

A303 Sparkford to Ilchester Dualling Scheme TR010036

6.3 Environmental Statement

Appendix 8.10 Water Vole and Otter Technical Report

APFP Regulation 5(2)(a)
Planning Act 2008

Infrastructure Planning (Applications: Prescribed
Forms and Procedure) Regulations 2009
July 2018



Infrastructure Planning

Planning Act 2008

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(Applications: Prescribed Forms
and Procedure) Regulations
2009**

**A303 Sparkford to Ilchester Dualling
Scheme**

Development Consent Order 201[X]

**6.3 Environmental Statement
Appendix 8.10 Water Vole and Otter Technical Report**

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Executive summary

The proposed A303 Sparkford to Ilchester Dualling scheme (hereafter referred to as 'the scheme') is to provide a continuous dual-carriageway on the A303 linking the Podimore Bypass and the Sparkford Bypass.

Suitable habitat for otter (*Lutra lutra*) and water vole (*Arvicola amphibius*) was identified whilst undertaking a Phase 1 habitat survey in 2016; the results of this survey recommended further specific surveys for both species. A habitat suitability assessment was completed identifying all the ditches and water courses that offered suitability for supporting otter and water vole. From this habitat assessment, 4 areas requiring further water vole presence / likely absence surveys were identified; these were survey area A (Dyke Brook), B, C and D. Water vole surveys were completed on 2 occasions; 1 in April 2017 and 1 in September 2017. The habitat assessment identified that only area A (Dyke Brook) offered suitability for otter. This area was surveyed in April 2017. The remaining areas were not subject to otter surveys as they offered low suitability for otter.

Water voles were confirmed to be present in areas A, C, and D. Water voles extended their distribution between survey 1 and 2 with higher numbers being recorded in September 2017.

The otter survey identified a high level of otter activity on the Dyke Brook in April 2017. During subsequent water vole surveys along Dyke Brook in September 2017, incidental checks were made for signs of otter. Lower levels of otter activity were recorded in September 2017 compared to April 2017. Therefore, it is likely that the Dyke Brook is a water course which is seasonally important for otters.

The scheme is not anticipated to directly affect any water courses used by otters or water voles and fragmentation or isolation of otter / water vole habitat will not occur. However, construction work for the scheme would be located in close proximity to water courses supporting water voles and therefore mitigation methods would be required to protect these populations and prevent disturbance impacts.

Although no water courses supporting otters would be affected as part of the work, there is a low risk of otters attempting to cross the carriageway close to Hazlegrove School. However, the road design includes deterrents to prevent mammals such as otter going onto the carriageway.

Enhancement measures for water voles have been incorporated into the scheme design. This includes the provision of additional ponds and ditches that would provide aquatic habitat for water voles. In addition, the drainage design would improve screening of the surface water run-off from the carriageway, which would improve the water quality within the adjacent drainage channels. This would indirectly improve habitats for otter within surrounding watercourses.

1 Introduction

1.1 Overview of the scheme

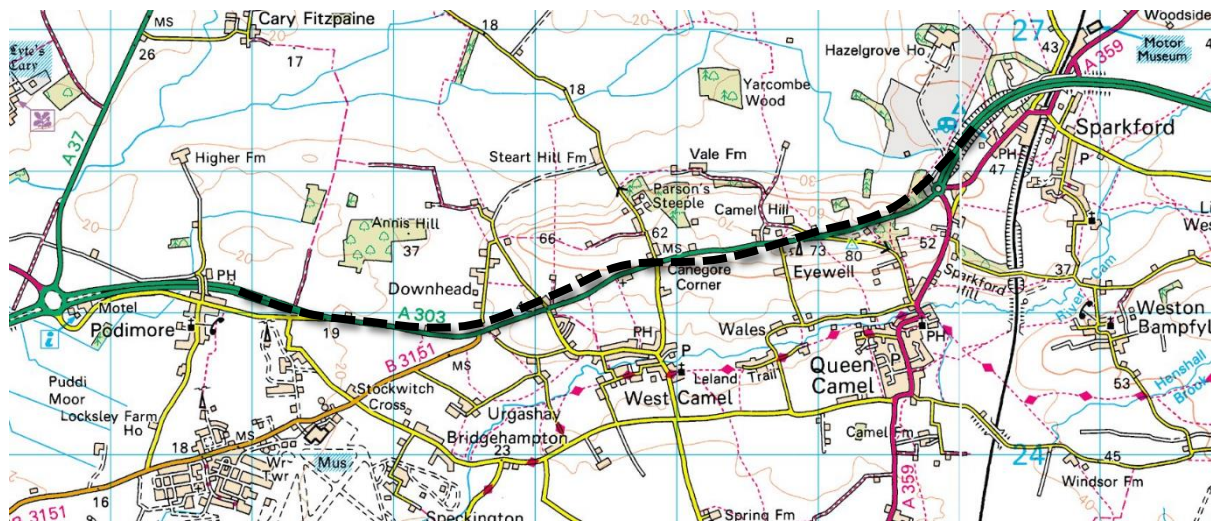
Existing route corridor

- 1.1.1 The A303 forms part of Highways England's Strategic Road Network (SRN) and a strategic link between the south west and the rest of the south, south-east and London. The route comprises multiple road standards, including dual carriageway, single carriageway and single carriageway sections with overtaking lanes. Speed limits also vary between 40 miles per hour and 70 miles per hour, depending on the character of the road and its surroundings.

Existing project road

- 1.1.2 The section of the A303 that is being upgraded as part of this scheme commences at the eastern limits of the existing dual carriageway, the Podimore Bypass. Travelling east, the corridor reaches the junction with the B3151 before bearing north east and rising upwards through Canegore Corner to reach the crest of Camel Hill at Eyewell. This section of the corridor is characterised by a single lane road, with double white lines negating overtaking and subject to a 50 miles per hour speed limit. There are several priority junctions along the route giving access to the settlements of Queen Camel and West Camel to the south and Downhead to the north, as well as several farm accesses and parking laybys.
- 1.1.3 From the crest of Camel Hill, the corridor descends to meet the roundabout at the western limit of the dual carriageway Sparkford Bypass (Hazlegrove Roundabout). This section comprises 2 lanes in the westbound direction, 1 lane in the eastbound direction and is also subject to a 50 miles per hour speed limit. Hazlegrove Roundabout forms a junction between the A303 and the A359 which runs south through Queen Camel and north-east through Sparkford. The roundabout also provides access to a service station, and to a school at Hazlegrove House.
- 1.1.4 The section of the A303 that is to be upgraded is almost 3.5 miles, or approximately 5.6 kilometres long.
- 1.1.5 The extents of the scheme are illustrated in Figure 1.1 below. Figure 2.1 of Volume 6.2 shows the proposed red line boundary for the scheme.

Figure 1.1: Scheme extents



Source: Mott MacDonald Sweco Joint Venture (MMSJV)

Scheme proposals

1.1.6 The proposed scheme is to provide a continuous dual-carriageway linking the Podimore Bypass and the Sparkford Bypass. The scheme would involve the removal of at-grade junctions and direct accesses. The Hazlegrove Junction would be constructed to grade-separated standards and Downhead Junction and Camel Cross Junction would be constructed to compact grade-separated standards, as illustrated on Figure 2.3 General Arrangement Plans, contained in Volume 6.2.

1.1.7 A detailed description of the scheme is provided within Chapter 2 of the Environmental Statement, Volume 6.1.

1.2 Scope of report

1.2.1 The objectives of this report are:

- to inform the Environmental Impact Assessment (EIA)
- to present the results of the surveys
- to present the relative distribution and abundance of otter (*Lutra lutra*) and water voles (*Arvicola amphibius*)
- to assess the potential impacts of the scheme on otters and water voles
- to provide recommendations for mitigation, habitat creation and enhancement

1.3 Legislation

Otter

1.3.1 Otters are a European protected species (EPS) protected under the *Conservation of Habitats and Species Regulations 2010*. In summary, it is an offence to:

- deliberately kill or injure this species
- deliberately disturb this species so as to impair its ability to survive, to breed or reproduce, or to rear or nurture its young
- damage or destroy a breeding site or resting place used by this species

1.3.2 Otters are partially protected under the *Wildlife and Countryside Act 1981* (as amended). In summary, it is an offence to:

- intentionally kill or injure these species
- intentionally or recklessly:
 - disturb these species whilst occupying any structure or place used for shelter or protection
 - obstruct access to any structure or place used by these species for shelter or protection

1.3.3 Otters are listed as priority species under Section 41 of the *Natural Environment and Rural Communities (NERC) Act 2006*. Section 40(1) of the Act states that 'every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity'. Section 40(3) explains that conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat.

Water vole

1.3.4 Water voles are fully protected under the *Wildlife and Countryside Act 1981* (as amended). In summary, it is an offence to:

- intentionally kill or injure these species
- intentionally or recklessly:
 - damage or destroy any structure or place used for shelter or protection
 - disturb these species whilst occupying any structure or place used for shelter or protection
 - obstruct access to any structure or place used by these species for shelter or protection

- 1.3.5 Water voles are also listed as priority species under Section 41 of the NERC Act 2006. Section 40(1) of the Act states that 'every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity'. Section 40(3) explains that conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat.

1.4 Status of water voles and otters at the national level

Otter

- 1.4.1 Otters are widely distributed throughout most counties of Great Britain. However, there are limited records of otters from Sussex, Kent, Surrey and the counties directly surrounding London. Otters have declined over the last century across Europe, including Britain, predominately owing to historic persecution, when the range of otters declined by 50%. Changes in water quality further exacerbated this decline by causing a reduction in food sources and the accumulation of toxins in the food chain. The otter is now recovering throughout much of its range but otter populations have not yet recovered to favourable status.
- 1.4.2 Historically, otters were listed as a *UK Biodiversity Action Plan* (UKBAP) species and are now listed as a species of 'principal importance for the conservation of biodiversity in England' under Section 41 of the NERC Act 2006. Following the production of *Biodiversity 2020*¹, the national strategy for England, actions were identified by experts to help in the recovery of populations of the S41 listed species. Actions identified for the recovery of otters include the following:
- Continue to work towards meeting water quality objectives on all rivers across the UK so they can support healthy fish stocks.
 - Ensure that riparian habitat has sufficient bankside vegetation and undisturbed terrestrial cover to provide resting and breeding sites for otters.
 - Continue to monitor otter recolonisation across the UK in periodic national surveys, augmented with annual surveillance where possible.
 - Ensure the otter continues to receive strong legal protection and advice is given about appropriate fishing methods that will not cause otter mortality.
 - Maintain surveillance of otter health and impacts of toxic chemicals through a programme of post-mortem and tissue analysis work.

¹ Defra (2011) *Biodiversity 2020: A strategy for England's wildlife and ecosystem services* [online] available at: <https://www.gov.uk/government/publications/biodiversity-2020-a-strategy-for-england-s-wildlife-and-ecosystem-services> (last accessed April 2018)

- Develop methods for assessing the abundance of otters as well as monitoring distribution.

