

A47 Blofield to North Burlingham Dualling

Scheme Number: TR010040

Volume 6

6.2 Environmental Statement Appendices **Appendix 8.8 – Great Crested Newt Report**

APFP Regulation 5(2)(a)

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

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Infrastructure Planning

Planning Act 2008

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

A47 Blofield to North Burlingham
Development Consent Order 202[x]

ENVIRONMENTAL STATEMENT APPENDICES
Appendix 8.8 Great Crested Newt Report

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1. Introduction

1.1. Background

1.1.1. In June and July 2020 Sweco undertook great crested newt, hereafter referred to as GCN, surveys on and in proximity to the A47 between Blofield and North Burlingham. This is to inform the Environmental Statement (ES) Chapter at PCF Stage 3 for the A47 Blofield to North Burlingham Improvement Scheme.

1.1.2. The Scheme improvements will:

- improve accessibility to and around the region, reducing congestion and delays to enable more reliable journey times
- improve safety performance for all road users, contributing to a 40% reduction target in accidents across Highways England's roads over the implemented schemes' first five years in operation
- provide alternative access to local roads
- improve the environmental impact of traffic along the A47 route, particularly for the communities in the six scheme areas
- support economic growth in the Peterborough, Norwich and Great Yarmouth areas by improving overall road capacity

1.1.3. This baseline report presents the results of the GCN surveys undertaken between Blofield and North Burlingham in June and July 2020 in addition to detailing potential impacts of the proposed Scheme upon GCN and further survey and mitigation requirements.

1.2. Scheme description and location

1.2.1. 'The site' is located along the A47 between Blofield and North Burlingham, Norfolk and is located between grid ref TG 3349 1012 to the west and TG 3887 1019 to the east. It is proposed to:

- building a dual carriageway south of the existing A47
- connecting to the existing dual carriageway sections of the A47 to the east and west
- new, safer junctions at Yarmouth Road and the B1140:
 - a compact grade separated junction at B1140 with overbridge
 - new merge lane and closing the central reserve at Yarmouth Road Junction preventing right turns across traffic
 - new two way junction at Main Road, to the east of North Burlingham

- a new footway / cycleway connecting Blofield and North Burlingham and also across the B1140 junction
- a new overbridge east of Blofield
- returning the existing A47 to the local network
- introduction of lighting at the Yarmouth Road junction and a new lighting layout at the B1140 junction
- closure of an existing layby and provision of a new layby
- agricultural access track to south of new dual carriageway
- new drainage, boundary fencing, safety barriers and signage

1.2.2. The 'survey area' comprises of the proposed DCO boundary with a surrounding buffer zone of 500m.

1.3. Aims and objectives

1.3.1. These surveys are intended as an update to those GCN surveys previously undertaken in 2016 and 2017 (Amey, 2017) outlined in Section 2.1, in accordance with the Chartered Institute of Ecology and Environmental Management's ((CIEEMs) CIEEM, 2019) guidelines on the lifespan of ecological data.

1.3.2. The aims of the 2020 survey work and this report are to:

- determine the presence or likely absence of GCN in waterbodies within 500m of the site and subsequently determine the likely presence of GCN within the site
- determine the population size class of GCN if confirmed to be present
- assess the potential implications on the proposed Scheme if GCN were found to be present and inform the design of appropriate mitigation
- provide instructions for mitigation and/or further survey work, where necessary
- ensure that the required level of survey work is conducted to apply for a licence, should one be necessary

2. Ecological background

2.1. Previous studies

Desk study

- 2.1.1. A desk study was previously undertaken at PCF Stages 1 and 2 including the purchase of data from Norfolk Biodiversity Information Service (NBIS) which returned no records of GCN within the 2km study area (Amey, 2017).

Phase 1 habitat surveys

- 2.1.2. A phase 1 habitat survey was undertaken in 2016, and updated in 2017, within 100m of the outermost route options at PCF Stage 1, identifying standing water (ponds) within the 100m survey area (Amey, 2017).

