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FLOOD RISK ASSESSMENT

THE CONSTRUCTION OF A COVERED DIGESTATE STORAGE LAGOON, PERIMETER BUNDING AND FENCING

LEADENHALL FARM, HOLBEACH, SPALDING, LINCOLNSHIRE

BEESWAX DYSON FARMING LTD

OCTOBER 2020



FRA		
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1.1 Introduction

- 1.1.1 This Flood Risk Assessment (FRA) accompanies the submission of a Planning Application on behalf of Beeswax Dyson Farming Ltd for the construction of a 5,500m³ covered digestate storage lagoon on agricultural land at Leadenhall Farm, Holbeach, Spalding, Lincolnshire.
- 1.1.2 Liquid digestate will be transported to the Application Site on a campaign basis from the Carrington and/or Nocton Anaerobic Digestion (AD) facility for storage, prior to being spread and used on the Applicant's surrounding agricultural land as a nutrient rich fertiliser at the required and appropriate time of year.
- 1.1.3 The Application Site is located in Flood Zone 3a, which has a High Probability risk of flooding. Footnote 50 in the National Planning Policy Framework (NPPF) confirms that *"a site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3"*. This FRA has been prepared in accordance with that requirement.

1.2 Planning Policy Context

- 1.2.1 The overarching aspiration of planning policy concerned with managing development and flood risk seeks to ensure that flood risk is taken into account at all stages of the planning process in order to divert development away from areas of the highest risk of flooding.
- 1.2.2 Policy DM15 (Flooding and Flood Risk) of the LMWLP states that *"proposals for waste developments will need to demonstrate that they can be developed without increasing the risk of flooding both to the site of the proposal and the surrounding area"*.
- 1.2.3 Paragraph 163 of the NPPF states that *"when determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:*
- a) Within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;*
 - b) The development is appropriately flood resistant and resilient;*
 - c) It incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*
 - d) Any residual risk can be safely managed, and*
-

e) Safe access and escape routes are included where appropriate, as part of an agreed emergency plan”.

1.2.4 The Application Site is located in Flood Zone 3a of the Environment Agency’s Flood Zone Map and is approximately 0.8ha in size. An FRA is therefore required to accompany the formal submission of a Planning Application.

1.2.5 This FRA has been undertaken with due regard to the statutory requirements of the NPPF and with reference to National Planning Practice Guidance (NPPG) in relation to development and flood risk. This ensures that flood risk is taken into account at all stages of the planning process and to avoid inappropriate development in areas potentially at risk of flooding.

1.2.6 The NPPG notes that:

“A flood risk assessment should also be appropriate to the scale, nature and location of the development. For example, where the development is an extension to an existing house (for which planning permission is required) which would not significantly increase the number of people present in an area at risk of flooding, the local planning authority would generally need a less detailed assessment to be able to reach an informed decision on the planning application”.

1.3 Description of Development

1.3.1 The description of development is proposed to be as follows:

“The construction of a covered digestate storage lagoon, perimeter bunding and fencing.”

1.4 Engineering Works

1.4.1 The excavation of topsoil, subsoil and clay will be undertaken to create the digestate lagoon void. Excavated material including clay will be used for the construction of the lagoon embankments and to create the lagoon floor. All excavated material will be utilised on the Application Site and within the development.

Storage Capacity

- Storage volume – 5,500m³ of digestate

Dimensional Summary

- Area of lagoon – 6,016m²
- Overall depth – 3m
- Digestate depth – 2.25m
- Freeboard – 0.75m
- Crest width – 4m
- Dry slope – 1:3
- Wet slope – 1:4
- Max height of embankment – 1.7m (crest to ground level)

1.4.2 The construction of the digestate lagoon will be carried out using 360 excavators, bulldozers and articulated dump trucks.

1.4.3 The embankments will be constructed in layers and the clay will be compacted using a towed vibrating roller. Perimeter embankments will be grass seeded.