Water vole

- 1.4.3 Water voles are widely distributed throughout the lowland areas of Great Britain, but are absent from Ireland. Water voles have declined over the last century across the UK, predominately owing to predation by mink (a non-native species). Between 1989 and 1998 a decline of 88% has been recorded. Increases in habitat fragmentation has exacerbated this decline.
- 1.4.4 Water voles are showing some signs that the species is overall, slowly expanding its range. However, expansion is localised and decline continues in other areas. On balance, it is thought that the expansions just about outweigh the declines.
- 1.4.5 Historically, water voles were listed as a UKBAP species and are now listed as a species of 'principal importance for the conservation of biodiversity in England' under Section 41 of the NERC Act 2006. Following the production of *Biodiversity 2020*¹, the national strategy for England, actions were identified by experts to help in the recovery of populations of the S41 listed species. Actions identified for the recovery of water voles include the following:
- Continue and extend the National Key Sites for water voles initiative.
 - Identify Regional Key Areas for water voles following agreed methodologies.
 - Establish and maintain a national water vole database and GIS.
 - Continue or establish (as appropriate) and maintain a programme of regular monitoring in National and Regional Key Areas and at a sample of other sites.
 - Maintain and, where appropriate, extend the area of suitable water vole habitat in National and Regional Key Areas.
 - Reduce the impact of mink predation, prioritising action in Regional Key Areas.
 - Ensure appropriate protection of the water vole and its habitat under the *Wildlife and Countryside Act*.

1.5 Otter and water vole ecology

Otter

- 1.5.1 Otters have been recorded as using almost all types of water course. Otters will utilise both flowing and still water bodies such as rivers, ditches, lakes, ponds and reservoirs. In England and Wales, otter activity is confined to fresh water

but in Scotland otters will utilise coastal habitats². Otters use aquatic features for foraging and commuting; healthy aquatic habitats are vital to ensure there is sufficient food to support the otter.

- 1.5.2 In addition to aquatic habitats, otters are dependent on terrestrial riparian habitats to provide resting sites. The term resting sites includes a variety of features, for example, natal holts, holts, couches, and hovers. Otters will utilise a wide range of features for resting sites, including holes in the ground, tree roots, gaps between rocks, tall ruderal vegetation, and scrub. The use of such habitats is very variable³.
- 1.5.3 Some correlations have identified a preference for otters utilising less disturbed locations, where dense vegetation and woodland provides cover.
- 1.5.4 Otters are largely nocturnal, and occur at very low population densities, with the average home range of a female being approximately 20 kilometres of a water course, and males covering 32 kilometres. Depending on the quality of the habitats this range can vary widely.

Water vole

- 1.5.5 Water voles in the UK are strongly correlated with aquatic habitats, although populations on the continent (and rare examples in the UK) also form terrestrial communities⁴. They prefer slow flowing rivers, ditches and lakes.
- 1.5.6 Water voles favour watercourses with steep earthen banks; excavating burrows into these banks with entrances both above and below the water level. Colonies are vulnerable to changes in water levels therefore, steep banks ensure that in times of high flow, water voles can retract to areas of higher ground. Water voles feed predominately on vegetation and require an abundant supply of food throughout the year. 227 plant species have been identified in their diet. Their preference is for well vegetated channels, which provide an abundant food supply whilst providing cover from predators.
- 1.5.7 Males home range is approximately 130 metres, with females typically having smaller ranges of 30 metres. Water voles are quite short-lived animals and will have multiple litters each year. In a good year, this means that populations can expand significantly and thus spread into less suitable habitat.

² Chanin, P. (2003). *Monitoring the Otter Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10, English Nature, Peterborough.

³ Chanin, P. (2003). *Monitoring the Otter Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10, English Nature, Peterborough.

⁴ Dean, M., Strachan R., Gow, D., Andrews, R. (2016). *The Water Vole Mitigation Handbook* (The Mammal Society Mitigation Guidance Series) [online] available at: <http://www.fensforthefuture.org.uk/admin/resources/downloads/water-vole-mitigation-guidance-final-2016.pdf> (last accessed October 2017)

2 Methodology

2.1 Desk study

- 2.1.1 A detailed desk study search was requested from Somerset Environmental Records Centre (SERC) in May 2017, within a 2 kilometre radius of the scheme. The results can be found within appendix A.

2.2 Field surveys

Otter survey

- 2.2.1 The Zone of Influence (Zol) for the otter surveys is in accordance with guidelines provided in the Design Manual for Road and Bridges⁵ (DMRB) and survey experience of the lead surveyor. The Zol is stated as 250m, however, due to the connectivity and suitability of the habitat the Zol was extended to 2 kilometres for the otter surveys.
- 2.2.2 Following the extended Phase 1 habitat survey undertaken in May 2016 and updated in March 2017, a habitat suitability assessment was completed identifying all water courses suitable for otters. From this assessment, and based upon the scheme design Dyke Brook and a tributary were identified as requiring further detailed surveys in accordance to the DMRB.
- 2.2.3 Dyke Brook is approximately 1.2 kilometres from the existing A303 carriageway. Surveys were undertaken during April 2017 and September 2017 along area A, known as Dyke Brook and a tributary, which is the main watercourse within the survey area, refer to appendix B detailing the survey location.
- 2.2.4 There are further small drainage ditches within proximity of the scheme, and although they may provide infrequent commuting habitat, they are unlikely to support populations of otter. Therefore, detailed otter surveys were not completed for these ditches. However, checks for otter signs were made alongside water vole surveys.
- 2.2.5 The scheme would not cross Dyke Brook and following widening of the road, the A303 remains located over 1 kilometre from the watercourse. Therefore, the scheme would not result in new barriers for otter dispersal. None of the remaining drainage ditches (areas B, C and D) would be crossed by the scheme.
- 2.2.6 The otter survey involved an assessment of the bank and channels looking for signs of otters, such as:

⁵ Design Manual for Roads and Bridges: *Nature Conservation Advice in Relation to Otters* (2001), volume 10, section 4.

- Natal holts, holts and potential holt sites
- Couches
- Spraints
- Anal jelly
- Tracks or footprints
- Silt or sand heaps and slides

2.2.7 All field signs found were photographed, mapped with a GPS (accurate to less than 5 metres) and with a standardised survey and location reference code.

2.2.8 When recording otter signs, levels of activity were used to categorise the status of any resting site, as per the methodology discussed by Basset and Wynn (2010)⁶. Resting sites were defined as having low, medium or high levels of activity.

2.2.9 Spraints were categorised as fresh, recent, or old as described by Devon Biodiversity Records Centre⁷, as follows:

- fresh spraint- usually black, tarry and sticky. It will have a distinct sweet musky smell
- recent spraint- will be starting to dry out, it may be turning grey and crumble when touched. It may still smell slightly of otter
- old spraint- completely dried becoming very pale and crumbly. It may have crumbled completely, leaving a grey ashy deposit, with some fish bones still present

Water vole survey

2.2.10 The Zol for the water vole surveys is in accordance with guidelines provided in the Water Vole Mitigation Handbook⁴ (2016) and survey experience of the lead surveyor. All water courses within 250m of the redline boundary were assessed. Watercourses outside of this buffer were included where considered necessary, owing to connectivity to other water courses

2.2.11 A habitat suitability assessment was completed, identifying all the ditches and water courses suitable for water voles within the Zol. From this assessment 4 surveys areas were identified, these were survey area A (Dyke Brook), B, C and D. For a plan showing the location of these survey areas, refer to appendix B.

⁶ Basset, S. and Wynn, J. (2010) *Otters in Scotland - How Vulnerable are they to disturbance*. In Practice, No 70, December 2010.

⁷ Devon Biodiversity Records Centre (2017) *Otter surveying* [online] available at: <http://www.dbrc.org.uk/otter-and-mink-signs/> (last accessed October 2017)

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- 2.2.12 The scope of the survey was determined prior to the final preliminary Stage 3 design of the project; therefore, the survey areas cover a wider scope than that required by the preliminary scheme design.
- 2.2.13 Other watercourses were identified during this scoping exercise, but were scoped out after visual assessment owing to poor habitat quality or poor connectivity. The details of this scoping exercise can be found in appendix C.
- 2.2.14 The survey took place following the guidelines set out in the *Water Vole Conservation Handbook*⁸. Two surveys were undertaken, with 1 being completed in April 2017 and the other in September 2017. During the survey a habitat assessment was completed detailing:
- bank profile, channel profile and characteristics and water levels
 - availability of food sources
 - vegetation structure (particularly the extent of suitable marginal vegetation)
 - level of shading
 - disturbance levels
 - bordering land use
 - connectivity with other areas of suitable or sub-optimal habitat
- 2.2.15 The survey area, plus 200 metres upstream and 200 metres downstream, was surveyed⁹ where access was available.
- 2.2.16 Where possible, the survey was undertaken using a mixture of methods including from the bank edge, in channel and using binoculars. A photographic record was made of field signs.
- 2.2.17 The photos are referred to in the text as, for example, Photo 1, Photo 2, and are included in appendix D.
- 2.2.18 During each survey, the banks of each watercourse or water body (up to a distance of 2 metres from the water's edge) were inspected for signs of use by water vole, with a note made of the number of each type of water vole sign recorded so that abundance could be estimated (ranked abundant as frequent, scarce, or none for each section surveyed). Field signs recorded included the following:
- presence of latrines
 - presence of burrows (both active and inactive)

⁸ Strachan, R., Moorhouse, T., Gelling, M. (2011). *Water Vole Conservation Handbook 3rd Edition*. Wildlife Conservation Research Unit, Oxford.

⁹ Chanin, P. (2003). *Monitoring the Otter Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10, English Nature, Peterborough.

- presence of runs
- presence of footprints
- presence of feeding remains
- individual droppings
- sightings and / or sounds (characteristic sound entering the water) of individuals

2.2.19 An indication of relative population size was estimated based on the number of latrines recorded within the survey area¹⁰ (Table 2.1).

Table 2.1: Relative population density (based on latrines per 100 metres)

Relative population density	First half of survey season (mid-April to end of July)	Second half of survey season (July to September)
High	10 or more	20 or more
Medium	3-9	6-19
Low	Less than or equal to 2 (or none, but with other confirmatory field signs)	Less than or equal to 5 (or none, but with other confirmatory field signs)

Source: *Water Vole Mitigation Handbook*¹⁰

2.3 Survey constraints and limitations

- 2.3.1 The surveys were undertaken under optimal conditions at suitable times of the year. However, the surveys provide a snapshot of activity at the site and therefore, there is always the risk of protected species being overlooked, either owing to the timing of the survey or the scarcity of the species at the site.
- 2.3.2 Conditions on site meant that some areas were difficult to access, owing to the density of vegetation. An assessment of these areas was made as far as was practicable, but it is possible that signs of otter or water vole were missed and therefore such features would not have been addressed within this report.
- 2.3.3 Water courses were scoped, to identify which ones required further survey. This process identified 5 ditches as unsuitable for water voles. At the time of the assessment these ditches were unsuitable, but depending on future land management practices, weather conditions and other factors, ditches previously identified as unsuitable can potentially increase in suitability for water voles.
- 2.3.4 Two visits were made to carry out water vole surveys, with the second visit undertaken in September 2017. At the time of the second visit, some water courses that were previously surveyed were found to be dry. These water courses therefore were not able to be surveyed a second time.

¹⁰ Chanin, P. (2003). *Monitoring the Otter Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10, English Nature, Peterborough.

- 2.3.5 Some sections of survey area C could not be surveyed a second time due to landowner access issues. The areas that could not be surveyed twice are detailed in appendix B.
- 2.3.6 The extent of area C within Yarcombe Wood could not be accessed due to landowner issues at the time of the surveys, and therefore a check for otter holts in this area could not be completed.

