



One Earth Solar Farm

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Volume 3: Technical Appendices Supporting ES Volume 2

Appendix 6.7: Badger, Otter and Water Vole Baseline

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A.6. Appendix 6.7: Badger, Otter and Water Vole Baseline

A.6.1 Introduction

Background

- A.6.1.1 This Appendix should be read in conjunction with Chapter 6 of the Environmental Statement (ES) which is provided in support of the delivery of an Environmental Impact Assessment (EIA) associated with the One Earth Solar Farm, hereafter referred to as the 'Proposed Development'.

Purpose of this Appendix

- A.6.1.2 The purpose of the Appendix is to present the methods and findings of the baseline mammal surveys, for badger, otter and water vole, which were undertaken to confirm species presence and to assess their population status. Surveys were completed between April and October in 2023 and 2024 following standard methods for species survey in the UK.
- A.6.1.3 This report does not allude to any requirements for mitigation and/or compensation in respect of badger, otter or water vole, nor does it assess the potential impacts that proposals might have upon them, as both issues are covered in detail in Chapter 6 of the ES.

Structure of this Appendix

- A.6.1.4 Due to the similar survey approach for otter and water voles, both of which are considered 'riparian' mammals, the report presents methods and results for these species together. The rest of the Appendix is structured as follows:

- > **Section 2: Methods;**
- > **Section 3: Results;**
- > **Section 4: Summary**
- > **Section 5: References**

The Order Limits

- A.6.1.5 The Order Limits are located on the border of Lincolnshire and Nottinghamshire along the River Trent, with a central grid reference of SK816718. The Order Limits cover 1,409 hectares (ha), an area which is bisected north to south by the River Trent, with 799 ha lying to the west and the remaining 604 ha to the east. The River Trent itself encompasses approximately 6 ha.

A.6.2 Methods

Desk Study

- A.6.2.1 An environmental desk study was undertaken in September 2023 to identify records of badger, otter and water vole within 2 kilometres (km) of the Order Limits, from Greater Lincolnshire Nature Partnership (GLNP) and Nottinghamshire Biological and Geological Records Centre (NBGRC).

Badger

- A.6.2.2 During the extended habitat survey conducted in 2023 and 2024, details for which are presented within **ES Volume 3, Appendix 6.3: Extended Habitat Survey [EN010159/APP/6.21]**, habitats within the Order Limits were assessed for their potential suitability to support sett excavation, commuting and foraging badgers.
- A.6.2.3 Concurrently, and during all site visits conducted throughout the survey period (including bat survey, ornithological survey, reptile survey, great crested newt survey, otter and water vole survey), a search for signs and evidence of badger activity was carried out in accordance with '*Surveying for Badgers: Good Practice Guidelines*' (Scottish Badgers, 2018).
- A.6.2.4 Field signs indicative of badger presence include:
- > faeces in the form of dung pits or latrines (territorial markers comprising collections of numerous dung pits);
 - > foraging signs, such as snuffle holes;
 - > badger hair (hair often found on overhanging vegetation and low barbed wire fences);
 - > footprints, mammal paths and scratching marks – often on posts at the base of tree trunks; and
 - > push under; where badgers habitually dig or push under barriers such as fences and lift or displace them (often coinciding with the presence of mammal paths and badger hairs).
- A.6.2.5 Where badger setts were identified during the extended habitat survey, these were further classified according to the criteria used in '*National Badger Surveys*' (Cresswell et al., 1990 and Wilson et al., 1997). The evidence of recent badger activity at each sett entrance was also recorded to establish the probable status of the sett.

Riparian Mammals (Otter and Water Vole)

A.6.2.6 During the extended habitat survey conducted in 2023, habitats within the Order Limits were assessed for their potential suitability to support otter and water vole. This included watercourses (rivers, streams and drainage ditches), ponds and associated terrestrial habitat, such as dense continuous scrub and woodland. The structure of all watercourses and waterbodies was recorded to include:

- > Length (watercourses) or size (for waterbodies);
- > Height and angle of banks;
- > Bank substrate;
- > Adjacent land use;
- > Presence of water, including depth and details of flow;
- > Presence of vegetation, including emergent and marginal vegetation within the channel and hedgerows, scrub and trees along the banks; and
- > Presence of features which may pose a barrier to movement (culverts and bridges).

A.6.2.7 In 2024, two field surveys were conducted, one in May (30th and 31st), and one in October (16th, 17th and 18th). The survey was conducted by a qualified ecologist with Full CIEEM membership and over 12 years' ecology experience. and incorporated all watercourses and waterbodies considered suitable to support otter and/or water vole following the habitat assessment.

A.6.2.8 During the field survey, a search was conducted for otter field signs, such as faeces (spraints), holts, footprints and feeding remains. In addition, any holes or hollows in the bank-side (artificial and natural) and well-connected terrestrial habitats, such as scrub or woodland, were examined for otter holts and resting places. Surveys followed guidance set out in '*Monitoring the Otter*' (Chanin, 2003a).

A.6.2.9 Concurrently, a search was conducted for water vole field signs, such as burrows, latrines, droppings, feeding remains, footprints and runs. In addition, signs of known competitors (brown rat) and predators (American mink) of water vole were recorded, as this may indicate the potential absence of water vole even where habitat is suitable. Survey and habitat assessment followed guidance set out in the '*Water Vole Mitigation Handbook*' (Dean et al., 2016) and '*Water Vole Field Signs and Habitat Assessment*' (Dean et al., 2021).