Phase 2 great crested newt surveys

- 2.1.3. In 2016 and 2017, at PCF Stages 1 and 2 respectively, targeted phase 2 GCN surveys were undertaken. A total of 66 waterbodies within 500m of the outermost route options in 2017 at PCF Stage 2 were subject to habitat suitability index (HSI) assessment and eDNA (environmental DNA) surveys (Amey, 2017).
- 2.1.4. Four waterbodies were found positive for GCN eDNA. Three of these waterbodies were within, or very close to, the 500m survey area at PCF Stage 1 in 2016, however were slightly outside of the 500m survey area at PCF Stage 2 in 2017 (Amey, 2017).
- 2.1.5. Population size class surveys were undertaken on all four of the waterbodies found positive for GCN eDNA and one other waterbody which was identified in 2017 after the eDNA surveys had been undertaken (Amey, 2017).
- 2.1.6. The population size class surveys identified small populations of GCN in two waterbodies, which were just outside of the 500m survey area at PCF Stage 2 in 2017. No GCN were recorded in the three other waterbodies which were subject to population size class assessment surveys, one of which was not subject to eDNA and two of which were positive for GCN eDNA (Amey, 2017).

2.2. Legislation

- 2.2.1. The great crested newt is afforded protection under the Conservation of Habitats & Species Regulations (CHSR) 2017 (as amended), which applies to all of its life stages. The great crested newt is also listed on Schedule 5 of the Wildlife and Countryside Act (WCA) 1981 (as amended) which makes it an offence to:

- deliberately, intentionally or recklessly kill, injure or take a great crested newt
- deliberately, intentionally or recklessly take or destroy the eggs
- possess or control any live or dead specimen or anything derived from a great crested newt
- deliberately, intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a great crested newt
- deliberately, intentionally or recklessly disturb a great crested newt while it is occupying a structure or place which it uses for that purpose

Mistreatment

2.2.2. The Animal Welfare Act 2006 came into force in 2007 and places a duty of care on an individual responsible for an animal. The duty of care is placed on an individual to meet the welfare needs of the animal. The Act states that the following are an animal's welfare needs:

- A suitable environment
- A suitable diet
- The ability to exhibit normal behaviour patterns
- Needs it has to be housed with, or apart from, other animals
- Protection from pain, suffering, injury and disease

2.2.3. Should mitigation such as capture and translocation of animals be required as a result of the development, the Animal Welfare Act 2006 would apply.

2.2.4. This species is also protected by the Protection of Animals Act 1911, which prohibits any acts of cruelty or mistreatment.

3. Methodology

3.1. Desk study

3.1.1. At PCF Stage 3, for which the 2020 surveys were undertaken, a single route option has been chosen. The 'survey area' for these GCN surveys includes waterbodies within the proposed DCO boundary and a buffer zone of 500m in accordance with *English Nature's Great Crested Newt Mitigation Guidelines (2001)*. The GCN surveys previously undertaken in 2016 and 2017 (see Section 2.1) were to inform the proposed Scheme at the route options stage and as such the survey area for the surveys undertaken in 2016 and 2017, whilst still within 500m of the proposed Scheme, covered a larger geographical area. Therefore, a number of the waterbodies surveyed in 2016 and 2017 will be outside of the survey area for GCN surveys at this stage.

3.1.2. The following drawing was used to identify those ponds previously surveyed in 2017:

- *Amey ((a) 2017). A47 Schemes Blofield to North Burlingham GCN Survey Results. A47 Corridor – Stage 2. Figure 9.3. Drawing number: HE551490-AMY-EBD-BB_STG2-DR-EN-0005.*

3.1.3. The following sources of information were used to identify any further waterbodies present within the survey area:

- *Amey ((b) 2017) A47 Schemes Blofield to North Burlingham Phase 1 Habitat Survey. A47 Corridor – Stage 2. Figure 9.1a. Drawing number: HE551490-AMY-EBD-BB_STG2-DR-EN-0001.*
- *Amey ((c) 2017) A47 Schemes Blofield to North Burlingham Phase 1 Habitat Survey. A47 Corridor – Stage 2. Figure 9.1b. Drawing number: HE551490-AMY-EBD-BB_STG2-DR-EN-0002.*
- Ordnance Survey mapping
- Multi-Agency Geographical Information for the Countryside (*MAGIC*) maps
- Aerial imagery

3.2. Waterbody descriptions

3.2.1. During the site visits undertaken between 18 June and 2 July 2020 by Sweco, descriptions of each waterbody within the survey area were noted including information on water depth, water quality, bank profile, presence of aquatic, emergent and surrounding vegetation, as well as suitability of the surrounding terrestrial habitat to determine the waterbodies' suitability as breeding habitat for GCN. The assessment was based on guidance within *Langton T. E. S. et al, (2003)* and *ARG UK, (2010)*. Waterbodies within 500m of the site boundary but

having a significant barrier to newt dispersal between them and the site were excluded. Examples of significant barriers include motorways, major roads, busy railway lines, large expanses of bare habitat and fast-flowing rivers.

3.3. Habitat suitability index (HSI) assessment

3.3.1. In accordance with *English Nature's Great Crested Newt Mitigation Guidelines (2001)* waterbodies within 500m of the site were subject to HSI assessments undertaken between 18 June and 2 July 2020. The HSI assessment provides an objective method for assessing the suitability of a waterbody as habitat for GCN (*Oldham et al., 2000; ARG UK, 2010*). The system provides an index between 0 and 1, with 0 indicating unsuitable habitat and 1 optimal habitat. Ten suitability indices are used to calculate the index score, each representing a factor considered to affect GCN. These factors are listed and briefly explained below:

1. Location: that is where the waterbody is located in the British Isles. Lowlands are generally thought to be most suitable; suitability declines with increases in altitude.
2. Waterbody area: that is the water surface area of a waterbody. Suitability peaks at approximately 800m².
3. Waterbody drying: how often a particular waterbody dries out. Waterbodies which dry out more frequently are less suitable.
4. Water quality: an indication of water quality based on the invertebrate diversity present. High invertebrate diversity indicates high water quality and suitability.
5. Shade: an estimate of the total shaded perimeter of a waterbody. Shoreline shade below 60% is optimal.
6. Fowl: indication of impact by waterfowl. High waterfowl numbers are generally considered detrimental.
7. Fish: indication of fish abundance. High fish numbers are generally considered detrimental.
8. Waterbody count: based on the density of waterbodies occurring within 1km of a particular waterbody. Suitability is positively correlated with waterbody density.
9. Terrestrial habitat: based on the availability of suitable habitat in the waterbody vicinity, e.g. rough grassland, scrub and woodland. For this assessment, the categories provided in *ARG UK, (2010)* were used. This differs from the assessment criteria by *Oldham et al. (2000)* and is based on work by *Lee Brady (unpublished)*.
10. Macrophytes: based on an estimate of the percentage cover by emergent and aquatic vegetation. Suitability peaks at between 70% and 80% cover.

3.3.2. The results are also compared against a categorical scale developed by *Lee Brady (unpublished)*. Results from individual waterbodies are categorised as follows:

- <0.5 = poor
- 0.5 – 0.59 = below average
- 0.6 – 0.69 = average
- 0.7 – 0.79 = good
- >0.8 = excellent

3.3.3. Natural England suggests a threshold HSI score of 0.5 as an indication that a waterbody is of very low value and unlikely to support GCN (*Natural England, 2019*). Further presence/likely absence surveys are normally undertaken at waterbodies with HSI scores above 0.5.

3.3.4. The survey was undertaken by Diane Wood MCIEEM (Principal Ecologist, Sweco, Natural England GCN class licence CL08 holder – registration number 2015-19177-CLS-CLS), Ishbel Campbell ACIEEM (Consultant Ecologist, Sweco, Natural England GCN class licence CL08 holder - registration number 2016-20998-CLS-CLS), Lydia Waite (Ecology Field Assistant, Sweco) and Lewis Gospel (Ecology Field Assistant, Sweco).

3.4. Presence or likely absence surveys

3.4.1. Due to the time constraints upon surveys as a result of COVID-19 and government lockdown measures (see Section 3.5 below) HSI assessments and eDNA surveys were undertaken simultaneously in order to adhere to the Natural England guidelines on eDNA surveys being taken no later than the end of June (Biggs *et al.*, 2014). As such, any waterbody subject to a HSI assessment was also subject to an eDNA survey unless it a) was not possible to access the banks of the waterbody due to either lack of access or dense vegetation (waterbodies eight, nine, 17, 30 and 40) or b) was scoped out due to professional judgement (waterbody 25 (see Section 4.4.1)).

3.4.2. eDNA water sampling surveys followed the guidance in the *Natural England protocol (Biggs et al., 2014)*. The eDNA sampling kits were collected from, and upon completion returned to, the SureScreen Scientifics laboratory in Derby.

3.5. Limitations

3.5.1. The results of this survey will remain valid until March 2022. Beyond this period, if works have not commenced, it is recommended that a new review of the ecological conditions is undertaken.

- 3.5.2. Due to delays in surveys commencing and land access being arranged for the surveys due to COVID-19 restrictions, 15 waterbodies were not surveyed due to lack of access. The waterbodies which were not subject to survey include waterbodies three, four, five, six, 10, 14, 15, 23, 24, 33, 34, 36, 37, 38 and 39. Waterbodies three, six and 10 were previously subject to eDNA in surveys undertaken in 2016 and 2017 (see Section 2.1) and were found negative for GCN eDNA.
- 3.5.3. Following these surveys undertaken in 2020 an updated scheme design was provided resulting in another of the waterbodies previously surveyed in 2017 now being within the survey area (the proposed DCO boundary and a 500m buffer). As the waterbody was not within the survey area of the scheme design that these surveys were originally designed around, the new waterbody (located at TG 33458 10439) had not been subject to survey. GCN eDNA was previously identified within this waterbody in surveys undertaken in 2017.

4. Results

4.1. Desk study

- 4.1.1. As part of a desk study previously undertaken (see Section 2.1) records of protected and notable species within 2km of the site purchased from NBIS returned no records of GCN (Amey, 2017).
- 4.1.2. Of the nine previously surveyed waterbodies displayed in drawing number: HE551490-AMY-EBD-BB_STG2-DR-EN-0005 ((Amey a, 2017) see Section 3.1.2), six are within 500m of the site (the ‘survey area’) based on the scheme design provided prior to undertaking these surveys in 2020. However, as one of these no longer exists five were to be subject to survey.
- 4.1.3. In addition, further sources of information (see Section 3.1.3) identified a further 34 ponds within the survey area. Two of these identified waterbodies (waterbodies 20 and 21) were found, upon survey, to be connected and as such were surveyed as one waterbody. Therefore, 39 waterbodies in total were subject to survey.
- 4.1.4. See Appendix A for locations of all 39 identified waterbodies within the survey area.

4.2. Habitat description

- 4.2.1. During the HSI assessments 11 waterbodies were found to be dry (waterbodies one, two, seven, 12, 16, 18, 22, 26, 27, 31 and 32).
- 4.2.2. Detailed descriptions of each of the 13 waterbodies within the survey area subject to HSI assessment are given in Table 4-1 below. The purpose of these descriptions is to determine the waterbodies’ suitability as breeding habitat for GCN. Therefore, information on water depth, water quality, bank profile, presence of emergent vegetation, as well as suitability of the surrounding terrestrial habitat has been provided. A grid reference is provided for each waterbody; refer to Appendix A for their positions in relation to the site.

Table 4-1: waterbodies within 500m of the site subject to HSI assessment and their descriptions.

Waterbody Number	Description	Location and Grid Reference
8	Moderate-sized farmland pond surrounded by tall, dense marginal vegetation preventing access to the water’s edge. Macrophyte cover on the waterbody surface was 100%.	Poplar Farm off Lingwood Road - TG 35762 09876

Waterbody Number	Description	Location and Grid Reference
9	Small man-made pond in farmland with steep banks and entirely surrounded by scrub and tall ruderal vegetation. There were no macrophytes recorded in this waterbody.	Poplar Farm off Lingwood Road - TG 35861 09969
11	Very small (5m ²) garden pond with little shade. Macrophytes on the water surface were recorded in abundance (80%) and a minor impact by waterfowl was observed.	The Lindens off Lingwood Road - TG 35985 09891
13	A moderate-sized woodland pond with a major impact by waterfowl recorded. The majority of the water surface was shaded by surrounding vegetation and emergent macrophytes were recorded including water soldier <i>Stratiotes aloides</i> .	Off Dell Corner Lane to the east - TG 36159 10257
17	Small farmland pond on a field margin inaccessible due to surrounding dense vegetation. 100% of the water surface was covered by macrophytes.	South of the A47, south-west of North Burlingham - TG 36442 09882
19	Large circular pond within arable farmland with very little shading from adjacent habitat. Waterfowl were present however caused no major impact upon the waterbody and its banks. Fish and macrophytes were also recorded present.	North of North Burlingham - TG 36758 10261
20 and 21	Large shaded woodland pond with no macrophytes present. Potentially originally two waterbodies which were joined. Moderately-steep earth banks. The pond is largely (approximately 95% of the surface) shaded by surrounding vegetation and no macrophytes were recorded.	North-east of North Burlingham - TG 36836 10121
25	A large, oblong-shaped garden pond on the edge of arable land containing a large number of carp <i>Cyprinidae</i> sp. Approximately half of the pond is subject to shade from surrounded vegetation. Macrophytes were recorded present on approximately 30% of the ponds surface and a minor impact by waterfowl was recorded.	North of North Burlingham - TG 36943 10151
28	A small pond surrounded by a small woodland copse within a farmyard. The majority of the pond (80%) is shaded by adjacent vegetation and macrophytes are present in only very small numbers covering approximately 5% of the pond surface.	West off the B1140, east of North Burlingham - TG 37403 10170
29	A moderate-sized lined garden pond with very little shading from adjacent habitat and a major impact by both fish and waterfowl recorded. Macrophytes are present covering approximately 30%	East off B1140 South Walsham Road - TG 37549 10201

Waterbody Number	Description	Location and Grid Reference
	of the pond surface and include the invasive non-native species (INNS) Canadian waterweed <i>Elodea canadensis</i> .	
30	A small farmland pond inaccessible due to dense surrounding vegetation within an arable field. The majority of the pond (90%) is shaded due to the surrounding vegetation and no macrophytes were recorded.	On the northern boundary of the A47 between the B1140 South Walsham Road and The Windle - TG 37988 09958
35	A moderate-sized pond within a farmyard which is entirely open to the sun with no shade cast from surrounding habitats. No macrophytes were present.	East of B1140 Acle Road, north off B1140 Coxhill Road - TG 37804 09482
40	A small garden pond with a moderate amount of shade (25% of the pond surface) cast from surrounding habitats and a major impact from waterfowl. Very few macrophytes were present covering approximately 5% of the pond surface.	Poplar Farm off Lingwood Road - TG 35832 09861

4.3. HSI assessment

4.3.1. The results of the HSI assessment revealed no waterbodies in the ‘excellent’ category, one in the ‘good’ category, two in the average category, six in the below average’ category and four in the ‘poor’ category.

4.3.2. Table 4-2 below lists the HSI scores and categories for each of the 13 waterbodies subject to HSI assessment. The HSI scores give each waterbody a score category (‘excellent’, ‘good’, ‘average’, ‘below average’ or ‘poor’) which indicates its suitability for GCN. Waterbodies in the ‘excellent’ category have a 93% chance of containing GCN whilst waterbodies in the ‘good’ category have a 79% chance, those in the ‘average’ category have a 55% chance, waterbodies in the ‘below average’ category have a 20% chance and those waterbodies in the ‘poor’ category have a 3% chance of containing GCN.

Table 4-2: HSI scores and categories for the 13 waterbodies subject to assessment.

Waterbody	HSI Score	HSI Category
No waterbodies with this score	N/A	Excellent
20 and 21	0.72	Good
8	0.67	Average

Waterbody	HSI Score	HSI Category
9	0.62	
35	0.56	Below average
28	0.56	
11	0.54	
13	0.53	
25	0.51	
17	0.50	
19	0.46	
30	0.37	
40	0.35	
29	0.34	

4.3.3. See Appendix C for the full HSI assessment results of the 13 waterbodies subject to assessment.

4.4. Presence or likely absence surveys

4.4.1. Due to the delays previously discussed in Section 3.5, HSI assessments and eDNA surveys were undertaken at waterbodies simultaneously in order to adhere to the Natural England guidelines on eDNA surveys being taken no later than the end of June (Biggs *et al.*, 2014). Waterbody 25 was scoped out of further survey following the HSI assessment due to it containing significant numbers of carp sp. Fish predate on the eggs of GCN and high densities present deem the waterbody unsuitable for breeding GCN. Waterbodies eight, nine, 17 and 30 were not subject to eDNA surveys due to them being inaccessible (for example, surrounded by dense vegetation (waterbodies nine and 17) or lack of access onto the land (waterbody 40)) preventing surveyors taking water samples. As such seven waterbodies were subject to eDNA surveys (waterbodies 11, 13, 19, 20 and 21 (counted as one), 28, 29 and 35).

4.4.2. Water samples were taken from each of the seven waterbodies for eDNA analysis between 18 June and 2 July 2020. The samples were taken to SureScreen Scientific laboratory in Derby for analysis on 19 June 2020

(waterbodies 13, 28 and 35), 26 June 2020 (waterbodies 20 and 21, and 29) and 3 July 2020 (waterbodies 11 and 19).

- 4.4.3. The results indicate that GCN eDNA was absent from all of the seven waterbodies subject to eDNA survey. See Appendix B for locations of waterbodies subject to eDNA surveys and results.

4.5. Incidental findings

- 4.5.1. The invasive non-native species (INNS) Canadian waterweed recorded in waterbody 29 (see Table 4.2-1) is listed on Schedule 9 of the WCA 1981 (as amended) and as such it is an offence to cause the spread of this species in the wild.

5. Conclusions and requirements

5.1. Further survey requirements

- 5.1.1. It is considered that GCN are likely absent from the seven waterbodies subject to eDNA survey (waterbodies 11, 13, 19, 20 and 21, 28, 29 and 35 (see Appendix A for waterbody locations)).
- 5.1.2. Waterbodies eight, nine and 25 scored either 'below average' or above in the HSI assessment (see Table 4.3-1) and as such require an eDNA survey prior to works commencing on site which is programmed to begin (in the form of site preparation) in June 2022.
- 5.1.3. In addition, it is considered advisable to undertake an eDNA survey on waterbodies 17 and 40. As waterbody 17 scored 0.5 in the HSI assessment it is borderline whether it should be subject to an eDNA survey (see Sections 3.3.3 and 5.1.4). Waterbody 40 scored 0.35 in the HSI assessment and falls in the 'poor' HSI category and would therefore not normally be subject to further survey (see Sections 3.3.3. and 5.1.4). However, previous surveys undertaken in 2017 (see Section 2.1) identified GCN eDNA in a now defunct waterbody south of North Burlingham and the A47. As this waterbody no longer exists it is considered possible that the GCN which were present there (as confirmed by the presence of GCN eDNA identified in the 2017 surveys) may have dispersed into neighbouring ponds which also lie south of the A47, including waterbodies 17 and 40.
- 5.1.4. As waterbody 30 was categorised as 'poor' in the HSI assessment (see Table 4.3-1) it is considered that this waterbody has a 3% chance of containing GCN (see Section 4.3.2). As Natural England considers scores of 0.5 or below as an indication that a waterbody is unlikely to support GCN ((Natural England, 2019) see Section 3.3.3) it is considered unlikely that GCN are present in waterbody 30 and is not necessary to undertake further survey.
- 5.1.5. Those waterbodies within the 500m survey area for which no land access was acquired (waterbodies three, four, five, six, 10, 14, 15, 23, 24, 33, 34, 36, 37, 38 and 39) and no survey was undertaken will require HSI assessment and, where appropriate, eDNA surveys prior to works commencing on site. In addition, those waterbodies which were found dry at the time of survey (waterbodies one, two, seven, 12, 16, 18, 22, 26, 27, 31 and 32) should be revisited and, if found to hold water, should be subject to HSI assessment and, where appropriate, eDNA surveys prior to works commencing.
- 5.1.6. The waterbody which was not surveyed due to being outside of the survey of the original scheme design these surveys were based upon, which is now within the

survey area following scheme design updates (see Section 3.5.3), should be subject to survey. Prior to works commencing on site, a HSI assessment of this waterbody should be undertaken, the results of which will inform or negate the need for an eDNA survey.

5.1.7. In **conclusion, and to summarise further survey requirements**, the following should be undertaken in 2021 prior to works commencing on site in June 2022:

- **eDNA surveys** of five waterbodies (eight, nine, 17, 25 and 40)
- **HSI assessment surveys**, and where appropriate subsequent eDNA surveys, of 16 waterbodies (three, four, five, six, 10, 14, 15, 23, 24, 33, 34, 36, 37, 38, 39 and the additional waterbody within the survey area following scheme design updates (see Sections 3.5.3 and 5.1.6))
- **Walkover of those 11 waterbodies found dry at the time of survey** (one, two, seven, 12, 16, 18, 22, 26, 27, 31 and 32) and, where a waterbody holds sufficient water, HSI assessment and where appropriate subsequent eDNA surveys

5.2. General mitigation requirements

5.2.1. The recorded location of the INNS Canadian waterweed in waterbody 29 (see Section 4.5.1) is outside of the current proposed DCO boundary. The INNS will therefore not be directly disturbed and as such no further requirements are necessary. However, should the proposed Scheme design change and works take place within waterbody 29 or immediately adjacent to its banks, the removal of the Canadian waterweed from the works area will be required prior to works commencing.

5.2.2. As good practice, general mitigation measures should include the covering of trenches/excavations overnight to prevent harm to any animals. If this is not possible, a means of escape, such as an exit ramp, should be inserted into trenches/excavations overnight.

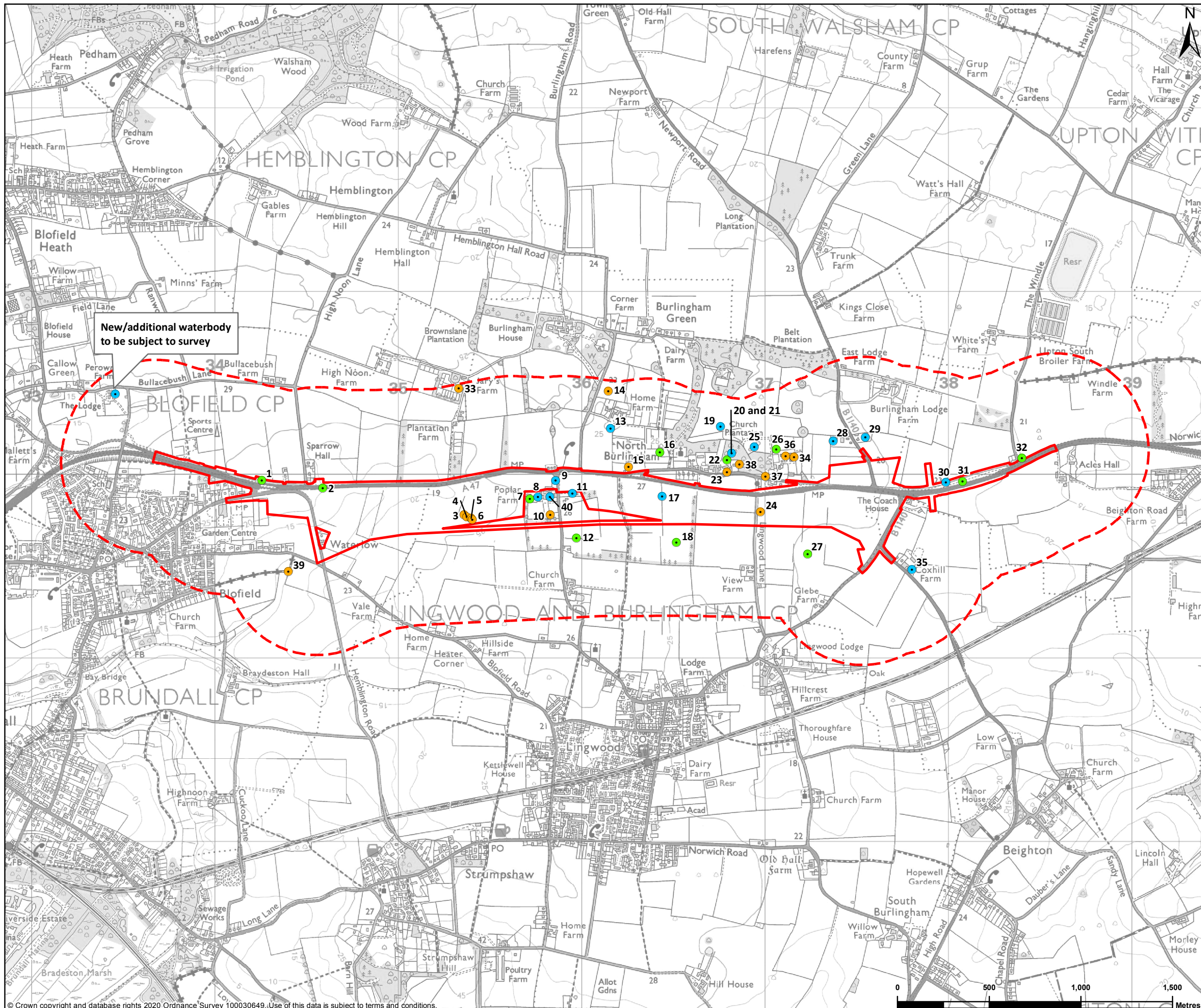
5.2.3. Pollution prevention measures should be employed during and post construction. Guidance on best practice in relation to pollution prevention and water management is set out in Construction Industry research and Information Association (CIRIA) Guidelines ((Soubry (2001), Murnane *et al.* (2006), Charles and Edwards (2015)), and the Environment Agency's approach to groundwater protection (Environment Agency, 2017) and groundwater protection guides (Environment Agency, 2017a), as required under the Water Framework Directive.

6. References

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Annex A. Waterbody locations map



- LEGEND**
- Red line boundary
 - Study area - 500m buffer
 - Waterbody location
 - Waterbody location - dry at time of survey
 - Waterbody location - not accessed



P01	17/12/2020	FIRST EDITION	PC	BM	DW
REV	DATE	REVISION NOTE	ORG	CHKD	APPD

DESIGNER
SWECO

CONTRACTOR
GallifordTry

CLIENT
highways england

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PROJECT STAGE
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DRAWING TITLE
ANNEX A - GREAT CRESTED NEWT SURVEY:
WATERBODY LOCATIONS
TR010040/APP/6.2

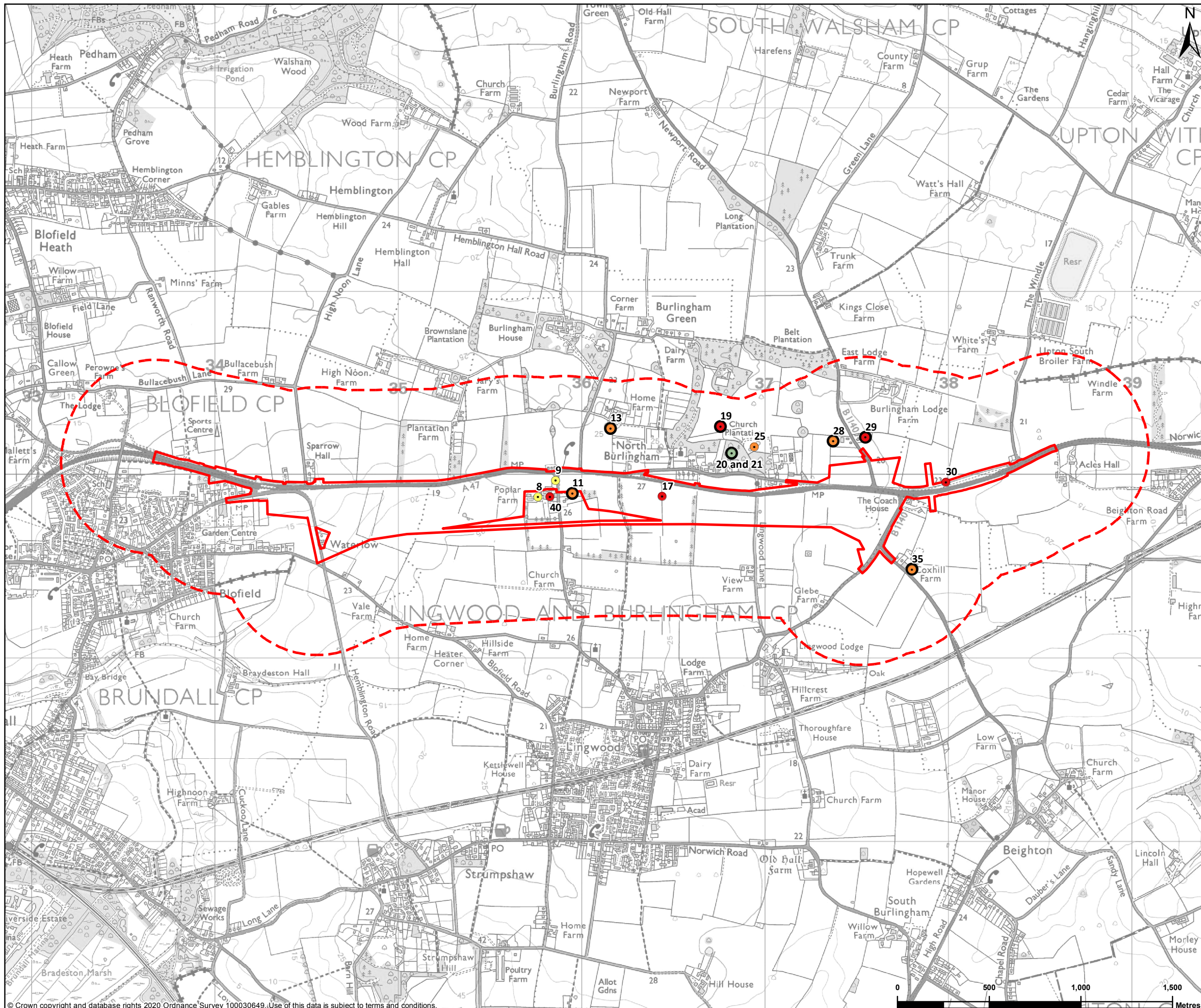
SUITABILITY
FOR INFORMATION

SHEET SIZE	SCALE	STATUS
A3	1:20,000	S2

DRAWING NUMBER
HE551490-GTY-EBD-000-DR-GI-30035

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Annex B. HSI assessment and eDNA survey results map



LEGEND

- