A358 Taunton to Southfields Dualling Scheme

Ecological Baseline Report - Otter

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Executive Summary

The A358 Taunton to Southfields Dualling scheme would provide a dual carriageway along the length of the A358 between Taunton and Ilminster in Somerset, connecting the M5 motorway to the A303 at Ilminster to the south.

Otter (*Lutra lutra*) surveys were part of the suite of habitat and protected species surveys commissioned in relation to the scheme. This report presents the results of the otter surveys undertaken throughout 2021 and aims to inform the ecology baseline for the scheme.

The objectives of this report are to present the methodologies used, identify survey limitations, and present the results of the otter habitat assessment and field signs surveys, which should be used to inform appropriate mitigation and enhancement.

Biological records provided by Somerset Environmental Records Centre (SERC) confirmed the likely presence of otter within close proximity to the scheme and within the wider landscape.

Twenty-three watercourses within the study area were identified as being suitable for otter during the habitat suitability assessment. These watercourses were subject to presence/likely absence field surveys in June and September 2021.

Evidence of otter was found along fifteen watercourses within the study area. Evidence included fresh and old spraints, footprints, slides, potential holts and couches, and confirmed holts and couches. Meare Stream (watercourse ID 30) contained the highest quantity of otter field signs. Overall, otter evidence was found along the entirety of the scheme, with evidence of otter crossing underneath the existing A358 via large bridges and underpasses.

The location, quantity and type of field signs indicate there is a widespread population of otters in close proximity to the A358. Positive field signs were associated with man-made features such as bridges, weirs, culverts, field drainage pipes and underpasses, the majority of which were within the red line boundary of the scheme. Additional field signs were also associated with natural features such as boulders within the watercourses and amongst bankside woodland habitats within the red line boundary.

It is not possible to conclude likely absence of otter on watercourses where evidence was absent during two surveys. Given the overall spread of positive field signs along the scheme, it is entirely possible that otters may frequent other watercourses (including those of low suitability) on an infrequent basis and their potential future presence should not, therefore, be ruled out.

1 Introduction

1.1 Purpose and scope of this document

1.1.1 The A358 Taunton to Southfields Dualling scheme (hereafter referred to as 'the scheme') would provide a dual carriageway along the length of the A358 between Taunton and Ilminster in Somerset, connecting the M5 motorway to the A303 at Ilminster to the south. Otter (*Lutra lutra*) surveys were part of the suite of habitat and protected species surveys commissioned in relation to the scheme.

1.1.2 This report presents the results of the otter surveys and aims to inform the ecology baseline for the scheme.

1.1.3 The objectives of this report are to:

- collate and review existing local records for otter
- present the methods, constraints and results of otter habitat assessment and field signs surveys

1.2 Scheme overview

1.2.1 The scheme is part of a programme of improvements planned along the A303/A358 corridor aimed at improving connectivity between London, the south-east and the south-west. The A303, alongside the A30, forms part of the strategic road network (SRN) and together with the A358, provides the link between London, the south-east and the south-west.

1.2.2 The programme of improvements, as set out in the Government's Road Investment Strategy [1] made a commitment to, "…upgrade all remaining sections of the A303 between the M3 and the A358 to dual carriageway standard, together with creating a dual carriageway link from M5 at Taunton to the A303".

1.2.3 The scheme directly addresses this long-term commitment and would provide a new high quality dual carriageway link from the M5 at Taunton to the A303 at Southfields roundabout. The new dual carriageway would comprise new and upgraded stretches of the existing A358 road. Full details of the scheme will be provided in Chapter 2 *The Project* of the Environmental Statement (ES). Please refer to Figure 1-1 for a Scheme plan.

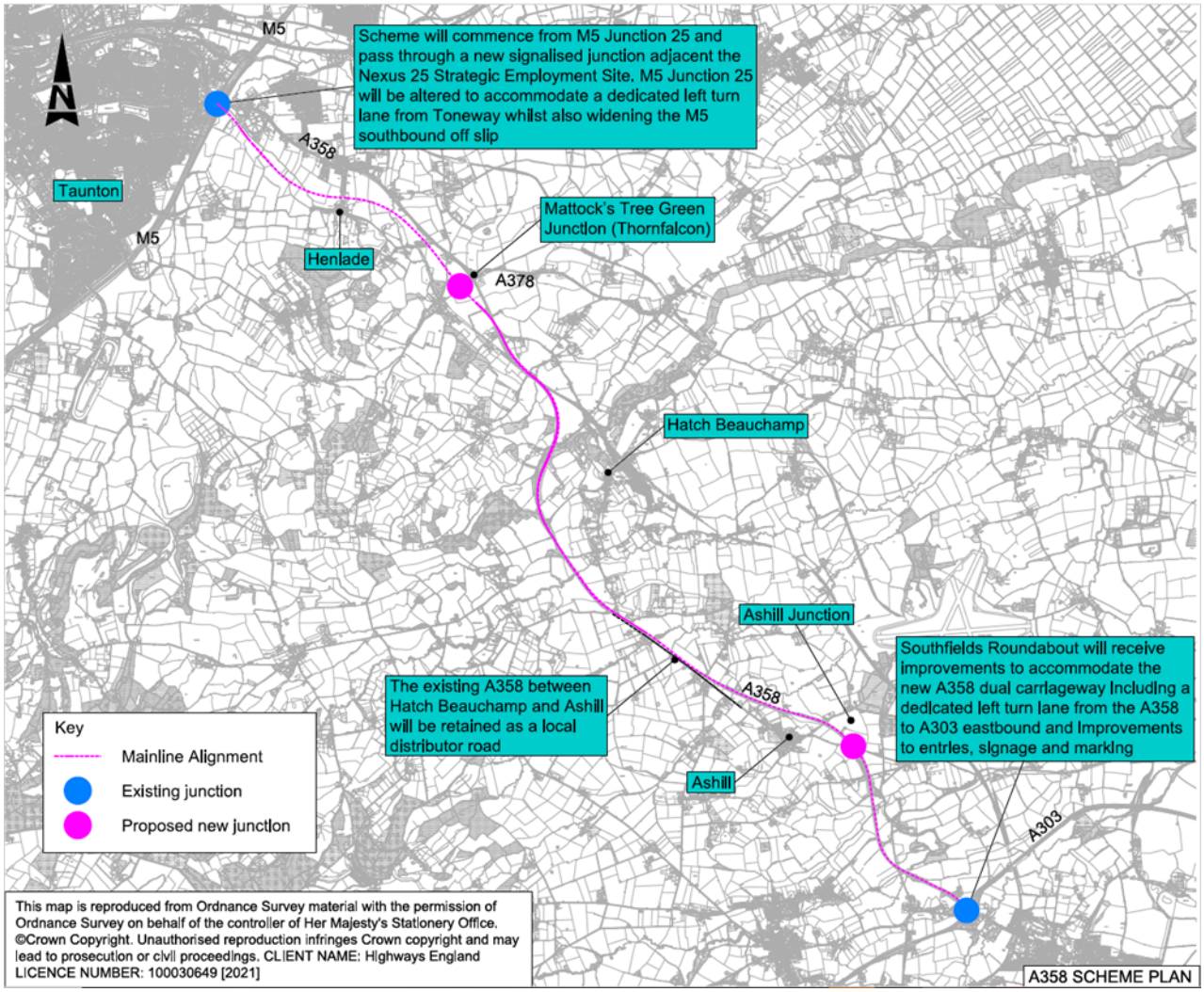

Figure 1-1 Scheme plan

1.3 Study area and zone of influence

1.3.1 The Chartered Institute for Ecology and Environmental Management (CIEEM) *Guidelines for Ecological Impact Assessment* [2] recommend that all potentially important ecological features that occur within the Zone of Influence (ZoI) for a scheme are investigated. The ZoI includes:

- areas to be directly within the land take for the scheme
- areas that would be temporarily affected during construction
- areas likely to be impacted by hydrological disruption
- areas where otters rely on habitat connectivity to or across the scheme
- areas where there is a risk of pollution and noise disturbance during construction and/or operation

1.3.2 The ZoI depends on the ecological features concerned. The ZoI was agreed in consultation with Natural England and has been defined as watercourses within the boundary of the scheme and extending 250 metres upstream and downstream of the defined ecology survey zone, which comprises the footprint of the scheme and associated site clearance area. For certain watercourses likely to be subject to greater impacts, such as culverting or realignment, the survey area was extended up to 500 metres. This ZoI is hereafter referred to as the study area.

1.4 Legislation

1.4.1 A framework of international, European, national and local legislation and planning policy guidance exists to protect and conserve wildlife and habitats. This legislation will be listed in full within Chapter 8 *Biodiversity* of the ES. Legislation relevant to and discussed within this report are:

- The Conservation of Habitats and Species Regulations 2017 (the 'Habitats Regulations')
- Wildlife and Countryside Act 1981
- Natural Environment and Rural Communities (NERC) Act 2006

1.5 Status of otter at national level

1.5.1 Intensive otter hunting in the eighteenth and nineteenth centuries for sport and fishery protection supressed the national otter population before a further crash because of river pollution from organochlorine insecticides in the mid nineteenth century [3]. By the 1970's, otters were found only in Scotland, parts of Wales, the West Country and remnant populations in England.

1.5.2 Following a ban on organochlorine insecticide in 1984, along with legal protection and significant improvements in river water quality, otter populations have recovered well and are now widely distributed throughout most of Great Britain. Otters were recorded at 58.8% of surveyed sites in 2009-10; compared with 5.8% in 1977-79, undertaken as part of the *Fifth otter survey of England 2009-2010: technical report* [4].

1.5.3 Otter is listed as a Species of Principal Importance (SPI) for the conservation of biodiversity in England in accordance with the provisions of Section 41 (S41) of the NERC Act 2006. Action plans associated with the species include monitoring, reduction of mortality (fisheries, toxicity, roads), protecting foraging resources and habitat protection including the protection of resting sites.

1.5.4 Otter is also listed under the now succeeded UK Biodiversity Action Plan (UK BAP) but continues to be regarded as a conservation priority in the subsequent *UK Post-2010 Biodiversity Framework* [5].

1.6 Status of otter at county level

1.6.1 The *Fifth otter survey of England* [4] recorded otters at 76.74% of all sites surveyed within the Somerset South and West region ("Wessex Region"). Surveys covered a total of 113 locations across ten catchment areas within the "ST" 100km grid square covering the region. Catchments and watercourses surveyed during the study included the rivers Bristol & Avon, River Tone, River Parrett, Brue and Axe, North Somerset Streams, West Somerset Streams, Hampshire & Avon, Frome, Piddle, Pool and Purbeck, Dorset Stour, and in watercourses across West Dorset.

