

Flood Risk Assessment
Revision A

Job No. 27402.2

Proposed Digestate Lagoon
Land east of Lady's Lane
Bressingham
Norfolk

Client: Deal Farm Biogas Ltd.

June 2022

REPORT CONTROL SHEET

Client: Deal Farm Biogas Ltd.

Job No.: 27402.2

Project Name: Proposed Digestate Lagoon
Land east of Lady's Lane
Bressingham
Norfolk

Issue		
Revision 0	January 2022	
Revision A (Lagoon shifted north outside of area at risk of surface water flooding)	June 2022	Report Prepared by: Sally Hare B.Sc (Hons) CSci, MEnvSc, MCIWEM Director - Environmental
		Report Reviewed & Authorised by: Matt Hare B.Sc, MCIWEM C.WEM, IEng, EngTech MICE Director - Infrastructure

CONDITIONS OF INVESTIGATION & REPORTING

This report and its findings should be considered in relation to the terms of the brief and objectives agreed between Plandescil Ltd and the Client.

Plandescil Ltd are only able to work with information available at the time when the Flood Risk Assessment is carried out which have been applied to the Flood Risk Assessment in accordance with current best practice. Plandescil Ltd cannot be held responsible for any subsequent flooding to the development or surrounding area.

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TABLE OF CONTENTS

REPORT CONTROL SHEET	1
CONDITIONS OF INVESTIGATION & REPORTING	1
TABLE OF CONTENTS.....	1
1.0 INTRODUCTION.....	3
1.1 Background Information.....	3
1.2 Objectives	3
2.0 EXISTING SITE.....	3
2.1 Location & Site Setting	3
2.2 Existing Site Layout & Topography	4
2.3 Geology	4
2.4 Hydrogeology.....	4
2.5 Hydrology & Catchment.....	4
3.0 PROPOSED DEVELOPMENT.....	5
3.1 Description	5
3.2 Vulnerability Classification	5
4.0 FLOOD RISK.....	6
4.1 Sources of Flooding	6
4.2 Fluvial/Tidal Flooding	7
4.3 Groundwater Flooding	7
4.4 Pluvial Flooding	7
4.5 Flooding from Reservoirs	7
5.0 FLOOD MITIGATION MEASURES	8
6.0 OFF-SITE IMPACTS.....	8
7.0 SEQUENTIAL TEST	8
8.0 SUMMARY	8
9.0 REFERENCES.....	8

DRAWINGS APPENDIX

Drawing No. 27402/154	- Site Location Plan – Proposed Digestate Lagoon B (West)
Drawing No. 27402/007	- Lagoon 2 Levels
Drawing No. 27402/014	- Proposed Digestate Storage Lagoon B (West) Site Layout
Drawing No. 27402.2/810	- Superficial Deposits Geology Map
Drawing No. 27402.2/811	- Bedrock Geology Map
Drawing No. 27402.2/812	- Hydrogeology Map
Drawing No. 27402.2/820	- Fluvial & Tidal Flooding Map – Extent
Drawing No. 27402.2/821	- Surface Water Flooding Map – Extent 3.3%, 1.0%, & 0.1% AEP
Drawing No. 27402.2/831	- Reservoir Flood Extent

APPENDIX A

SFRA Map Extract – Flood Risk Mapping GN_83 Fluvial & Tidal Flood Zones with Climate Change⁽³⁶⁾

SFRA Map Extract – Flood Risk Mapping GN_83 Groundwater Flooding⁽³⁶⁾

SFRA Map Extract – Flood Risk Mapping GN_83 Surface Water Flooding⁽³⁶⁾

SFRA Map Extract – Flood Risk Mapping GN_83 Reservoir Flooding⁽³⁶⁾

1.0 INTRODUCTION

1.1 Background Information

This Flood Risk Assessment was prepared by Plandescil Ltd. The report was commissioned by Cornerstone Planning Limited on behalf of Deal Farm Biogas Ltd., to accompany a planning application for a proposed liquid digestate storage lagoon on the land east of Lady's Lane, Bressingham, Norfolk, referred to here within as the site.

This Revision A of the Flood Risk Assessment report has been prepared following correspondence from the Lead Local Flood Authority (LLFA)⁽³⁷⁾ in response to the planning application (South Norfolk Council planning reference 2021/2788). This has led to the location of the lagoon and the red line planning boundary shifting marginally north to locate it outside of the area at risk of surface water flooding, refer to Drawing No. 27402.2/821 in the **Drawings Appendix**.

1.2 Objectives

This report has been prepared to evaluate the flood risk to the proposed development, in addition to considering the impact that the development will have on the surrounding area.

This assessment has been prepared in accordance with the requirements of the National Planning Policy Framework, Planning Policy Guidance, Flood Risk and Coastal Change Guidance (NPPF, FR&CCG)⁽²⁾, the regional requirements of the LLFA⁽³⁵⁾, and the local Strategic Flood Risk Assessment (SFRA)⁽³⁶⁾. A variety of public, published, and site-specific information sources have been consulted in the compilation of this report, a list of these sources can be found in **Section 9.0, References**.

2.0 EXISTING SITE

2.1 Location & Site Setting

The proposed site is located to the north of the settlement of Bressingham, to the south-west of Shelfanger, and south-east of Boyland Common, refer to Drawing No. 27402/154 in the **Drawings Appendix** for the Site Location Plan. **Table 2.1** below provides a site summary.

Site Summary	Details
Site Address	Land east of Lady's Lane, Bressingham, Norfolk
Coordinates (Easting & Northing)	608640, 282864 ⁽⁶⁾
Local Planning Authority	South Norfolk Council ⁽¹¹⁾
Lead Local Flood Authority (LLFA)	Norfolk County Council
Environment Agency Area of Responsibility	East Anglia ⁽¹⁴⁾
Internal Drainage Board (IDB)	None ⁽³¹⁾

Table 2.1 Site summary.

The site is situated in an agricultural setting surrounded by agricultural land, to the north are agricultural buildings.

2.2 Existing Site Layout & Topography

The existing site comprises undeveloped agricultural land, as shown on Drawing No. 27402/007 in the **Drawings Appendix**.

A topographical survey has been carried out of the existing site to determine the existing site levels, refer to Drawing No. 27402/007. The site levels relate to a GPS derived datum, control was established using Ordnance Survey National GPS OSGB32(36), and translated from ETRS89 using OSGM02 and OSTN02 models. All levels within this report refer to ground levels above ordnance datum (AOD) unless otherwise noted.

Ground levels vary across the site from 46.19m AOD in the east, to 46.95m AOD in the south.

2.3 Geology

The British Geological Survey's (BGS), digital geological map⁽⁸⁾ identifies that the site is underlain by Lowestoft Formation (Diamicton) Superficial Deposits, and that the Chalk Formation Bedrock is located at depth. Refer to Drawing No's. 27402.2/810 & 811 in the **Drawings Appendix** showing an extract of the BGS Superficial and Bedrock Geology Map⁽⁸⁾.

Cranfield Soil and Agrifood Institution's Soilscape Viewer⁽¹⁵⁾ identifies the soils of the area to be slowly permeable, seasonally wet, slightly acid, but base rich loamy and clayey soils with impeded drainage that drain to the stream network.

2.4 Hydrogeology

The Hydrogeological Map⁽⁹⁾ indicates the groundwater to be located at approximately 30m - 35m AOD, suggesting the groundwater to be a minimum of approximately 11.19m below ground level (bgl). Refer to Drawing No. 27402.1/812 in the **Drawings Appendix** showing an extract of the Hydrogeology Map.

2.5 Hydrology & Catchment

No surface water bodies are located on-site. Drawing No. 27402/014 in the **Drawings Appendix** shows a pond located amongst the agricultural buildings to the north of the site, and several ditches located to the west of the agricultural buildings, the closest to the site is located approximately 46.5m north of the site.

The site is located in the catchment of a principal drainage network, at its closest the drain is located approximately 517m south-east of the site. To establish the catchment of the drainage network when it is adjacent to the site, the Flood Estimation Handbook Web Service⁽¹²⁾ was consulted, which confirmed it has a catchment of 0.77km². The catchment is shown in **Figure 2.5** below.



Figure 2.5 The catchment of the principal drainage network when adjacent to the site (the red outline denotes the site)⁽¹²⁾.

3.0 PROPOSED DEVELOPMENT

3.1 Description

The proposed development is for the construction of a 5,000m³ digestate storage lagoon to enable the farmer to draw liquid directly when spreading. This will minimise traffic movements. Refer to Drawing No. 27402/014 in the **Drawings Appendix** detailing the proposed site layout. As discussed in **Section 1.1** consideration was given to the layout to locate the lagoon outside of the area shown to be at risk of pluvial flooding.

3.2 Vulnerability Classification

NPPF, FR&CCG⁽²⁾ Table 2, Flood Risk Vulnerability Classification provides a detailed list of land use and their flood risk vulnerability classifications. This list is recognised as not being exclusive and provides guidance on the various uses and their subsequent Flood Risk Classification.

NPPF, FR&CCG⁽²⁾ Table 2 Flood Risk Vulnerability Classification describes the proposed site as having a less vulnerable land-use.

NPPF, FR&CCG⁽²⁾ Table 3, Flood Risk Vulnerability and Flood Zone 'Compatibility' assesses the appropriateness of the development against the vulnerability classification, and the probability of the site experiencing fluvial and/or tidal flooding. NPPF, FR&CCG⁽²⁾ Table 3, has been extracted and

summarised in **Table 3.2** below, this shows Flood Zone 1, 2, and 3a to be appropriate for less vulnerable developments, whilst in Flood Zone 3b development should not be permitted.

Fluvial and tidal flood zones are defined as follows:

Flood Zone 1: Fluvial and Tidal Flood Zone 1 has less than 1 in 1000 chance of flooding at a location in any one given year (i.e., less than 0.1% annual exceedance probability (AEP) of flooding).

Flood Zone 2: Fluvial and Tidal Flood Zone 2 has a 1 in 1000 chance of flooding at a location in any one given year (i.e., a 0.1% AEP of flooding).

Flood Zone 3: Fluvial Flood Zone 3 has a 1 in 100 chance of flooding at a location in any one given year (i.e., a 1.0% AEP of flooding). Tidal Flood Zone 3 has a 1 in 200 chance of flooding at a location in any one given year (i.e., a 0.5% AEP of flooding).

Flood Zone 3 is subdivided into two categories, Flood Zone 3a and 3b, these are as follows;

Flood Zone 3a: Fluvial Flood Zone 3a has a 1 in 100 chance of flooding at a location in any one given year (i.e., a 1.0% AEP of flooding). Tidal Flood Zone 3a has a 1 in 200 chance of flooding at a location in any one given year (i.e., a 0.5% AEP of flooding).

Flood Zone 3b: Fluvial and tidal Flood Zone 3b has a 1 in 20 chance of flooding at a location in any one given year (i.e., a 5.0% AEP of flooding). This is often referred to as the functional floodplain.

Flood Risk Vulnerability Classification		Essential Infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood Zone	Flood Zone 1	✓	✓	✓	✓	✓
	Flood Zone 2	✓	✓	Exception Test Request	✓	✓
	Flood Zone 3a	Exception Test Request	✓	x	Exception Test Request	✓
	Flood Zone 3b	Exception Test Request	✓	x	x	x

Table 3.2 NPPF, FR&CCG Flood zone vulnerability and flood zone 'compatibility'⁽²⁾.

Key:

✓ Development is appropriate x Development should not be permitted

4.0 FLOOD RISK

4.1 Sources of Flooding

The proposed development could be at possible risk from the following sources of flooding:

- Fluvial/ tidal flooding;
- Groundwater flooding;
- Pluvial flooding, and
- Flooding from reservoirs.

4.2 Fluvial/Tidal Flooding

The Environment Agency's Flood Map for Planning⁽¹⁴⁾ and the SFRA⁽³⁶⁾ indicates that the site is not located in an area of flood risk as the proposed development is located within the current and future fluvial and tidal Flood Zone 1, refer to Drawing No. 27402.2/820 in the **Drawings Appendix**, and **Appendix A**. Flood Zone 1 has less than 0.1% chance of flooding at a location in any one given year.

The SFRA⁽³⁶⁾ also considers the impact of climate change, this shows the site to be located outside of the area at risk of this, refer to **Appendix A**.

4.3 Groundwater Flooding

The SFRA includes groundwater flood risk based upon the Areas Susceptible to Groundwater Flooding (AStGWf) dataset, however the location of the site appears to be unclassified⁽³⁶⁾, refer to **Appendix A**.

BGS groundwater contours⁽⁹⁾ indicate the groundwater level to be 30m - 35m AOD, suggesting the groundwater to be a minimum of approximately 11.19m below the existing ground levels of the site.

4.4 Pluvial Flooding

In 2013 the Environment Agency, working with the LLFAs produced the updated Flood Map for Surface Water (uFMfSW), it should be noted that subsequently the name of this dataset was revised to the Risk of Flooding for Surface Water Flooding (RoFfSW). The RoFfSW assessed flooding scenarios as a result of rainfall during the 3.3%, 1.0%, and 0.1% AEP flood events⁽²⁶⁾.

The RoFfSW dataset available through Open Government Data⁽¹⁴⁾ and the SFRA⁽³⁶⁾ indicates the site to be at very low risk of surface water flooding, refer to Drawing No. 27402.2/821 in the **Drawings Appendix** and **Appendix A** detailing the surface water flood risk. The Environment Agency defines very low risk as having a less than 1 in 1000 chance of flooding in any one given year (i.e., a 0.1% AEP of flooding)⁽²⁶⁾.

As discussed in **Section 1.1** and **3.1**, consideration was given to the layout to locate the lagoon outside of the area shown to be at risk of pluvial flooding

4.5 Flooding from Reservoirs

The Environment Agency's Risk of Flooding from Reservoirs dataset⁽²⁵⁾ available through Open Government Data⁽¹⁴⁾, details the extent of reservoir flooding during a wet day, dry day, and fluvial contribution flood event. This shows that the site is not located in an area that is at risk of reservoir flooding, refer to Drawing No.'s 27402.2/831 in the **Drawings Appendix** for further details. The extent of flooding shown on the Reservoirs dataset, reflects the SFRA reservoir flooding map⁽³⁶⁾, refer to **Appendix A**.

5.0 FLOOD MITIGATION MEASURES

No specific flood mitigation measures are recommended; however, the proposal should be constructed so that it meets appropriate regulations, and considers best practice.

6.0 OFF-SITE IMPACTS

It is evident that any hydrological change within the catchment will have an effect downstream.

The RoFFSW dataset indicates the site to be at very low risk of surface water flooding, the development will therefore not occupy any existing surface water flow routes or displace any flows.

The proposal is located within fluvial and tidal Flood Zone 1 and therefore will not occupy any critical flood plain storage or cause any obstruction to the natural flow of water.

7.0 SEQUENTIAL TEST

It is the Local Planning Authority's responsibility to apply the Sequential Test to steer proposed new development away from areas at risk of flooding. However, the proposed development will be located within fluvial and tidal Flood Zone 1. Tables 1, 2, and 3 of NPPF, FR&CCG⁽²⁾ state that this is the preferred Flood Zone for all new development. The site is also at very low risk of surface water flooding, therefore, the Local Planning Authority will not be required to apply the Sequential Test to the proposal in this instance.

8.0 SUMMARY

This report has evaluated the flood risk to the proposed site, in addition to considering the impact that the proposal will have on the surrounding area.

This report has shown that the proposed development is located in fluvial and tidal Flood Zone 1, is at very low risk of flooding from surface water, and reservoirs, and is at low risk of groundwater flooding.

9.0 REFERENCES

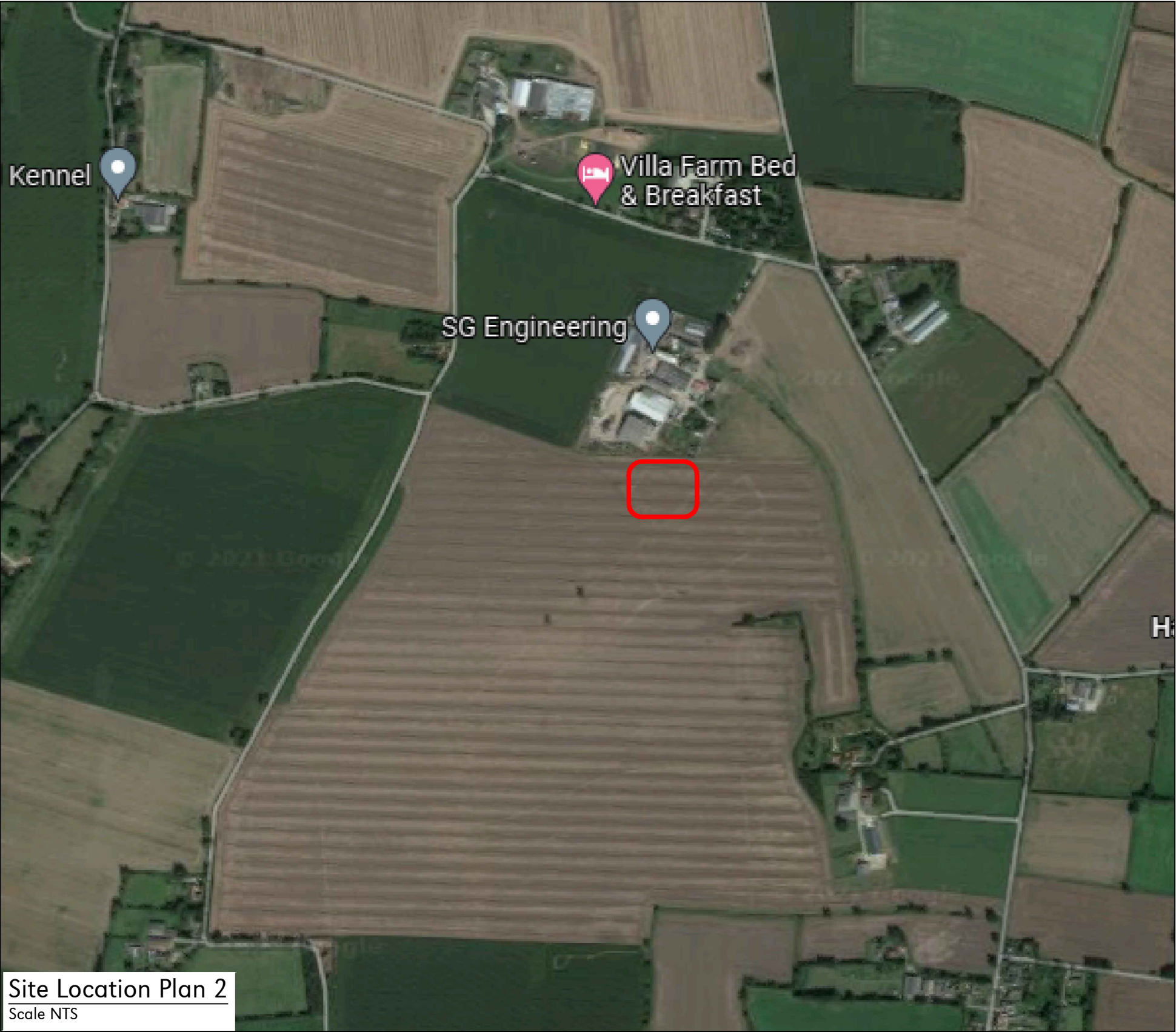
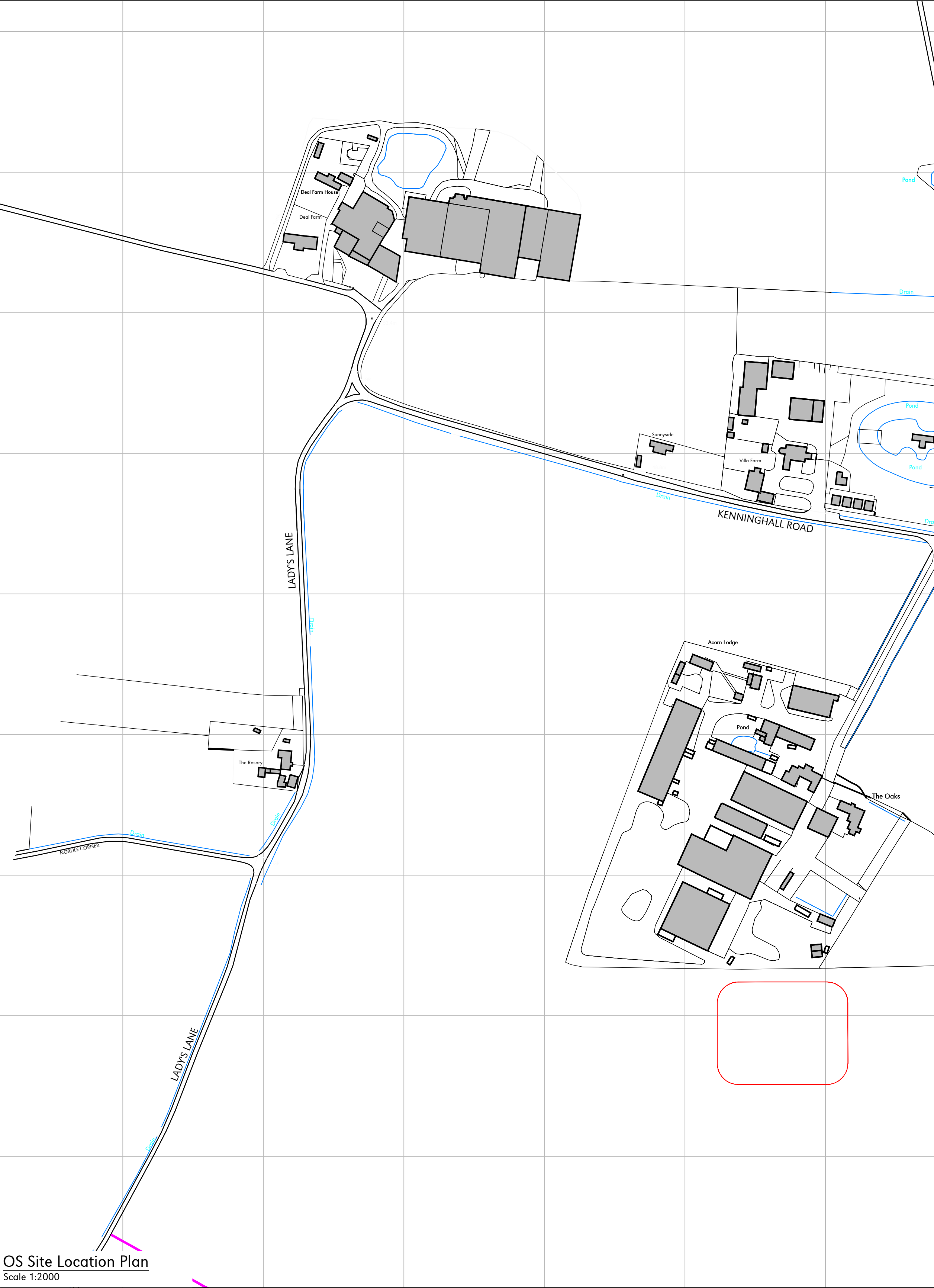
A variety of public, published, and site-specific information sources have been consulted in the compilation of this report, a list of these sources can be found below.

1. Ministry of Housing, Communities and Local Government (2021) National Planning Policy Framework (NPPF).
2. Planning Practice Guidance Suite (2021) National Planning Policy Framework, Flood Risk & Coastal Change Guidance (NPPF, FR&CCG).
3. Communities and Local Government (2010) Planning Policy Statement 25: Development & Flood Risk (PPS 25).
4. Google website (2022) Google Maps.
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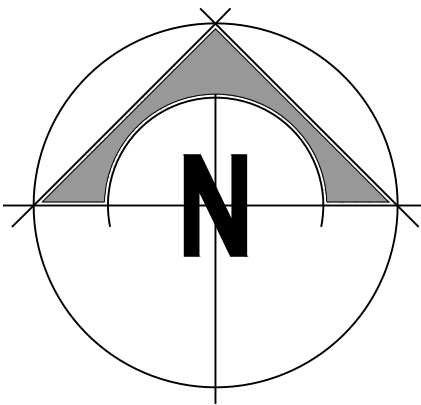
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25. Environment Agency website (2022) Long Term Flood Risk Information.
26. Environment Agency website (2019) What is the Risk of Flooding from Surface Water Map?
27. Environment Agency website (2022) Flood Risk Assessment: Climate Change Allowances.
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29. CIRIA (2004) Development and Flood Risk – Guidance for the Construction Industry, CIRIA C624.
30. Communities and Local Government (2007) Improving the Flood Performance of New Buildings: Flood Resilient Construction.
31. ADA website (2016) Internal Drainage Boards, England Wall Chart.

32. Met Office website (2022) Weather Warnings Guide.
33. Environment Agency website (2022) Climate Change Allowances for Peak River Flow Map.
34. Environment Agency (2012) Ordinary Watercourse Regulation.
35. Norfolk County Council (2021) Lead Local Flood Authority Statutory Consultee to Planning Guidance Document.
36. JBA Consulting (2017) Greater Norwich Area Strategic Flood Risk Assessment.
37. Norfolk County Council (2022) Correspondence from the Lead Local Flood Authority to South Norfolk Council

DRAWINGS APPENDIX



- GENERAL NOTES:
1. All dimensions noted are in millimetres unless stated otherwise.
 2. All levels to be above Ordnance Survey Datum defined levels (A.O.Dm) unless noted otherwise.
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 6. This drawing is to be read in conjunction with all other relevant documents relating to the project.
 7. To be read in conjunction with Plandescil Ltd drawing 27402/014 - Proposed Digestate Storage Lagoon B (West) Site Layout



Legend:
Redline Boundary (Area - 6,589m² / 0.6589ha)

FOR PLANNING

Rev	Date	Rev By	Chkd	Description
B	17-05-22	OAJ	OAJ	Lagoon Location Moved
A	09-02-22	JLB	AF	Lagoon Size Updated
0	16-12-21	-	OAJ	First Issue

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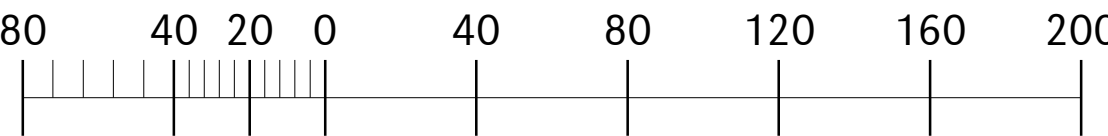
Client
BioWatt Site Services Ltd

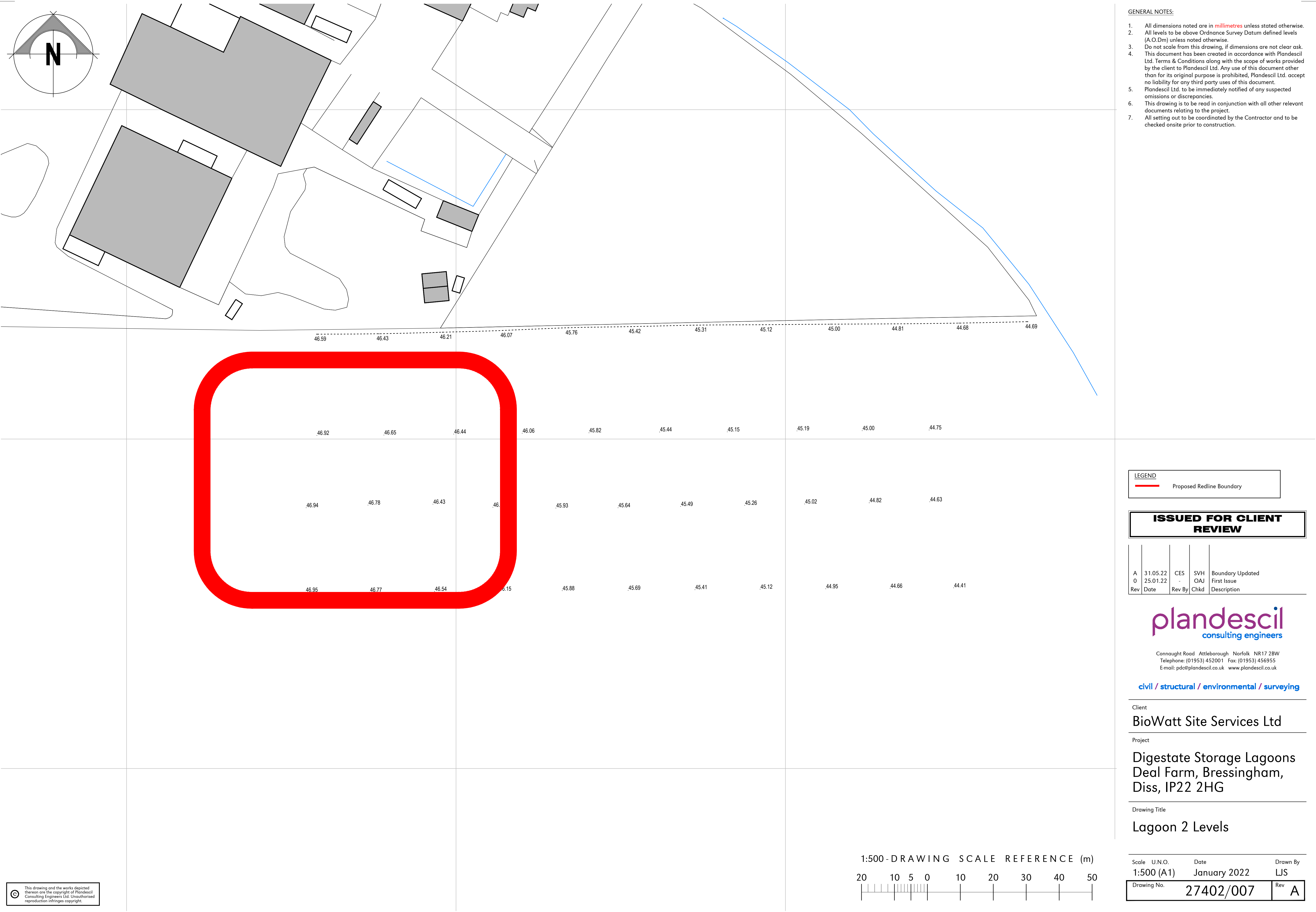
Project
**Proposed Digestate Lagoon
Land Off of Lady's Lane,
Bressingham, Diss, IP22 2HG**

Drawing Title
**Site Location Plan - Proposed
Digestate Lagoon B (West)**

Scale	U.N.O.	Date	Drawn By
As Noted (A1)		December 2021	JLB
Drawing No.	27402/154	Rev	B

1:2000 - DRAWING SCALE REFERENCE (m)





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7. All setting out to be coordinated by the Contractor and to be checked onsite prior to construction.

LEGEND

Proposed Redline Boundary

ISSUED FOR CLIENT REVIEW

A	31.05.22	CES	SVH	Boundary Updated
0	25.01.22	-	OAJ	First Issue
Rev	Date	Rev By	Chkd	Description

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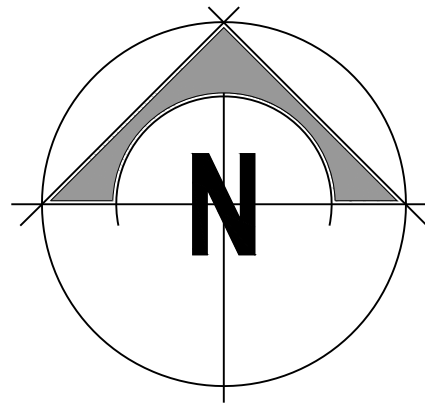
Project

Digestate Storage Lagoons
Deal Farm, Bressingham,
Diss, IP22 2HG

Drawing Title

Lagoon 2 Levels

Scale	U.N.O.	Date	Drawn By
1:500 (A1)		January 2022	LJS
Drawing No.	27402/007	Rev	A



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 7. To be read in conjunction with Plandescil Ltd drawing 27402/154 - Site Location Plan - Proposed Digestate Lagoon B (West)

Legend:		
—	Top of Lagoon Bank	
—	Bottom of Internal Lagoon Bank	
—	Redline Boundary (Area - 6,589m ² / 0.6589ha)	

FOR PLANNING

Rev	Date	Rev By	Chkd	Description
B	17-05-22	OAJ	OAJ	Lagoon Location Moved
A	09-02-22	JLB	OAJ	Lagoon Size Updated
0	16-12-21	-	OAJ	First Issue

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Project
**Proposed Digestate Lagoon
Land Off of Lady's Lane,
Bressingham, Diss, IP22 2HG**

Drawing Title
**Proposed Digestate Storage
Lagoon B (West) Site Layout**

Scale	U.N.O.	Date	Drawn By
1:1000 (A1)		December 2021	JLB
Drawing No.	27402/014	Rev	B



Legend	
	Site Boundary
	Lowestoft Formation (Diamicton)

Rev	Date	Rev By	Chkd	Description
A	31.05.22	-	MJH	Boundary Adjusted
0	25.01.22	-	MJH	First Issue

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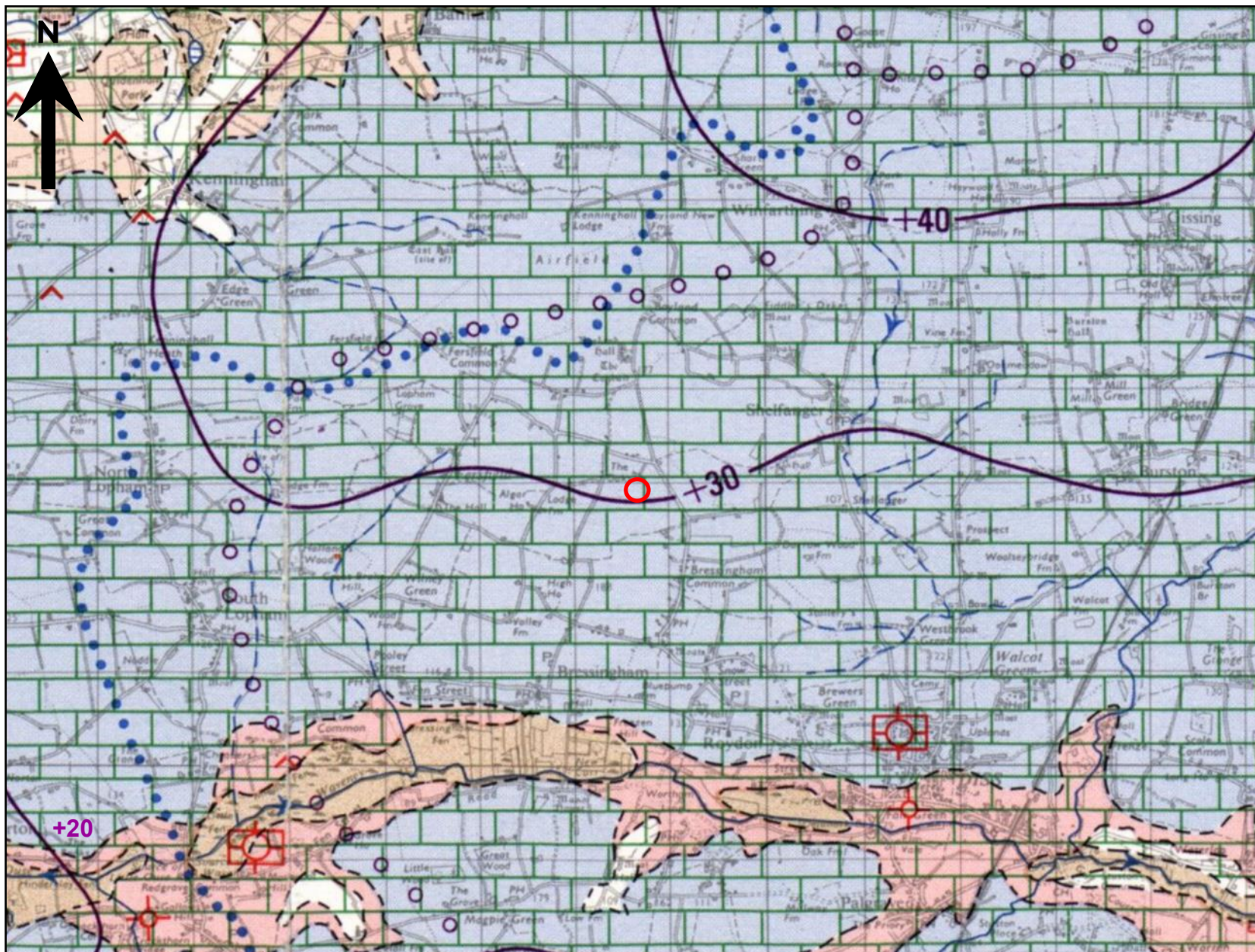
Client
Deal Farm Biogas Ltd.

Project
Proposed Digestate Lagoon
Land east of Lady's Lane
Bressingham
Norfolk

Drawing Title
Superficial Deposits Geology Map

Based upon Geology of Britain Viewer, with the permission of the British Geological Survey.

Scale	U.N.O.	Date	Drawn By
N.T.S (A4)		January 2022	SVH
Drawing No.	27402.2/810	Rev	A



Legend				
—	Approx. Site Location			
—	Contours of the water table or pressure surface			

0	25.01.22	-	MJH	First Issue
Rev	Date	Rev By	Chkd	Description

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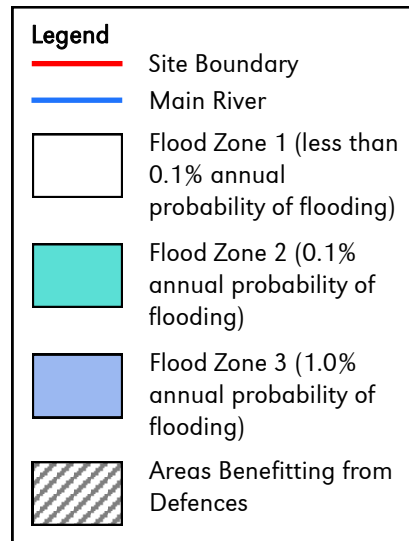
Client
Deal Farm Biogas Ltd.

Project
Proposed Digestate Lagoon
Land east of Lady's Lane
Bressingham
Norfolk

Drawing Title
Hydrogeology Map

Based upon Sheet 1 : Hydrogeological Map of Southern East Anglia (1:125,000) - 1981, with the permission of the British Geological Survey.

Scale	U.N.O.	Date	January 2022	Drawn By	SVH
N.T.S (A4)					
Drawing No.	27402.2/812	Rev	0		



A	31.05.22	-	MJH	Boundary Adjusted
0	25.01.22	-	MJH	First Issue
Rev	Date	Rev By	Chkd	Description

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Email: pdc@plandescil.co.uk www.plandescil.co.uk

civil / structural / environmental / surveying

Client
Deal Farm Biogas Ltd.

Project
Proposed Digestate Lagoon
Land east of Lady's Lane
Bressingham
Norfolk

Drawing Title
Fluvial & Tidal Flooding Map –
Extent

Scale	U.N.O.	Date	Drawn By
	N.T.S (A4)	January 2022	SVH
Drawing No.	27402.2/820	Rev	A

Source: Google Maps and Data.gov.uk, based upon the Environment Agency's Flood Map for Planning dataset.
(Contains public sector information licensed under the Open Government Licence v3.0.)



Legend

- Site Boundary
- Less than 0.1% AEP
- Extent of 0.1% AEP (Low Risk)
- Extent of 1.0% AEP (Medium Risk)
- Extent of 3.3% AEP (High Risk)

A	31.05.22	-	MJH	Boundary Adjusted
0	25.01.22	-	MJH	First Issue
Rev	Date	Rev By	Chkd	Description

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civil / structural / environmental / surveying

Client
Deal Farm Biogas Ltd.

Project
Proposed Digestate Lagoon
Land east of Lady's Lane
Bressingham
Norfolk

Drawing Title
Surface Water Flooding Map –
Extent 3.3%, 1.0%, & 0.1% AEP

Scale	U.N.O.	Date	Drawn By
	N.T.S (A4)	January 2022	SVH
Drawing No.	27402.2/821	Rev	A

Source: Google Maps and Data.gov.uk, based upon the Environment Agency's Flood Map for Planning dataset.
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Legend				
	Site Boundary			
	Dry Day Flood Extent			
	Wet Day Flood Extent			
	Fluvial Contribution Flood Extent			

Rev	Date	Rev By	Chkd	Description
A	31.05.22	-	MJH	Boundary Adjusted
0	25.01.22	-	MJH	First Issue

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Client
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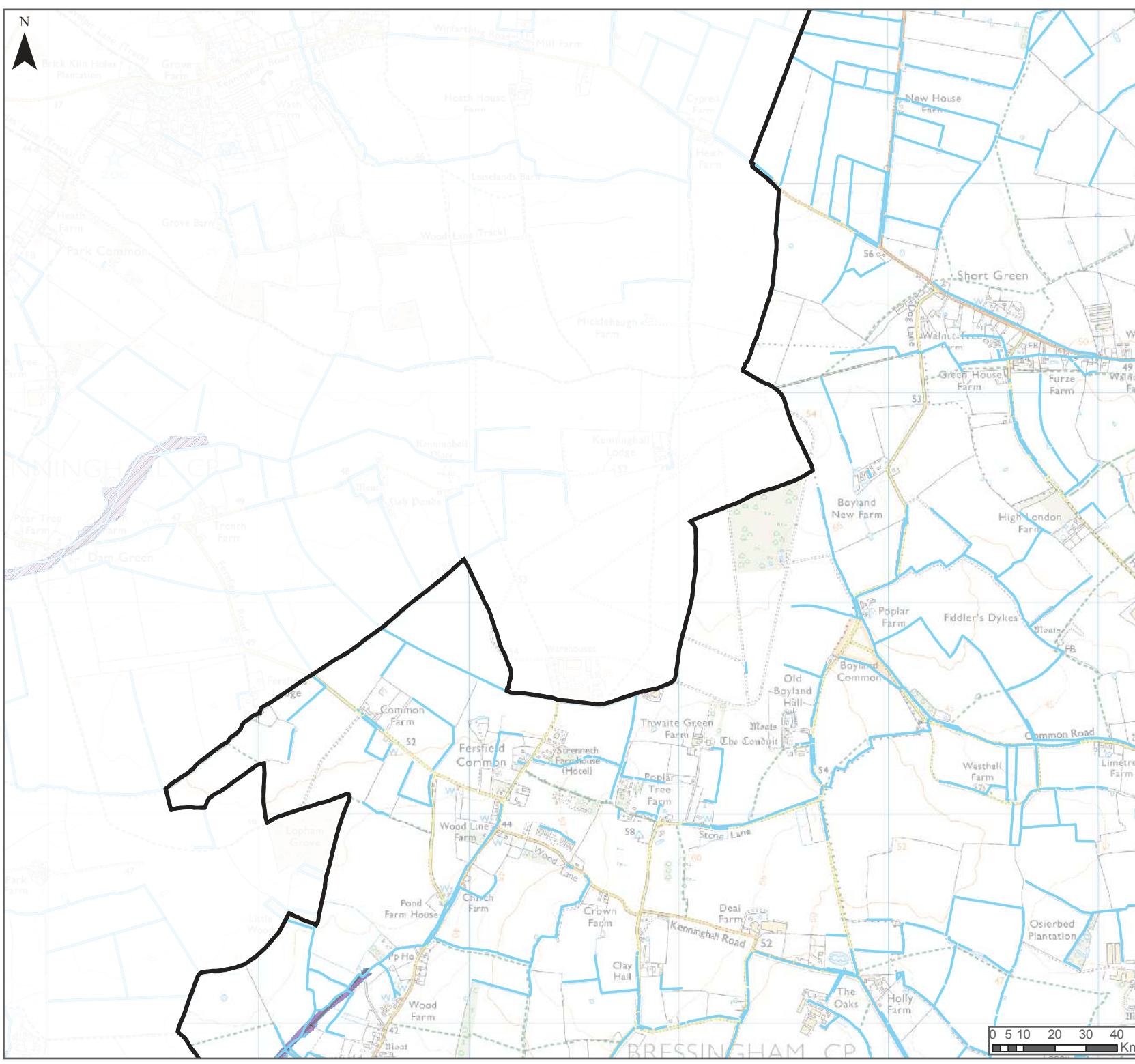
Project
Proposed Digestate Lagoon
Land east of Lady's Lane
Bressingham
Norfolk

Drawing Title
Reservoir Flood Extent

Scale	U.N.O.	Date	January 2022	Drawn By	SVH
Drawing No.	27402.2/831	Rev	A		

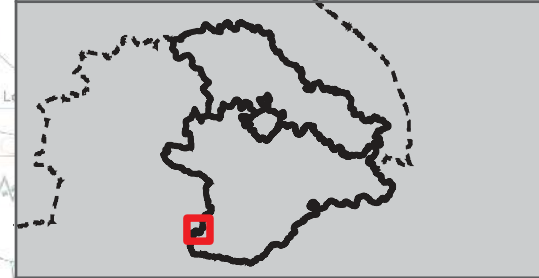
Source: Google Maps and Data.gov.uk, based upon the Environment Agency's Flood Map for Planning dataset.
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APPENDIX A



GREATER NORWICH STRATEGIC FLOOD RISK ASSESSMENT

APPENDIX A: FLOOD RISK MAPPING INDEX GRID: GN 83



LEGEND

Note: All layers are turned off by default. Click the box next to the layer of interest to turn on.

Authority Information

- ☒ Administrative Area
- ☒ Study Area
- ☒ Main Rivers
- ☒ Detailed River Network
- ☐ The Broads

Flood Zones

- ☒ Flood Zones 3b
- ☒ Indicative Flood Zones 3b
- ☒ Flood Zones 3a
- ☒ Flood Zones 2

Surface Water

- ☐ RoFFSW 3.3% AEP
- ☐ RoFFSW 1% AEP
- ☐ RoFFSW 0.1% AEP

Reservoir Flooding

- ☐ Reservoir Flooding

Fluvial Climate Change

- ☒ 1% AEP with 35% Climate Change
- ☒ 1% AEP with 65% Climate Change
- ☒ 0.1% AEP with 25% Climate Change

