

A428 Black Cat to Caxton Gibbet improvements

TR010044

Volume 6

6.3 Environmental Statement

Appendix 8.15: Fish

Planning Act 2008

Regulation 5(2)(a)

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

26 February 2021

Infrastructure Planning

Planning Act 2008

**The Infrastructure Planning
(Applications: Prescribed Forms
and Procedure) Regulations 2009**

**A428 Black Cat to Caxton Gibbet
Improvements
Development Consent Order 202[]**

Appendix 8.15: Fish

Regulation Number	Regulation 5(2)(a)
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1 Introduction

1.1 Background and scope of works

- 1.1.1 As part of the A428 Black Cat to Caxton Gibbet improvements (the Scheme), fish surveys were undertaken to inform the biodiversity assessment reported in **Chapter 8, Biodiversity** of the Environmental Statement [TR010044/APP/6.1].
- 1.1.2 This report provides the results of fish surveys completed in 2018, which were based on the agreed scope of work for Stage 3 (Ref 1-1), the Phase 1 Habitat Survey (**Appendix 8.20** Phase 1 Habitat Surveys of the Environmental Statement [TR010044/APP/6.3]) and a thorough desk study exercise undertaken in 2018-2019 as outlined in **Appendix 8.1** of the Environmental Statement [TR010044/APP/6.3].
- 1.1.3 These reports identified species and habitats of principal Importance (listed under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006), which could be potential constraints to the works or influence the design and implementation of the Scheme.
- 1.1.1 **Chapter 2, The Scheme** of the Environmental Statement [TR010044/APP/6.1] provides the background and a description of the Scheme.
- 1.1.2 This appendix includes:
- Relevant legislation.
 - Methods for desk and field-based assessments undertaken in 2018 to determine presence or absence of fish in value watercourses across the Survey Area (defined in 1.3) based on desk study and field survey visits.
 - Competencies of the ecologists involved in undertaking the above surveys.
 - Limitations to the surveys undertaken and any assumptions made as a result of incomplete data.
 - Survey results.
- 1.1.3 The approach for determining the nature conservation importance of fish populations recorded during the assessment.
- 1.1.4 The information described in this appendix provides a baseline of fish activity recorded within the watercourses surveyed.
- Fish ecology**
- 1.1.5 These surveys assess fish populations in any suitable rivers, lakes, streams and waterbodies.

2 Legislation and policy

2.1 Legislation

- 2.1.1 The following wildlife legislation is relevant to fish in relation to the Scheme:
- Wildlife and Countryside Act 1981 (as amended) (the WCA).
 - Natural Environment and Rural Communities (NERC) Act 2006.
 - Water Framework Directive (WFD) 2000.
 - The Conservation of Habitats and Species Regulations, 2017 (as amended).
- 2.1.2 The WCA covers the protection of species and habitats including Sites of Special Scientific Interest (SSSI) designated sites. The Act makes it an offence (subject to exceptions) to intentionally kill, injure or take any wild animal listed on Schedule 5, and prohibits interference with places used for shelter or protection, or intentionally disturbing animals occupying such places.
- 2.1.3 Section 41 of the NERC Act provides a list of fish species and freshwater habitats of Principal Importance for nature conservation in England, which is to be used by decision-makers to guide the implementation of their duties under Section 40 of the Act. Decision-makers are required to have regard to the Section 41 list when fulfilling their wider responsibility under the NERC Act to have regard to the conservation of biodiversity in England.
- 2.1.4 The Conservation of Habitats and Species Regulations 2017 (as amended) consolidate the Conservation of Habitats and Species Regulations 2010 with subsequent amendments. The Regulations transpose Council Directive 92/43/EEC, on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive), into national law. There are eight fish species listed as Annex II: Sea Lamprey (*Petromyzon marinus*), Brook Lamprey (*Lampetra planeri*), River Lamprey (*Lampetra fluviatilis*), Allis Shad (*Alosa alosa*), Twaite Shad (*Alosa fallax*), Atlantic Salmon (*Salmo salar*), Spined Loach (*Cobitis taenia*) and Bullhead (*Cottus gobio*).
- 2.1.5 Spined Loach is an interest feature of the Ouse Washes Special Area of Conservation (AC,) which is hydrologically connected to the Scheme
- 2.1.6 Fish species of particular interest are those Species of Principal Importance in England listed on Schedule 41 of the NERC Act 2006. These include European Eel (*Anguilla anguilla*), Spined Loach, Burbot (*Lota lota*), Atlantic Salmon, Brown/Sea Trout (*Salmo trutta*) and River Lamprey. Bullhead, although not listed on Section 41, is listed on the International Union for Conservation of Nature (IUCN) Red list of Threatened Species and again on Annex II of the *EC Habitats Directive* (3) and is a Special Area of Conservation (SAC) Annex II (such as Atlantic Salmon, River Lamprey, Sea Lamprey and Spined Loach), species at a number of sites, though none have been identified within 100 meters to the Scheme.

