Oxford Flood Alleviation Scheme

Environment Agency

Otter Survey 2018

IMSE500177-CH2-XX-00-SU-EN-0714 | 01

June 2021

Oxford Flood Alleviation Scheme

Project No:	684232CH
Document Title:	Otter Survey 2018
Document No.:	IMSE500177-CH2-XX-00-SU-EN-0714
Revision:	01
Date:	June 2021
Client Name:	Environment Agency
Client No:	IMSE500206
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File Name:	Otter Survey

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Document history and status

Revision	Date	Description	By	Review	Approved
0	10.10.18	1st Draft	Amanda Baker, Thomas Moore	Debbie MacKenzie	
1	10.06.21	Final	Amanda Baker	Debbie MacKenzie	Phil Marsh

Contents

1. Introduction

1.1 Background

Jacobs has been commissioned by the Environment Agency to undertake a survey for potential otter *Lutra lutra* holts and lying up sites, to inform details of the proposed Oxford FAS route as part of Oxford Flood Alleviation Scheme (FAS). The majority of this survey was to examine new areas not covered by the previous otter survey report (CH2M, 2016a) and to visit sites that were identified as potential otter holts and lying up sites.

The Oxford FAS is critical in reducing the long-term risk of flooding to residential and commercial properties in the floodplain. The principal component of the FAS is improvements to approximately 7km of the proposed route so as not to accelerate the speed at which the floodplain can drain. This may also be augmented by improvements to approximately 1km of other channels.

An initial otter survey was carried out between July and September 2016 (CH2M, 2016a) which identified potential otter holt and lying up sites. No active holts were identified at this time. This 2018 survey was undertaken on the recommendation of the Ecological Appraisal (CH2M, 2015) and the subsequent Ecological Appraisal Summer 2016 (CH2M, 2016b), which identified the need for further species-specific ecological surveys.

1.2 Objectives

Otter are known to inhabit the River Thames (also known as the River Isis) through Oxford and connecting watercourses. The main aim of the 2018 survey was to assess the wider habitat suitability (within a 200m buffer zone around the scheme site boundary encompassing current design) and to determine the locations of any holts or resting places and gather evidence, by recording field signs (otter prints, spraints, feeding remains);

The objective of this otter survey was to:

- Survey for evidence of otter in areas not previously surveyed due to a change in the scheme design or areas not previously accessible; and
- Visit potential otter holts and lying up sites previously identified in the summer of 2016, determine if they are in active use, and re-examine the status of each resting site.

1.3 Ecology of Otter

Otters are found throughout Britain in aquatic and marine habitats including rivers, small streams, ditches, ponds, lakes, marshes, reed beds, estuaries and coastal waters, with an abundant, varied supply of food, plenty of bankside vegetation and clean water. They are also now found in urban areas.

Otters are extremely territorial and solitary animals. Active largely at dusk and night, they usually rest in holts in or near to riverbanks, often within a tree root system, a hole in a bank or under a pile of rocks, caves, or manmade features such as drains. Otters will also rest above ground in vegetation, creating flattened areas (couches). The diet of otters is mainly fish but also crustaceans, frogs, voles and aquatic birds and they often travel over large tracts of territory. A dog (male) otter may cover around 18km of river habitat, marking their range by depositing spraint (faeces) in prominent places.

Otters breed just once every two years with cubs dependent on their mother for a year. In England, breeding can occur throughout the year, typically with one to three cubs a litter. Breeding areas are often traditional sites that otters will return to year after year.

Otters are vulnerable to disturbance. Particular activities that may pose significant potential harm include the following: -

- road schemes near or crossing watercourses;
- maintenance of water bodies and associated features e.g. bridges and culverts;
- impacts on banks and adjacent habitats e.g. vegetation removal;

- tree management;
- increased access for people and dogs; and
- pollution of watercourses.

1.4 Legislation & Policy

Otters are protected under Schedule 5 of the Wildlife and Countryside Act (1981) as amended, and The Countryside and Rights of Way Act (CRoW Act, 200), and are listed on Schedule 2 of the Conservation of Habitats and Species Regulations 2010. The otter is listed on Appendix 1 of CITES, Appendix II of the Bern Convention and Annexes II and IV of the Habitats Directive; under this legislation, otters and their places of shelter are protected, and it is an offence to:

- Intentionally kill, injure or take an otter;
- Keep, transport, sell or exchange any live or dead otter or any part of an otter;
- Intentionally or recklessly disturb an otter in its place of shelter; and
- Intentionally or recklessly damage, destroy or obstruct access to a place of shelter.