3 Results

3.1 Desk study

Otters

- 3.1.1 Seven otter records were returned by the records search, 6 of which were south of the existing A303. These were all on or very close to the River Cam. These records were dated between 2008 and 2014. The record to the north of the A303 was from the River Cary, close to Cary Fitzpaine (2008). The closest record is approximately 600 metres south of the A303, located along the River Cam.

Water voles

- 3.1.2 The data search returned 3 records of water voles; 1 of these was from the River Cam, located 625 metres to the south of the A303 (2012) and the other 2 records were close to Sparkford Wood, which is over 1.5 kilometre away from the scheme (2007).

3.2 Habitat assessment

Otters

- 3.2.1 The otter survey was undertaken for area A. This covered Dyke Brook and a tributary that fed into Dyke Brook.
- 3.2.2 Dyke Brook is a small water course that is connected to a network of drainage ditches. The brook is in a deep ditch with steep banks, with the depth of the water ranging from 10-50 centimetres (Photo 1, appendix D). The brook is crossed by a road at Steart Bridge and downstream the brook joins the River Carey.
- 3.2.3 The water course is surrounded by a mixture of habitats, but the predominant habitat type is either semi-improved agricultural grassland or arable fields. Along the extent of the survey, a well-managed hedge runs along 1 side of the bank edge.
- 3.2.4 Dyke Brook provides limited locations for resting sites and holts due to the lack of cover. However, at the further western extent of the survey, mature trees border the ditch; these trees and tree roots could be utilised by a resting otter. Close to Steart bridge, are areas of scrub and trees which could also provide cover for resting otters.
- 3.2.5 As well as agricultural land, small pockets of woodland remain in the landscape. Yarcombe Wood is a dense wood which has little disturbance, and would provide potentially suitable habitat for holts and resting otters.
-

3.2.6 Small fish, including three-spined stickleback (*Gasterosteus aculeatus*) were observed during the survey and amphibians were also recorded using the watercourses. Dyke Brook is unlikely to be able to support large fish but the combination of amphibians and small fish will mean that in spring and early summer, the brook has a good supply of prey for otters.

Water voles

3.2.7 Water vole surveys were undertaken for 4 sites, referred to as areas A, B, C or D. Although treated as separate areas within this report, there is connectivity between A, C and D, with area B being unconnected from the other survey areas. The habitat assessment for these survey areas is detailed in Table 3.1 below.

Table 3.1: Water vole habitat assessment

Site location	Bank profile, bank characteristics and water level	Vegetation structure and shading levels	Bordering land use, disturbance levels	Connectivity
Area A, Dyke Brook (Photo 1, appendix D)	Small water course in a deeply incised channel. Earthen banks good for water voles to build burrows. Few ledges for latrines. The brook has been cleared within the last five years.	Frequent aquatic vegetation.	Agricultural, and a well-maintained hedge along one side. Depth of channel and presence of hedge means potential disturbance to water voles would be low.	Good connectivity both up and downstream to other drainage ditches and watercourses.
Area B (Photo 2, appendix D)	The channel is shallow (15cm), with a low flow. Earth banks.	Reeds and sedges were rare, but the channel frequently had long grasses extending from the banks into the channel.	The channel is alongside a small area of woodland and alongside an arable field.	Not connected to other drainage ditches.
Area C (Photo 3, appendix D)	The depth of channel varied but overall was shallow, with a low flow. Banks were made of earth.	Aquatic vegetation was frequent but the channel was also very shaded for 70% of the channel. In the less shaded areas aquatic vegetation dominated the channel.	Agricultural land with an access track running alongside 30% of the survey area. Approximately 20% of the channel borders Yarcombe Wood.	The ditch connects with Dyke brook; two other drainage channels flow into the ditch.
Area D (Photo 4, appendix D)	The bank profile is deep and narrow but had a very low flow.	Aquatic vegetation was occasional but terrestrial vegetation overhung the bank providing potential food sources for water voles	Channel is on a field boundary with a mature hedge line on one site. The field behind this is permanent grazing pasture with mature trees.	The ditch connects to survey area C.

3.3 Field signs

Otters

- 3.3.1 Otter field signs were prevalent at the time of the survey. Signs were found along the extent of Dyke Brook but a greater level of activity was recorded to the west of Steart Bridge. Within this area, 5 spraints were found as well as 1 secretion of anal jelly. Over 5 spraints were also recorded under Steart bridge (Photo 6, appendix D). Otter footprints were also noted (Photo 5, appendix D). The location of these records is described in appendix B.
- 3.3.2 All field signs recorded along the brook were either 'fresh' or 'recent'. The spraints recorded under the bridge varied more in age and decomposition. There were examples of 'fresh', 'recent', and 'old' spraints under the bridge.
- 3.3.3 Although only 1 field survey was completed; incidental checks for otter signs were made during the second water vole survey. Spraints were found again under the bridge but no other signs were noted.
- 3.3.4 No resting sites or holts were identified during the survey but some limited section of the survey area have been identified as having suitable habitat for resting otter.

Water voles

- 3.3.5 Water voles were recorded in 3 of the 4 survey areas. One probable mink scat was also recorded. The water vole survey results are described in Table 3.2 below and are mapped in appendix G and H.

Table 3.2: Water vole survey results for 2017

Site location	Survey	Latrine	Burrow	Feeding sign	Population density (Based on survey 2)	Other
Area A (Photo 7, appendix D)	Survey 1 (April 2017)	✓	✓	✓	-	One probable mink scat recorded under bridge
	Survey 2 (September 2017)	✓	✓	✓	Overall low but medium population density at-ST5811527034 and ST5647226618	
Area B (Photo 8, appendix D)	Survey 1 (April April 2017)	x	✓	x	-	
	Survey 2 (September April 2017)	Dry	✓	Dry	N/A	
Area C	Survey 1 (April April 2017)	✓	✓	✓	-	

Site location	Survey	Latrine	Burrow	Feeding sign	Population density (Based on survey 2)	Other
(Photo 9, appendix D)	Survey 2 (September April 2017)	✓	✓	✓	Low	
Area D (Photo 10, appendix D)	Survey 1 (April April 2017)	x	✓	x	-	Water vole heard during survey
	Survey 2 (September April 2017)	✓	✓	✓	Low	

Notes: ✓ = present, x = absent

3.4 Interpretation of biological records

Otters

- 3.4.1 The records show that otters are using both the River Cam and the River Carey, with records south and north of the A303. Neither of these water courses cross the A303. Owing to the lack of connectivity, it is likely that there are 2 separate populations of otters south and north of the A303. There may be limited connection between the otters on each river but the existing A303 is a busy road and is likely to form a significant barrier.

Water voles

- 3.4.2 The records show a patchy distribution of water voles. There has also been a general decline of the species across England within the past 10 years. The record to the south of the A303 is from West Camel and is over 600 metres away from the carriageway.

3.5 Interpretation of field signs

Otters

- 3.5.1 The survey identified a high level of localised activity, with otters regularly sprainting along the extent of area A (Dyke Brook). Some spraints appeared to have been laid on top of others, this could be multiple otters communicating or an otter very regularly marking its territory.
- 3.5.2 The fact that this level of sprainting activity was not seen later in the year suggests that area A (Dyke Brook) is optimal for otters earlier in the year. One possible explanation of this could be that it corresponds with high levels of amphibian activity, which provides a food source for otters. The landscape has numerous drainage ditches which are interconnected to storage ponds. High levels of amphibian activity were noted in these ponds. Otters are known to alter their diet depending on food availability and have been known to heavily predate amphibians in the spring.

-
- 3.5.3 Due to the relatively small size of the drainage ditches it is likely that fish size will be small, and therefore do not provide an adequate food source for otters. Therefore, the food abundance for otters is likely to reduce later in the summer as amphibians disperse from the ditches. At this time of year otters would need to forage more widely or on more substantial watercourses.
- 3.5.4 No resting sites or holts were identified during the survey. Limited sections of the survey area provided suitable resting locations. The woodland was not able to be accessed at the time of the survey but could provide suitable locations for resting otters, or holts. Although woodland would provide a suitable location for holts, prey availability reduces the potential for natal holts.
- 3.5.5 Otters are known to have large territories, with seasonal variation, preferring some sections of a territory at different times of the year. Within the stretch of the brook that was surveyed, the habitat suitable for resting sites was limited. Therefore, otters could be resting in territory outside of the survey area, and be commuting through the survey area, spending more time here when there is an abundance of prey.

Water voles

- 3.5.6 Water vole presence was confirmed in survey areas A, C and D. Although potential burrows were found at area B no feeding signs were found.
- 3.5.7 Surveys of area A recorded water voles on both visits but the distribution of the animals changed over the year. At the time of the first visits the signs were limited to east of Steart Bridge and to the southern stretch of the watercourse. Later in the year the signs were found over a wider area including to the west of Steart bridge. This greater distribution will reflect water voles breeding throughout the summer months and the young dispersing into unoccupied territories as they mature.
- 3.5.8 It is likely that the distribution identified during the spring survey indicates part of the core territory for this population which then expands from this core area as conditions allow. Protecting the core section of habitat will be important to ensure the wider population does not become isolated.
- 3.5.9 A potential burrow was identified at area B, but without latrines, presence of water voles cannot be confirmed. The lack of connectivity of area B also means it is less likely to be colonised by new individuals. On the second survey the ditch was dry, further reducing its ability to support water voles.
- 3.5.10 Area C is connected to Dyke Brook (area A) by 2 ditches. Being further up the catchment, Area C has lower water levels, but had a good distribution of aquatic plants. Water vole latrines, burrows and feeding signs were confirmed on each visit. Although water voles were confirmed within this ditch, there was a section
-

directly adjacent to Yarcome Wood where no signs were found. Unfortunately, this also corresponds to the stretch that was not able to be surveyed a second time as a result of land access constraints. Although a second visit was not possible, water voles are assumed to be present in this section, owing to the seasonal expansion of the water voles ranges. This was demonstrated in the other survey areas and because that stretch of the water course connects to Dyke Brook, where a population of water voles has been confirmed.

- 3.5.11 The initial habitat assessment of area D found it to be of sub-optimal suitability for water voles owing to its low water level, and lack of aquatic vegetation due to shading and encroachment of terrestrial vegetation. No signs of water voles were recorded within this ditch during the April 2017 survey. However, multiple latrines, burrows and feeding signs were found on the second visit and a water vole was also heard entering the water. It is considered likely that the population of water voles located upstream utilise this sub-optimal water course during times when there is greater competition for resources.
- 3.5.12 The distribution and pattern of water vole signs observed during the surveys indicates when conditions are suitable and during a good breeding year, the extent of their territory within the survey area will expand. Therefore, as water voles were recorded in area D it can be assumed that they would also colonise sub-optimal watercourses connected to area D, provided other conditions are met.

4 Potential impacts

4.1 Construction

- 4.1.1 The scheme is not anticipated to directly affect any water courses used by otters or water vole or result in habitat fragmentation or isolation.
- 4.1.2 Due to the distance of otter habitat from the proposed works (over 1 kilometre) disturbance impacts to this species during construction are not anticipated.
- 4.1.3 Survey areas D and C are the closest to the proposed area of works. Between chainage 4,900.00m and 5,600.00m of the main carriageway, slip roads are proposed in order to provide access to Hazlegrove. At this location the slip roads would extend to approximately 100 metres from the drainage ditches. However, this is considered sufficiently far that water voles would not be subject to disturbance impacts.
- 4.1.4 As part of the construction strategy, it is proposed to use the field directly adjacent to area D for soil storage. This activity has the potential to impact upon water voles as a result of damaging burrows, disturbance, changing the drainage of the land and thereby reducing the water quality of the ditch. This ditch is considered to be of local and of seasonal importance for water voles. Therefore, the works could result in a Slight Adverse effect upon the water vole population within area D.