- 2.1.7 Proposed developments or activities that have the potential to affect the water environment require a WFD Assessment. Compliance with the WFD means attainment of Good Ecological Status by a defined date. Any new development cannot cause deterioration in status or prevent the future attainment of Good Status where it is not already achieved within waterbodies where fish species are a key component of Good Status. Article 4.7 of the WFD provides legislation for exemption conditions that could allow implementation of schemes that cause deterioration in ecological status, for example for reasons of overriding public interest.
- 2.1.8 The above legislation has been considered when planning and completing survey work using methods described in Section 1.3; when identifying potential constraints to the Scheme and when proposing suitable recommendations for further survey, design options and mitigation.

2.2 Policy framework

- 2.2.1 National and local planning policies relevant to biodiversity are evaluated in the Environmental Statement, Volume 1 [TR010044/APP/6.1]. The following local planning policies are specifically related to this appendix.

Local planning policy

- 2.2.2 A summary of relevant policies that consider fish are described below:

In the ‘*Shaping where you live 2035*’ *Central Bedfordshire Local Plan 2015 – 2035*’ (January 2018) under Policy EE3 (Ref 1-3): Nature conservation it states that “*Important habitats and sites of geological and geomorphological interest will be protected, maintained and enhanced.... Development would not be permitted that would adversely affect: protected species; and species and habitats of principal importance.*”

In the *Adopted South Cambridgeshire Local Plan* (September 2018) Policy NH/4 (Ref 1-5): Biodiversity states that: “*New development must aim to maintain, enhance, restore or add to biodiversity. Opportunities should be taken to achieve positive gain through the form and design of development. Measures may include creating, enhancing and managing wildlife habitats and networks. If significant harm to the population or conservation status of a Protected Species, Priority Species or Priority Habitat resulting from a development cannot be avoided, adequately mitigated, or, as a last resort, compensated for, then planning permission will be refused.*

Where there are grounds to believe that a proposal may affect a Protected Species, Priority Species or Priority Habitat, applicants will be expected to provide an adequate level of survey information and site assessment to establish the extent of a potential impact.” (Ref 1-5)

In the Adopted Huntingdonshire's Local Plan (March 2018) Policy LP40: Water Related Development states that: "A proposal for water related development will be supported where it can be demonstrated that: measures will be incorporated to maintain or enhance water quality and quantity and river morphology, with reference to the Environment Agency's Anglian river basin district River Basin Management Plan and the Water Framework Directive; biodiversity of the water, its margins and nearby nature conservation sites will be maintained or enhanced; and it will contribute to the re-naturalisation of the water body."

3 Methods

3.1 Survey area

- 3.1.1 The Survey Area for the assessment of the presence, or likely absence of fish was informed by the professional judgement of suitably qualified and experienced specialists. The Survey Area comprised the area within and 100 metres on either side of the Order Limits.
- 3.1.2 Scoping was undertaken in of all the watercourses and waterbodies within the Survey Area. Those watercourses or waterbodies which required specific assessment were surveyed using field surveys in 2018 as described below. The scoping included use of walkover surveys, consulting the Phase 1 Habitat Survey map (**Appendix 8.20** of the Environmental Statement [**TR010044/APP/6.3**].) and analysis of aerial photography. The watercourses and waterbodies which were surveyed are shown in **Figure 1**.
- 3.1.3 Watercourses and water bodies within the Survey Area that would have no potential to be impacted, directly or indirectly, by the Scheme, e.g. those in the vicinity of the de-trunked section of the existing A428 for which there will be no associated works, were not surveyed. Within the Survey Area there were also several watercourses and waterbodies that could not be surveyed as they had dried out. This approach ensured that all suitable habitat within the Survey Area (**Figure 1**) was assessed prior to and following adoption of LA 108 (Ref 1-8).
- 3.1.4 Any limitations to these surveys are acknowledged and explained in the Limitations section of this appendix with consideration given to any implications to the findings.

3.2 Desk study

- 3.2.1 The Survey Area lies within the southern part of National Character Area (NCA) 88: Bedfordshire and Cambridgeshire Claylands, which supports a range of habitats and species, including the River Great Ouse and a number of its tributaries, and some species classified as rare and scarce (Ref 1-2). Tributaries flowing into the River Great Ouse from Bedfordshire are Begwary and Duloe Brooks and Rockham Ditch, and from Cambridgeshire the Hen, Fox, Gallow and Wintringham Brooks and Stone Brook (**Figure 1**). Additionally, there are a number of waterbodies to consider, including field ponds, a lake at Croxton Park (approximately 1.5ha) and water filled excavations at Begwary Brook County Wildlife Site, Wyboston Pits County Wildlife Site/Wyboston Leisure Park, Little Barford County Wildlife Site and those near Roxton and the existing Black Cat roundabout.
- 3.2.2 As part of the agreed scope of work for the Scheme, work was undertaken comprising:
- An updated desk study for fish.
 - Fish surveys to be carried out on key waterbodies directly or indirectly impacted by the Scheme.