The otter is also a Species of Principal Importance under Section 41 of the Natural Environment and Rural Communities Act 2006. Many typical otter habitats (for example, wet woodlands, reed beds and ponds) are also classed as Habitats of Principal Importance.

2. Study Methodology

2.1 Desk Study

A desk study was carried out as part of the Ecological Appraisal (CH2M, 2015), in which records of protected species, including otter, were provided by Thames Valley Environmental Records Centre (TVERC) in 2015. These records, along with information obtained from the Multi-Agency Geographic Information for the Countryside website (MAGIC), were consulted to locate water courses and habitats that may be suitable for otter holts within and adjacent to the proposed scheme.

2.2 Field Survey

A review of the 2016 otter survey, which covered approximately 36.3km of watercourse, was undertaken to identify areas not previously surveyed for otter and to target a repeat survey of potential otter holts and lying up sites. Surveyors noted any field signs including prints, spraints, urination sites, feeding/prey remains, slides, pathways and any additional likely or potential holts and resting places were visually searched for. Where access was restricted, potential holts and resting areas were viewed from the opposite bank without the need to enter the water.

The otter survey was undertaken by three teams of experienced ecologists:

- Amanda Baker (Senior Ecologist, CH2M/Jacobs) and Graham Scholey (Environment Agency Technical Lead) on the 02/02/2018;
- Amanda Baker with Declan Forde (Graduate engineer) on the 26/07/18; and
- Thomas Moore (Senior Ecologist, CH2M/Jacobs) and Emile Gorse (Ecologist, CH2M/Jacobs) on 04/07/18 and 05/07/18.

The survey was undertaken over these time periods to capture any seasonal variation in the habitats that could be used by otter and due to access restrictions, which are further expanded upon in the constraints and limitations section.

2.2.1 Otter Resting Sites

A description of different otter resting sites (Roper et al 2007) (i.e. any site that an otter uses to stop when not engaged in foraging or commuting) is provided below in Table 2.1.

Table 2.1 Otter Resting Sites

Otter Resting Site	Description
Natal holt	Discreet holt site that is used by the female to birth cubs, often on small feeder streams or some distance from water. Mother and cub remain for three months after birth before moving onto secondary holt. Natal holts are extremely difficult to locate without radio-telemetry / long term surveillance as minimal signs of activity except for bedding.
Breeding site	An area of land, or open water and land, large enough to provide a breeding otter with the following: security from disturbance; one or more potential natal den sites; play areas for cubs; no risk of flooding; and access to a good food supply. Breeding sites may be large and are particularly sensitive to disturbance as young cubs are at risk out of the natal holt. Nursery areas within breeding sites show high levels of cub activity, e.g. evidence of play and learning, paths around or over obstacles, flattened patches of vegetation, grooming hollows, spraint stations, signs heaps and feeding remains. Holts in these areas are unlikely to be the primary natal holt where cubs where born.
Grooming hollow	Depressions from otter cleaning and grooming activity. Often located in soft sand / fine gravel / bracken, although rabbit warrens or old badger setts can be used too.

Otter Resting Site	Description
Couch	Above ground area where otter can lie up / groom. Often a simple swirl or depression in tall grasses, or may be covered in grass / bracken / reeds and sometimes contain bedding. In very isolated locations, females have been known to birth cubs in some couches although this is considered rare.
Hover	Bolt holt / ledge along bankside used for temporary cover when exiting the water. Distinguishes a site from a secluded holt where they are likely to rest up for long periods (during the day in river systems or at night in coastal areas). Back of the hover can be readily seen, footprints, feeding evidence and/or spraints often visible.

2.2.2 Resting Site Status

The status of resting sites is ranked using the scale below in Table 2.2. Resting sites (Roper et al 2007) with a higher position in the hierarchy will be of greater importance and therefore the loss/disturbance of these structures/features is unlikely to be significant in terms of individual occupying such site and the local otter population.