1.5 Lining/Cover

1.5.1 The digestate lagoon will be lined with a 2 millimetre (mm) high-density polyethylene (HDPE) and will also have a floating cover of 1mm. All HDPE liners will be welded together to ensure a water tight seal. The lagoon will have a freeboard of approximately 750mm.

1.6 Vehicle Movements

1.6.1 Liquid digestate will be delivered to the Application Site by heavy commercial vehicles (HCVs)/tankers on a campaign basis. It is anticipated that approximately 170 loads of digestate will be imported to the site on an annual basis, usually over a three week period (8 loads a day/16 movements).

1.7 Spreading of Digestate

1.7.1 The stored digestate will be extracted from the lagoon using an overbank pipe. It will then be taken to the surrounding agricultural land by tractor for spreading as a fertiliser and soil conditioner at the appropriate time of year.

1.8 Site Security

- 1.8.1 The digestate lagoon will be secured by the erection of a 1.8m high K-rail security fence along the crest of the lagoon embankment.

1.9 Hours of Operation

- 1.9.1 Construction works will be undertaken between 7am and 7pm daily.

1.10 Landscaping

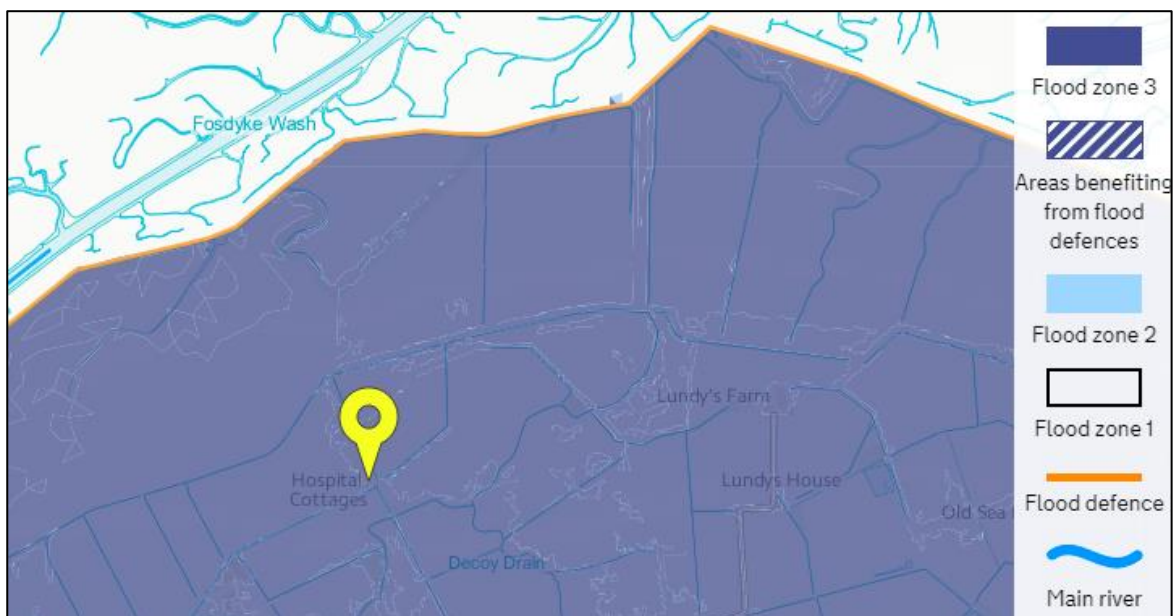
- 1.10.1 The embankments of the digestate lagoon will be grass seeded.

1.11 Timescales

- 1.11.1 It is anticipated that the engineering operation will take approximately 6 – 8 weeks to complete.

1.12 Flood Risk Classification

- 1.12.1 The yellow flag on the map below locates the Application Site on the Environment Agency's Flood Map. This confirms that the Application Site falls within Flood Zone 3a – highest risk of flooding.