1.6.2 Results confirmed presence of otter within all surveyed catchments. The data also indicated that the Wessex Region had the highest percentage increase in otter presence compared to any other study area or catchment. The increase was attributed to recolonisation; however, the population is still below carrying capacity.

1.6.3 The South Somerset Local BAP has been withdrawn; however, a more recent biodiversity strategy has been produced by the Somerset Biodiversity

Partnership. *The Somerset Biodiversity Strategy 2008 – 2018* [6] contains objectives to protect, enhance and create a range of habitats, including priority habitats, that can be exploited by SPI such as otter. The Taunton Deane *Local Biodiversity Action Plan* [7] lists otter as having a county-wide action plan and identifies otter as a LBAP species associated with broadleaved woodland.

1.7 Species-specific ecology

1.7.1 Otters have been recorded as using almost all types of watercourses. Otters will utilise both flowing and still water bodies such as rivers, ditches, lakes, ponds and reservoirs and coastal habitats. Otters use aquatic features for foraging and commuting; healthy aquatic habitats are vital to ensure there is sufficient food to support the otter.

1.7.2 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, non-natal holts, couches, and hovers. Otters will utilise a wide range of features for resting sites, including holes in the ground, below tree roots, gaps between rocks, culverts, reeds, tall ruderal vegetation, and scrub. The use of such habitats is very variable [8].

1.7.3 Some correlations have identified a preference for otters utilising less disturbed locations, where dense vegetation and woodland provides cover.

1.7.4 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.

2 Methodology

2.1 Desk study

2.1.1 A detailed desk study was undertaken which identified records of otter within 2 kilometres of the scheme. Records were obtained from Somerset Environmental Records Centre (SERC).

2.2 Field study

Habitat suitability assessment

2.2.1 A targeted approach to assessing habitat suitability was agreed with Natural England prior to the 2021 surveys commencing. Each accessible watercourse within the study area (within the scheme boundary and 250 metres upstream and downstream of the construction boundary) was surveyed to assess the suitability of the habitat for supporting otter. In addition, the habitat suitability assessment area was extended up to 500 metres upstream and downstream for suitable watercourses subject to higher impacts, such as culverting or realignment.

2.2.2 At each watercourse a survey was undertaken during the early season (mid-April to June) and during the late season (July to September). Habitat assessments were undertaken on both occasions to account for seasonal variations within the watercourse. During the detailed habitat assessment each watercourse was assigned a ranking of either negligible, low, moderate or high suitability for otter.

2.2.3 Watercourses were considered to be suitable if they provided a food supply, contained a sufficient quantity of potential den sites, were subject to low levels of disturbance and were free from pollutants [9]. The habitat suitability assessment involved assessing the following features of each watercourse:

- Bank profile, depth, composition, and management
- Channel width
- Flow speeds
- Channel shading
- Presence of foraging and resting opportunities
- Adjacent land-use and disturbance
- Connectivity.

Otter field signs survey

2.2.4 Watercourses which were deemed suitable for supporting otter, as defined by the habitat suitability assessment, were then surveyed for field signs of otter. The otter field sign survey involved an assessment of the channel, bank and bordering terrestrial habitat, looking for signs of otters, such as:

- Confirmed or potential natal and non-natal holt sites
- Confirmed or potential couches
- Spraints
- Anal jelly
- Tracks/footprints
- Feeding remains
- Silt/sand heaps and slides.

2.2.5 All accessible lengths of each watercourse were searched for signs of otter. This included bankside and channel assessments by surveyors. Restricted access along watercourses was limited to dense vegetation or prohibited access (landowner refusal).

2.2.6 A targeted approach to surveying for otter field signs was agreed with Natural England prior to the 2021 surveys commencing. Watercourses were surveyed for field signs within the scheme boundary and 100 metres upstream and downstream of the construction boundary. Where higher quality habitat was identified beyond 100 metres the field signs survey was extended to 250 metres (or 500 metres for watercourses likely to be subject to greater impacts).

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

2.2.8 All surveys were undertaken by experienced ecologists meeting the CIEEM *competencies for otter surveys* [10] and were familiar with the *Common Standard Monitoring Guidance for Mammals* [5], the *Design Manual for Roads and Bridges (DMRB) LA 108 Biodiversity* [11] and supplementary conservation advice on otters (now withdrawn). Surveyors included Sophie Amphlett, Marie Fleming, Jacob Haddon, Steven Mills, Stephanie Bevan, John Daw, Nick Mason, Felix Tuff, Chloe Stephenson, Jack Anderson, Amelia Houghton, Kallum Buxton, Jack Wykes and Anna Burnham.

2.2.9 The surveys were undertaken under optimal conditions at suitable times of the year with no periods of heavy rain in the week preceding the surveys (which may have washed away field signs).

2.2.10 Survey dates and weather conditions for each of the 23 watercourses surveyed for otter field signs are provided in Table 2-1.

Table 2-1 Otter field sign survey dates and weather conditions

Watercourse (ID number) *	Date	Air temperature (°C)	Rain (0-5)	Cloud cover (0-8)	Wind (Beaufort scale)	Significant rain (preceding survey)
Blackbrook Business Park (62)	16/06/2021	22	0	3	2	No
	13/09/2021	16	0	1	2	No
Broughton Brook (15a)	15/06/2021	19	0	0	1	No
	13/09/2021	16	0	1	2	No
Black Brook Tributary 1 (17)	16/06/2021	22	0	3	2	No
	15/09/2021	18	0	0	2	No
Black Brook (19)	16/06/2021	22	0	3	2	No
	15/09/2021	18	0	0	2	No
Black Brook Tributary 3 (19.1)	16/06/2021	22	0	3	2	No
	23/09/2021	17	0	4	2	No
Black Brook Tributary 2 (20)	16/06/2021	22	0	3	2	No
	23/09/2021	18	0	0	2	No
Black Brook Tributary 6 (20.1)	16/06/2021	22	0	3	2	No
	23/09/2021	17	0	4	2	No
Thornwater	16/06/2021	22	0	3	2	No

Watercourse (ID number) *	Date	Air temperature (°C)	Rain (0-5)	Cloud cover (0-8)	Wind (Beaufort scale)	Significant rain (preceding survey)
Stream (24)	14/09/2021	14	0	2	2	No
Meare Stream (30)	17/06/2021	18	0	0	2	No
	15/09/2021	18	0	0	2	No
Meare Stream Tributary 1 (31)	18/06/2021	20	0	0	2	No
	10/09/2021	17	0	8	2	No
Unnamed field drainage ditch (32)	15/09/2021	18	0	0	2	No
Fivehead River Tributary 1 (33)	17/06/2021	18	0	0	2	No
	15/09/2021	18	0	0	2	No
Fivehead River main channel 1 (34)	17/06/2021	17	0	8	3	No
	17/09/2021	16	0	0	3	No
Fivehead River main channel 2 (36)	21/06/2021	18	0	1	2	No
	14/09/2021	14	0	2	2	No
Fivehead River Tributary 5 (37)	22/06/2021	17	0	2	1	No
	14/09/2021	14	0	2	2	No
Venner's Water (39)	23/06/2021	17	0	2	1	No
	13/09/2021	16	0	1	2	No
River Isle drainage network (42)	18/06/2021	20	0	0	2	No
	13/09/2021	16	0	1	2	No
Cad Brook drainage network (51)	24/06/2021	18	0	4	3	No
	13/09/2021	16	0	1	2	No
Cad Brook (52)	24/06/2021	18	0	4	3	No
	13/09/2021	16	0	1	2	No
River Ding (54)	09/06/2021	18	0	3	3	No
	08/09/2021	18	0	0	3	No
River Ding Tributary 1 (54.1)	15/06/2021	20	0	2	1	No
	08/09/2021	18	0	0	3	No
River Ding drainage network (54a)	15/06//2021	18	0	0	3	No
	08/09/2021	18	0	0	3	No
Back Stream (55)	09/06/2021	18	0	3	3	No
	08/09/2021	18	0	0	3	No

* Each watercourse was given an ID number, which is referenced on associated mapping

2.3 Assumptions and limitations

2.3.1 The surveys provide a snapshot of activity at the site and therefore, there is always the risk of otter being overlooked, either owing to the timing of the survey or the scarcity of otter at the site.

2.3.2 Conditions on site meant that some areas were difficult to access, owing to the density of bankside vegetation, hedgerows, and dense scrub. An assessment of these areas was made as far as was safe and practicable, but it is possible that signs of otter were missed and therefore such features would not have been addressed within this report.

2.3.3 Access to the following watercourses was restricted:

- Black Brook Tributary 1 (17) – east bank restricted access (access refusal).
- Black Brook Tributary 6 (20.1) – south bank restricted access with limited views from the north bank due to dense vegetation (access refusal).
- Meare Stream Tributary 1 (31) – middle section with restricted access in June 2021 (access refusal). Fully accessible during September 2021 surveys.
- Fivehead River Tributary 5 (37) – southern section with restricted access in June 2021 (access refusal). Fully accessible during September 2021 surveys.
- Unnamed field drainage ditch (32) – restricted access in June 2021 (access refusal). Fully accessible during September 2021 surveys.

2.3.4 A precautionary approach was used for all watercourses with restricted access, whereby otters were assumed to be present unless the habitat was found to be of negligible suitability. All watercourses with restricted access were tributaries converging into other suitable watercourses and were likely to exhibit similar characteristics.

3 Results

3.1 Desk study

3.1.1 Information received from SERC identified 307 records of otter within the study area within the last 10 years. Additional records pre-2011 were provided; however, these were not reviewed any further.

3.1.2 Most records pertained to spraints; however, observations of live otters in-situ and road traffic collision (RTC) (deceased individuals) records were also provided. A total of six RTC records were received, four of which were located on the A358 along the scheme. RTC locations include Horton Cross, Thickthorn Lane (two records), and at the Fivehead River crossing.

3.1.3 Clusters of records were located along the larger watercourses to the north-west of the scheme on the outskirts of Taunton, and to the south-west of the scheme between Broadway and Horton. A significant number of records were located along the River Tone and Black Brook at Taunton, and along the Bridgewater and Taunton Canal to the north. A second cluster of records were located to the south of the scheme along the River Ding at Horton and along the River Isle north of Ilminster. Records of otter were also scattered along smaller watercourses along the A345 between Taunton and Ilminster.