Table 2.2 Otter Resting Sites

Resting Site Scale	Description
High	Abundance of spraints that are of a mixed age-range indicating high levels of activity. May also include large spraint mounds or well used grooming hollows and have a pronounced otter odour. Rarely, the spraints are old with no signs of recent activity but of such abundance to indicate an important feature used over a long period of time. The site affords a high degree of cover and is usually coupled with key features such as freshwater and abundance of prey. May be suitable as breeding area, potentially with nursery habitat suppling pools for swimming and hunting practice and may afford safe features for provision of natal holt. Paths or slides leading to/from feature well-worn and pronounced. Usually available throughout the year and at high tide and low tide/flow. However, in certain situations, elaborate couch features may only be used during the summer months only but are occupied year after year which also indicates a high status. Loss/disturbance of such a feature will often be considered significant in terms of individual and local population.
Moderate	Structure/feature containing mixed age-range of spraints, but not in significant quantities. Cover may be limited, or the site may only be suitable at certain times of the year (may not be available at high tide/flow). Paths may be present leading to/from the features but are unlikely to be overly pronounced. Unlikely to be suitable as breeding/natal site but will afford suitable seclusion as a resting site and may be linked to other important features within the territory (feeding/grooming/breeding areas). Loss / disturbance of this feature will be determined by the availability of more suitable or well used sites within the territory.
Low	Limited evidence of activity within structure/feature, i.e. low number of spraints present / limited age range. Not suitable as breeding/natal site and unlikely to afford suitable seclusion to form an important resting site for prolonged periods. Site is likely to provide temporary refuge only when moving through territory as connectivity may be limited to freshwater / foraging areas. Loss/disturbance of this feature is unlikely to be significant in terms of individual or local otter population.

2.2.3 Caveats & Limitations

Otters will range over large distances, males covering 40km and breeding females ranging over 15km. The latter could be considered to conceal their use of a den decreasing sprainting and inhabiting secure well-hidden sites, so finding signs of otter can be difficult. Therefore, the desk study including the collation of historic records and an overall assessment of the habitat suitability (including for breeding) is undertaken.

A number of water courses were not accessible (either fully or partially) at the time of the survey due to health and safety reasons (i.e. working near water), land access permissions, and/or dense vegetation obscuring view/physical access of the respective banks. Therefore, there is potential for signs of activity to have gone unrecorded. However, this is not considered to negatively affect the overall integrity of the survey results as this imitation has been incorporated into the proposed mitigation accordingly.

3. Results

3.1 Desk Study

The TVERC record search returned records of otter in the wider Oxford area within the River Thames and its tributaries. The nearest record for otter was on the Bulstake Stream, approximately 1.4km upstream from where the Bulstake enters the study area.

A MAGIC search did not return any records of past EPS licences for otter within the wider Oxford area.

There have been records of casual sightings from members of the Oxford project team (specifically at Willow Walk). The July 2014 field survey (URS, 2014) suggests that otter regularly use both Hinksey Stream and Weir's Mill Stream which are located in close proximity to the Didcot to Oxford line near Hinksey.

3.2 Field Survey

Otter activity was recorded throughout the northern environs of the scheme, whereas conditions rendered signs of activity much harder to locate in the larger water courses such as Weir's Mill Stream to the south. Details of the otter activity recorded is given in Table 3.1 below and presented in Figures 1 to 7 (Appendix A).

Further details relating to the type and status of any confirmed or potential resting sites along the surveyed sections of water course are provided in Table 3.2 below, following further survey.

Table 3.1 Evidence of Otter Activity

Feature /Target Note	Habitat description	Activity recorded							
		Potential holt / resting site[1]	Spraint	Urination site	Anal jelly	Footprint	Slide	Pathway	Feeding remains
1	Wytham / Seacourt stream (SP 4921 0662) – beside northern boundary of Seacourt Car Park and upstream environs. Scattered semi-mature crack Willow *Salix fragilis* and common emergent and tall ruderal vegetation such as reed canary-grass *Phalaris arundinacea*, purple loosestrife *Lythrum salicaria*, soft rush *Juncus effusus*, common nettle *Urtica dioica* and himalayan balsam *Impatiens glandulifera* (Schedule 9, W&CA 1981) present along the banksides. Access to left bank (LB) only).	✓	✓	-	-	✓	-	-	✓
2	Bulstake Stream (SP 4985 0643) – Binsey Lane bridge and upstream environs, wide shallow water feature with crack willow (mixed age range), nettle and purple loosestrife dominant along the surveyed section. Occasional sedges also present.	-	✓	-	-	-	-	-	-
3	Osney ditch (SP 5005 0630) – small footbridge at the end of Henry Road (beside Botley Park) leading downstream to Botley Road (A420) Road. Scattered young / semi-mature trees and scrub dominant along riverbanks with nettle underneath. Species composition includes field maple *Acer campestre*, hawthorn *Crataegus monogyna*, and blackthorn *Prunus spinosa* also present.	-	✓	-	-	-	-	-	✓
4	Weirs Mill Stream (SP 5214 0399 - SP 5213 0378) – small stretch bounding former landfill site, now used as horse paddocks. Scattered trees (willow dominant) and common native shrubs (such as hawthorn, hazel *Corylus avellana*) and blackthorn) and dense ruderal (such as reed canary-grass, purple loosestrife, meadowsweet *Filipendula ulmaria* and greater burdock *Arctium lappa*). Limited access due to dense vegetation to right bank (RB) only).	-	-	-	-	-	-	-	-
5	Weirs Mill Stream (SP 5214 0343 – 5208 – 0330) – Southern-by-pass (A423) bridge and downstream environs. Similar conditions to that above, increased woodland and scrub within the immediate environs. Limited access for health and safety reasons relating to large width and depth of the stream.	-	-	-	-	-	-	-	-
6	Dry ditch beside Whitehouse Road (SP 5118 0524) – from culvert end bordering a nearby play area north-westwards. Ash trees dominant, with scattered sycamore, bramble, hawthorn and hazel also present.	-	-	-	-	-	-	-	-