- 3.2.3 The aim of the desk study was to help characterise the baseline context of the Scheme and provide valuable background information that would not be captured by a single site survey alone. The desk study was undertaken to identify nature conservation and other designations relevant to fish, within the Study Area which comprised the area within and 1 kilometre (0.6 miles) beyond the Order Limits.
- 3.2.4 In addition to a thorough review of published information on habitats and species in the Survey Area and the surrounding landscape, the Environment Agency, Cambridgeshire and Peterborough Environmental Records Centre and Bedfordshire and Luton Biodiversity Recording and Monitoring Centre were contacted in 2018 to obtain relevant records. Details of the search for these records are provided in **Appendix 8.1** of the Environmental Statement [TR010044/APP/6.3].

3.3 Field survey

- 3.3.1 The identification and selection of aquatic habitats for fish surveys are described in **Appendix 8.4** of the Environmental Statement [TR010044/APP/6.3]. All surveys relevant for aquatic habitats were relevant for scoping the need for fish assessment.
- 3.3.2 This process included a review of Ordnance Survey maps and other online sources, Phase 1 Habitat mapping, aquatic habitat walkover surveys, and subsequent surveys (notably amphibian surveys).
- 3.3.3 Hen Brook was the only waterbody identified as requiring fish surveys. Apart from the River Great Ouse, all other watercourses and waterbodies were either of very low value, mostly dry at the time of the walkover habitat survey or were not within 100 metres of the Scheme, for example the lake at Croxton Park and the water filled excavations in the River Great Ouse corridor.
- 3.3.4 The River Great Ouse is designated as a County Wildlife Site by both Bedfordshire and Cambridgeshire and is an integral part of the Ouse Valley Living Landscape scheme. The river is a heavily managed lowland river that has been modified for navigation and flood storage purposes throughout its lower reaches, such as in the area of the Scheme. The fish assemblage of this river is typical of many modified rivers in lowland England with an abundance of coarse fish (**Appendix 8.1** of the Environmental Statement [TR010044/APP/6.3]). Since 1947, 23 species of freshwater fish and two hybrids have been recorded from the Bedfordshire stretch of the River Great Ouse which extends to Wroxton (Ref 1-9). Given the knowledge of the fish fauna of the River Great Ouse, it was decided that a fish survey was unnecessary.
- 3.3.5 Hen Brook was sampled on 11 October 2018 using an electric fishing backpack (Electracatch WFC911) over 100 metre stretch starting downstream at NGR TL 19852 58794 (at a culverted section where the existing A428 passes over the brook) up to the upstream point at NGR TL 19919 58716.

3.3.6 Fish surveys were undertaken by three suitably experienced aquatic ecologists to assess the presence or absence of fish species in the watercourses. The survey was carried out in line with standard Environment Agency methodology (Ref 1-7).

3.3.7 A single semi-quantitative run was carried out, with no stop nets in place. A semi-quantitative method was used due to the restricted nature of the channel and the dense macrophyte growth. Fish caught were placed in aerated water containers before being identified and measured to fork length (mm). All fish were returned to the watercourse unharmed.

3.4 Biodiversity value

3.4.1 An evaluation of the relative nature conservation value of ecological features (encompassing nature conservation designations, ecosystems, habitat and species) is an essential prerequisite step to allow ecological impact assessment of the Scheme. It is necessary to ascribe values against which the type and magnitude of potential impacts can be considered in order to identify any likely significant effects on fish in the subsequent EIA.

3.4.2 The method of evaluation has been developed with reference to the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018) (Ref 1-6). This guidance gives advice on scoping and carrying out environmental assessments and places appraisal in the context of relevant policies. Data received through consultation, desk-based studies and field-based surveys are used to allow ecological features of nature conservation value or potential value to be identified, and the main factors contributing to their value described and related to available guidance.

3.4.3 The value of fish that will be addressed in this appendix will be defined with reference to the geographical level at which the feature being assessed is considered to matter.

Table 3-1: Importance of ecological features

Importance of ecological features	Typical descriptors with examples of criteria
International or European	<p>An internationally designated site or candidate site including Special Protection Areas (SPA); potential SPAs (pSPAs); Special Areas of Conservation (SAC); candidate or possible SACs (cSACs or pSACs¹); and/ or Wetlands of International Importance (Ramsar sites).</p> <p>Biogenetic Reserves, World Heritage Sites and Biosphere Reserves.</p> <p>Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such.</p> <p>Resident or regularly occurring populations of species which may be considered at an international or European level² where:</p> <ul style="list-style-type: none"> a. The loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale. b. The population forms a critical part³ of a wider population at this scale.