3.1.4 The desk study confirmed otter were present near the scheme and utilise watercourses running adjacent to or passing directly underneath the A358. A map of records has been provided at Appendix A *Historical records from SERC*.

3.2 Habitat Assessment

3.2.1 Twenty-three watercourses located within the study area were assessed for their suitability to support otter. The results of the habitat assessment, including a description of the sections of each of the watercourses located within the study area, are provided below and summarised in Table 3.1.

Blackbrook Business Park (62)

3.2.2 A short section of wet ditch is located within the Blackbrook Business Park to the west of the scheme.

3.2.3 The wet ditch is shallow at 0.5 metres in depth and narrow with a channel width of 1 to 2 metres. The bank profile was steep (>45 degrees) and there was a sluggish flow rate. The ditch was heavily shaded (99%) by overhanging plantation woodland and scrub (along the M5 northbound carriageway). There was a lack of submerged vegetation however pendulous sedge was present as marginal vegetation along the earth banks.

3.2.4 Roadside hedgerows provided limited connectivity to several drainage ponds within the wider business park. It is unknown whether this ditch is connected to Broughton Brook to the east via culverts underneath the existing A358. The ditch was buffered from the business park and public access by dense vegetation, resulting in low levels of disturbance.

3.2.5 Fish populations were considered to be absent within the ditch, with an overall lack of feeding opportunities for otter. Resting opportunities for otter were limited to dense scrub along the banks, in addition to the overhanging roots of trees. Overall, the ditch was of low suitability for otter.

Broughton Brook (15a)

3.2.6 Broughton Brook is located at the northern extent of the scheme and runs alongside the southbound carriageway of the M5. The watercourse passes underneath the existing A358 at Blackbrook Bridge, located at the southbound M5 exit junction.

3.2.7 Broughton Brook is a small watercourse which ranges in depth from 0.5 to >1 metre and had a channel width ranging from 2 to 5 metre. The profile of the watercourse was steep (>45 degrees) with a moderate flow speed. The channel varied from open to heavily shaded by overhanging vegetation (~90% shade). There was a lack of submerged and marginal vegetation throughout the stretch of watercourse surveyed as part of this assessment. Pockets of bankside scrub provided limited connectivity between Broughton Brook and other nearby watercourses such as Black Brook to the east.

3.2.8 The banks of the watercourse had been modified and were largely man-made, with long sections of earth cliffs subject to a mixture of management methods. The adjacent land use comprised arable farmland, urban, and semi-natural woodland habitats with low levels of disturbance.

3.2.9 Fish populations were considered to be transient within the watercourse, providing limited foraging opportunities for otter. However, smaller species such as stickleback (*Gasterosteidae* spp*,)* were observed to be present, and the watercourse was considered suitable for signal crayfish (*Pacifastacus leniusculus)*. Remains of signal crayfish were identified within an otter spraint towards the south of the scheme on the River Ding, indicating their presence within the wider landscape. Resting opportunities for otter were limited to dense scrub and ruderal vegetation along the banks, in addition to the overhanging roots of mature trees. Overall, the watercourse was moderately suitable for otter.

Black Brook Tributary 1 (17)

3.2.10 Black Brook Tributary 1 originates near Stoke Mary to the south of the scheme and joins Black Brook (19) to the south of the Taunton Park and Ride.

3.2.11 Tributary 1 is a small watercourse with a shallow depth <30 centimetres and a narrow channel ranging from 1m to 2m in width. The banks had a shallow profile (<45 degrees), with some short sections displaying a steeper profile towards the south. The channel displayed a sluggish flow rate and varied from open to heavily shaded by overhanging vegetation and field boundary hedgerows (90% shade). Submerged and marginal vegetation was sparse and consisted of pendulous sedge (*Carex pendula)* and fool's watercress (*Apium nodiflorum)*. The adjacent land use comprised arable farmland and semi-natural woodland habitats with low levels of disturbance.

3.2.12 Fish populations were likely absent from within the watercourse, which was shallow and subject to varying depth (some too shallow to sustain fish populations or permit fry dispersal). The sluggish flow rate and pooling observed along the watercourse was however likely to support amphibians and signal crayfish, providing foraging opportunities for otter. Resting opportunities for otter were limited to dense scrub and woodland along the banks, in addition to the overhanging roots of mature trees. Overall, the watercourse was of moderate suitability for otter.

Black Brook (19)

3.2.13 Black Brook is located at the northern extent of the scheme. The watercourse is fed by several smaller tributaries which originate to the south and south-west (tributaries 1, 2, 3, 5 and 6). Black Brook runs in a north-westerly direction towards the A358/M5 Junction, where it passes under Blackbrook Bridge and finally terminates in the River Tone to the north, at Ruishton.

3.2.14 Black Brook is a small watercourse which varies in composition and profile. Depth ranged from 0.2 to 1 metre, with a channel width ranging from 1 to 5 metres. The deepest and widest sections were associated with hard engineering (new culverts and road bridges) at the A358/M5 Junction, and Nexus 25 development site.

3.2.15 The profile of Black Brook ranged from sheer banks made from gabion baskets to shallow earth and silt slopes leading to the channel bed. Flow rate was slow along the entirety of the watercourse. The majority of the watercourse was heavily shaded by overhanging vegetation (90% shade), with the exception of the recent earthworks in association with the Nexus 25 development (open with 0% shading). A small section of the watercourse to the north of the existing A358 exhibited dense submerged and marginal vegetation (limited to fool's watercress and pendulous sedge). Pockets of scrub also provided limited terrestrial connectivity between Black Brook and Broughton Brook to the west.

3.2.16 The banks of Black Brook were modified (culverted, gabion baskets and bank cutting) around the A358 and Nexus 25 development. The stretch of Black Brook to the north of the existing A358 displayed signs of occasional dredging and bank cutting. The adjacent land use comprised arable farmland, urban, and semi-natural woodland habitats with low to moderate levels of disturbance.

3.2.17 Fish populations were considered to be transient within the watercourse, and signal crayfish were known to be present locally, providing limited foraging opportunities for otter. Resting opportunities for otter were limited to dense scrub, pockets of semi-natural woodland and ruderal vegetation along the banks, in addition to the overhanging roots of mature trees. Overall, the watercourse was moderately suitable for otter.

Black Brook Tributary 3 (19.1)

3.2.18 Black Brook Tributary 3 originates in Henlade and runs westward to join the main Black Brook watercourse to the south of the Taunton Park and Ride.

3.2.19 Tributary 3 is a small watercourse with a shallow depth ranging from dry to 0.5 metres and had a narrow channel ranging from 2 to 5 metres in width. The adjacent land use comprised arable farmland with a single public right of way footpath, with low levels of disturbance.

3.2.20 The profile of the watercourse was steep (>45 degrees), with a sluggish flow speed. The channel was shaded by overhanging vegetation and field boundary hedgerows (90% shade). There was a lack of vegetation throughout the stretch of watercourse surveyed as part of this assessment, in part due to overshading and dense bramble (*Rubus fruiticosus agg*.) along the earth banks. Adjoining hedgerows provided terrestrial connectivity between other nearby tributaries to the south.

3.2.21 Fish populations were likely absent from within the watercourse, which was shallow and dry in places. The sluggish flow rate and pooling was however likely

to support amphibians providing limited foraging opportunities for otter. Resting opportunities for otter were limited to hedgerow bases and the overhanging roots of mature trees along the watercourse. Overall, the watercourse was of moderate suitability for otter.

Black Brook Tributary 2 (20)

3.2.22 Black Brook Tributary 2 forms from the convergence of two smaller tertiary tributaries (Tributaries 5 and 6) and flows into Tributary 1 to the north-west of Henlade.

3.2.23 Tributary 2 is short in length (approximately 300 metres) with a shallow depth <30 centimetres and a narrow channel ranging from 2 to 5 metres in width. The adjacent land use comprised arable farmland and semi-natural woodland habitats with low levels of disturbance.

3.2.24 The profile of the watercourse ranged from steep (>45 degrees) to undercut, with a sluggish flow speed. In addition, areas of dry channel bed or small pools of standing water were present. The channel was heavily shaded by overhanging vegetation (90% shade) and there was a lack of submerged or marginal vegetation throughout. Adjoining hedgerows provided terrestrial connectivity between other nearby tributaries to the south and west.

3.2.25 Fish populations were likely absent within the tributary, which was shallow and subject to varying depths (some too shallow to sustain fish populations or permit fry dispersal). The sluggish flow rate and pooling was, however, likely to support amphibians and signal crayfish providing limited foraging opportunities for otter. Resting opportunities for otter were limited to hedgerow bases and the overhanging roots of mature trees along the watercourse. Overall, the watercourse was of moderate suitability for otter.

Black Brook Tributary 6 (20.1)

3.2.26 Black Brook Tributary 6 was largely inaccessible due to restricted land access on one side of the bank, coupled with a dense hedgerow limiting any views from adjacent accessible land parcels. Given the nature of the surrounding habitats and land-use, Tributary 6 was considered to be similar in composition, profile and suitability to Tributary 3 above.

Thornwater Stream (24)

3.2.27 Thornwater Stream is located towards the north of the scheme. The watercourse passes underneath the A358 adjacent to Thorn Lane.

3.2.28 Thornwater Stream is a shallow watercourse <0.5 metres in depth, with a channel width ranging from 1 to 2 metres. The profile of the watercourse ranges from shallow through to steep (>45 degrees) and undercut in places, with an increasing flow rate from slow to moderate along its course. The channel varied from open, to heavily shaded by overhanging vegetation (0% to 100% shade). Submerged vegetation was associated with open and less shaded stretches of the watercourse. Submerged species include fools' watercress, reed sweet grass (*Glyceria maxima)* and pendulous sedge. Tall ruderal vegetation and bramble scrub lined the banks and field boundary hedgerows provided connectivity to adjacent terrestrial habitats.

3.2.29 The southern and northern extent of the watercourse were unfenced and bound by urban habitats (residential and farm buildings) meaning they were subject to high levels of anthropogenic disturbance. The northern section was also partly canalised (stone blockwork). These areas were subject to regular maintenance, primarily via frequent mowing. The central stretch of watercourse flowed through a mixture of arable and pastoral farmland, with low levels of disturbance, however there was occasional evidence of bankside poaching and channel compaction from cattle.