[1] Further details of the type and status of these sites are described in Table 5:2 below.

Feature /Target Note	Habitat description	Activity recorded							
		Potential holt / resting site[1]	Spraint	Urination site	Anal jelly	Footprint	Slide	Pathway	Feeding remains
7	Hogacre ditch (SP 4999 05355) – dry ditch, very over-grown with willow and scrub.	-	✓	-	-	-	-	-	-
8	Hinksey Stream, near Devil's Backbone bridge (SP 5120 0442). Feeding remains, what appear to be crayfish and footprints along a relatively open water course with good reed cover along the banks.	-	✓	-	-	✓	-	-	✓

Table 3.2 Otter Resting Site Summary

Feature/ Target Note	No of confirmed resting sites	Resting site type					Resting site status
		Natal holt	Breeding site	Grooming hollow	Couch	Hover	
1	2	-	-	-	1	1	Low
2	0	-	-	-	-	-	No confirmed resting sites although limited LB access
3	0	-	-	-	-	-	No confirmed resting sites although limited access
4	0	-	-	-	-	-	No confirmed resting sites although limited access
5	0	-	-	-	-	-	Negligible
6	0	-	-	-	-	-	No confirmed resting sites
7	0	-	-	-	-	-	No confirmed resting sites
8	0	-	-	-	-	-	No confirmed resting sites

3.3 Incidental Recordings

During the survey in February 2018, kingfisher *Alcedo atthis*, a Schedule 1 bird, was observed feeding at the confluence of Hinksey Stream with Seacourt Stream. Badger *Meles meles* hair was snagged on fencing near TN10 (Map 2 of 8, Appendix B of the Water Vole and Otter Survey Report, 2016). Badgers are afforded protection under the Protection of Badgers Act, 1992.

4. Mitigation, Recommendations and Conclusion

4.1 Mitigation and Recommendations

One couch and one hover were recorded, in close proximity to each other, in the northern part of the scheme along the Wytham/Seacourt Stream. If the works proposed are considered likely to damage, destroy or obstruct access to these resting places then a mitigation licence[2] is likely to be required.

A licence application must include a method statement to define how impacts on otters will be reduced and a reasoned statement provided to show that there is no satisfactory alternative.

The Oxford Flood Risk Management scheme is a phased development, and therefore the licence application should also provide:

- A master plan; and
- A habitat management and maintenance plan

Natural England decide whether to issue a licence within approximately 30 working days of receiving an application.

Suggested mitigation to avoid impacts on otters utilising a resting place within the proposed Oxford Flood Risk Management Scheme include:

- Retention and enrichment of otter habitats in the existing water bodies and associated banks (i.e. marginal planting. Trees such as willows, ash and oak could be planted along select locations of the riverbanks to provide shelter in the future. Emergent vegetation and dense scrub such as bramble should be encouraged to provide cover for otters. This may require livestock to be excluded from the riverbank by fencing except at discrete points where access to drinking water is required. Emergent vegetation is also important and so reeds and rushes should be encouraged. The restored vegetation should have a species composition that is comparable with the local riparian flora.)
- Installation of mammal ledges on existing bridges and culverts to allow for continued passage alongside water bodies;
- Where otters are known to be active, they should be excluded from the area by fencing and an alternative route provided to allow them to pass the site safely;
- Care must be taken to keep equipment, materials and portacabins from obstructing the otters' preferred route; and
- No night-time working with deep excavations covered.

Additional compensation measures, in accordance with current Government guidelines[3], which could be incorporated into the scheme design include:

- Construction of artificial holts; if a repeat survey confirms that there will be damage to or removal of a holt; and
- Restoring or improving habitats to compensate for those that will be lost as a result of the development.

No further confirmed resting places were noted within the survey extents at the time of the surveys although some banks were notably inaccessible for health and safety reasons. The lack of signs from these areas is representative of the habitat conditions and associated survey limitations and should not be interpreted as confirmation of likely absence.

[2] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/738471/A45-otters-mitigation-licence.pdf

[3] https://www.gov.uk/guidance/otters-protection-surveys-and-licences#mitigation-compensation-methods-and-avoiding-impacts

The surveyed area has considerable well-connected watercourses, most of which are well vegetated or adjacent to pockets of woodland. In summary there is ample suitable habitat for at least a small population of otters to be present within the proposed working area. The presence of otters, already known from previous site visits by the project team, was confirmed during the initial walkover/wading survey in 2016, on which spraints and feeding remains were encountered.

The detailed design should seek to avoid the potential otter holts and lying up areas identified in Table 3.1 and 3.2 above. However, further pre-construction surveys are recommended by the Environment Agency's Technical Specialists to confirm if these subsequently become active and will define the appropriate mitigation going forward. The overall design of the scheme should also aim to retain and where possible enhance connectivity of watercourses with respect to otters.

A pre-construction survey should focus on those features described in Table 3:2 and be carried out when bankside/riparian vegetation has receded (to allow ease of access) and aim to identify and confirm any ***active*** holts and resting/lying up areas. Sufficient time should be allowed to enable the finalisation of the mitigation strategy and apply for a license from Natural England if necessary, as described above.

If a holt or couch is identified during the construction of the scheme, an exclusion zone of 30m will need to be established, and all works therein suspended. Expert advice must then be sought to ascertain the status of any holt. If a breeding site is found during construction, all work should cease while advice is sought from Natural England. This may lead to a cessation of work for 10 weeks until the cubs are mobile and able to leave the area. Thorough pre-construction assessment work is therefore essential before commencement of works to avoid delays.

The mitigation described above should be considered further during the Environmental Impact Assessment process and measures will be recorded in the resulting Environmental Statement and the Environmental Action Plan (EAP) written for the scheme's construction.

Further mitigation measures have also been recommended in the Water Vole and Otter Survey Report (CH2M, 2016a).

4.2 Conclusion

Based on the otter activity recorded and status of the resting sites, otters are considered to be present in low numbers within and adjacent to the study area boundary. The proposed flood alleviation scheme has the potential to kill or injure otters and damage, disturb and fragment their habitat and places of shelter. Provided the works are undertaken in accordance with the recommendations of this survey report, current indications are that a significant adverse impact to these species can be avoided.

References

CH2M, 2015 Ecological Appraisal (Environment Agency)

CH2M, 2016a Water Vole and Otter Survey (Environment Agency)

CH2M, 2016b Ecological Appraisal Summer 2016 (Environment Agency)

Roper E. & Basset S., 2007. Otter Resting Site Status. Unpublished.

URS, 2014. Hinksey Flood Alleviation Scheme Otter and Water Vole Survey

Thames Valley Environmental Records Centre (TVERC)

The Multi Agency Geographic Information Service (MAGIC), www.magic.gov.uk

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/738471/A45-otters-mitigation-licence.pdf

Appendix A. Otter Survey Results - Figures 1 to 7

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TN1

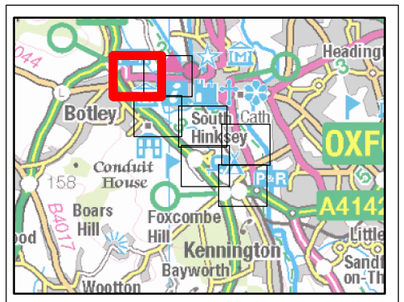
TN2

TN3

Seacourt Stream

Seacourt Stream

Bulstake Stream



Legend

Survey Boundary

Otter Activity

- Confirmed Resting Site
- Spraint
- Spraint and feeding remains
- Spraint; footprint; feeding remains.

Watercourses in Study Area

0 125 250

Metres

Rev	By	Chkd	Apprvd	Date	Description

Client
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Kings Meadow House
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Oxford Flood Alleviation Scheme

Drawing :
Otter Survey Results

Drawn By :	Martin Costello	Date: 23/11/2018
Checked By :	Amanda Baker	Date: 23/11/2018
Approved By :	Emily Hewitt	Date: 23/11/2018

Drawing No. : Figure 1

Revision -

Drawing Scale : 1:5,000

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N

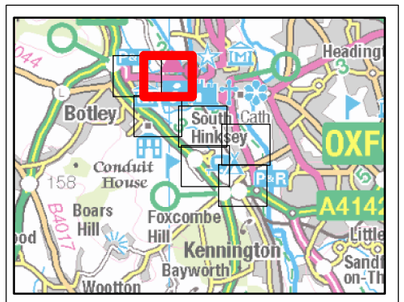
TN1

TN2

TN3

Seacourt Stream

Bulstake Stream



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Drawn By :	Martin Costello	Date: 23/11/2018
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Approved By :	Emily Hewitt	Date: 23/11/2018