Importance of ecological features	Typical descriptors with examples of criteria
	c. The species is at a critical phase ⁴ of its life cycle at this scale.
UK or National	<p>Sites designated at national UK level e.g. Sites of Special Scientific Interest (SSSI); Marine Protection Areas (MPAs) including Marine Conservation Zones (MCZs); and National Nature Reserves (NNR).</p> <p>Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such.</p> <p>Areas of key/ priority habitats identified in the <u>UK Post-2010 Biodiversity Framework</u> i.e. UK Biodiversity Action Plan (BAP), including those published in accordance with Section 41 of the Natural Environment and Rural Communities Act (2006) and those considered to be of principal importance for the conservation of biodiversity.</p> <p>Areas of ancient woodland e.g. woodland listed within the Ancient Woodland Inventory.</p> <p>Resident or regularly occurring populations of species which may be considered at a national or UK level⁵ where:</p> <ol style="list-style-type: none"> The loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale. The population forms a critical part of a wider population at this scale. The species is at a critical phase of its life cycle at this scale.
Regional	<p>Habitats or populations of species of value at a regional level (e.g. East Anglia).</p> <p>Areas of key or priority habitat identified as being of Regional value in the appropriate Natural Area profile (or equivalent) now referred to as the National Character Area (NCA).</p> <p>Key or priority habitat or species listed within the Highways England / Highways Agency BAP.</p> <p>Resident or regularly occurring populations of species which may be considered at a regional level⁶ where:</p> <ol style="list-style-type: none"> The loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale. The population forms a critical part of a wider population at this scale. The species is at a critical phase of its life cycle at this scale.
County or Unitary Authority or District	<p>Habitats or populations of species of value at a County (i.e. Cambridgeshire) level or District (i.e. South Cambridgeshire).</p> <p>Designated sites, such as County Wildlife Sites (CWS), Local Wildlife Sites (LWS) or Sites of Importance for Nature Conservation (SINCs), and Local Nature Reserves (LNRs) designated in the county or unitary authority area i.e. District context.</p> <p>Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such.</p>

Importance of ecological features	Typical descriptors with examples of criteria
	<p>Areas of key/ priority habitats identified in the Local Biodiversity Action Plan (LBAP).</p> <p>Resident or regularly occurring populations of species which may be considered at a County (or District) level⁷ where:</p> <ol style="list-style-type: none"> The loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale. The population forms a critical part of a wider population at this scale. The species is at a critical phase of its life cycle at this scale.
Local	<p>Habitats or species populations of value in a local (i.e. within approximately 5 kilometres of the site) context.</p> <p>Designated sites include LNRs designated in the local context.</p> <p>Trees that are protected by Tree Preservation Orders (TPOs).</p> <p>Areas of habitat, or populations or communities of species considered to appreciably enrich the habitat resource within the local context (such as veteran trees), including features of value for migration, dispersal or genetic exchange.</p>
Site	<p>Habitat that is of value in the context of the site only.</p> <p>Populations of common and widespread species.</p> <p>A degraded and, or impoverished example of a common or widespread habitat in the local area.</p>
<p>*As well as assigning importance there is also a need to identify all legally protected species that could be affected by the Scheme in order that measures can be taken to ensure that adherence to the relevant legislation is observed. This may include the adoption of mitigation and appropriate licensing which is acceptable to Natural England.</p> <p>¹ pSACs are sites which have been formally advised by to UK Government but have not yet been submitted to the European Commission. These sites should be valued at an international (European) level on the basis that they meet the relevant selection criteria for a SAC but are not yet designated as such.</p> <p>² Such species include those listed within the Directive 2009/147/EC on the Conservation of wild birds (i.e. EC Birds Directive) (codified version of Council Directive 79/409/EEC as amended) or animal/ plant species listed within Council Directive 92/43/EEC on the Conservation of natural habitats and of wild flora and fauna (i.e. Habitats Directive).</p> <p>³ Such populations include sub-populations that are essential to maintenance of metapopulation dynamics e.g. critical emigration and, or immigration links between otherwise discrete populations.</p> <p>⁴ Seasonal activity or behaviour upon which survival or reproduction depends.</p> <p>⁵ Species which may be considered at the UK or national level including animals and plants which receive legal protection on the basis of their conservation interest (those listed within the Wildlife and Countryside Act 1981 (as amended) Schedule 1, 5 and 8); species listed for their principal importance for biodiversity (in accordance with the Natural Environment and Communities Act 2006 Section 41 England); priority species listed within the UK Post 2010 Biodiversity Framework (i.e. UKBAP); or species listed within the Red Data Book.</p>	

Importance of ecological features	Typical descriptors with examples of criteria
	<p>⁶ Such species include those listed in the appropriate Natural Character Area and key/ priority species.</p> <p>⁷ Such species include those at county level (i.e. Bedford or Cambridge) including unitary authority area i.e. District level (i.e. Bedford Borough Council); as listed on the LBAPs; and listed as a county designated site.</p>

3.5 Competency of surveyors

3.5.1 Ecologists who worked on this project are members of (at the appropriate level) the Chartered Institute of Ecology and Environmental Management (CIEEM) and, or the Institute of Fisheries Management (IFM) and follow the respective codes of professional conduct Ref 1-4 when undertaking fish surveys.

Limitations

3.5.2 Information obtained during the desk study was dependent upon people and organisations having made and submitted records for the area of interest. As such, a lack of records for a particular habitat or species does not necessarily mean that the habitat or species does not occur in the Survey Area. Likewise, the presence of records for particular habitats and species does not automatically mean that these still occur within the area of interest or are relevant in the context of the Scheme.

3.5.3 The 100 metre stretch of Hen Brook was selected as the habitats present were representative of the entire brook. However, it is unlikely that all fish species found in the Brook were caught. The lack of minor species such as Three-spined Stickleback (*Gasterosteus aculeatus*) and Bullhead is not typical of a waterbody like this. Dense macrophyte growth in some areas, especially at the entrance to the culverted section, could prevent migratory species such as European Eel from accessing the upstream surveyed section.

3.5.4 Water levels were low reducing the amount of wetted area and potentially preventing access for fish to upstream sections of Hen Brook.

4 Results

4.1 Desk study

- 4.1.1 While historic aquatic ecology data covering fish were requested from the Environment Agency, this was very limited and only available for Hen Brook near to St Neots and the River Great Ouse <1 kilometre (<0.6 miles) from the Scheme.
- 4.1.2 A review of the historical fish data provided by the Environment Agency (2011) for Hen Brook found the presence of eight fish species, all of which were common coarse fish, dominated by Roach (*Rutilus rutilus*), as well as Rudd (*Scardinius erythrophthalmus*), Chub (*Leuciscus cephalus*), Dace (*Leuciscus leuciscus*), Bleak (*Alburnus alburnus*), Tench (*Tinca tinca*), Pike (*Esox lucius*), Common Bream (*Abramis brama*), Gudgeon (*Gobio gobio*), Silver Bream (*Abramis bjoerkna*), Perch (*Perca fluviatilis*) and Roach - Common Bream hybrid (*Rutilus rutilus x Abramis brama*). The species recorded are ubiquitous and have a preference or tolerance of moderate to low energy lowland watercourses. None of the fish species present were rare or protected, and no migratory salmonids were recorded.
- 4.1.3 Environment Agency data from National Fish Populations Database (NFPD) (2018) for the River Great Ouse show European Bullhead, Spined Loach and European Eel are prevalent throughout the river and within the area of the Scheme. Hen Brook directly discharges into the River Great Ouse so there is a chance they could be present within the Hen Brook catchment. River or Brook Lamprey have been recorded in the headwaters of the River Great Ouse, but the last record in 1947 was at Tempsford which is approximately 1 kilometre (0.6 miles) upstream of the point at which the Scheme crosses the River Great Ouse. Atlantic Salmon has not been recorded in the River Great Ouse since 1880 and there was an unconfirmed report of a Burbot in 1969. Brown Trout have also not been recorded within the location of the Scheme. Details for these records are provided in **Appendix 8.1** of the Environmental Statement [TR010044/APP/6.3].
- 4.1.4 A review of records for Spined Loach in the River Great Ouse and other watercourses and waterbodies in the surrounding region identified that Spined Loach is widespread within the catchment including up and downstream of the point at which the Scheme crosses the river (**Figure 2**). This species has not been recorded within close proximity to the Scheme, the closest record being from the River Ivel downstream of Blunham (Environment Agency data from 1995). It is also known from the River Kym, a tributary of the River Great Ouse and from Little Paxton Pits, both downstream of the Scheme (**Figure 2**). Taking a precautionary approach, Spined Loach is assumed to be present or potentially present in the section the River Great Ouse crossed by the Scheme.

- 4.1.5 In addition to being a species listed on Section 41 of the NERC Act, Spined Loach is an interest feature of the Ouse Washes SAC, which is hydrologically connected to the Scheme, 43.2 kilometres downstream of it, having passed through St Neots, Huntingdon and St Ives. Given the distance between the Scheme and the Ouse Washes SAC and the frequency of occurrence of populations of this fish in between the Scheme and the SAC, the Spined Loach in the River Great Ouse in the section crossed by the Scheme has no connection with the Ouse Washes population of Spined Loach and this species is not considered any further in the context of this SAC.
- 4.1.6 The Water Framework Directive status for the waterbodies is included in detail in **Appendix 8.4** of the Environmental Statement [TR010044/APP/6.3]. The Environment Agency only provided data for Hen Brook and the River Great Ouse, though it is likely that the monitoring points for the biological elements are not within the vicinity of the Scheme. It is therefore not possible to provide any further clarification on the sensitivity of species and communities present.

4.2 Field survey

- 4.2.1 Hen Brook lies within arable land and has been realigned and over-deepened along much (> 33%) of its length explaining at least in part the low water level. In addition, large parts of the Brook are impounded by culverts and reinforced concrete banks. The channel is moderately shaded by deciduous trees, mainly on the right bank (50%).
- 4.2.2 On average the watercourse is 1 meter wide and 0.3 meters deep. The section at the most downstream stretch is culverted for around 30 metres and there is also a minor bridge over the brook upstream of the 100 meters survey stretch. Flow throughout was uniform with no pool or riffles were present. The channel substrate was dominated by silt (50%) with some gravel (20%) and sandy (30%) areas. There were in parts dense macrophyte growth choking up areas of the brook with species including Common Duckweed (*Lemna minor*), Branched Bur-reed (*Sparganium erectum*) and Fool's Watercress (*Apium nodiflorum*). Himalayan Balsam (*Impatiens glandulifera*) was also present along the banks in isolated areas.
- 4.2.3 A total of 45 individual fish were caught over the 100 metres section with Roach dominating the catch with 28 individuals, followed by Chub (13 individuals), Perch (three individuals) and a single Dace (**Table 4-1**).
- 4.2.4 No invasive non-native fish species or protected fish species were caught during this survey.
- 4.2.5 The fish assemblage found at Hen Brook is typical of a lowland tributary, with all species caught having been found in Hen Brook previously in Environment Agency fish surveys.

Table 4-1: Fish species caught at Hen Brook, October 2018 (Fork lengths to the nearest mm).

Total Numbers and Mean Length	Chub	Perch	Roach	Dace
	215	164	136	176
	168	174	190	
	176	173	151	
	229		171	
	181		144	
	219		149	
	229		135	
	193		155	
	205		123	
	158		176	
	197		149	
	192		166	
	183		132	
			165	
			143	
			145	
			137	
			175	
			158	
			159	
			183	
			156	
			163	
			183	

Total Numbers and Mean Length	Chub	Perch	Roach	Dace
			141	
			147	
			140	
			132	
Total Number	13	3	28	1
Mean length (mm)	196	170	154	176