3.2.30 Fish populations were considered to be transient within the watercourse, providing limited foraging opportunities for otter. However, smaller species such as stickleback may be present, and the watercourse was considered suitable for signal crayfish. Resting opportunities for otter were limited to dense scrub and ruderal vegetation along the banks, in addition to the overhanging roots of mature trees. Overall, the watercourse was of low suitability for otter.

Meare Stream (30)

3.2.31 Meare Stream is located towards the centre of the scheme and runs from West Hatch perpendicular to the existing A358, towards Wrantage. The watercourse passes underneath the A358 via a large culvert to the south-east of West Hatch Lane.

3.2.32 Meare Stream is a shallow watercourse with a depth of <0.5 metres and a channel width ranging from 1 to 5 metres. The profile of the watercourse also ranged from undercut, to steep (>45 degrees) with a slow to moderate flow speed. The channel was heavily shaded (75% to 90% shade) by overhanging vegetation, primarily the canopies of mature trees and scrub along the banks. There was a lack of submerged vegetation; however, tall ruderal vegetation and scrub were present along the tops of the earth banks providing additional cover and connectivity. Roadside and field boundary hedgerows provided connectivity to adjacent terrestrial habitats. The adjacent land use comprised arable farmland and urban habitats with low levels of disturbance.

3.2.33 Fish populations were considered to be transient within the watercourse, providing limited foraging opportunities for otter. However, smaller species such as stickleback were observed to be present, and the watercourse was considered suitable for signal crayfish. Resting opportunities for otter were provided by dense scrub and ruderal vegetation along the banks, in addition to the overhanging roots of mature trees. Overall, the watercourse ranged from low to high suitability for otter.

Meare Stream Tributary 1 (31)

3.2.34 Meare Stream Tributary 1 is located at the centre of the scheme and runs alongside the northbound carriageway of the existing A358, before passing underneath via a large concrete underpass on Griffin Lane.

3.2.35 Tributary 1 originated as a dry ditch within Bickenhall Wood to the west of the A358 and progressed to a small slow flowing watercourse alongside Lady Anna's Wood before passing underneath the existing A358. The watercourse had an undercut profile with tall banks between 1 to 3 metres in height and a narrow channel width of 1 to 2 metres. The depth varied from dry to 0.5 metres, with riffles (silt and stone) and deeper pools located at small meanders and natural weirs comprised of fallen deadwood and exposed roots. The watercourse was

heavily shaded (80% shade) by the adjacent woodland and bankside scrub. Submerged and marginal vegetation was absent where the watercourse runs through the woodland; however, a canalised stretch of the watercourse along Griffin Lane contained pendulous sedge and fools' watercress.

3.2.36 The banks of the watercourse had been heavily modified at the existing A358 overpass, which comprised a large concrete bridge with steep abutments sloping down to a steep canalised valley holding the realigned section of the watercourse. The adjacent land use comprised arable farmland, urban, and semi-natural woodland habitats with low levels of disturbance.

3.2.37 Fish populations were considered to be absent within the watercourse. However, signal crayfish are known to be present locally, providing limited foraging opportunities for otter. Resting opportunities for otter were present throughout the surrounding woodland, bankside scrub, man-made structures and amongst the overhanging roots of mature trees. Overall, the watercourse was moderately suitable for otter.

Unnamed field drainage ditch (32)

3.2.38 The field drainage ditch is located towards the centre of the scheme and has a source at the eastern edge of Bickenhall Woods. The ditch runs through an arable field, into a belt of plantation woodland and terminates at a drainage pond along the northbound carriageway of the existing A358.

3.2.39 The drainage ditch was dry along its entire length. It had an average depth of <0.5 metres from bank-top to channel bed, and a narrow channel width of <1 metre. The profile of the ditch was steep (>45 degrees). The section of ditch within the arable field was unshaded, however the remaining ditch running through the plantation woodland was heavily shaded by canopy cover (80% shade). There was a lack of submerged vegetation, however, outcrops of sedges were present along the banks within the plantation woodland. Encroaching grassland was present along the banks and within the channel bed; however, this stretch of ditch had recently been mown. The plantation woodland and woodland edge habitat provided limited terrestrial connectivity, however no aquatic connections to nearby watercourses were noted. The adjacent arable land and plantation woodland were located on private land, resulting in low levels of disturbance.

3.2.40 Fish populations were absent within the dry ditch system, however, smaller species such as stickleback and common amphibians may be present within the pond where the ditch terminates. Resting opportunities for otter were restricted to a few mature bankside trees within the plantation woodland. Overall, the ditch was of negligible suitability for otter.

Fivehead River Tributary 1 (33)

3.2.41 Fivehead River Tributary 1 is located towards the centre of the scheme and has a source to the north of Bickenhall where it flows eastwards towards the convergence with the main Fivehead River to the west of the existing A358.

3.2.42 Tributary 1 is a small watercourse with an average depth of <0.5 metres and had a channel width ranging from 1 to 2 metres. The profile of the watercourse was vertical and undercut with a moderate flow speed. The channel was heavily shaded by overhanging vegetation (80% shade) and there was a lack of

submerged and marginal vegetation. The banks were, however, lined by mature bankside trees, mixed scrub and sedges. Hedgerows and scrub provided limited connectivity to adjacent terrestrial habitats. The banks were comprised of earth, stone and gravel and were subject to mixed forms of management. The adjacent land use comprised arable and pastoral farmland, with low levels of disturbance.

3.2.43 Fish populations were considered to be transient within the watercourse, providing limited foraging opportunities for otter. However, small fish (species unknown) were observed to be present, and the watercourse was considered suitable for signal crayfish. Resting opportunities for otter were limited to cavities within the bank and within exposed roots of mature bankside trees. Overall, the watercourse was moderately suitable for otter.

Fivehead River main channel 1 (34)

3.2.44 The Fivehead River main channel 1 is located towards the centre of the scheme approximately 1 kilometre to the south of Hatch Beauchamp. The watercourse runs perpendicular to the A358 and flows directly underneath the road via a large bridge.

3.2.45 Main channel 1 is variable in composition, depth and profile. To the west of the A358, the river was shallow at >0.5 metres, and narrow, with an average channel width of 2 metres. The profile was vertical and undercut, with a moderate flow speed. The banks and channel were composed of stone, gravel and earth. The section of river running directly underneath the A358 had been artificially channelled, with steep concrete banks leading up to the road bridge. To the east of the A358, the river became shallower at <0.5 metres and wider at 2 to 5 metres, with a slower flow speed. The riverbanks remained vertical and undercut.

3.2.46 The channel was moderately shaded (60% to 80% shade along its length) by bankside trees and scrub. Hedgerows, bankside trees and scrub provided limited and intermittent connectivity to adjacent terrestrial habitats. The surrounding land use comprised arable farmland, urban, and small pockets of semi-natural woodland habitats with low levels of disturbance.

3.2.47 Fish populations were considered to be transient within the watercourse, providing limited foraging opportunities for otter. However, small fish (species unknown) were observed to be present, and the watercourse was considered suitable for signal crayfish. Resting opportunities for otter were limited to cavities within the bank and amongst the exposed roots of mature bankside trees. Overall, the watercourse was moderately suitable for otter.

Fivehead River main channel 2 (36)

3.2.48 The Fivehead River main channel 2 is located along the Taunton Dean and Somerset District boundary, to the south of Capland. The watercourse runs perpendicular to the existing A358 and flows directly underneath the scheme.

3.2.49 Main channel 2 was variable in composition, depth and profile. The section of watercourse to the west of the A358 was overshaded, steep and largely dry, with occasional pools of standing water. To the east of the A358 the watercourse was steep (>45 degrees), with a moderate flow speed and a depth ranging from 0.5 to 1 metre, and a channel width of 2 to 5 metres. The channel was heavily shaded (90% to 95% shade) by the bankside woodland canopy and tall ruderal vegetation. There was a lack of submerged vegetation along the majority of the

watercourse, however marginal sedges and small pockets of water pepper (*Persicaria hydropiper)* and gypsywort (*Lycopus europaeus)* were present to the east. The banks of the watercourse were subject to mixed management from adjacent arable and pastoral land-use.

3.2.50 Fish populations were considered to be absent to the west of the A358, and transient within the watercourse to the east, providing limited foraging opportunities for otter. Resting opportunities for otter were available within the adjacent woodland and ruderal vegetation along the banks. Overall, the watercourse was moderately suitable for otter.

Fivehead River Tributary 5 (37)

3.2.51 Fivehead River Tributary 5 runs along a series of field boundaries and through arable fields before terminating at the Fivehead River main channel 2 to the north-east of the existing A358.

3.2.52 Tributary 5 is variable in composition, depth and profile. The watercourse to the west of the existing A358 runs alongside field boundary hedgerows and through the centre of an arable field. This section of the watercourse was a narrow dry ditch (<1 metre wide), with undercut banks, and tall ruderal vegetation along the banks and within the channel bed itself. The watercourse ranged from open to moderately shaded (0 to 70% shade) from overhanging hedgerow vegetation. The banks were fenced from grazing and arable farming activities resulting in low levels of disturbance.

3.2.53 The remaining section of watercourse to the east of the A358 was also variable and ranged in profile from steep (>45 degrees) to shallow (<45 degrees) as it approached main channel 2. Depth was shallow (<0.5 metres) and the channel width remained narrow at <1 metre. The watercourse ranged from open to moderately shaded (0 to 70% shade) from overhanging hedgerow vegetation. The upper banks were subject to mixed management, including flailing, however dense ruderal growth was present within the channel comprising water dropwort (*Oenanthe crocata)*, hedge parsley (*Torilis arvensis)* and nettle (*Urtica dioica)*.

3.2.54 Fish populations were considered to be absent within the watercourse due to large sections of dry channel, reducing foraging opportunities for otter. Resting opportunities for otter were limited to hedgerow bases and the exposed roots of scattered mature trees along the bank. Overall, the watercourse was of low suitability for otter.

Venner's Water (39)

3.2.55 Venner's Water is located towards the centre of the scheme to the north-west of Ashill. The watercourse runs perpendicular to the A358 and crosses underneath an un-named road leading to Ashill, before passing underneath the existing A358.

3.2.56 Venner's Water is a small watercourse which ranged in depth from <0.5 to 1 metre and had a channel width ranging from 2 to 5 metres. The profile of the watercourse was steep (>45 degrees) with a sluggish to slow flow speed. The channel varied from open, to heavily shaded by overhanging hedgerow and woodland vegetation (30% to 80% shade). The majority of the watercourse lacked submerged vegetation, however short sections to the north supported willowherb *(Epilobium sp*,) water dropwort and yellow iris (*Iris pseudacorus)*. Marginal and bankside vegetation was also lacking along the majority of the watercourse as a

result of heavy shading. Field boundary hedgerows and pockets of scrub and woodland provided limited connectivity to adjacent terrestrial habitats.

3.2.57 The banks of the watercourse ranged from artificial (in proximity to residential dwellings), to a mixture of earth and stone. The adjacent land-use comprised arable farmland and urban habitats with low levels of disturbance.

3.2.58 Fish populations were considered to be transient within the watercourse, providing limited foraging opportunities for otter. Resting opportunities for otter were limited to ruderal vegetation along the banks and at hedgerow bases. Overall, the watercourse was moderately suitable for otter.

River Isle drainage network (42)

3.2.59 The River Isle drainage network is located towards the south of the scheme and to the north of Rapps. A series of small watercourses located to the east of the A358 connect to form the wider drainage network which flows eastwards to meet the River Isle.

3.2.60 The short section of watercourse subject to assessment was shallow, with a depth of <0.5 metres, and had a channel width that ranged from 1 to 2 metres. The profile of the watercourse was steep (>45 degrees), with no flow (dry channel bed). The channel was heavily shaded (80% shade) by the canopy of the surrounding woodland. Submerged and marginal vegetation was absent, however encroaching grassland and ruderal vegetation was present along the banks and within the channel. The banks comprised of earth and were subject to mixed management as a result of varied adjacent land use. Adjacent habitats included plantation woodland, arable and pastoral farmland with moderate levels of disturbance. Connectivity was provided by other small ditches comprising the wider drainage network.

3.2.61 Fish populations were absent within the ditch, however, connected watercourses nearby may support smaller species such as stickleback and common amphibians. Resting opportunities for otter were limited to bankside trees and within the surrounding woodland. Overall, the ditch was of low suitability for otter.

Cad Brook drainage network (51)

3.2.62 The Cad Brook drainage network is located towards the south of the scheme and to the south of Rapps. The drainage network comprises a series of ditches which originate to the west of the A358 near South Town, and flow eastwards and terminate in Cad Brook to the east of the A358. The southern section of the drainage network was entirely dry during the initial assessment and considered unsuitable for otter. The southern sections were therefore scoped out and excluded from further survey effort.

3.2.63 The northern section of the Cad Brook drainage network comprised a small drainage ditch following several small field boundaries. The ditch had a steep profile (>45 degrees) and a channel width ranging from 1 to 2 metres and an average depth of <0.5 metres. The flow was sluggish, and the banks and channel were comprised of earth and stone. Shading ranged from 50% to 80% from overhanging hedgerow vegetation and the bankside was dominated by hemlock (*Conium maculatum)* and nettle.

3.2.64 Fish populations were considered to be absent within the watercourse due to sections of dry channel, reducing foraging opportunities for otter. Resting

opportunities for otter were limited to hedgerow bases. Overall, the watercourse was of low suitability for otter.

Cad Brook (52)

3.2.65 Cad Brook is located towards the southern end of the scheme and runs approximately 300 metres south of Rapps. The watercourse runs perpendicular to the A358 and crosses underneath via a large concrete underpass.

3.2.66 Cad Brook is a small watercourse which ranges in depth from 0.5 to 1 metre and had a channel width ranging from 1 to 2 metres. The profile of the watercourse was steep (>45 degrees) with a sluggish to slow flow speed. The channel varied from open, to heavily shaded by overhanging hedgerow vegetation (5% to 80% shade). The majority of the watercourse lacked submerged vegetation, however short sections displayed dense water dropwort, reed canary grass, hemlock, water mint (*Mentha aquatica)*, fool's watercress and willowherb. Field boundary hedgerows provided limited connectivity to adjacent drainage ditches and other terrestrial habitats.

3.2.67 The banks of the watercourse comprised of earth and stone and did not appear to be affected by arable activities, despite the water course being unfenced. The adjacent land-use comprised arable farmland and urban habitats with low levels of disturbance.

3.2.68 Fish populations were considered to be transient or likely absent within the watercourse. In addition, tadpoles were observed to be present which suggests a breeding population of amphibians nearby, providing limited foraging opportunities for otter. Resting opportunities for otter were limited to ruderal vegetation and hedgerow bases along the banks. Overall, the watercourse was moderately suitable for otter.

River Ding (54)

3.2.69 The River Ding is the southernmost watercourse along the scheme. The watercourse passes underneath an unnamed road at Horton Cross via a stone blockwork bridge, and under the existing A358 via a large concrete underpass.

3.2.70 To the west of the A358 the River Ding is a moderately sized watercourse with tall undercut earth banks (1 to 3 metres in height) and had a channel width between 2 to 5 metres. The flow was moderate, and the depth ranged from 0.5 to 1 metre, with several deeper pools observed at meander points. A water treatment facility is located approximately 500 metres upstream of the A358. The channel had been modified in association with the facility, with large gabion baskets, culverts and concrete outfall pipes (incl. steep abutments into the banks) located on the north bank. The channel was heavily shaded (80% shade) by overhanging woodland canopy and scrub. Submerged vegetation was absent; however, the banks were dominated by tall ruderal vegetation and large outcrops of Himalayan balsam (*Impatiens glandulifera)*. The adjacent land use comprised arable farmland which would typically result in low disturbance, however, a frequently used public footpath ran alongside the River Ding and there was evidence of dogs entering the watercourse at regular intervals, resulting in moderate disturbance.

3.2.71 A large man-made weir located approximately 100 metres downstream (to the east) of the existing A358 marked a change in the overall profile, depth, and width of the watercourse. To the east, the watercourse retained a steep profile (>45

degrees), however the height of the banks was markedly reduced (0.5 to 1 metre). The depths decreased to 0.5 to 1 metre and the channel width reduced from 5 to 2 metres along its length. The watercourse also displayed a sluggish flow speed, with several pools of standing water present within the woodland and along the woodland edge. The channel was heavily shaded (80% to 100% shade) by the canopy of the adjacent woodland. Submerged vegetation was absent, and the majority of the earth banks were bare, with the exception of encroaching ivy (*Helix hedera)* and common nettle. The adjacent land use comprised arable farmland and private semi-natural woodland habitats with low levels of disturbance.

3.2.72 Fish populations were considered to be transient within the watercourse as a result of fluctuating water levels and the presence of a large weir (restricting movement upstream). However, smaller species such as sticklebacks were observed to be present, and the watercourse was considered suitable for signal crayfish. Tadpoles were also identified within pools of standing water to the east of the existing A358, all of which provide foraging opportunities for otter. Resting opportunities for otter were provided by the semi-natural broadleaved woodland, overhanging roots of mature trees, scrub and ruderal vegetation along the banks. Overall, the watercourse was highly suitable for otter.

River Ding Tributary 1 (54.1)

3.2.73 River Ding Tributary 1 is a short section of watercourse located adjacent to the River Ding, which is the southernmost watercourse along the scheme. This watercourse originates to the east of Horton and runs eastwards before joining the main River Ding channel at Horton Cross.

3.2.74 Tributary 1 is a small and steep (>45 degrees) watercourse with a narrow channel width of 1 to 2 metres and was largely dry, with small pools of standing water (<0.5 metres in depth). The channel was moderately shaded (70% shade) by overhanging hedgerow vegetation and scrub. The earth banks and channel bed were dominated by tall ruderal vegetation, including hemlock and common nettle. The channel bed also had a thick layer of silt.

3.2.75 The adjacent land use comprised arable farmland habitats with low levels of disturbance. However, there were public and unofficial footpaths running alongside the watercourse, with evidence of dogs entering both Tributary 1 and the main River Ding channel, which resulted in moderate levels of disturbance.

3.2.76 Fish populations were considered to be absent, as the majority of the watercourse was dry. It is however suitable for amphibians, thereby providing limited foraging opportunities for otter. Resting opportunities for otter were limited to bankside ruderal vegetation and hedgerow bases. Overall, the watercourse was of low suitability for otter.

River Ding drainage network (54a)

3.2.77 The River Ding drainage network flows into the River Ding and Back Stream at the southern end of the scheme. It comprises of two small drainage ditches along the edge of a large woodland block designated as part of the Jordan’s Park Local Wildlife Site (LWS) and connects to Back Stream to the south via a field boundary hedgerow.

3.2.78 The drainage network is a series of shallow (<0.5 metres bank height) linear ditches, with a steep profile (>45 degrees) and narrow channel width of 1 to 2 metres. The ditches were largely dry, however there were sections of slow flowing water and pools of standing water, particularly to the west of the woodland. There was a lack of submerged and marginal vegetation, and the banks of the watercourse were largely bare earth, with encroaching ivy and scrub. The southern banks of the watercourse displayed signs of recent clearance and dredging works. The network was heavily shaded (60% to 100%) by the adjacent woodland and hedgerow vegetation.

3.2.79 Fish populations were considered to be absent within the ditch, with an overall lack of feeding opportunities for otter. Resting opportunities for otter were limited to the adjacent woodland habitat. The primary value of the watercourse was attributed to its connectivity to the River Ding and Back Stream. Overall, the ditch was of low suitability for otter.

Back Stream (55)

3.2.80 Back Stream is located to the south of the scheme and splits from the River Ding main channel at the A358. The watercourse passes underneath the A358 via a large concrete underpass.

3.2.81 Back Stream is a moderately sized watercourse with a steep profile (>45 degrees) and channel ranging from 2 to 5 metres in width. The depth varied from 0.5 to 1 metre, with riffles (stone and pebble) and deeper pools located at meander points. Flow speed was slow and submerged vegetation is present in small pockets, mainly comprising of reed canary grass and fools' watercress. The watercourse was moderately shaded (50% to 60% shade) by overhanging vegetation, including large mature bankside trees and scrub. Himalayan balsam was also present along the watercourse. Field boundary hedgerows leading up to the watercourse provided additional connectivity to the River Ding to the north. The adjacent land use comprised arable farmland habitats with low levels of disturbance.

3.2.82 Fish populations were considered to be transient within the watercourse, providing limited foraging opportunities for otter. However, smaller species such as sticklebacks were observed, and the watercourse was considered suitable for signal crayfish and amphibians. Resting opportunities for otter were present within man-made structures such as open culverts, and woodland along the banks, in addition to the overhanging roots of mature trees. Overall, the watercourse was highly suitable for otter.