Drawing No. : Figure 2
Revision : -

Drawing Scale : 1:5,000

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N

Seacourt Stream

Bulstake Stream

Bulstake Stream

Hogacre Ditch

Hinksey Stream

TN7

NEW BOTLEY

NORTH HINKSEY VILLAGE

Raleigh Park

Harcourt Hill

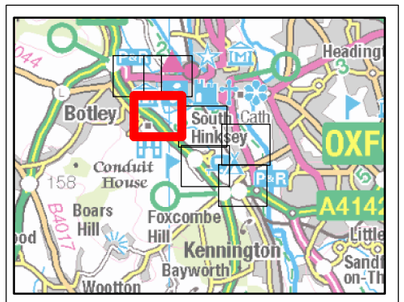
River Thames or Isis

Industrial Estate

Pavilion

St Peter's College Sports Ground

A34



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Drawn By :	Martin Costello	Date: 23/11/2018
Checked By :	Amanda Baker	Date: 23/11/2018
Approved By :	Emily Hewitt	Date: 23/11/2018

Drawing No. : Figure 3
Revision -

Drawing Scale : 1:5,000

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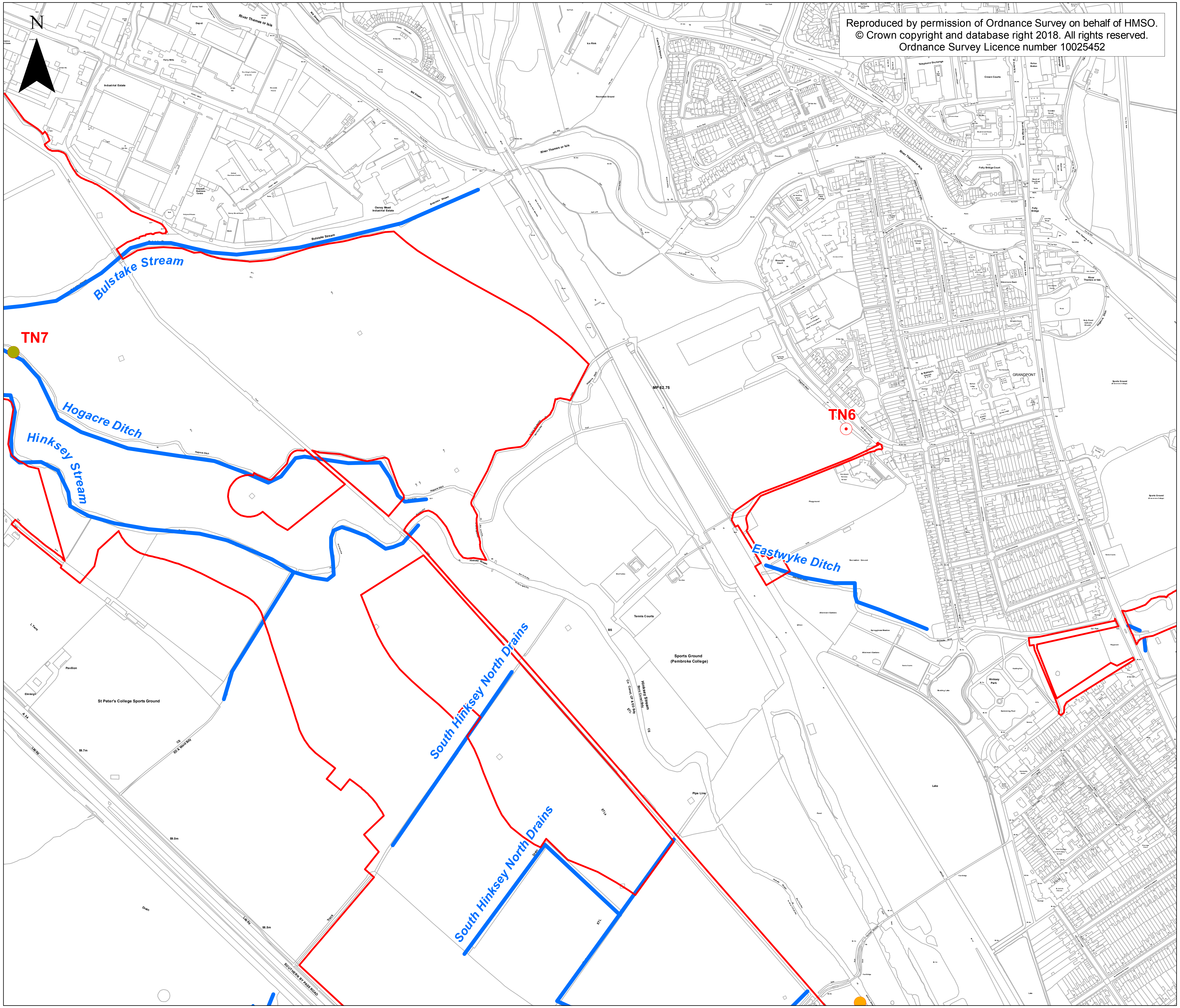