A.6.2.10 Where watercourses were not accessible, they were surveyed from the closest accessible point for their suitability to support riparian mammals, using binoculars to assist observation where necessary.

Limitations

- A.6.2.11 The River Trent had an extensive floodplain area which was inaccessible on foot, preventing a full survey of field signs in this area. Searches were limited to accessible locations with prominent structures, such as bridges and culverts. Some sections of drainage ditch were inaccessible due to dense vegetation and/or steep, tall banks. These sections were observed using binoculars and from elevated vantage points, such as bridges or bank tops.

A.6.3 Results

Badger (Confidential Information)

Desk Study

- A.6.3.1 It is important to note, that due to welfare issues regarding this species, location details of setts should remain confidential to ensure their continued protection from persecution. As such, some of the desk study records have location details redacted or are shown using a low accuracy.
- A.6.3.2 The Lincolnshire data search returned 29 records of badger, with four being recorded within the Order Limits. The most recent of which is from 2022 and is [REDACTED]
- A.6.3.3 The Nottinghamshire data search returned 92 records of badger, which included 41 records relating to setts within the Order Limits. The majority of these were located [REDACTED] with records ranging from 2010 to 2022.

Habitat Assessment

- A.6.3.4 Suitable habitat for sett creation, commuting and foraging was recorded throughout the Order Limits. Suitable habitats include arable fields, which account for over 80 per cent of the Order Limits, as well as woodland and grassland.

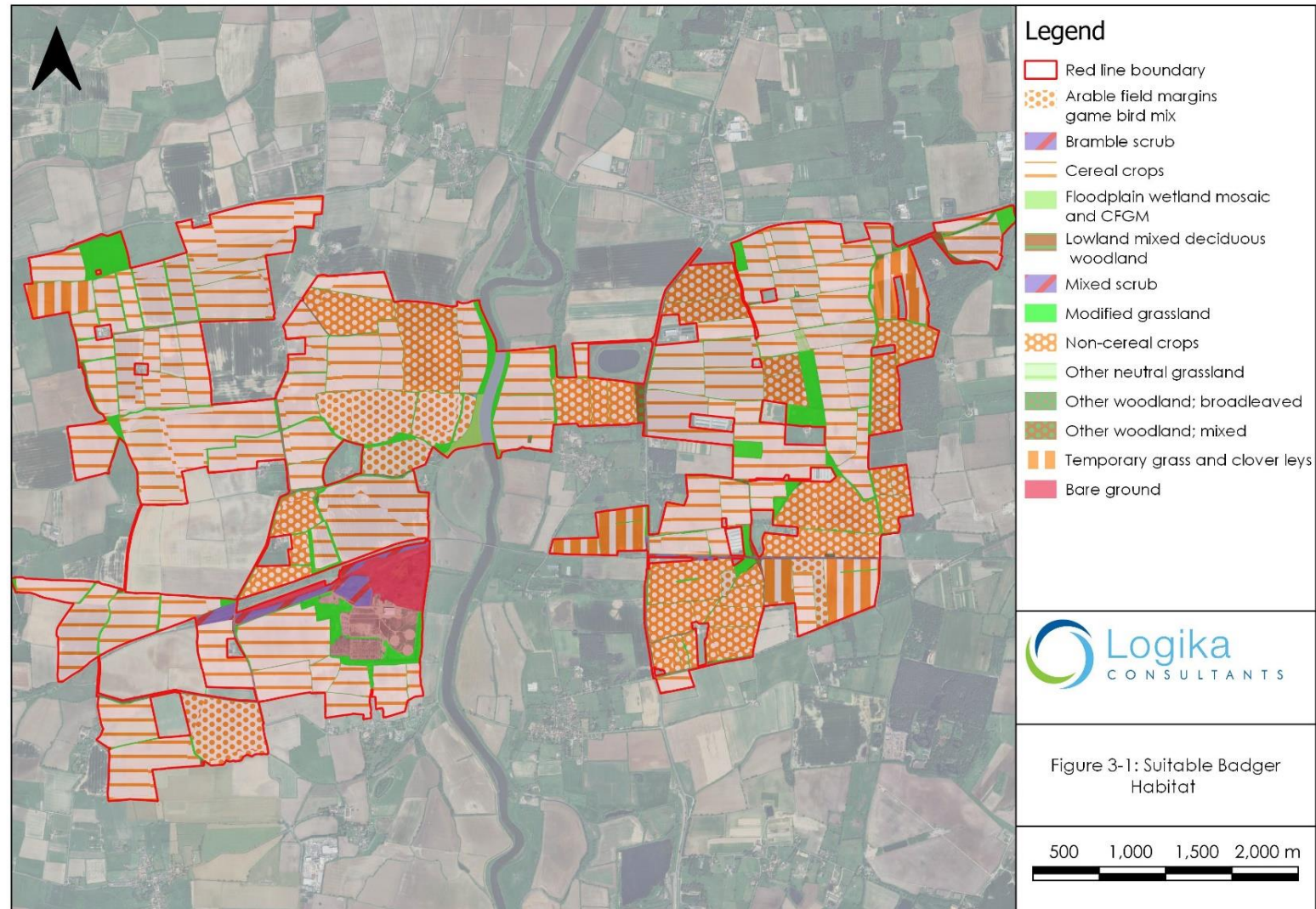


Figure 3.1 Suitable Badger Habitat

Field Survey

A.6.3.5 Badger setts were recorded at seven locations, with four latrines also being recorded. These are described in **Table 3.1**, with locations shown in **Figure 3.2**.