4.2 Operation

- 4.2.1 Once operational, there is potential for indirect effects on otters and water voles due to pollution events and sediment changes, which may filter through the ditch network. However, the comprehensive drainage mitigation included as part of the scheme would treat the runoff such that water quality impacts to the surrounding drainage network would be very low - negligible. In the long term, it is not anticipated that there would be any impacts to otters and water voles as a result of the scheme.

5 Mitigation and enhancement recommendations

- 5.1.1 Where works (including temporary works) are within close proximity to ditches known to support water vole, a minimum buffer of 5 metres from the edge of the ditch should be retained and fenced. This buffer would prevent impacts to water vole burrows, minimise disturbance and prevent encroachment of plant or operatives. Maintaining a 5 metre buffer would negate the need for a Natural England licence. However, if works are required within the buffer area, a licence from Natural England would be required.
- 5.1.2 During the construction phase, best practice guidelines regarding pollution prevention would be adhered to. This would include the Construction Industry Research and Information Association (CIRIA) *C532 Control of Water Pollution from construction sites*¹¹ and *Environmental Good Practice on Site*¹². This would minimise the risk of adverse impacts to water vole habitat as a result of the soil storage close to area D. Pollution prevention measures would be regularly monitored throughout the construction process to ensure the methodology remains effective.
- 5.1.3 The scheme has been designed to ensure that pollution protection measures are integrated into the design of the scheme, to prevent pollutants entering the local drainage system and being transported into the wider landscape. These measures include wet attenuation ponds, trapped gullies and catchpits on side roads to intercept run-off and ditches to collect runoff. The creation of wet attenuation features may also provide aquatic habitat for riparian species.
- 5.1.4 Through the implementation of the mitigation described above, and an effective Sustainable Drainage scheme (SuDs), it is expected that the effect of the construction and operation of the road would have a Neutral effect upon riparian mammals and therefore, would be non-significant.

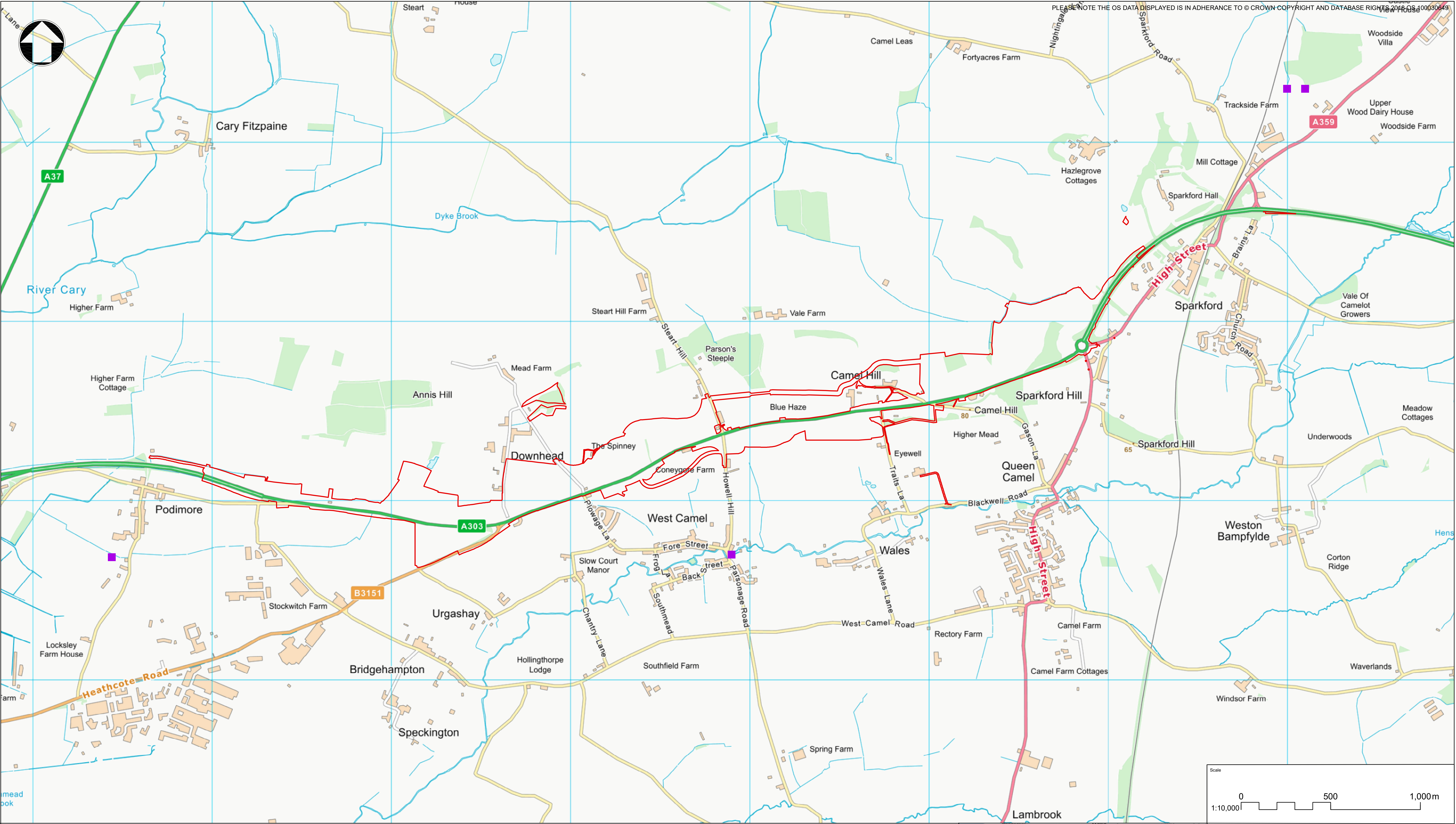
¹¹ Construction and Research Association (2001). (CIRIA) *C532 control of water pollution from construction sites, guidance for consultants and contractors*.

¹² Construction and Research Association (2001). (CIRIA) *C532 control of water pollution from construction sites, guidance for consultants and contractors*.

6 Conclusion

- 6.1.1 Habitat for otters and water voles was identified within the survey area. Through a review of biological records and completing field surveys, both species were confirmed to be present.
- 6.1.2 Although both otters and water voles were confirmed as being present within the survey area, the scheme is not anticipated to directly affect any water course or drainage feature used by either species.
- 6.1.3 However, temporary works are proposed directly adjacent to area D, a ditch with confirmed presence of water voles. Mitigation measures must be implemented to ensure that the water voles are protected during the works. This includes implementation of strict pollution control measures. These mitigation measures should be checked on a regular basis to ensure they remain effective, and a record should be kept ensuring compliance is maintained.
- 6.1.4 Comprehensive drainage mitigation would be included as part of the scheme, which would treat the runoff such that water quality impacts to the surrounding drainage network would be very low to negligible. Therefore, otter and water vole populations within surrounding watercourses would not be affected by changes in water quality as a result of the scheme.

Appendix A: Biological records



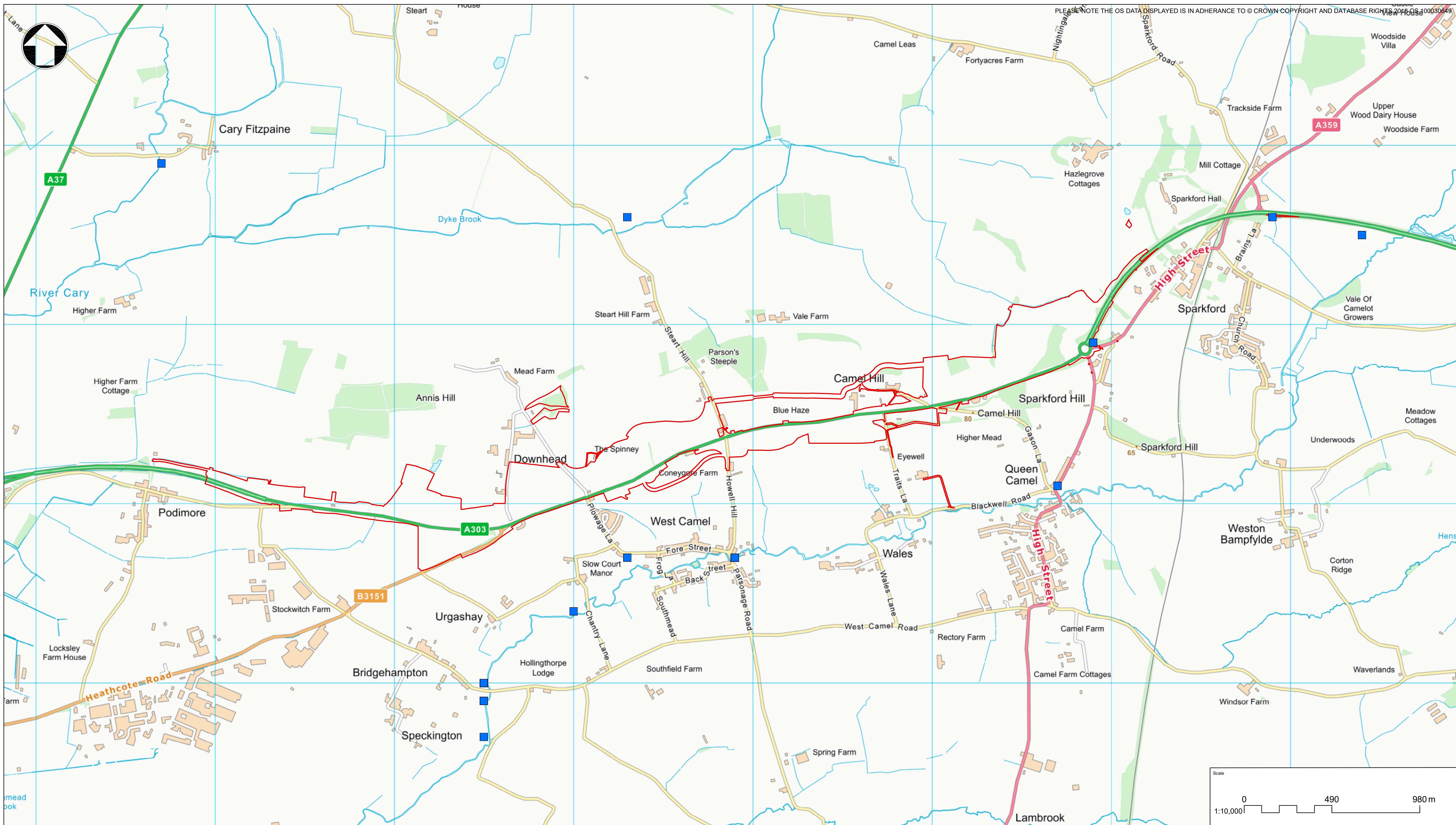
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- KEY
- PROPOSED RED LINE BOUNDARY
 - EUROPEAN WATER VOLE