Tidal Climate Change

- ☒ 0.5% AEP Climate Change
- ☒ 0.1% AEP Climate Change

Surface Water Climate Change

- ☐ 1% AEP with 40% Climate Change

Areas Susceptible to Groundwater Flooding

- ☐ $\geq 75\%$
- ☐ $\geq 50\% < 75\%$
- ☐ $\geq 25\% < 50\%$
- ☐ $< 25\%$

Other

- ☐ Dry Islands $> 0.5\text{Ha}$

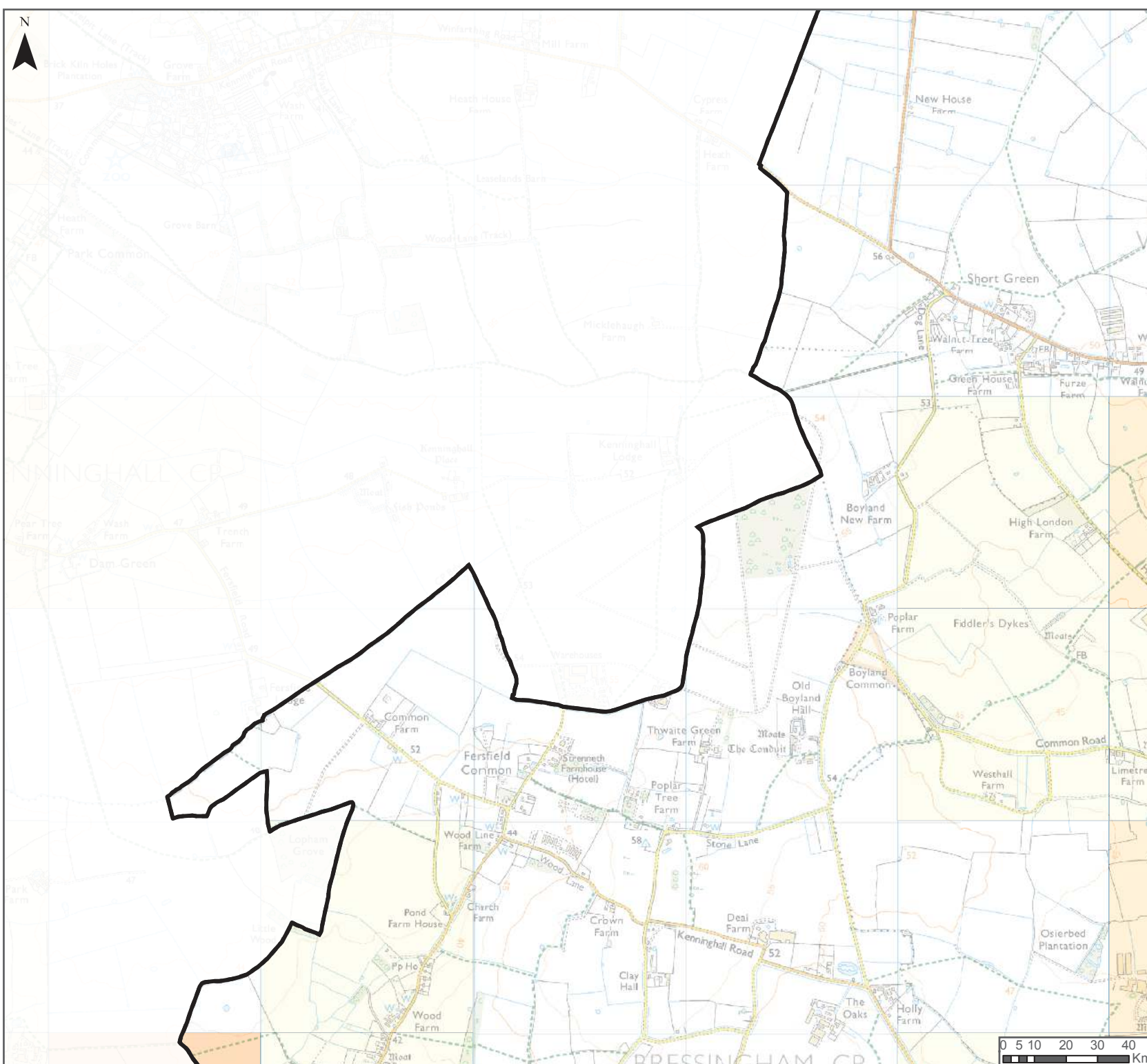
**Return to
Index Map**

**Mapping Supporting
Information**

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GREATER NORWICH STRATEGIC FLOOD RISK ASSESSMENT

APPENDIX A: FLOOD RISK MAPPING INDEX GRID: GN_83



LEGEND

Note: All layers are turned off by default. Click the box next to the layer of interest to turn on.

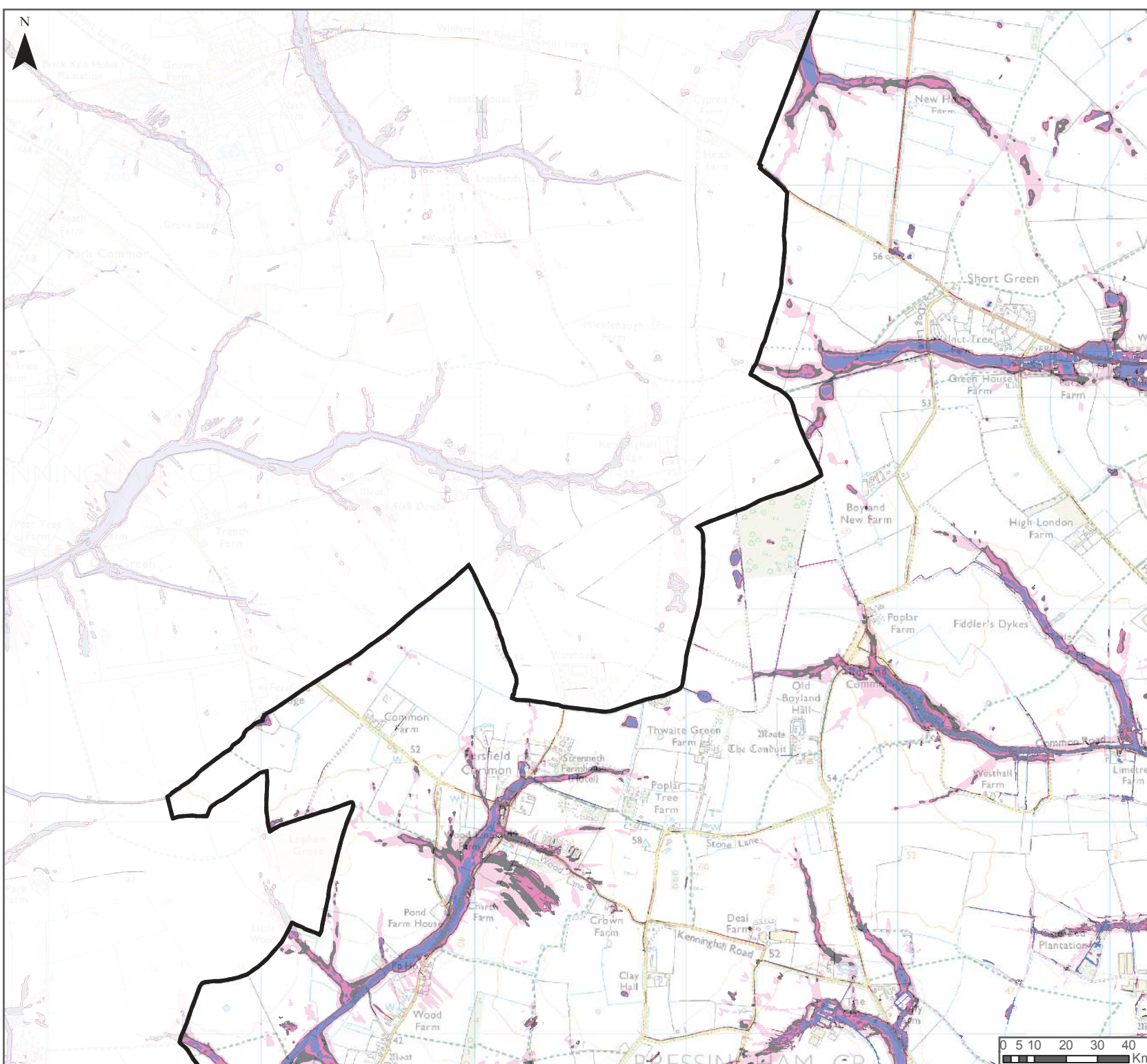
- Authority Information**
 - ☒ Administrative Area
 - ☒ Study Area
 - ☐ Main Rivers
 - ☐ Detailed River Network
 - ☐ The Broads
- Flood Zones**
 - ☐ Flood Zones 3b
 - ☐ Indicative Flood Zones 3b
 - ☐ Flood Zones 3a
 - ☐ Flood Zones 2
- Surface Water**
 - ☐ RoFSW 3.3% AEP
 - ☐ RoFSW 1% AEP
 - ☐ RoFSW 0.1% AEP
- Reservoir Flooding**
 - ☐ Reservoir Flooding
- Fluvial Climate Change**
 - ☐ 1% AEP with 35% Climate Change
 - ☐ 1% AEP with 65% Climate Change
 - ☐ 0.1% AEP with 25% Climate Change
- Tidal Climate Change**
 - ☐ 0.5% AEP Climate Change
 - ☐ 0.1% AEP Climate Change
- Surface Water Climate Change**
 - ☐ 1% AEP with 40% Climate Change
- Areas Susceptible to Groundwater Flooding**
 - ☒ >= 75%
 - ☐ >= 50% <75%
 - ☐ >= 25% <50%
 - ☐ < 25%
- Other**
 - ☐ Dry Islands >0.5Ha

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[Mapping Supporting Information](#)

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GREATER NORWICH STRATEGIC FLOOD RISK ASSESSMENT

APPENDIX A: FLOOD RISK MAPPING INDEX GRID: GN_83



LEGEND

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Authority Information

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- ☐ Detailed River Network
- ☐ The Broads

Flood Zones

- ☐ Flood Zones 3b
- ☐ Indicative Flood Zones 3b
- ☐ Flood Zones 3a
- ☐ Flood Zones 2

Surface Water

- ☒ RoFSW 3.3% AEP
- ☒ RoFSW 1% AEP
- ☒ RoFSW 0.1% AEP

Reservoir Flooding

- ☐ Reservoir Flooding

Fluvial Climate Change

- ☐ 1% AEP with 35% Climate Change
- ☐ 1% AEP with 65% Climate Change
- ☐ 0.1% AEP with 25% Climate Change

