrounded by a 1.9m high bund wall to provide secondary containment for the AD tank area.

4.2.3 Digestate Separation

The substrate, known more commonly as digestate, left after the biogas production process is a nutrient rich slurry. The digestate will be separated into solid and liquid fractions. The solid fraction can be applied to land. An estimated 24,465 tonnes of solid digestate will be produced annually. This volume is expected to generate approximately 979 additional road movements per year.

The liquid fraction will be stored and applied to land between March and September, subject to land conditions, moisture levels and chemical loading parameters. The plant will produce approximately 96,004 tonnes of liquid digestate annually. Storage will be provided both on and off-site, with a total of 10 months storage available. Of the total volume, 67,000 tonnes will offset existing road movements currently used to remove slurry and manure from Lower Leighton. The remaining 29,004 tonnes will result in an estimated 1,160 additional road movements per year.

The landowner at Lower Leighton Farm has confirmed 917 hectares of land is available for applying digestate, allowing for the spreading of approximately 27,549 tonnes. The remaining digestate will be managed by local agricultural contractors on land within the vicinity of the site.

4.2.4 Gas Upgrade Area

The gas upgrade area is located directly to the west of the bunded AD plant area. Located to the north of the gas upgrade area is a flare which would only be used in an emergency situation to burn off gas from the plant if it could not be transferred to the gas grid or burnt in the on site CHP engines.

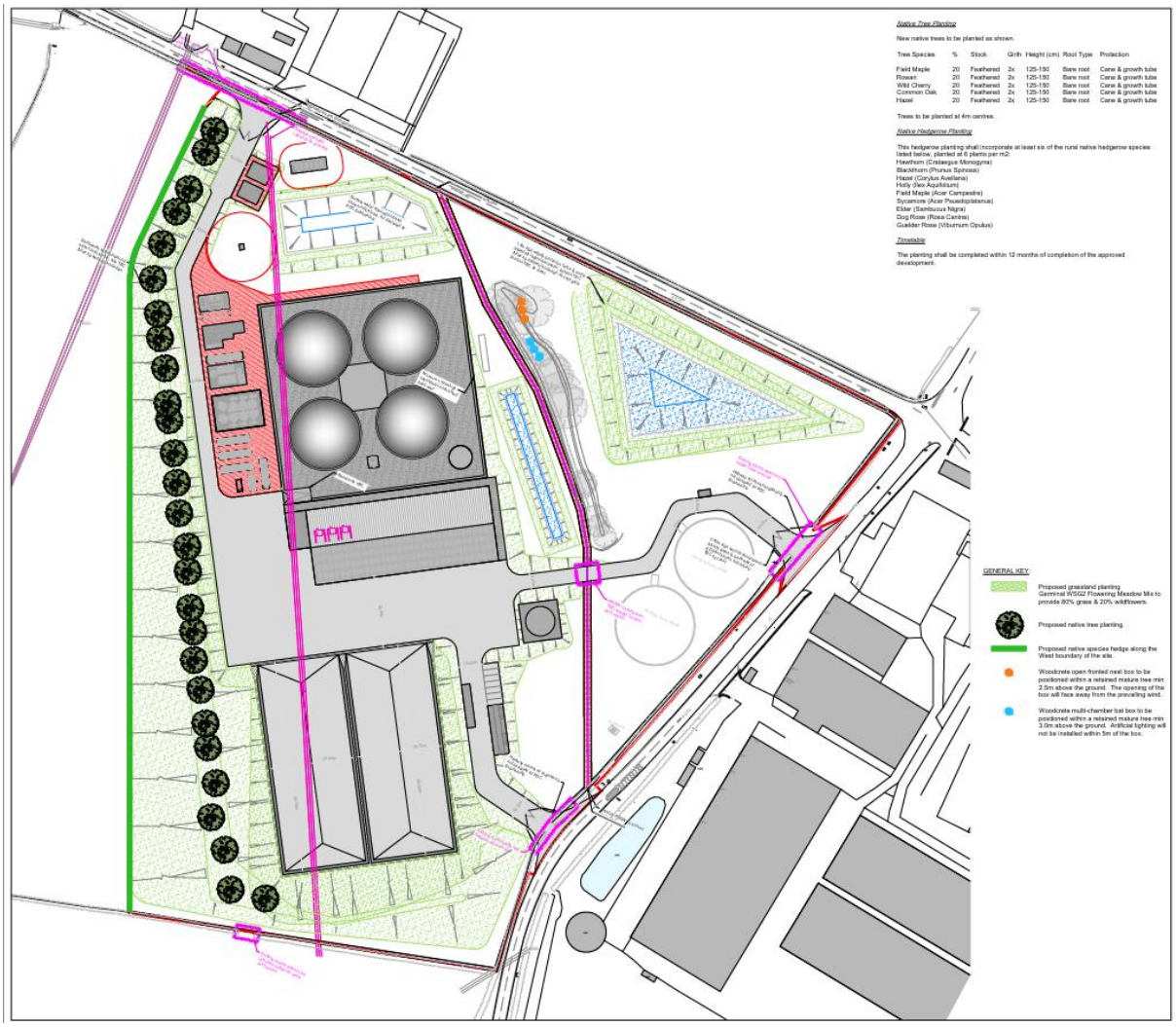
4.2.5 Office Building

The office building has been constructed using similar materials to the other buildings on site. The office building would comprise the following elements:

- Site reception
- Offices and meeting rooms
- Toilets, shower/changing rooms and locker rooms
- Canteen, kitchen area and lounge area
- Laboratory

5. Landscape and Ecological Planting

A scheme of landscape and ecological planting is proposed as part of the new development. This includes native tree planting, grassland planting and native species hedgerow along the West boundary of the site.



6. Site Access

The site will be accessed off the existing accesses which are to be improved off the B4388 and B4381. The access roads are to be 10m wide.

More details on traffic can be found in Chapter 8 of the Environmental Statement.

All visitors to the Proposed Development would have to visit the site reception first, where they would be equipped with appropriate PPE. Private vehicles would not be allowed on site, with parking provided outside of the fenced area.