Table 3.1: Evidence of Badger Recorded within the Order Limits

ID	Evidence
■	[REDACTED]
■	[REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]
■	[REDACTED] [REDACTED] [REDACTED]
■	[REDACTED] [REDACTED]
■	[REDACTED]
■	[REDACTED]
■	[REDACTED] [REDACTED]
■	[REDACTED]
■	[REDACTED]
■	[REDACTED] [REDACTED]
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■	[REDACTED]
■	[REDACTED]
■	[REDACTED]

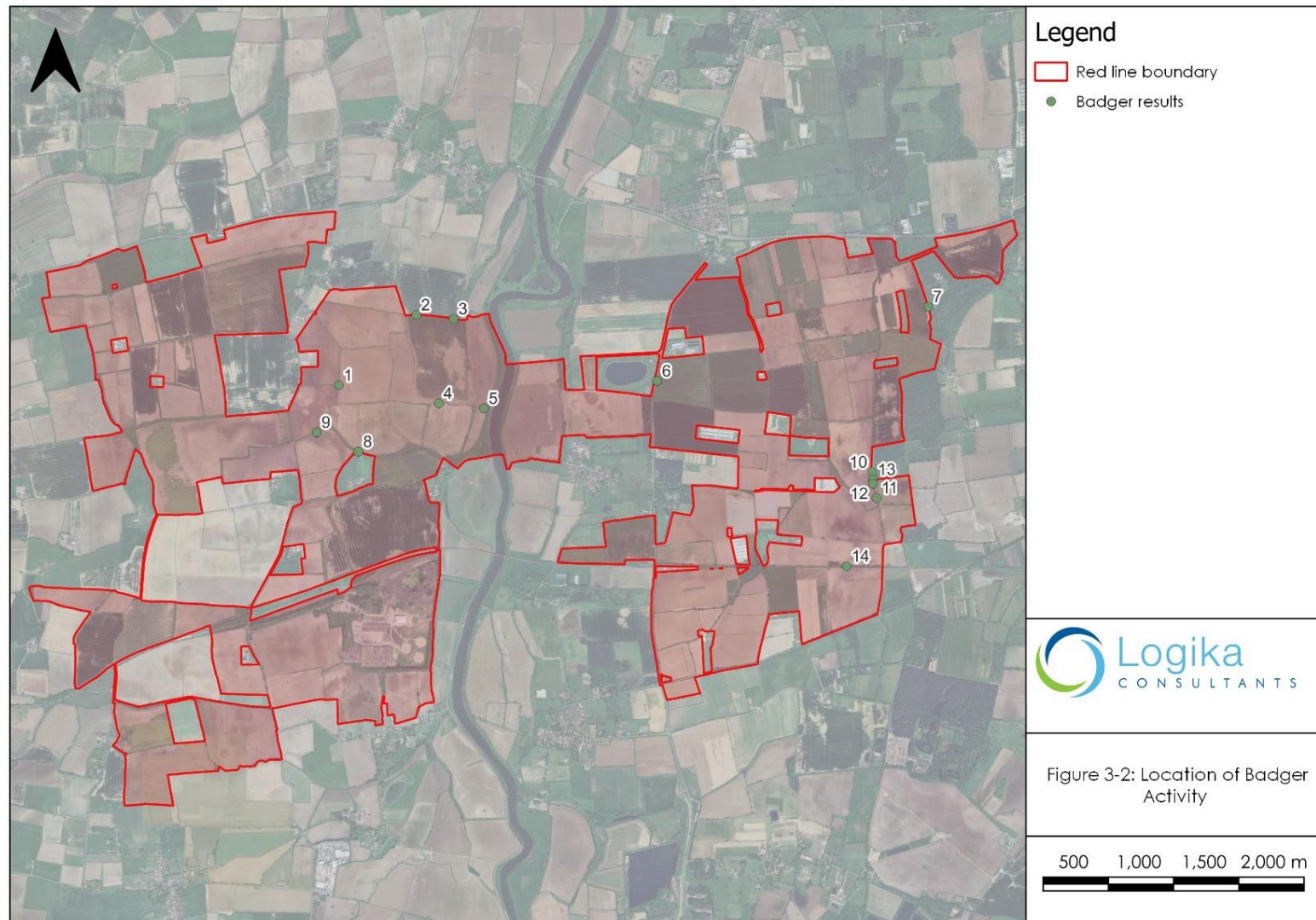


Figure 3.2 Location of Badger Activity

Riparian Mammals (Otter and Water Vole)

Desk Study

- A.6.3.6 GNLP returned three records for water vole, none of which were within the Order Limits. The closest record was located 122m north of the Site, across the A47, near the layby on Westmoor lane.
- A.6.3.7 NBGRC provided 13 records of water vole, five of which were from within the Order Limits. These records cover 2015-2017 and are located to the west of the River Trent, along the Fledborough beck and associated ditches to the north.
- A.6.3.8 GNLP returned two records of otter within 2 km of the Order Limits, none of which were from within the Order Limits. The most recent record was from 2019, where a dead otter was recorded 1.6 km east of the Order Limits, at Foss Dyke near the village of Drinsey Nook.
- A.6.3.9 NBGRC returned a single record for otter; located 1.6 km east of the Order Limits, near Foss Dyke, Drinsey Nook in 2015.
- A.6.3.10 In addition, both GNLP and NGBRC returned records for American mink, with two records being recorded within the Order Limits in 2017, along the Fleborough beck, 0.35 km west of the River Trent.