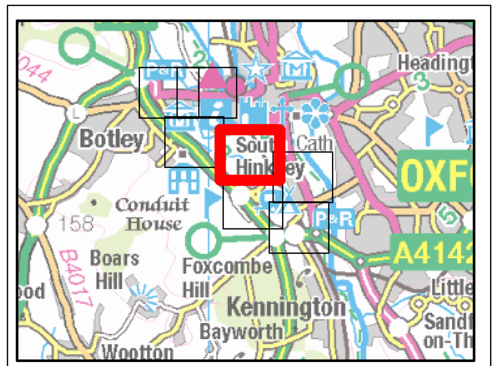

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Drawn By : Martin Costello Date: 23/11/2018
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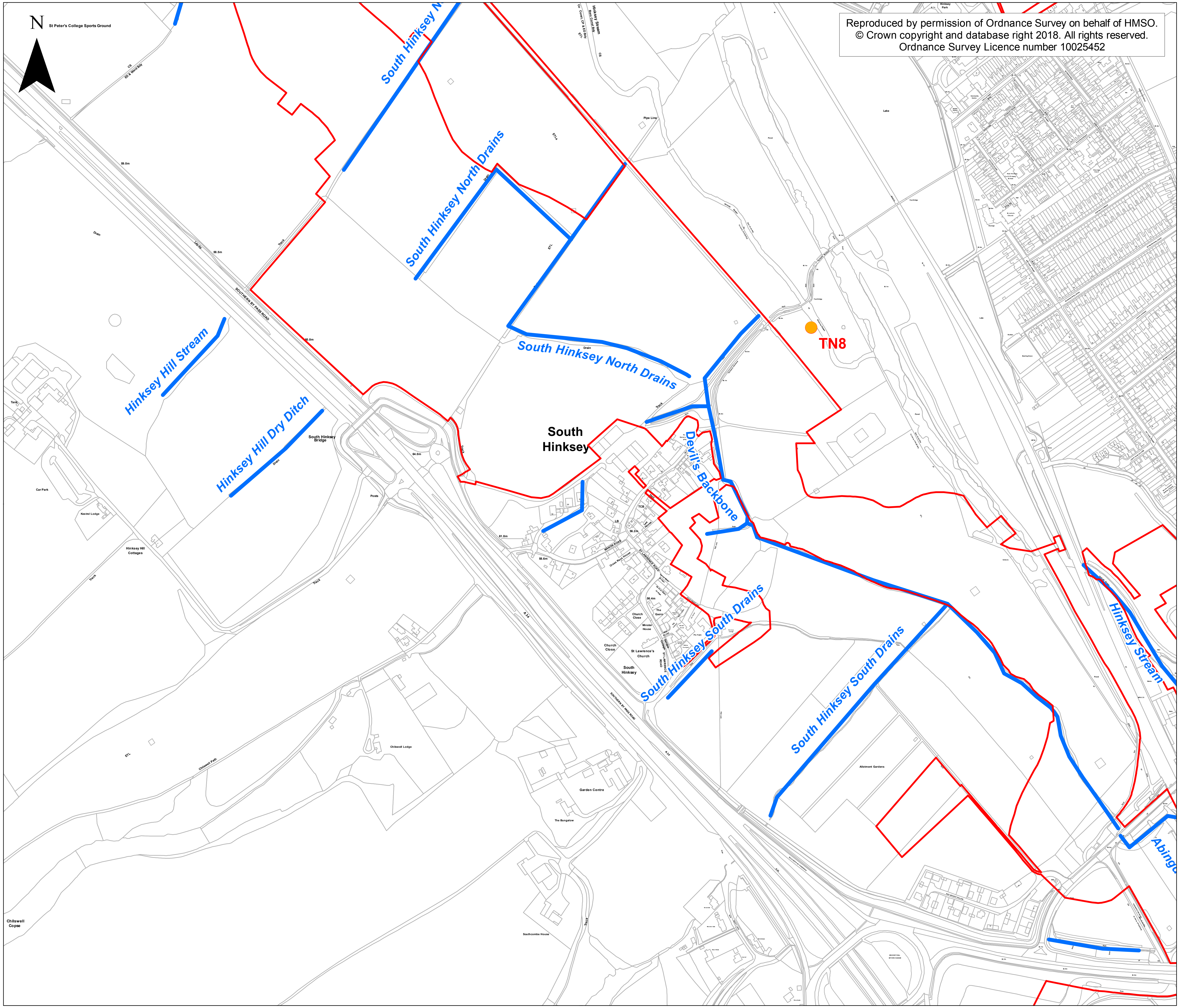
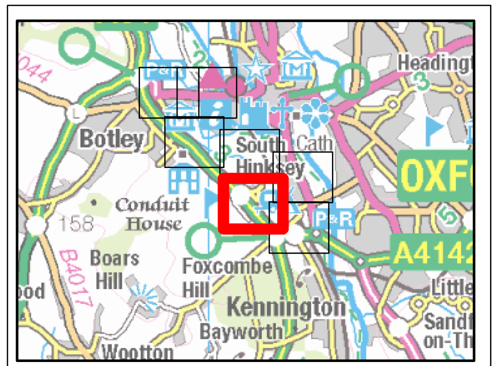
Approved By : Emily Hewitt Date: 23/11/2018