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Drawing Title					
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WATER VOLE DATA					
Drawing Status					Suitability
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HE551507 - MMSJV - EBD					Revision
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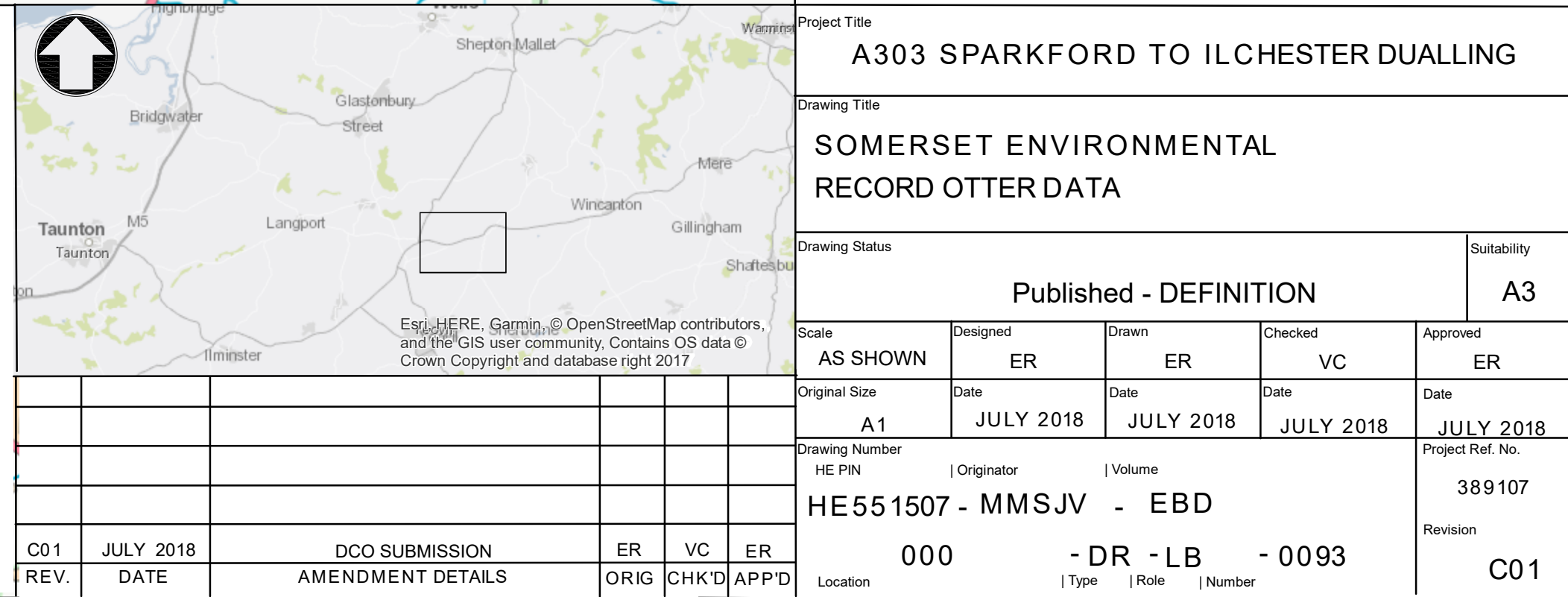


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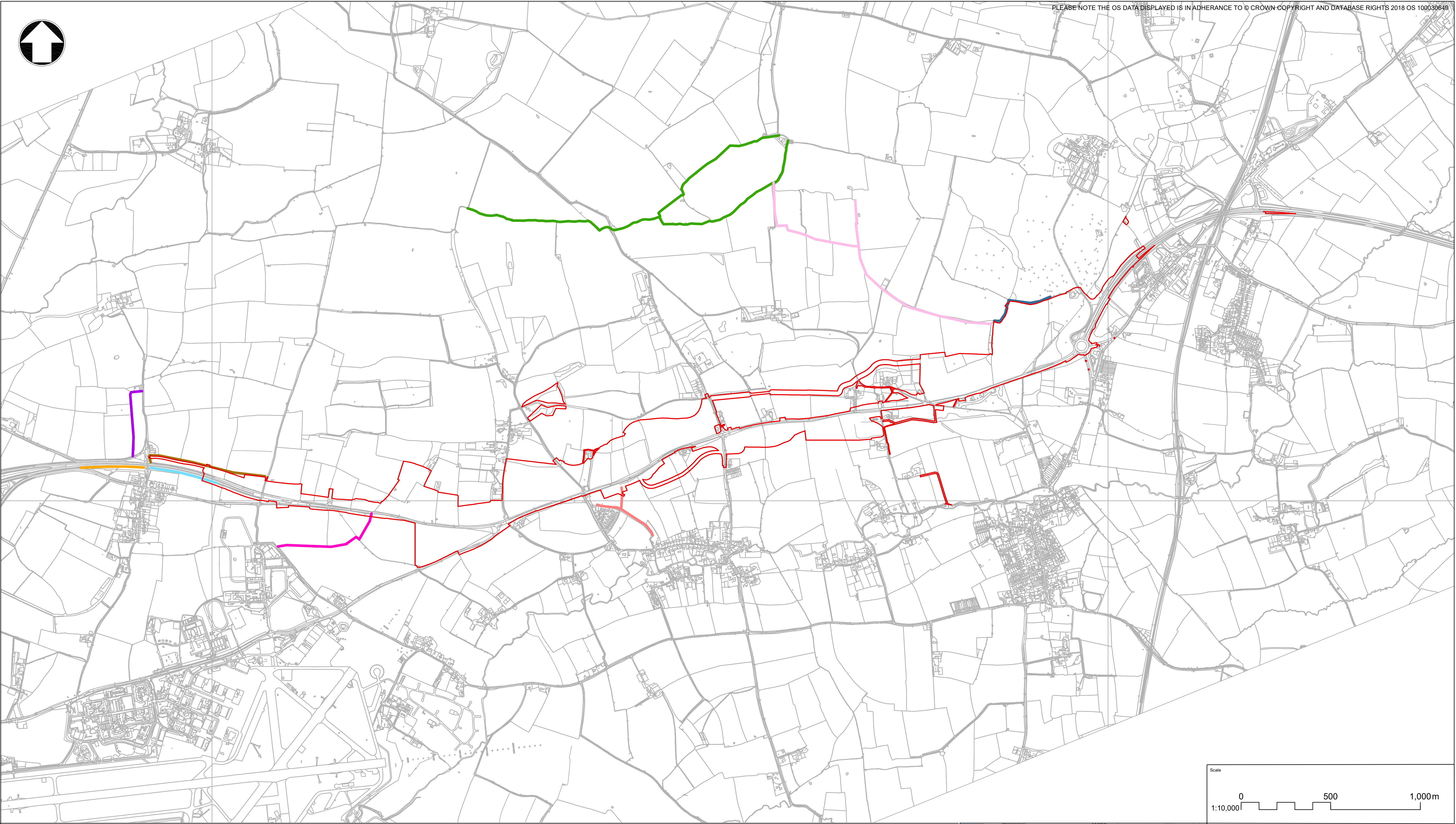
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Appendix B: Survey area



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- KEY**
- PROPOSED RED LINE BOUNDARY
- SURVEY AREAS**
- AREA A
 - AREA B
 - AREA C
 - AREA D
 - AREA E
 - AREA F
 - AREA G
 - AREA H
 - AREA I

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REV.	DATE	AMENDMENT DETAILS	ORIG	CHK'D	APP'D

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Drawing Title WATER VOLE AND OTTER SCOPING SURVEY					
Drawing Status Published - DEFINITION					Suitability A3
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000 - DR - LB - 0055					Revision C01
Location Type Role Number					

Appendix C: Water vole survey scoping exercise

Table C.1 below details the ditches and water courses that were assessed as part of the scoping exercise. These ditches were identified prior to the final preliminary design of the scheme and the area covered by the ditches reflected potential design options and a buffer of 200 metres upstream and downstream away from works. The location of these ditches is shown in appendix B.

Table C.1: Water vole habitat scoping exercise

Watercourse Number/ ID	Habitat assessment	Reasoning	Scoping Result
Area A 3065m	Optimal habitat <ul style="list-style-type: none"> - steep earth banks - aquatic vegetation - well-connected ditch 	Suitable for water voles	Scoped in
Area B 1905m	Moderate habitat <ul style="list-style-type: none"> - earth banks - aquatic vegetation - partially connected ditch 	Some connectivity to other water courses, and moderate potential for water voles.	Scoped in
Area C 380m	Optimal habitat <ul style="list-style-type: none"> - steep earth banks - aquatic vegetation - well-connected ditch 	Suitable for water voles	Scoped in
Area D 420m	Sub-optimal habitat <ul style="list-style-type: none"> - shallow earth banks - some aquatic vegetation - Low water levels - partially connected ditch 	Sub-optimal habitat, but connected to ditches with higher suitability. Therefore, an opportunity for water voles to colonise the ditch.	Scoped in
Area E 650m	Sub-optimal habitat <ul style="list-style-type: none"> - Suitable food resources (watercress and hawthorn) - Bank side habitat not structurally diverse - Shallow water level so highly likely to dry out - Poor connectivity to other water courses 	Owing to poor connectivity the possibility of colonisation by water voles is low and if the water course dried up there would be nowhere for water voles to go to as a refuge; therefore, the ditch is unlikely to retain a population of water voles.	Scoped out
Area F 400m	Sub-optimal habitat <ul style="list-style-type: none"> - Good width of bankside habitat - Ditch over-grown and shaded - Very isolated - Short ditch (300m) 	The ditch is 300m long, over-shaded and has no connectivity to other watercourses; therefore, the water course is unlikely to be able to support a breeding population of water voles.	Scoped out
Area G 330m	Sub-optimal habitat <ul style="list-style-type: none"> - Over-shaded with limited food resources 	Owing to the poor habitat quality and poor connectivity the possibility of water voles is low.	Scoped out

Watercourse Number/ ID	Habitat assessment	Reasoning	Scoping Result
	<ul style="list-style-type: none"> - Shallow banks, poor suitability for burrowing - Shallow water - Likely to periodically dry out. - Poor connectivity to other water courses 		
Area H 650m	Unsuitable habitat dry ditch	Ditch within works footprint, but the ditch is dry and unsuitable for water voles.	Scoped out
Area I 500m	Sub-optimal habitat <ul style="list-style-type: none"> - Heavily shaded and overgrown ditch - Little water and a very disturbed habitat. The ditch is very close to a well-used public right of way. Poor connectivity to other water courses.	Headwall for an outfall pipe is going to be installed bypassing some of the existing channel. This is likely to result in approximate 100m of the channel drying out.	Scoped out

Appendix D: Photos

Table D.1: Photos



Photo Number	Description	Photograph
1	Survey area A- Dyke Brook. Deeply incised channel	
2	Survey area B	




Photo Number	Description	Photograph
3	Survey area C	
4	Survey area D Deep channel obscured by trees and bramble.	Not applicable
5	An example of a spraint and anal jelly found on the Dyke Brook	
6	Multiple spraints found at Steart Bridge on the Dyke Brook	