Table 3-1 Habitat suitability assessment survey distance summary

Watercourse (ID number) *	Distance surveyed up & downstream of construction boundary	Habitat suitability	Subject to high impacts (requires 500m survey)
Blackbrook Business Park (62)	To construction boundary only: ditch does not extend beyond this point.	Low	No
Broughton Brook (15a)	250m up and downstream	Moderate	No

Watercourse (ID number) *	Distance surveyed up & downstream of construction boundary	Habitat suitability	Subject to high impacts (requires 500m survey)
Black Brook Tributary 1 (17) **	130m upstream; access restricted beyond this point	Moderate	Yes
Black Brook (19)	500m downstream and 300m upstream	Moderate	Yes
Black Brook Tributary 3 (19.1)	To construction boundary only: watercourse does not extend beyond this point.	Moderate	Yes
Black Brook Tributary 2 (20) **	To construction boundary only: watercourse does not extend beyond this point.	Moderate	Yes
Black Brook Tributary 6 (20.1) **	To construction boundary only: watercourse does not extend beyond this point.	Moderate	No
Thornwater Stream (24)	500m upstream and downstream	Low	Yes
Meare Stream (30)	250m up and downstream	High	No
Meare Stream Tributary 1 (31)	500m up and downstream	Moderate	Yes
Unnamed field drainage ditch (32)	100m upstream; end of ditch network	Negligible	No
Fivehead River Tributary 1 (33)	250m upstream; merges with main channel	Moderate	No
Fivehead River main channel 1 (34)	250m up and downstream	Moderate	No
Fivehead River main channel 2 (36)	500m upstream and downstream	Moderate	Yes
Fivehead River Tributary 5 (37)	500m upstream, 500m downstream	Low	Yes
Venner's Water (39)	250m upstream, 500m downstream	Moderate	Yes
River Isle drainage network (42)	500m downstream; ditch ends at 500m	Low	Yes
Cad Brook drainage network (51)	100m up and downstream; ditch network ends at this point	Low	No

Watercourse (ID number) *	Distance surveyed up & downstream of construction boundary	Habitat suitability	Subject to high impacts (requires 500m survey)
Cad Brook (52)	250m up and 500m downstream; brook starts 250m upstream, no further feature to survey	Moderate	No
River Ding (54)	500m up and downstream	High	Yes
River Ding Tributary 1 (54.1)	250m upstream: terminates into River Ding downstream	Low	No
River Ding drainage network (54a)	250m downstream; originates from River Ding upstream	Low	No
Back Stream (55)	500m downstream: originates from River Ding upstream	High	Yes

* Each watercourse was given an ID number, which is referenced on associated mapping.
** Indicates access limitations. See 2.3.3 for further details.

3.3 Field study

3.3.1 22 out of the 23 watercourses subject to the habitat suitability assessment were deemed suitable (low to high suitability) for supporting otter. Watercourse 32 was found to be unsuitable for otter during the initial habitat assessment and was therefore scoped-out of the remaining surveys. The 22 suitable watercourses were all then subject to detailed otter field signs surveys. Positive field signs of otter were recorded on 15 watercourses. Field signs were located directly underneath the A348 at various bridges and culvert locations, as well as up to 500 metres upstream and downstream of the scheme.

3.3.2 As stated in section 2.3.4 (limitations), a precautionary approach was used for watercourses with restricted access. Watercourses 17, 20.1, 31, 32 and 37 were inaccessible to varying degrees throughout the survey period but were assumed to exhibit similar characteristics to connected or nearby watercourses. Otters were therefore considered to be likely present along these watercourses.

3.3.3 Further details on the distribution, type and quantity of field signs have been provided in Table 3-1 and mapped in Appendix B *Otter survey area and field signs*.

Table 3-2 Summary of field signs identified along each watercourse in June 2021 and September 2021

Watercourse (ID number) *	Date	Field signs	Easting	Northing	Notes
Blackbrook Business Park (62)	15/06/2021	Otter footprints	325405	124786	Prints on the banks at the northern point of the watercourse
Broughton Brook (15a)	15/06/2021	Otter spraint	325609	124853	Old spraint
		Otter footprints	325616	124779	Prints found under the A345 road bridge in the mud

Watercourse (ID number) *	Date	Field signs	Easting	Northing	Notes
	13/09/2021	Otter spraint	325609	124853	Old spraint found on stone within the channel
		Otter spraint	325587	124717	Fresh spraint on the bank
		Otter footprints	325616	124779	Prints found under the A345 road bridge in the mud
Black Brook Tributary 1 (17)	16/06/2021	Slide	326031	124263	Worn access route into watercourse from adjacent field (fresh scrapes in mud)
	15/09/2021	Otter slide, footprints, potential couch	326031	124263	Worn access route into watercourse, footprints on earth banks leading to an overhanging willow with a dry earth platform underneath (incl. more footprints)
Black Brook (19)	15/09/2021	Potential otter couch and slide	325681	12472	Ground level potential couch in the base of a hollow willow tree, of sufficient size for otter and no disturbance. Slide leads to willow tree
		Otter spraint	325669	124705	Old otter spraint on a piece of rubble within the channel
		Otter spraint	325724	124644	Old otter spraint underneath a footbridge
		Potential holt	325750	124604	Short section of concrete culvert from Nexus development within dense ruderal and bramble scrub, above water level and low disturbance
Black Brook Tributary 3 (19.1)	16/06/2021	Partial otter footprints	325978	124346	Possible footprints on east bank under footbridge
		Otter footprints	326040	124280	Cluster of footprints on wide earth bank under willow tree
	23/09/2021	Otter spraint	326040	124280	Old spraint on a concrete lintel over the watercourse
		Otter spraint	326320	124040	Old spraint found on the corner stone of an old bridge (remains of bridge foundations only)
Black Brook Tributary 2 (20)	16/06/2021	Partial otter footprints	326323	124025	Possible old footprints on east bank under metal footbridge
	23/09/2021	Partial otter footprints	326323	124025	Possible footprints on east bank under metal footbridge
Thornwater Stream (24)	16/06/2021	Potential holt	327645	123231	Hole in ash tree roots with a wide entrance and narrows to 10cm
		Potential holt	327566	123456	A cavity underneath the roots of a hazel tree
		Potential holt	327578	123774	Tunnel leading underneath adjacent farmyard
		Potential holt	327645	123231	Hole in ash tree roots with a wide entrance and narrows to 10cm

Watercourse (ID number) *	Date	Field signs	Easting	Northing	Notes
	14/09/2021	Potential holt	327574	123575	Suitable exposed roots for underwater entrance to potential cavity
		Potential holt	327569	123671	Hole (20cm diameter) into root ball of coppiced hazel with second hole at waters' edge
Meare Stream (30)	17/06/2021	Potential couch	329173	121173	Smoothed earth in cavity on the bank
		Spraint	329202	121228	Spraint on a stone on the bank within vegetation
		Spraint	329202	121251	Spraint on a stone on the bank within vegetation
		Spraint	329207	121270	Fresh spraint on stone on the bank
		Spraint	329207	121270	Fresh spraint on stone on the bank
		Spraint, potential couch	329243	121366	Area of smooth soil in a hollow within a tree bowl, next to an old spraint
		Spraints	329255	121442	Two spraints on stone on the bank
		Spraint	329237	121489	Spraint on tree roots
		Spraint, potential holt	329228	121524	Spraint on a rock on the edge of the channel, opposite to a tree with cavities suitable for a holt
		Footprints	329237	121555	Footprints underneath a box culvert
		Spraints	329247	121616	Spraint on a stone on the bank and on a tree stump
		Spraint, potential holt	329254	121668	Old spraint at the entrance to a below ground cavity amongst ash tree roots
		Potential holt	329258	121680	Cavity beneath ash tree roots, extending 1m backwards
		Spraint, potential couch	329262	121692	Spraint on west bank and potential holt underneath overhanging tree roots on the east bank
	15/09/2021	Spraint	329166	121161	Fresh spraint on a rock within the channel
		Spraint	329241	121476	Fresh spraint on a rock within the channel
		Potential holt	329234	121294	Hole underneath tree roots in the bank
		Footprints	329237	121555	Footprints underneath a box culvert
		Spraint	329247	121603	Well used sprainting site, with fresh and old spraints containing fish bones on a tree stump
		Potential holt	329236	121623	Tunnel into tree roots extending approximately 1m.
		Potential holt	329258	121654	Hole into tree roots and possible cavity within the trunk
Meare Stream	18/06/2021	Spraint	329273	120595	Old spraint in channel

Watercourse (ID number) *	Date	Field signs	Easting	Northing	Notes
Tributary 1 (31)		Potential couch	329307	120689	Potential couch under overhanging tree roots
		Potential couch	329367	120745	Sheltered earth ledge underneath an old oak tree with overhanging roots
		Spraint, potential couch	329598	120853	Potential couch beneath tree roots with access to the water, old spraint at the water's edge near the entrance
		Spraint	329608	120864	Old spraint on boulder in channel
		Spraint	329695	120944	Old spraint in channel
	09/09/2021	Potential couch	329307	120689	Potential couch under concrete slabs under hazel trees towards the edge of the woodland
		Potential couch	329367	120745	Sheltered earth ledge underneath an old oak tree with overhanging roots
		Potential couch	329609	120851	Old stone wall underneath mature beech tree with exposed roots and cavities
Fivehead River main channel 1 (34)	17/06/2021	Otter footprints	329564	119160	n/a
		Spraints	329680	119267	Three spraints on concrete bank
	15/09/2021	Potential holt	329558	119134	Path leading to a chamber under a tree along the bank
		Potential holt	329564	119160	Underwater entrance underneath overhanging roots (deep water prevented further inspection)
		Potential couch, slide, spraints	329633	119222	Potential couch behind a dead tree with a slide into the watercourse. Two old spraints on top of tree roots
		Spraint	329651	119226	Fresh spraint on gravel bank
		Spraints	329680	119267	Old spraints on deadwood fallen across the watercourse
		Spraint	329747	119311	Old spraint on concrete bank
		Potential couch	329900	119397	Cavity beneath tree roots with smoothed earth
		Spraint	329929	119395	Old spraint on a log within the watercourse
		Spraint	329968	119400	Fresh spraint underneath a road bridge. A larger more frequently used sprainting site to the northern end of the road bridge.
Fivehead River main channel 2 (36)	21/06/2021	Potential couch	330264	118301	Large, sheltered earth bank at bridge abutment
		Spraint	330364	118359	Small amount of spraint by bridge
		Spraint	330485	118448	Spraint on a concrete slab within the channel