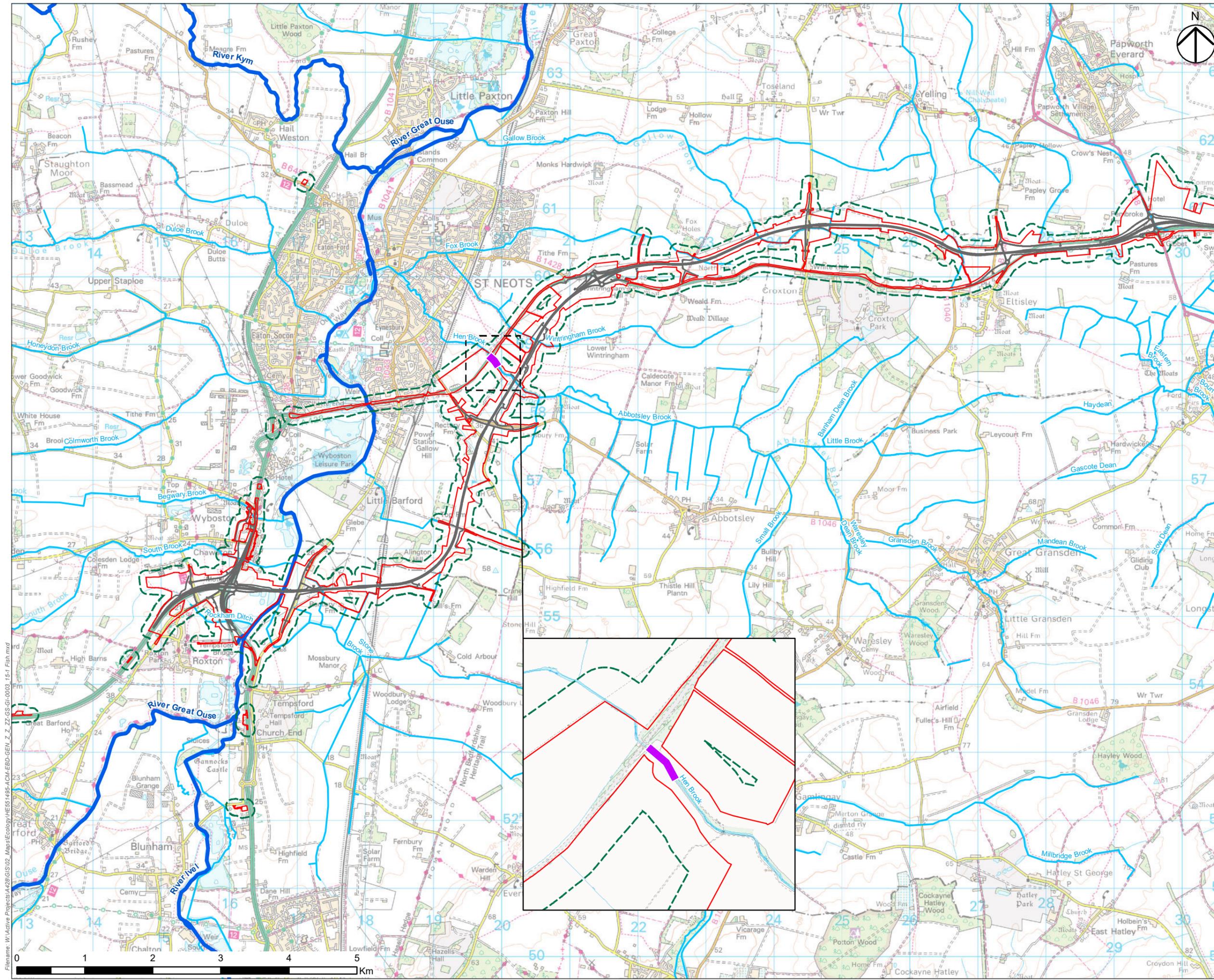
5 Summary and conclusions

- 5.1.1 The River Great Ouse is designated as a County Wildlife Site by both Bedfordshire and Cambridgeshire and is an integral part of the Ouse Valley Living Landscape scheme which seeks to expand and link existing nature reserves along the river corridor by working in partnership with local authorities, local communities, landowners and other organisations. The river is a heavily managed lowland river that has been modified for navigation and flood storage purposes throughout its lower reaches, such as in the area of the Scheme.
- 5.1.2 The fish assemblage of this river is typical of many modified rivers in lowland England with an abundance of coarse fish (**Appendix 8.1** of the Environmental Statement [TR010044/APP/6.3]). Barbel is noted as being particularly prevalent, and the protected fish species European Eel, Bullhead and Spined Loach are also found here. Therefore, the fish species of the River Great Ouse is of Regional value in terms of nature conservation importance and consideration will need to be given to potential impacts during construction, e.g. vibration, drainage alteration and pollution from spills. Operation-phase impacts could include light spill, shading and pollution from spills.
- 5.1.3 Hen Brook is a heavily modified waterbody that has been over-deepened and re-aligned through much of the length surveyed and culverted in its downstream section for approximately 30 meters. Collectively, these modifications can limit the availability of valuable aquatic habitat for fish. However, no protected or invasive non-native fish species were caught during the survey in October 2018 and therefore the fish species of the brook are of Local value in terms of nature conservation importance.
- 5.1.4 No other watercourses or waterbodies within the zone of influence of the Scheme were assessed as requiring assessment.
- 5.1.5 No further surveys are recommended.

6 References

- Ref 1-1. Jacobs UK Ltd. (2017) Advanced Stage 3 Ecology Survey Scope, April 2017.
- Ref 1-2. Natural England, National Character Area (NCA) Profile: 88 Bedfordshire and Cambridgeshire Claylands. Available at:
<http://publications.naturalengland.org.uk/publication/5091147672190976>
accessed June 2017.
- Ref 1-3. Young, N. (2018) Central Bedfordshire Local Plan 2015 – 2035. Shaping where you live 2035. Central Bedfordshire Council Local Plan 2035. January 2018. Available at:
https://www.centralbedfordshire.gov.uk/info/45/planning_policy/468/local_plan. Accessed November 2020.
- Ref 1-4. Professional Code of Conduct. Chartered Institute of Ecology and Environmental Management (CIEEM), January 2019.
- Ref 1-5. South Cambridgeshire District Council (2009) Local Development Framework Biodiversity Supplementary Planning Document (Adopted 2009). Available at:
<https://www.scambs.gov.uk/planning/local-plan-and-neighbourhood-planning/biodiversity-spd/>. Accessed November 2020.
- Ref 1-6. Chartered Institute of Ecology and Environmental Management (CIEEM) (2018), Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. September 2018.
- Ref 1-7. Beaumont, W.R.C, Taylor, A.A.L., Lee, M.J., & Welton J.S. (2014) Guidelines for Electric Fishing Best Practice. Environment Agency, R&D Technical Report W2-054/TR.
- Ref 1-8. Highways England (2019) LA 108 Biodiversity. Available at:
<http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol11/section3/LA%20108%20Biodiversity-web.pdf>.
- Ref 1-9. Winter, H.R. 1997. The fish of the Bedfordshire Great Ouse. Bedfordshire Naturalist, 51, (1), 49-52.