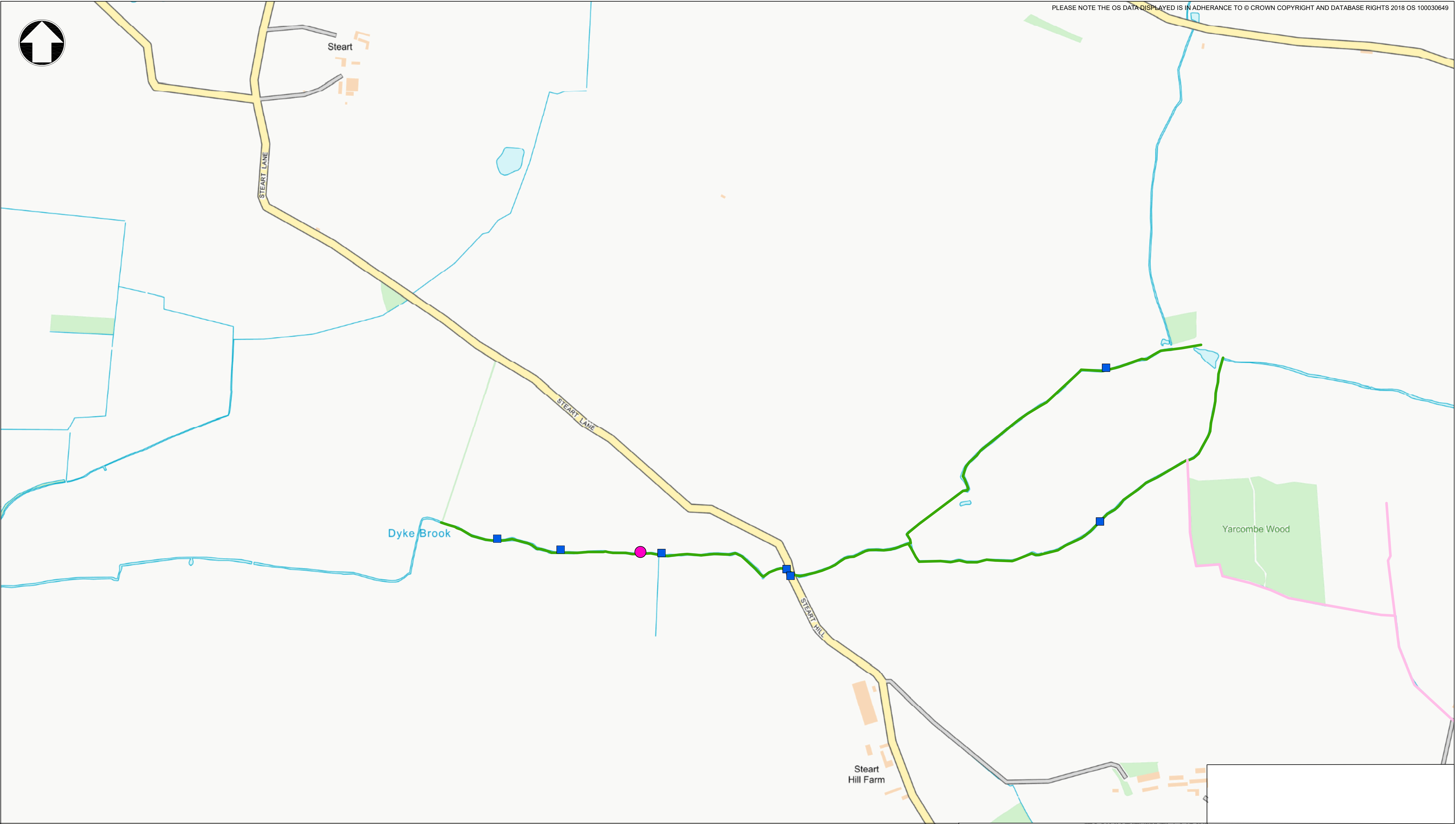
Photo Number	Description	Photograph
7	Water vole signs found on the Dyke Brook	
8	Unoccupied burrows at survey area B	
9	Water vole burrow and feeding signs, survey area C	

Photo Number	Description	Photograph
10	Latrine, survey area D	

Appendix E: Otter results April 2017



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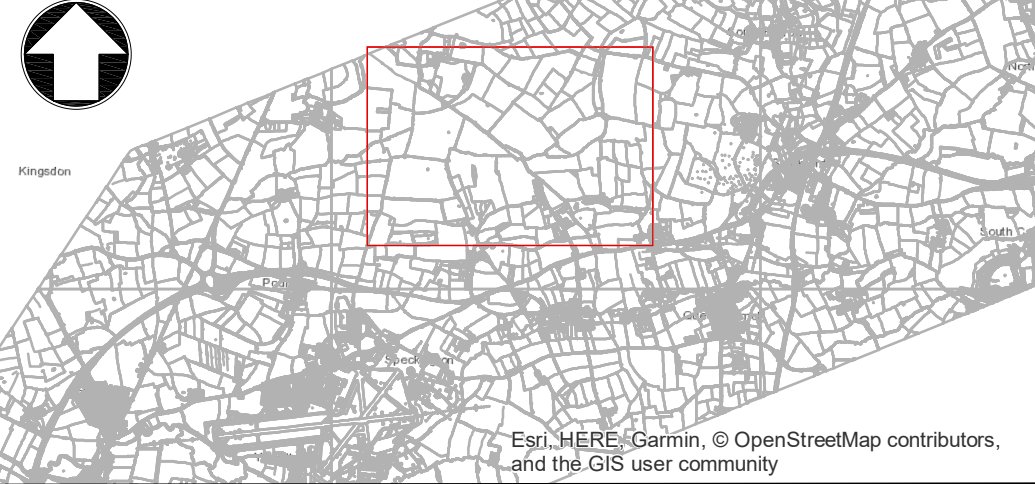
- KEY**

SURVEY AREAS

 - AREA A
 - AREA C
- SURVEY RESULTS**

 - ANAL JELLY
 - SPRAINT

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Drawing Title				
OTTER AND MINK SIGNS (APRIL 2017)				
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Location Type Role Number				

Appendix F: Otter results September 2017



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KEY

SEPTEMBER SURVEY RESULTS 2017

OTTER SPRRAINT AND MINK DROPPINGS

SURVEY AREAS

AREA A

AREA C

NO ACCESS



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Appendix G: Water vole results April 2017

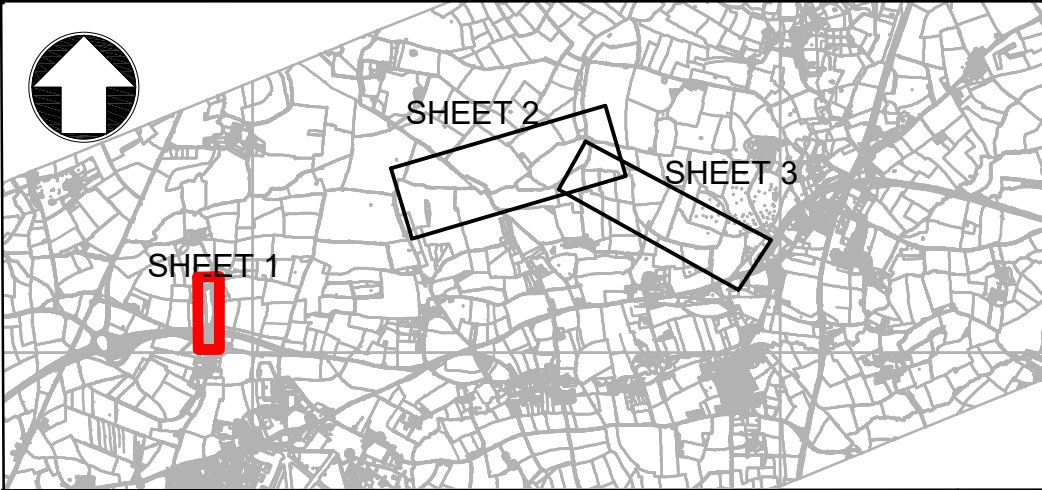


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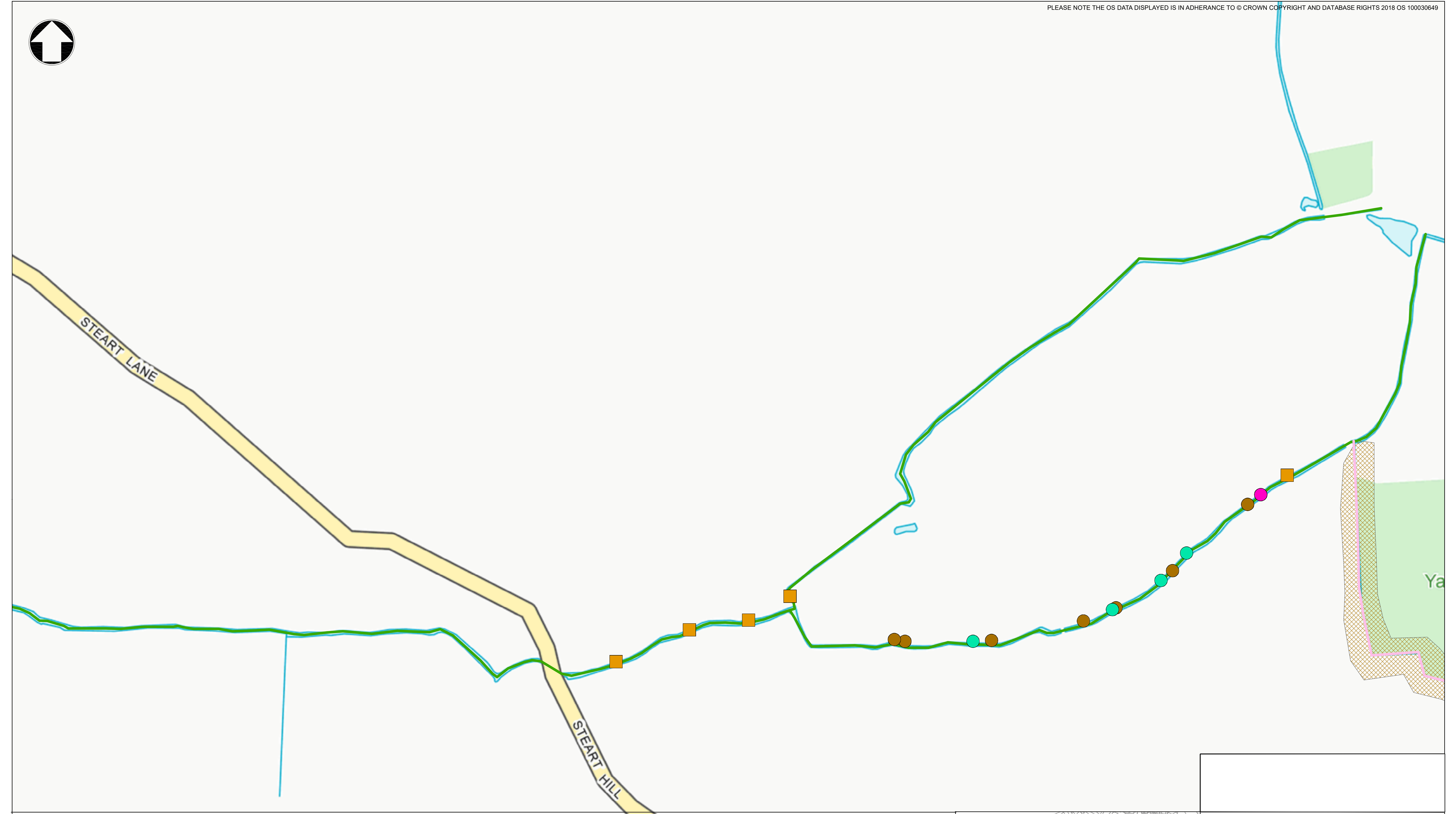
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- SURVEY AREAS**