Habitat Assessment

- A.6.3.11 Suitable foraging, commuting and resting habitat for otter and water vole were recorded within the Order Limits, as shown on **Figure 3.3**
- A.6.3.12 All drainage ditches within the Order Limits were associated with five main watercourses: The River Trent, Fledborough beck, the Old Trent, Sewer dyke and an unnamed drainage ditch in the east. A description of each of these watercourses is presented below in **Table 3.2**.
- A.6.3.13 All five watercourses are considered suitable to support foraging, commuting and resting otter. The Fledborough beck, the Old Trent, Sewer dyke and unnamed ditch are all considered to provide suitable habitat for water vole, with the River Trent being considered unsuitable due to the large variation in water levels where the banks are regularly overtopped and the flow of water is fast.
- A.6.3.14 Field survey focussed along these main watercourses, with searches extending to tributaries, most of which were agricultural drainage ditches. Drainage ditches formed boundaries to arable fields supporting cereal and non-cereal crops, they were formed of earth banks at an angle of 45 to 60 degrees. Banks supported tussock forming grasses, tall forbs and scattered bramble or hawthorn scrub, with occasional hedgerows or treelines extending the entire length,

A.6.3.15 Water depth reached a maximum of 30 cm and water quality was typically poor, with slow flowing, turbid water draining from adjacent agricultural land. Emergent and marginal vegetation (common reed and sedges) was largely absent and, where present, constituted only short sections. The near absence of mature stands of common reed may be attributable to annual scraping practices conducted by land owners to reduce the build up of silt and maintain drainage.

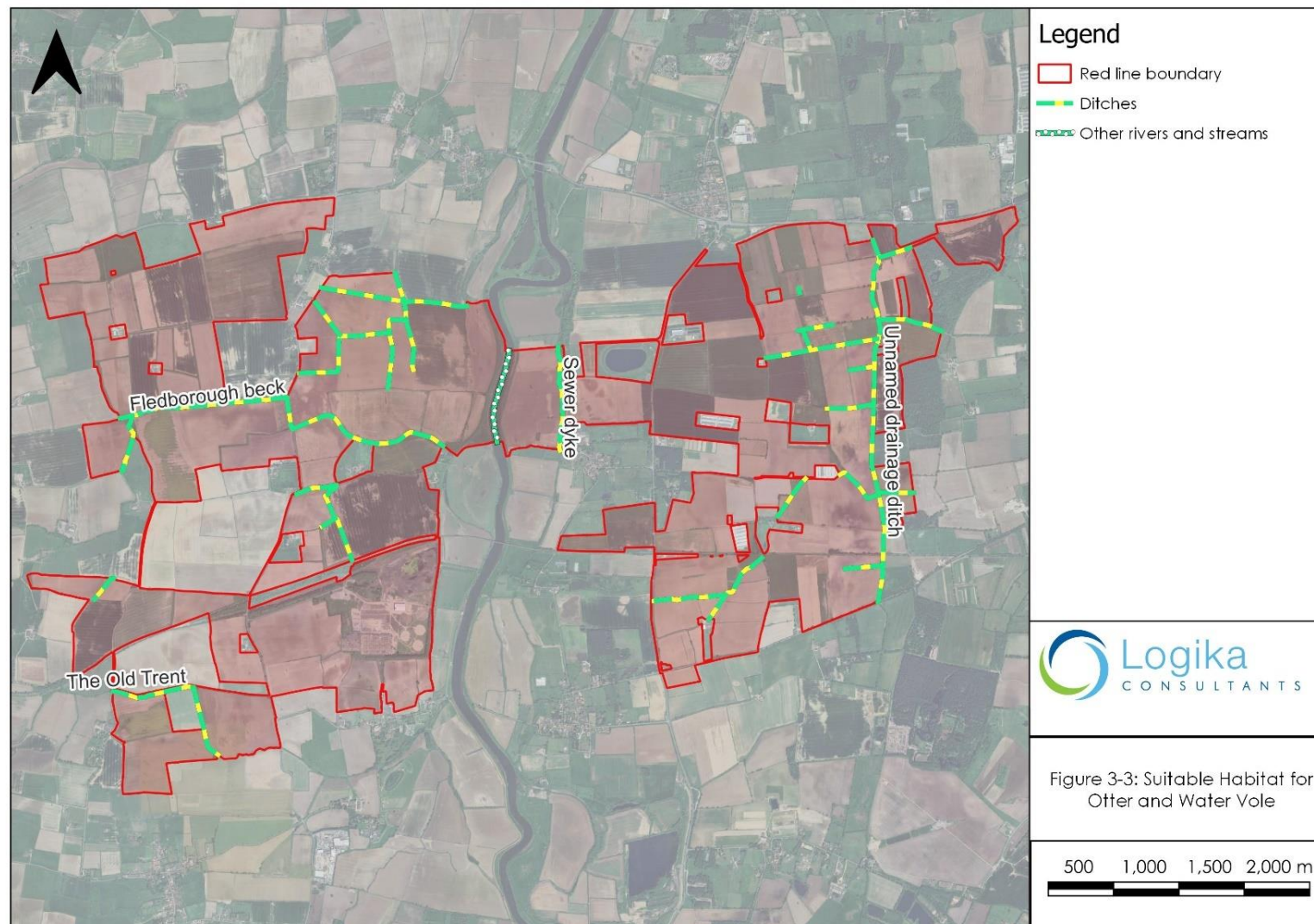


Figure 3.3 Suitable Habitat for Otter and Water Vole

Table 3.2: Suitability Assessment of Main Watercourses within the Order Limits

ID	Type	Shore/ bank	Bank modifications	Bordering land use	Presence of vegetation	Disturbance	Bank profile	Depth	Width	Water	Rat/ mink evidence	Water vole evidence	Otter evidence
River Trent	River	Earth	None	Floodplain grazing marsh / arable	Short grass and scrub (bramble)	Low	Shallow <45°	~0.8-3m	~75m	Permanent – fast flowing	Mink	×	×
Fledborough beck	Ditch	Earth	None	Arable with narrow field margins	Submarginal vegetation (reed beds), Scrub (bramble)	High	Steep >45°	~1.5-5m	~0.5-1m	Permanent – sluggish flow	Mink	×	×
The Old Trent	Ditch	Earth	None	Arable with narrow field margin	Submarginal vegetation (reed beds), Scrub (bramble)	High	Steep >45°	~1.5-4m	~0.5-2m	Permanent – sluggish flow	×	×	×
Sewer dyke	Ditch	Earth	None	Arable with narrow field margins	Submarginal vegetation (reed beds), Scrub (bramble)	High	Steep >45°	~2-4m	~1-2m	Permanent – sluggish flow	×	×	×
Unnamed drainage ditch	Ditch	Earth	None	Arable with narrow field margins	Submarginal vegetation (reed beds), Scrub (bramble)	High	Steep >45°	~2-3m	~1.5-2m	Permanent – sluggish flow	×	×	×

Field Survey

A.6.3.16 Sixteen field signs potentially attributable to water vole were identified during the survey. These are detailed in **Table 3.3** below, with locations shown on **Figure 3.4** and **Figure 3.5**.

Table 3.3: Evidence of Water Vole Recorded within the Order Limits

ID	Confidence	Evidence
1	Low	Burrow
2	Low	Small mammal run
3	Moderate	Rodent footprint
4	Moderate	Flattened earth at water's edge
5	High	Flattened vegetation with a few droppings' size/shape typical of water vole
6	High	Trampled latrine and flattened vegetation typical of water vole
7	Moderate	Couple of droppings, that are the size and shape typical of water vole
8	High	Latrine in flattened vegetation, typical of water vole
9	High	Latrine - green but flattened, typical of water vole
10	Moderate	A few droppings, shape and size typical of water vole
11	Low	Rodent footprint
12	High	Old latrine - size and shape typical of water vole
13	Moderate	Single dropping and rodent footprint
14	Moderate	Single dropping - size and shape typical of water vole
15	High	Old latrine with droppings typical of water vole
16	High	Latrine and flattened vegetation typical of water vole