Figure 1 – Watercourses and Location of Fish Sampling Section on Hen Brook



- NOTES
- LEGEND
- Order Limits
 - The Scheme
 - - - Survey Area (100m)
 - Fish survey section
 - River course
 - other watercourse

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Purpose of Issue

DCO APPLICATION

Client
 Highways England
 Woodlands
 Manton Lane
 Manton Industrial Estate
 Bedford
 MK41 7LW

Development Consent Order Number

TR010044

Project Title

**A428 BLACK CAT
 TO CAXTON GIBBET
 IMPROVEMENTS**

Drawing Title

**FIGURE 1
 WATERCOURSES AND LOCATION
 OF FISH SAMPLING SECTION ON
 HEN BROOK**

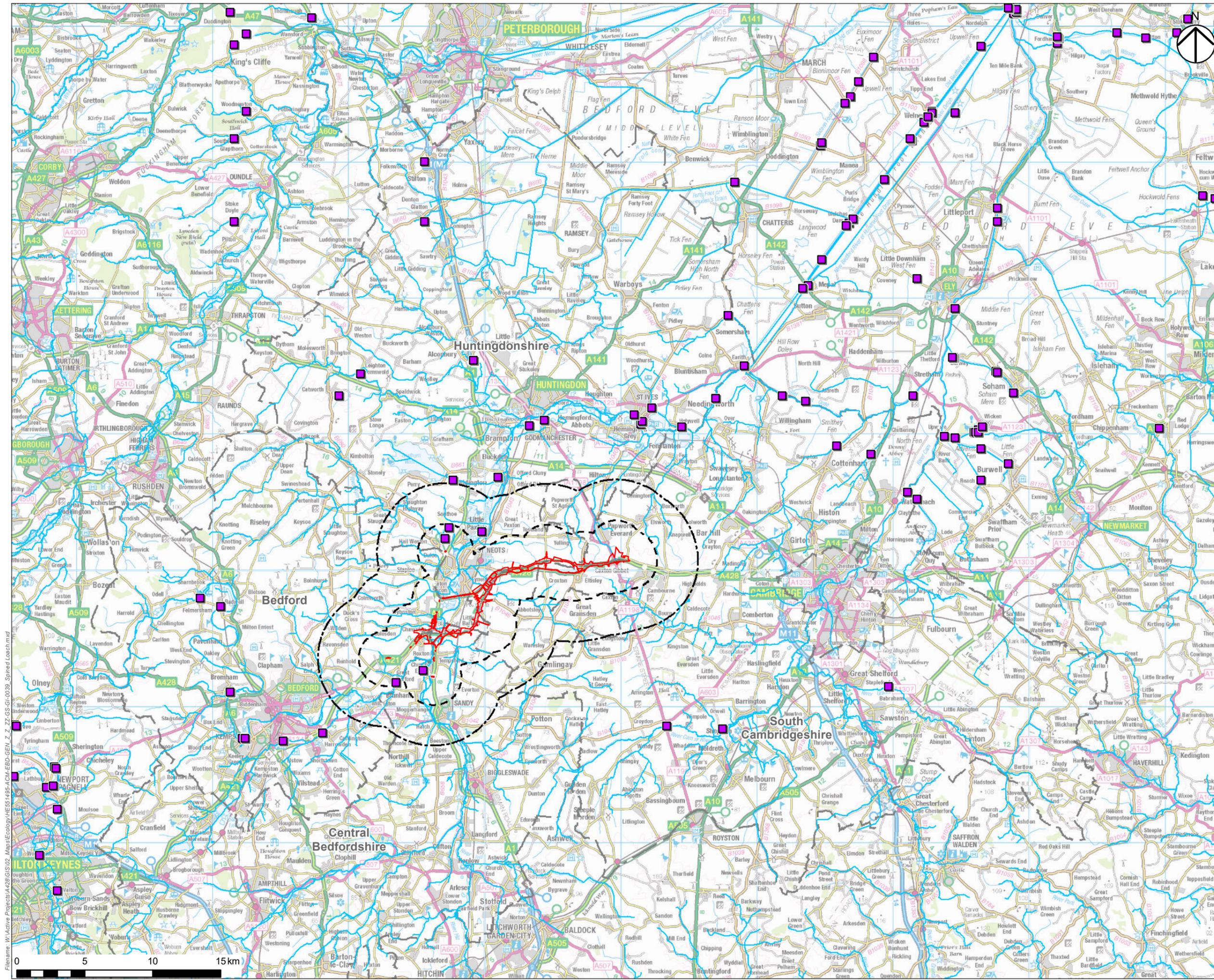
Designed	Drawn	Checked	Approved	Date
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60541541	D7			
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Figure 2 – Spined Loach Records



NOTES

LEGEND

- Order limit
- The Scheme
- 2km Order Limits buffer
- 5km Order Limits buffer
- Spined Loach record

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**FIGURE 2
SPINED LOACH RECORDS**

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