 - AREA B
 - AREA F
 - AREA G
 - AREA H



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APRIL 2017 SURVEY

UNKNOWN BURROW

BURROW

FEEDING STATION

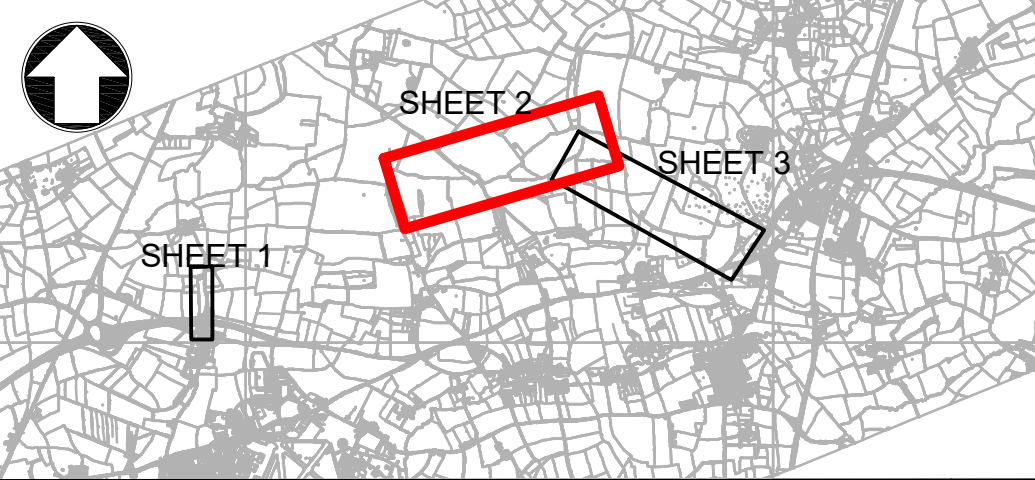
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SURVEY AREAS

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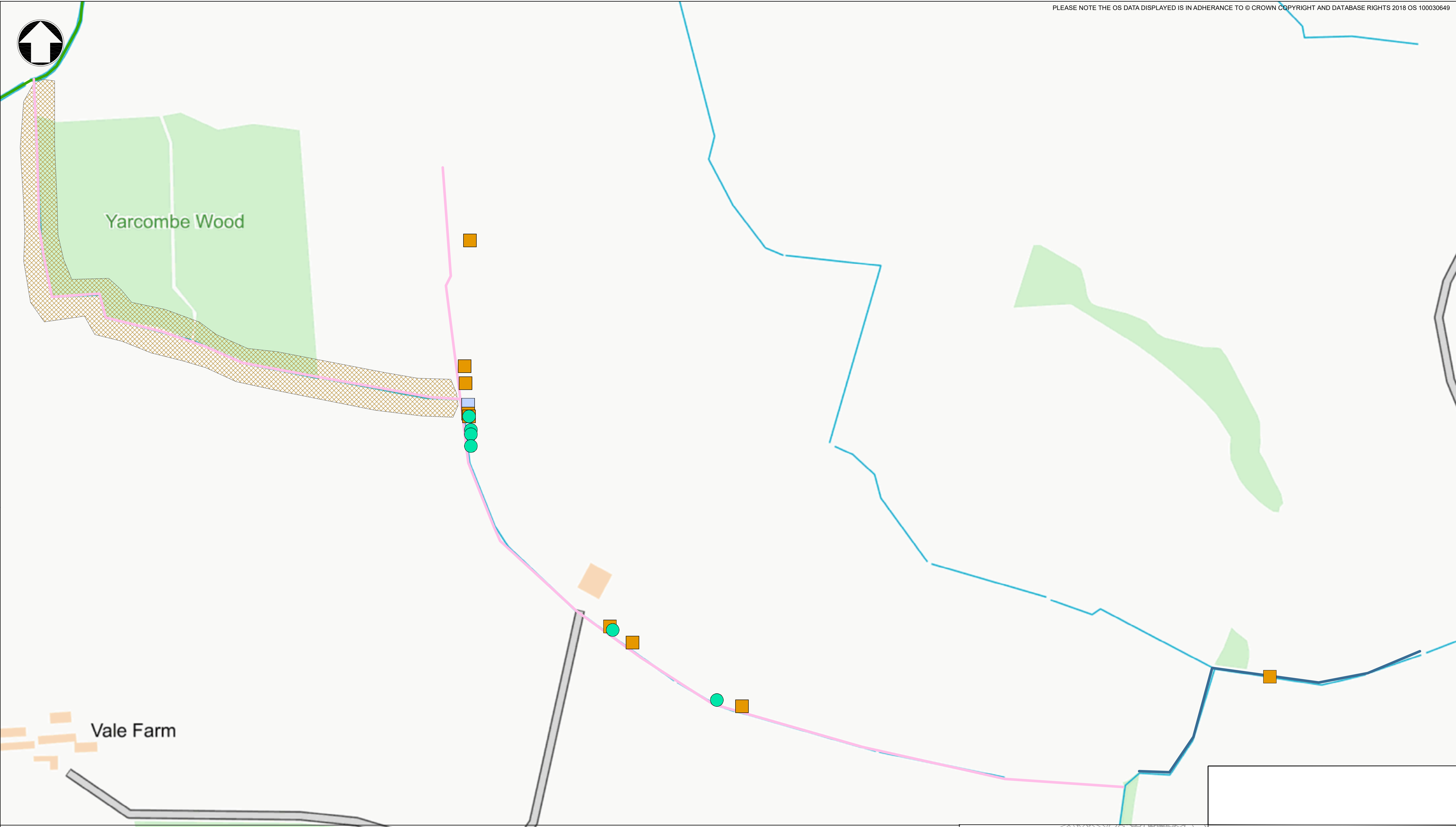
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APRIL 2017 SURVEY

UNKNOWN BURROW

UNKNOWN FEEDING STATION

LATRINE

SURVEY AREAS

AREA A

AREA C

AREA D

NO ACCESS

SHEET 1

SHEET 2

SHEET 3

Project Title

A303 SPARKFORD TO ILCHESTER DUALLING

Drawing Title

WATER VOLE SIGNS APRIL 2017

SHEET 3 OF 3

Drawing Status

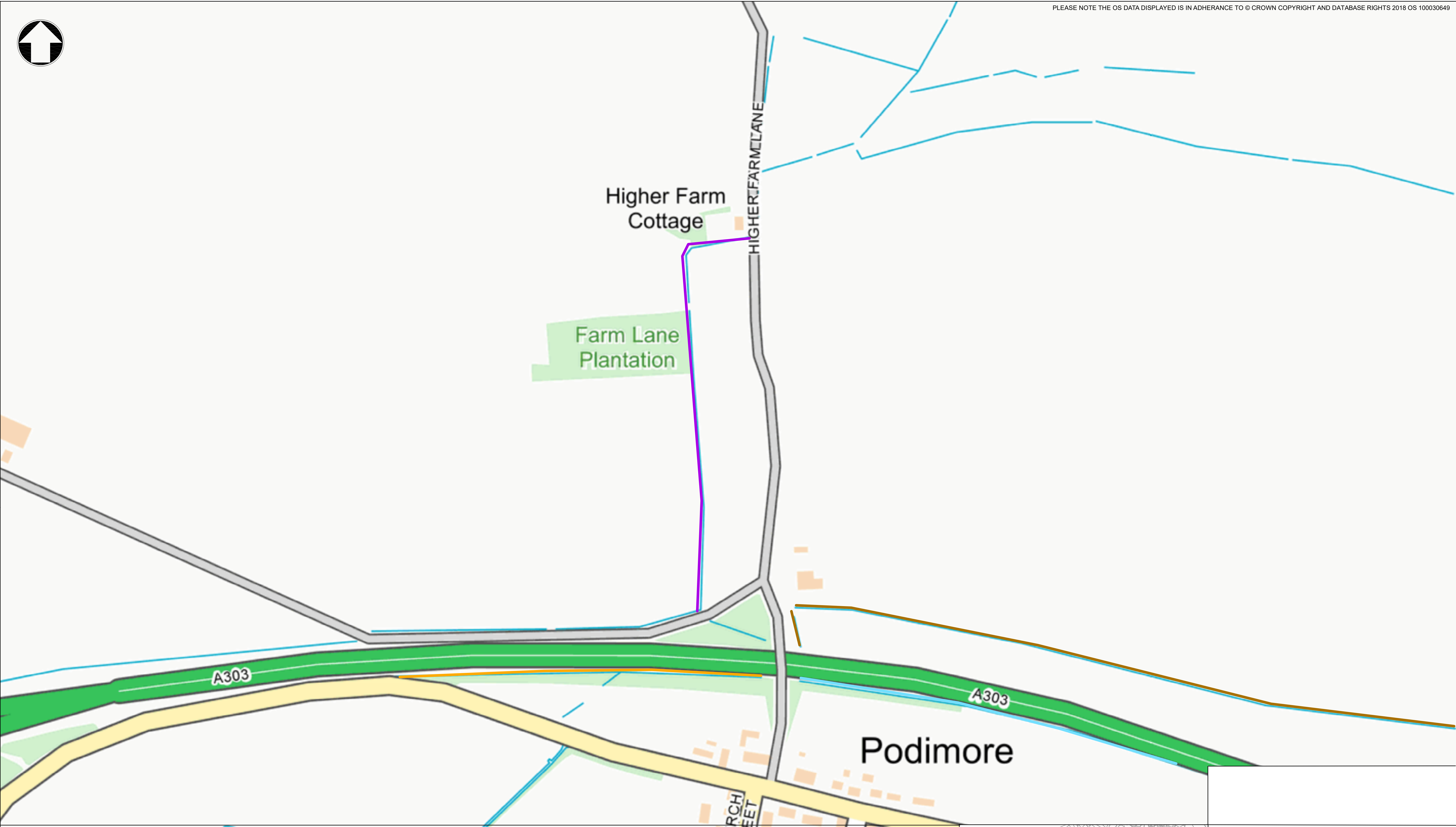
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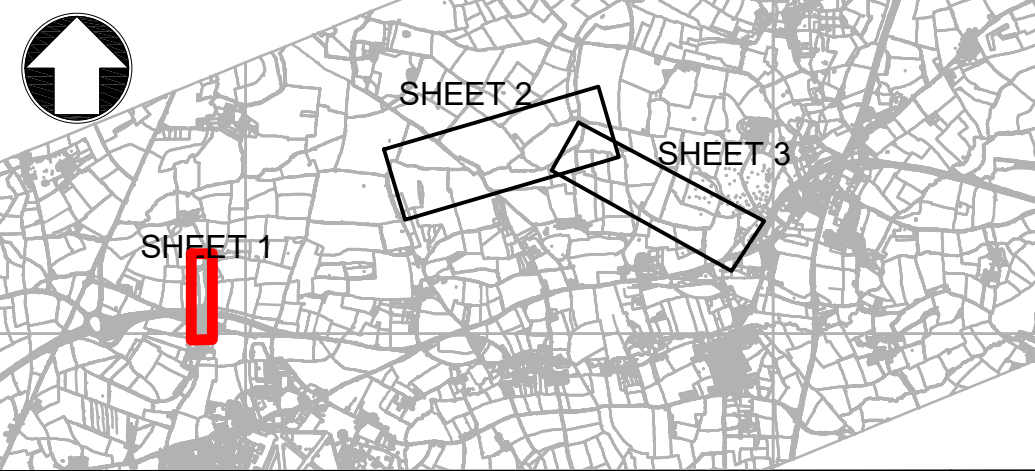
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Appendix H: Water vole results September 2017