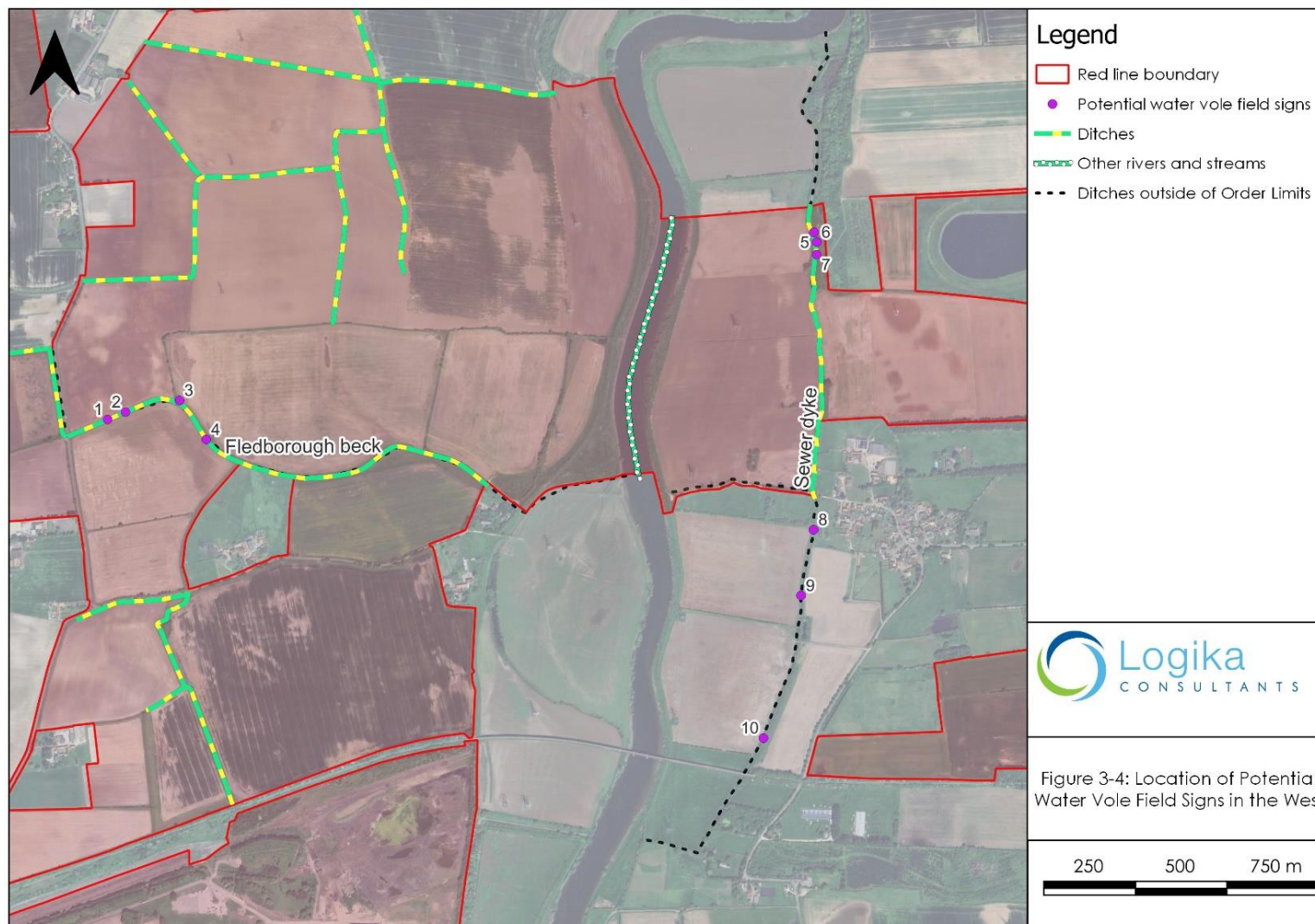


Figure 3.4: Location of Potential Water Vole Field Signs in the West

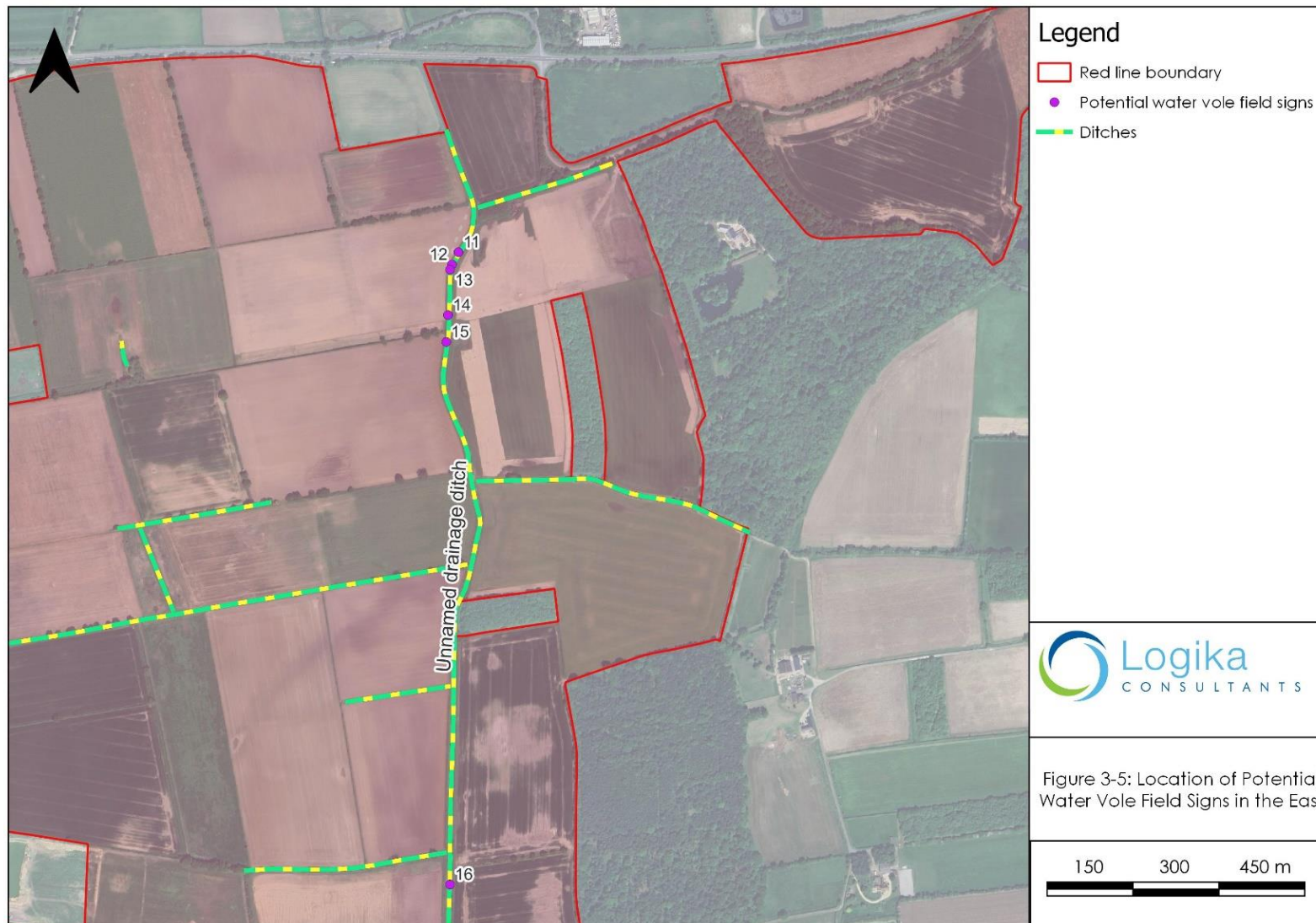


Figure 3.5: Location of Potential Water Vole Field Signs in the East

A.6.3.17 Ten field signs potentially attributable to otter were identified during the survey, nine of which were recorded to the west of the River Trent. These are detailed in **Table 3.4** below, with locations shown on **Figure 3.6** and **3.7**.

Table 3.4: Evidence of Otter Recorded within the Order Limits

ID	Confidence	Evidence
1-3	Low	Mammal run – possibly otter
4	Low	Thick scrub providing cover for otter
5-8	Low	Mammal run – possibly otter
9	High	Spraint containing fish bones and scales and of a size and shape typical of otter
10	Low	Mammal run through dense tall common reed, possibly otter

A.6.3.18 An adult American mink was recorded in October 2023, near the River Trent, by St Gregory's Church, in Fledborough.