Tidal Climate Change

- ☐ 0.5% AEP Climate Change
- ☐ 0.1% AEP Climate Change

Surface Water Climate Change

- ☒ 1% AEP with 40% Climate Change

Areas Susceptible to Groundwater Flooding

- ☐ $\geq 75\%$
- ☐ $\geq 50\% < 75\%$
- ☐ $\geq 25\% < 50\%$
- ☐ $< 25\%$

Other

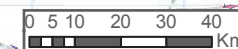
- ☐ Dry Islands $> 0.5\text{Ha}$

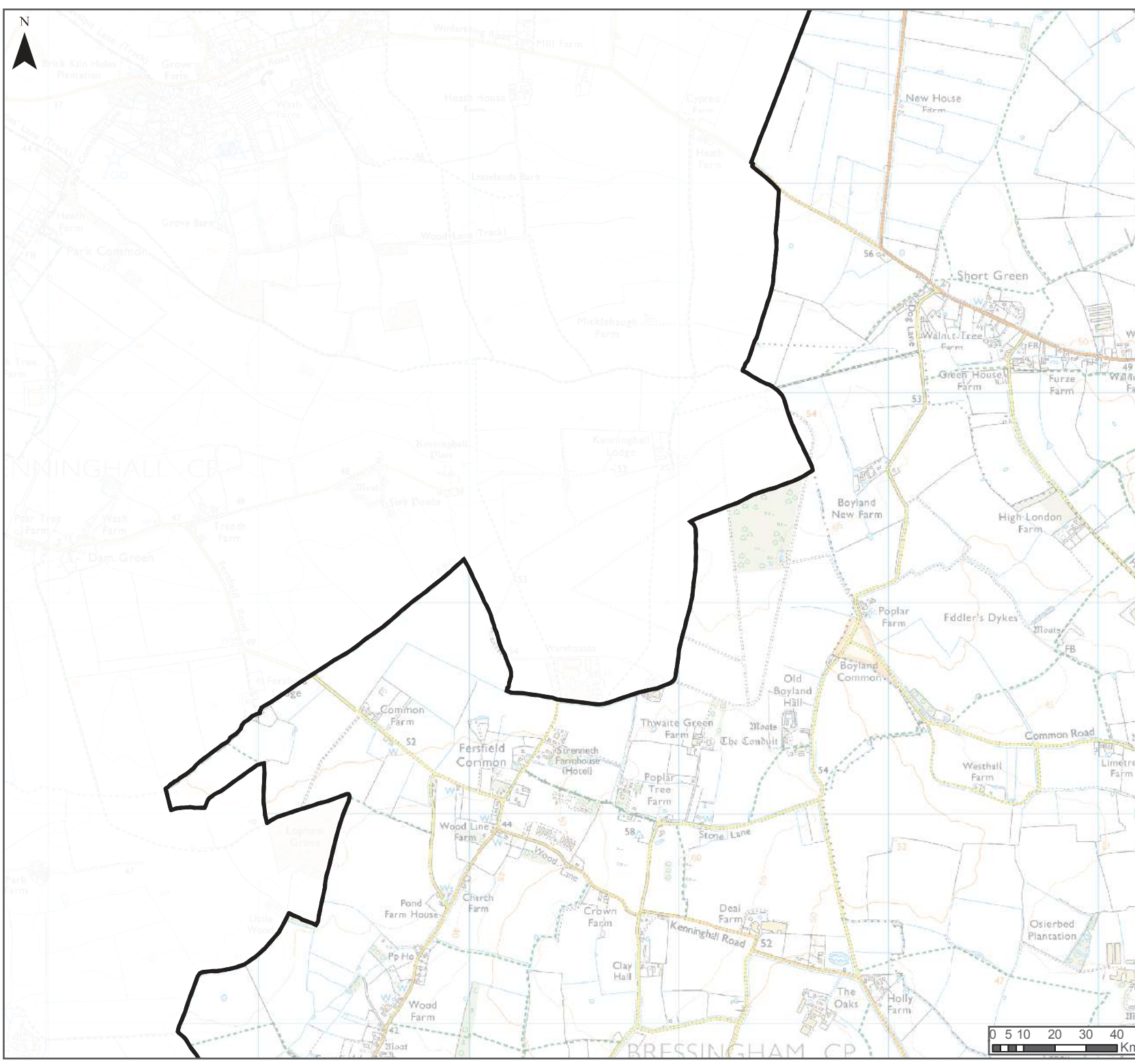
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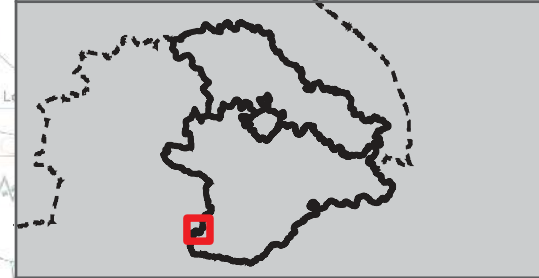
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GREATER NORWICH STRATEGIC FLOOD RISK ASSESSMENT

APPENDIX A: FLOOD RISK MAPPING INDEX GRID: GN 83



LEGEND

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Authority Information

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- ☐ Main Rivers
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- ☐ The Broads

Flood Zones

- ☐ Flood Zones 3b
- ☐ Indicative Flood Zones 3b
- ☐ Flood Zones 3a
- ☐ Flood Zones 2

Surface Water

- ☐ RoFfSW 3.3% AEP
- ☐ RoFfSW 1% AEP
- ☐ RoFfSW 0.1% AEP

Reservoir Flooding

- ☒ Reservoir Flooding

Fluvial Climate Change

- ☐ 1% AEP with 35% Climate Change
- ☐ 1% AEP with 65% Climate Change
- ☐ 0.1% AEP with 25% Climate Change

Tidal Climate Change

- ☐ 0.5% AEP Climate Change
- ☐ 0.1% AEP Climate Change

Surface Water Climate Change

- ☐ 1% AEP with 40% Climate Change

Areas Susceptible to Groundwater Flooding

- ☐ >= 75%
- ☐ >= 50% <75%
- ☐ >= 25% <50%
- ☐ < 25%

Other

- ☐ Dry Islands >0.5Ha

Return to Index Map

Mapping Supporting Information

civil engineering and building



- Industrial, Commercial, Agricultural and Domestic building design
- Foundation Design and ground improvements
- Highway Engineering including PDS/Civil 3D
- Retaining walls
- Sheet Piling
- Infrastructure planning and design
- Design of sustainable drainage system (SUDS)
- Soakaway design
- Architectural design of industrial buildings
- Planning and building regulation applications
- 3D conceptual models
- Renewable Energy Civil Engineering design and project management
- Anaerobic Digestion and Waste to Energy Project design and detail

environmental engineering



- Contaminated Land investigations (intrusive & non-intrusive)
- Land remediation verification
- Environmental impact assessments (EIA)
- Flood Risk Assessments
- Water supply, treatment, storage and distribution
- Foul and surface water & effluent/leachate drainage design
- Drainage network modelling
- 1D & 2D flood modelling
- Hydraulic river modelling
- Flood Alleviation
- Breach & overtopping analysis
- Reservoir flood inundation modelling
- Consent to discharge applications
- Landscaping design
- Tree surveys
- Environmental Permits

structural engineering



- Structural calculations for Commercial, Agricultural and Domestic building design
- Structural design using steel, stainless & carbon steel, concrete, timber, alloys and masonry
- Maritime and Hydraulic structures
- Structural surveys and structural suitability surveys
- Structural failure studies
- Subsidence claims
- Temporary works design
- 3D Finite Element Analysis
- Structural monitoring
- Structural enhancement/remedial work
- Historic building advice
- 3D Revit & Level 2 BIM structural design & modelling

surveying land and buildings



- Geomatic / topographical site surveys
- Building, Road, and Earthworks Setting out
- Engineering Setting out
- Establish precise site survey control
- 3D digital terrain modelling
- Volumetric analysis
- Site area computations
- Flood risk surveys using GPS active network
- Measured building floor plans and elevation surveys
- Land transfer plans to Land Registry requirements
- Drainage network surveys
- Assistance/Expert witness in land boundary disputes
- Deterioration monitoring
- Preparation of asset plans
- As built record surveys



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