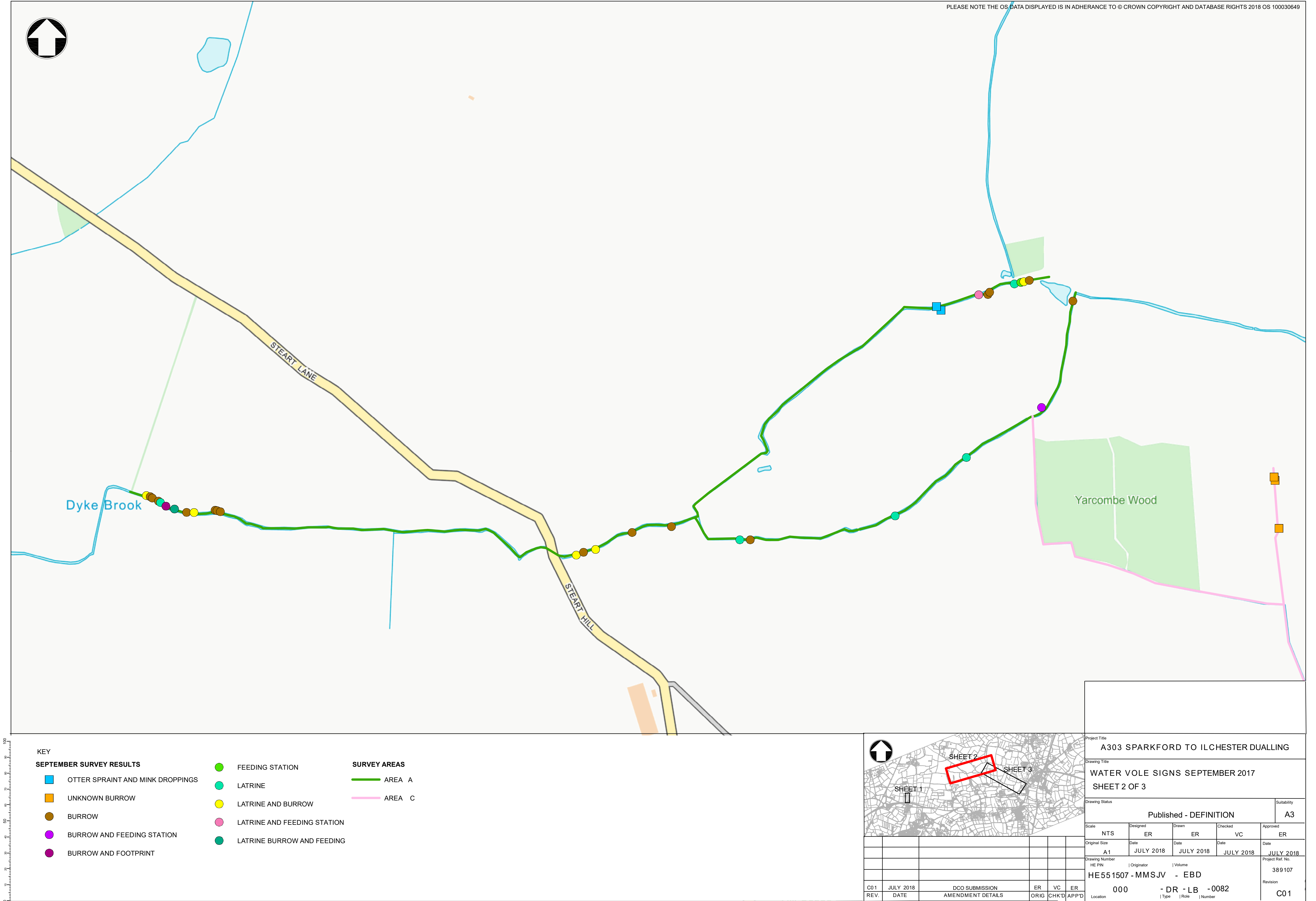
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- KEY
- SURVEY AREAS**
- AREA B
 - AREA F
 - AREA G
 - AREA H



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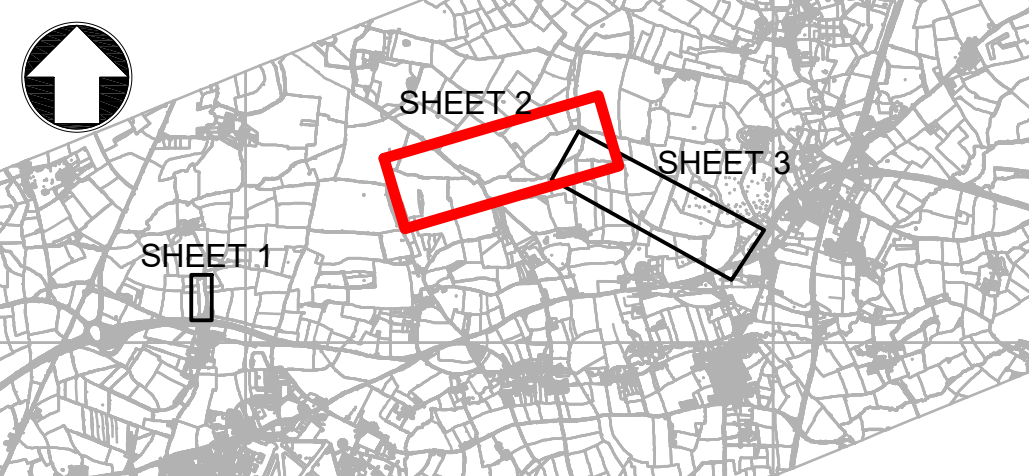
SEPTEMBER SURVEY RESULTS

- OTTER SPRINT AND MINK DROPPINGS
- UNKNOWN BURROW
- BURROW
- BURROW AND FEEDING STATION
- BURROW AND FOOTPRINT

- FEEDING STATION
- LATRINE
- LATRINE AND BURROW
- LATRINE AND FEEDING STATION
- LATRINE BURROW AND FEEDING

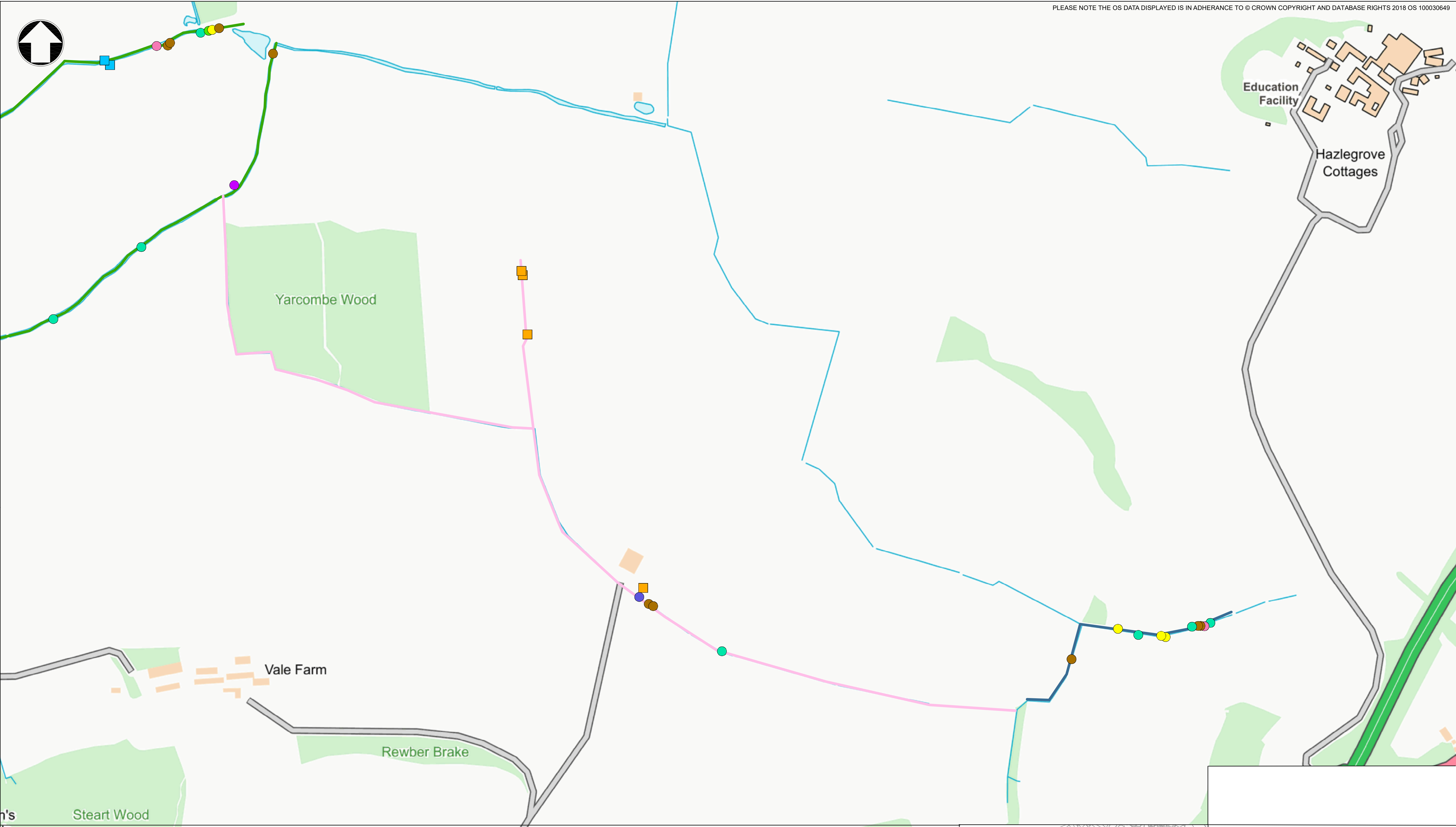
SURVEY AREAS

- AREA A
- AREA C



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Drawing Status Published - DEFINITION					Suitability A3
Scale NTS	Designed ER	Drawn ER	Checked VC	Approved ER	
Original Size A1	Date JULY 2018	Date JULY 2018	Date JULY 2018	Date JULY 2018	
Drawing Number HE PIN		Originator HE551507 - MMSJV		Volume - EBD	
000		- DR - LB - 0082		Project Ref. No. 389107	
Location		Type - DR - LB - 0082		Role - EBD	
Revision C01		Number			



KEY

SEPTEMBER SURVEY RESULTS

- OTTER SPRRAINT AND MINK DROPPINGS
- UNKNOWN BURROW
- BURROW
- BURROW AND FEEDING STATION

SURVEY AREAS

- AREA A
- AREA C
- AREA D

FEEDING STATION

- LATRINE
- LATRINE AND BURROW
- LATRINE AND FEEDING STATION
- POTENTIAL BURROW

Project Title
A303 SPARKFORD TO ILCHESTER DUALLING

Drawing Title
WATER VOLE SIGNS SEPTEMBER 2017
SHEET 3 OF 3

Drawing Status
Published - DEFINITION

Suitability
A3

Scale	NTS	Designed	ER	Drawn	ER	Checked	VC	Approved	ER
Original Size	A1	Date	JULY 2018	Date	JULY 2018	Date	JULY 2018	Date	JULY 2018
Drawing Number	HE551507 - MMSJV - EBD							Project Ref. No.	389107
REV.	DATE	AMENDMENT DETAILS		ORIG	CHK'D	APPD	Location	000	- DR - LB - 0083
									C01

Sheet Navigation

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