- 1.12.2 Flood Zone 3a is land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding.

- 1.12.3 The NPPG confirms that 'Waste Treatment' is classified as 'Less Vulnerable'. Table 3 of the NPPG 'Flood Risk Vulnerability and Flood Zone Compatibility' (see below) states that less vulnerable development is 'appropriate' in Flood Zone 3a. This fulfils the requirements of the sequential test.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	✗	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	✗	✗	✗	✓*

1.13 Overview of the Surrounding Area

- 1.13.1 The River Welland and The Wash are located approximately 1.5km to the north of the Application Site, with dykes and raised roads across the area. Drainage ditches have been installed in the surrounding fields and during heavy rainfall, these ditches drain/are pumped into the River Welland to reduce the effects of localised flooding.
- 1.13.2 Flood protection measures in the form of embankments have been constructed alongside the River Welland and The Wash in order to protect surrounding land and buildings.

1.14 Potential Source of Flooding

- 1.14.1 The potential sources of flooding that could affect the Application Site have been identified as the River Welland, The Wash and the internal drainage network. The surrounding area is relatively flat, and any flood water will rise uniformly across the surrounding area.
- 1.14.2 Although the Application Site lies within an area susceptible to flooding, the surrounding area benefits from flood defence measures which will minimise the impact of a flood event on the site.

1.15 Impact of flooding on the Proposed Development

- 1.15.1 As all rainfall will be contained within the lagoon, on top of the floating cover, there is no increase in the risk of surface water flooding to external receptors. Hence, the surface water flood risk to neighbouring land is considered very low and mitigation measures are not required.
- 1.15.2 The proposed lagoon will cause some very slight changes to the run-off characteristics of the site, due to the construction of the embankments. There is currently an overall very low risk of surface water flooding across the site and this is not expected to change as a result of the proposed development.
- 1.15.3 The lagoon will be designed with a freeboard of 0.75m above the maximum digestate depth. In the event of a rainfall storm event, the accumulated water on top of the floating cover would be below the freeboard allowance. The lagoon will therefore provide sufficient storage capacity for a rainfall storm event.
- 1.15.4 The proposal will be constructed in accordance with the requirements for Slurry Storage Systems, under Schedule 2, of the SSAFO Regulations as a benchmark to build any containment system for liquid digestate. The Applicant will ensure that those requirements will be followed when constructing the lagoon.
- 1.15.5 The interior of the lagoon will be lined with clay that is won during the excavation works. A HDPE membrane will line the lagoon to prevent digestate loss and therefore avoiding any adverse impacts upon the water environment. A protective underlay will be used beneath the HDPE liner (e.g. heavy duty geotextile) to prevent damage to the liner. The HDPE liner and cover will also be anchored into the ground. The lagoon will also be fitted with a leak detection system, which will be monitored by the Site Operations Manager or nominated competent person. These measures will ensure that the risks of pollution to groundwater as minimised.
- 1.15.6 The surrounding area benefits from flood defence measures including drainage ditches and is therefore well suited to cope with extreme flood events very quickly. The actual risk of flooding to the Application Site is very low given the level and condition of the existing flood defence measures.
- 1.15.7 The Environment Agency provides a free flood alert service. The Applicant is already registered on the alert database which provides early warning to ensure the site is prepared for a flood event.
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1.16 Conclusion

- 1.16.1 This FRA has determined that the Application Site is located within Flood Zone 3a, which has the highest risk of flooding. The surrounding area benefits from flood defence measures in the form of embankments including drainage ditches designed to drain the surrounding land into the River Welland. The land is well equipped to deal with a flood event.
- 1.16.2 The proposal is defined as 'less vulnerable' and is appropriate in this location.
- 1.16.3 It is therefore concluded, that the proposed development will not give rise to an increased risk of flooding in the locality. The proposal is therefore compliant with Policy DM15 (Flooding and Flood Risk) of the LMWLP and national planning guidance relating to flood risk.

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