Watercourse (ID number) *	Date	Field signs	Easting	Northing	Notes
		Footprints	330614	118520	Footprints in earth under existing A358 road culvert
		Potential holt	330627	118534	Culvert pipe with entrance partly covered by bramble
		Spraint	330735	118559	Spraint on a concrete slab within the channel
		Potential couch	330759	118586	Potential couch in a large cavity within a willow base adjacent to the river
	14/09/2021	Spraints, potential couch	330264	118301	Old spraint under a bridge and a large, sheltered earth bank at bridge abutment
		Potential couch	330364	118359	Large, sheltered earth bank at bridge abutment
		Potential couch	330627	118534	Culvert pipe with entrance partly covered by bramble
		Feeding remains, potential couch	330670	11851	Feeding remains under a fallen tree. Tree also provides some shelter
Venner's Water (39)	23/06/2021	Potential couch	331564	117910	Potential couch in large culvert under the existing A358
		Spraint	331622	118020	Old spraint (containing fish bones) found at the entrance to a culvert
	13/09/2021	Spraint	331765	118067	Mix of old and fresh spraints on to of a concrete block within the channel
		Spraint	331771	118075	Old spraint located on top of a log within the channel
		Potential couch	331939	118007	Secluded sheltered area beneath a collapsed willow tree
		Potential couch	331974	117961	Potential couch on the upper banks underneath a steel and timber footbridge
Cad Brook (52)	24/06/2021	Otter spraint	333352	116596	One spraint under a culvert on the eastern side of the lane
		Spraint, potential couch	333417	116699	Cavity in tree bowl with an old spraint. Cavity provides shelter and appears occasionally used
	15/09/2021	Potential couch	333093	116361	Stone bridge with dry culvert underneath
		Spraint	333164	116435	Very old dry spraint on top of stone block within dry channel
River Ding (54)	09/06/2021	Otter spraints	333283	115551	Four spraints of varying age on top of a boulder within the channel. Spraints contain the remains of signal crayfish
	15/06/2021	Otter spraints	333662	115848	Five spraints of varying ages atop a large weir

Watercourse (ID number) *	Date	Field signs	Easting	Northing	Notes
	08/09/2021	Otter spraints	333662	115848	Old spraints, mostly washed away, atop a large weir
Back Stream (55)	09/06/2021	Potential holt, potential couch	333782	115710	Fallen willow within the channel with a large, lifted root plate providing above ground and under water access to cavities around roots.
		Spraints	333984	115698	One fresh spraint and older spraints containing signal crayfish remains
	08/09/2021	Spraints, potential couch	333658	115680	Old partial spraint on a boulder within the channel, spraint contains signal crayfish remains. Potential couch on the southern bank under the exposed roosts of a large tree with a sheltered earth bank
		Potential couch	333668	115677	Old concrete drainage pipe above ground and water level
		Otter spraint	333685	115687	Old spraint on a pebble beach (north bank)
		Otter spraint	333699	115684	Old spraint and patches of tar staining on rocks
		Otter spraints	33378	115698	Frequently used sprainting location, ten spraints of varying age underneath a large road bridge over the A358
		Otter spraints	333826	115690	One large and fresh spraint amongst pebbles on a gravel bank
		Otter spraints	333847	115691	Two old and bleached spraints with tar staining on rocks within the channel
		Otter spraints	333984	115698	Four old spraints on rocks within the channel

* Each watercourse was given an ID number, which is referenced on associated mapping

4 Conclusion

4.1 Key findings

4.1.1 A biological records search returned 307 records of otter within a 2 kilometre radius of the scheme. Records indicated otter are likely present near the scheme. In addition, the majority of records located towards Taunton are in close proximity to larger watercourses such as the River Tone, which is connected to many of the northerly watercourses included within this assessment, such as Broughton Brook and Black Brook.

4.1.2 The habitat assessment revealed the majority of watercourses along the scheme were suitable for otter, with over 75% of the watercourses being classified as having moderate suitability or higher, whereas seven were considered to be of low suitability and one was negligible.

4.1.3 The results of the field surveys have confirmed that otters are using a range of watercourses, including those that were of low suitability.

4.1.4 Positive field signs including spraints and footprints along low suitability watercourse may be indicative of a widespread otter population, with individuals exploiting a range of sub-optimal habitat, in addition to high quality and high suitability watercourses. The presence of spraints along these watercourses also indicates frequent use and potential territorial scent markings of individual otters.

4.1.5 A significant number of potential holts and couches were recorded; however, none were confirmed as being in active use by otter. The findings of the habitat and field survey assessment confirms there are ample resting and sheltering opportunities for otter.

4.1.6 The most notable limitation for otters along the different watercourses may be the absence of adequate foraging resources, primarily fish. Most watercourses displayed shallow water levels, with many having culverts, weirs, and sections of dry channel bed; all of which limit the likelihood of permanent or transient fish populations. There are, however, records of the remains of signal crayfish remains in spraints recorded along the scheme.

4.1.7 Meare Stream (ID 30) was found to contain the highest quantity of positive or potential field signs for otter. Records included spraints, potential holts and potential couches. Meare stream flows eastwards and connects to the River Isle drainage network and rhine system approximately 4km from the scheme boundary. This system of rhines and drainage channels is highly suitable for otter and is likely to support a higher population density, with individuals travelling west towards the scheme along various smaller watercourses.

4.1.8 Positive field signs for otter were recorded on over half of the watercourses subject to assessment. The precautionary principle applied to watercourses with access limitations resulted in a further four watercourses (17, 20.1, 31 and 37) having an assumed likely presence of otter along inaccessible sections. The location, quantity and type of field signs indicate there is a widespread population of otters in close proximity to the A358 which may be negatively impacted as a result of the scheme.

4.1.9 It is not possible to conclude likely absence of otter on watercourses where evidence was absent during two surveys. Given the overall spread of positive field signs along the scheme, it is entirely possible that otters may frequent other

watercourses (including low suitability) on an infrequent basis and their potential future presence should therefore not be ruled out [11].

Abbreviations List

Please refer to ES Report Chapter 17 Abbreviations

Glossary

Please refer to ES Report Chapter 18 Glossary

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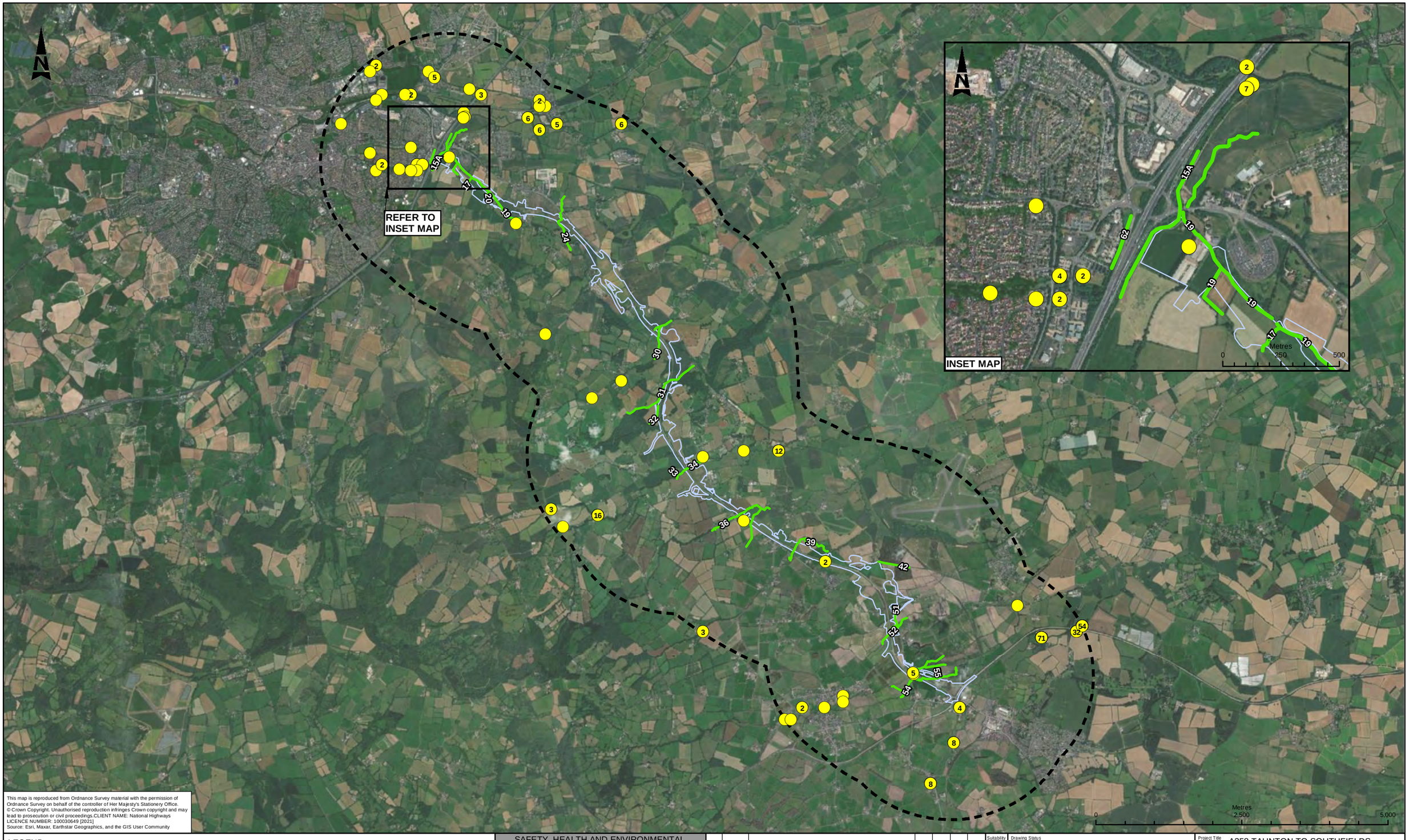
Appendices

Appendix A Historical records from SERC



LEGEND

- ECOLOGY SURVEY ZONE
- 2KM DATA SEARCH AREA
- WATERCOURSE **LABELS REPRESENT WATERCOURSE ID NUMBERS*
- EURASIAN OTTER *(306 TOTAL RECORDS)* **LABELS REPRESENT TOTAL RECORDS PER LOCATION. NO LABEL REFERS TO A SINGLE RECORD*