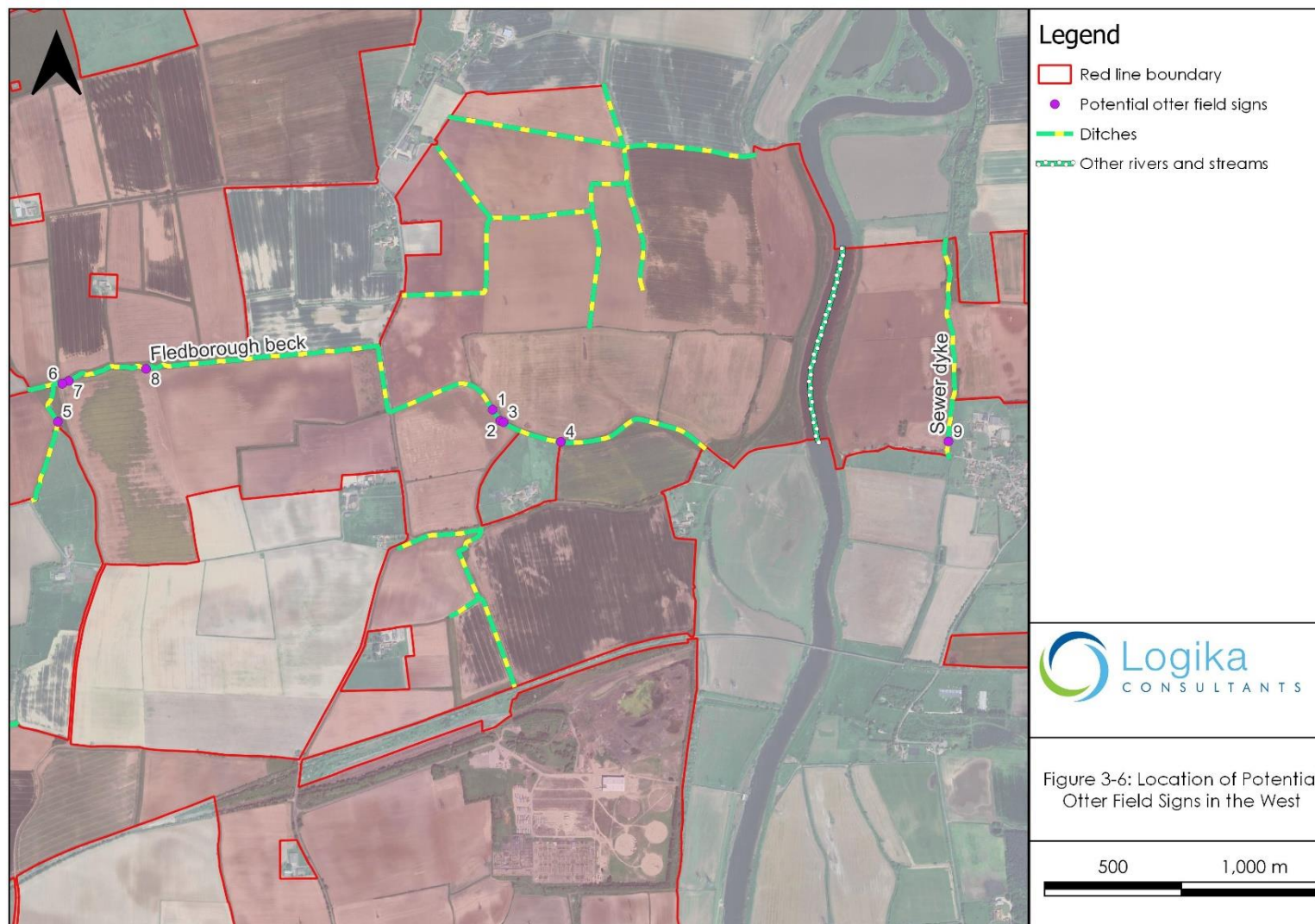


Figure 3.6: Locations of Potential Otter Field Signs in the West

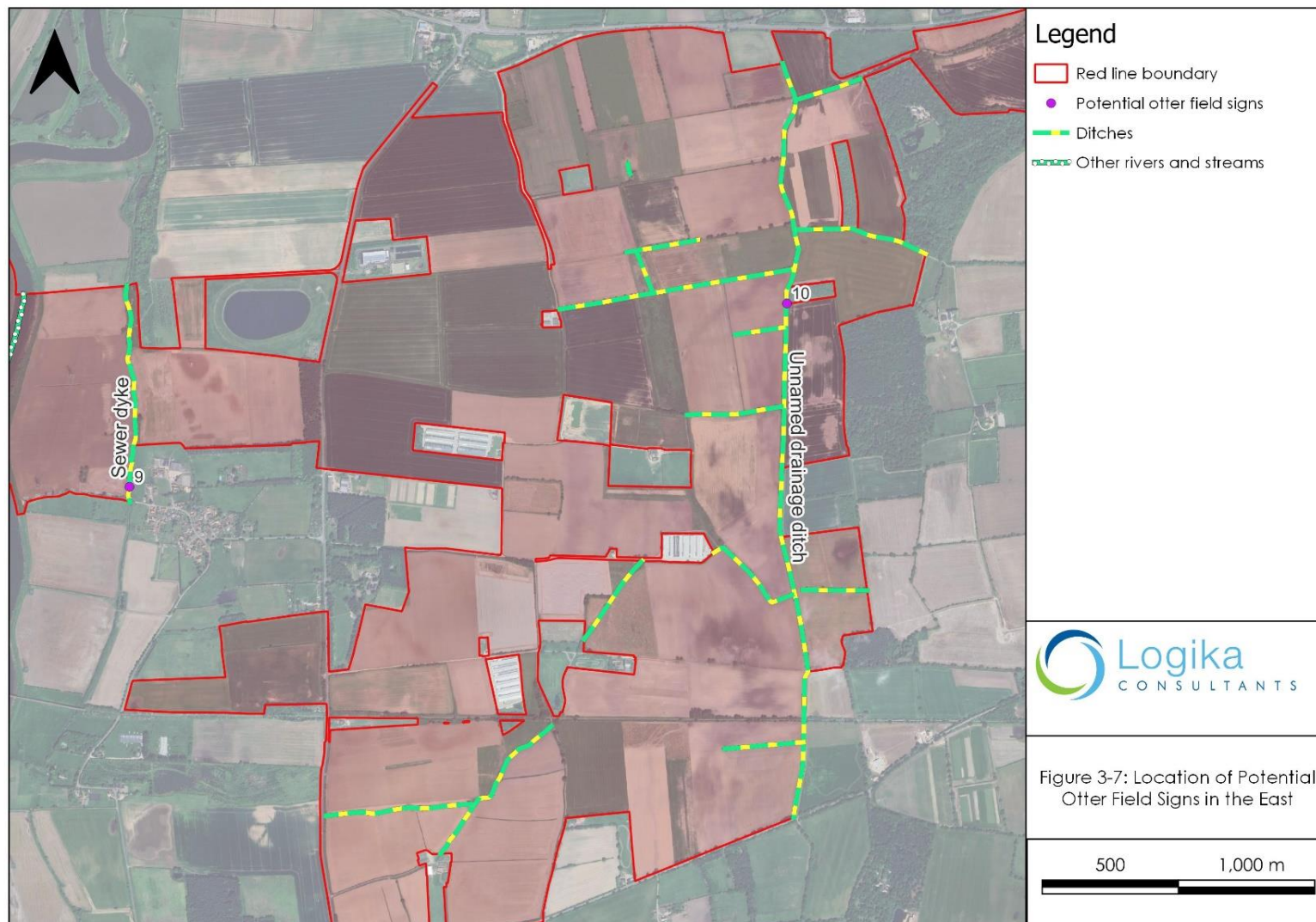


Figure 3.7: Locations of Potential Otter Field Signs in the East

A.6.4 Summary

Badger

A.6.4.1

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Riparian Mammals (Otter and Water Vole)

A.6.4.4 Suitable foraging, commuting and resting habitat for otter and water vole were recorded throughout the Order Limits.

A.6.4.5 Evidence of water vole that confirmed presence were recorded within the north of the Sewer Dyke, and outside of the Order Limits in the south and within the north and south of the unnamead drainage ditch.

A.6.4.6 Although there were ten potential otter field signs recorded within the Order Limits, only one, a spraint recorded in the south of the Sewer Dyke, was considered to confirm presence of this species. Out of the remaining potential field signs, the majority (eight) were located in the west, along the Fledborough Beck.

A.6.5 References

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