Drawing No. :	Revision
Figure 4	-

Drawing Scale : 1:5,000





Legend

Survey Boundary

Otter Activity

- Confirmed Resting Site
- Spraint
- Spraint and feeding remains
- Spraint; footprint; feeding remains.
- Watercourses in Study Area

0 125 250
Metres

Rev	By	Chkd	Apprvd	Date	Description

Client

Environment Agency
Kings Meadow House
Kings Meadow Road
Reading
RG1 8DQ

CH2M HILL
Burderop Park, Swindon, SN4 0QD
Tel: +44 (0)1793 812479 Fax: +44 (0)1793 812089
www.ch2m.com

Project :
Oxford Flood Alleviation Scheme

Drawing :
Otter Survey Results

Drawn By : Martin Costello Date: 23/11/2018
Checked By : Amanda Baker Date: 23/11/2018
Approved By : Emily Hewitt Date: 23/11/2018

Drawing No. : Figure 5
Revision -

Drawing Scale : 1:5,000

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N

Devil's Backbone

South Hinksey South Drains

South Hinksey South Drains

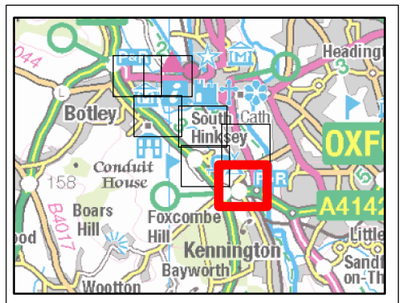
Hinksey Stream

Abingdon Road Drain

Hinksey Stream

TN4

TN5



Legend

Survey Boundary

Otter Activity

- Confirmed Resting Site
- Spraint
- Spraint and feeding remains
- Spraint; footprint; feeding remains.

Watercourses in Study Area

0 125 250

Metres

Rev	By	Chkd	Apprvd	Date	Description

Client

Environment Agency
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Project :

Oxford Flood Alleviation Scheme

Drawing :

Otter Survey Results

Drawn By :	Martin Costello	Date: 23/11/2018
Checked By :	Amanda Baker	Date: 23/11/2018
Approved By :	Emily Hewitt	Date: 23/11/2018

Drawing No. : Figure 6

Revision -

Drawing Scale : 1:5,000

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N

TN6

TN8

TN4

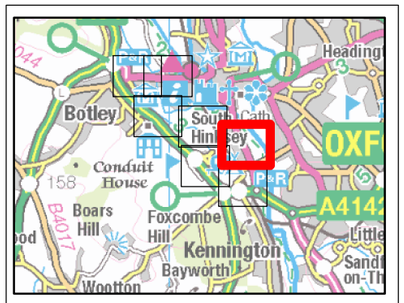
Eastwyke Ditch

Abingdon Drains

Abingdon Drains

South Drains

Hinksey



Legend

- Survey Boundary

Otter Activity

- Confirmed Resting Site
- Spraint
- Spraint and feeding remains
- Spraint; footprint; feeding remains.
- Watercourses in Study Area

0 125 250
Metres

Rev	By	Chkd	Apprvd	Date	Description

Client
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Project :
Oxford Flood Alleviation Scheme

Drawing :
Otter Survey Results

Drawn By :	Martin Costello	Date: 23/11/2018
Checked By :	Amanda Baker	Date: 23/11/2018
Approved By :	Emily Hewitt	Date: 23/11/2018

Drawing No. : Figure 7
Revision -

Drawing Scale : 1:5,000

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