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Client: national highways

TAYLOR WOODROW together @ VINCI · ARUP · RAMBOLL

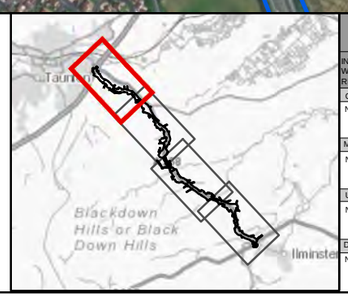
Appendix B Otter survey area and field signs

LEGEND

- ECOLOGY SURVEY ZONE
- OTTER SURVEY EXTENT
- WATERCOURSES

OTTER FIELD SIGN

- SPRAINT
- FOOTPRINTS
- FEEDING REMAINS
- CONFIRMED COUCH
- POTENTIAL COUCH
- CONFIRMED HOLT
- POTENTIAL HOLT
- SLIDE
- POTENTIAL SLIDE



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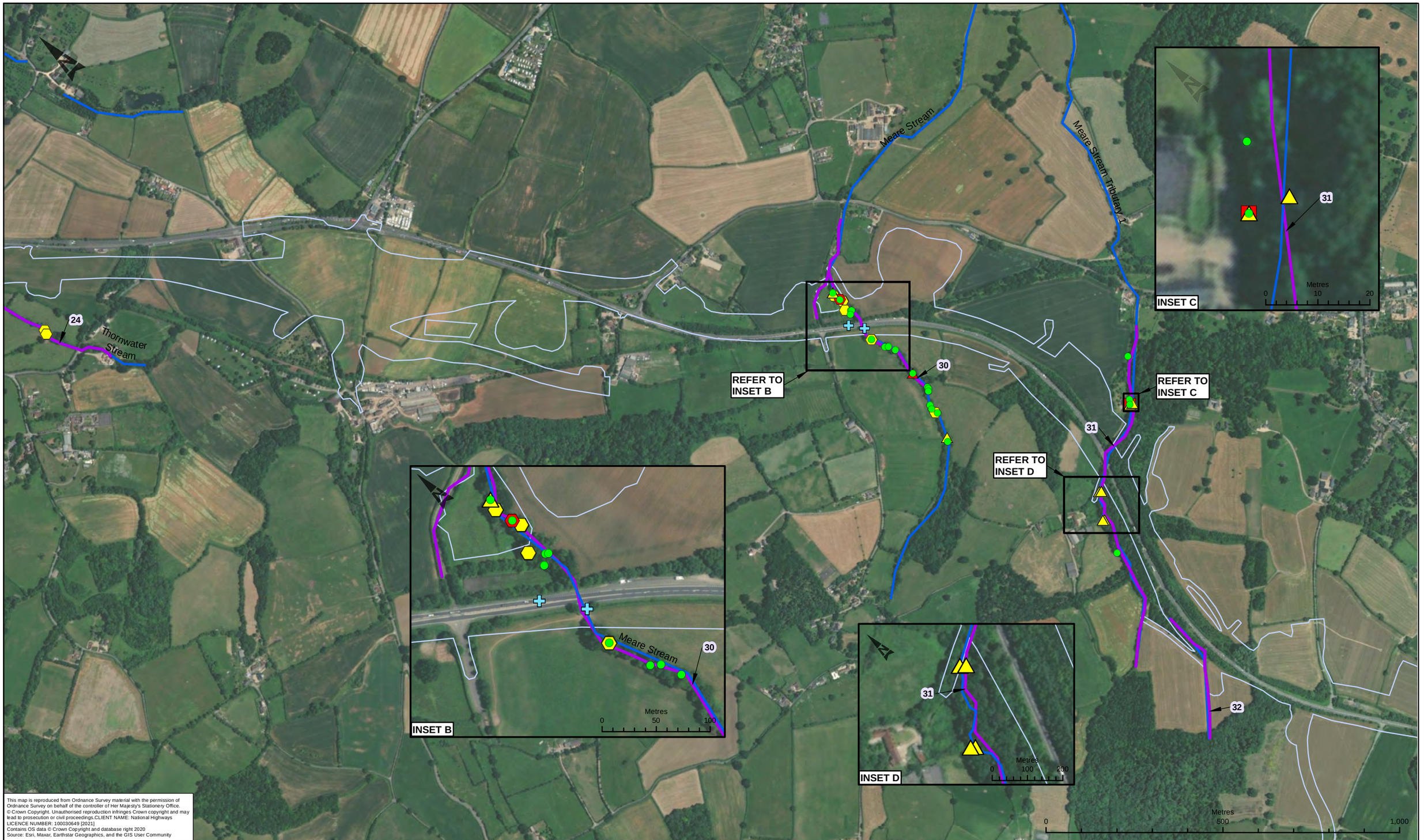
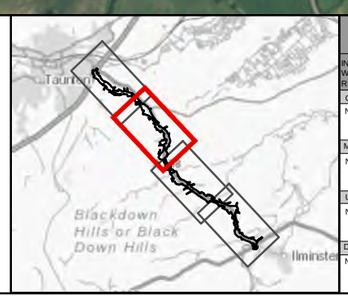


LEGEND

- ECOLOGY SURVEY ZONE
- OTTER SURVEY EXTENT
- WATERCOURSES

OTTER FIELD SIGN

- SPRAINT
- FOOTPRINTS
- FEEDING REMAINS
- CONFIRMED COUCH
- POTENTIAL COUCH
- CONFIRMED HOLT
- POTENTIAL HOLT
- SLIDE
- POTENTIAL SLIDE



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- ECOLOGY SURVEY ZONE
- OTTER SURVEY EXTENT
- WATERCOURSES

OTTER FIELD SIGN

- SPRAINT
- FOOTPRINTS
- FEEDING REMAINS
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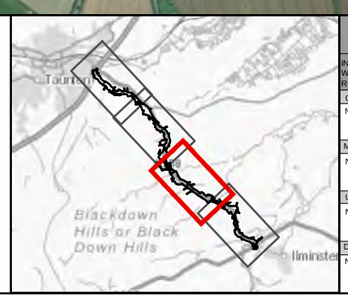

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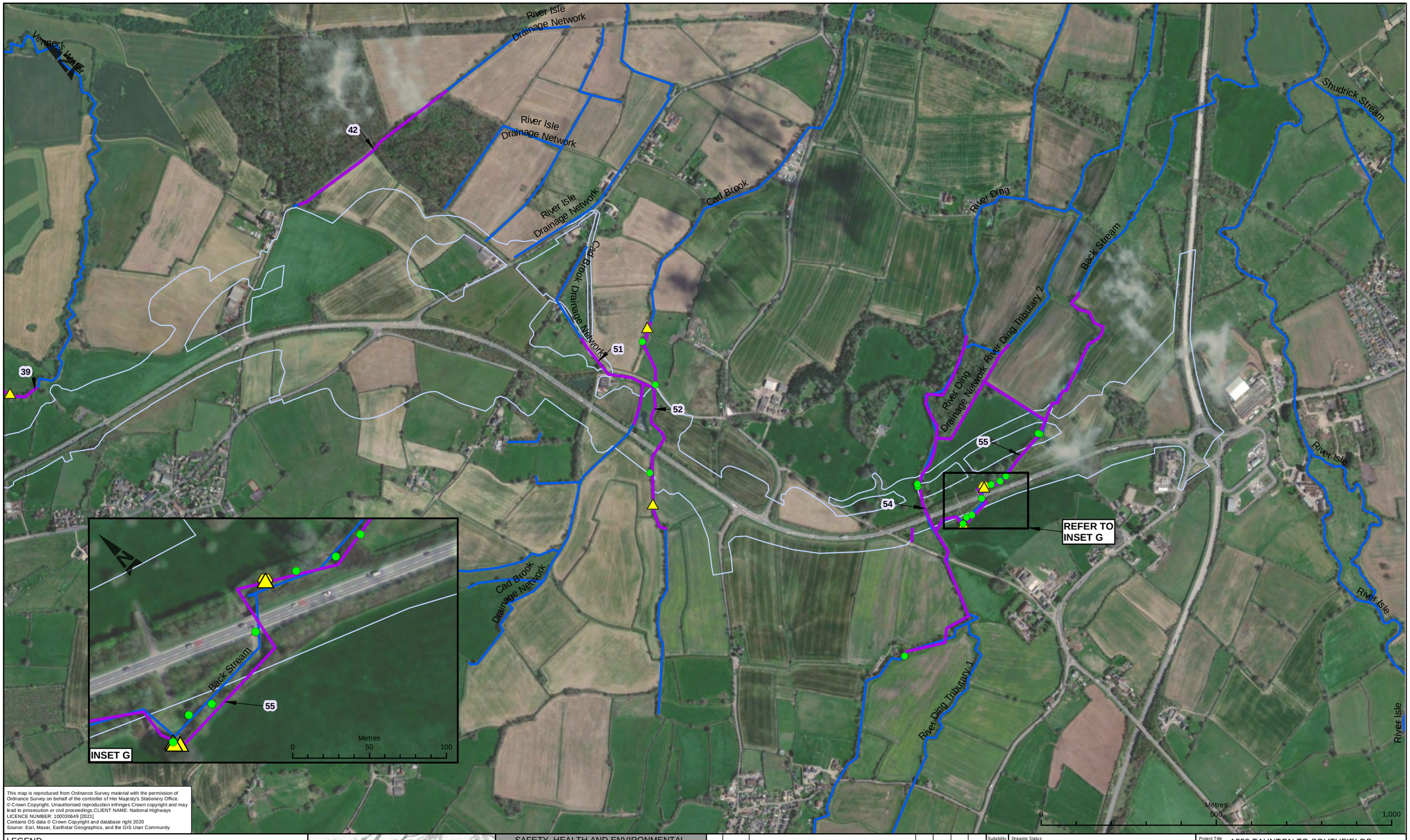

LEGEND

- ECOLOGY SURVEY ZONE
- OTTER SURVEY EXTENT
- WATERCOURSES

OTTER FIELD SIGN

- SPRAINT
- FOOTPRINTS
- FEEDING REMAINS
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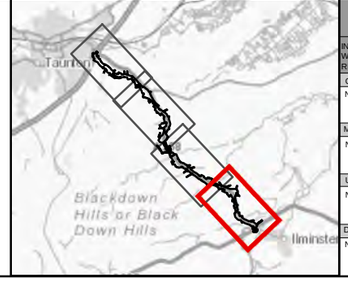

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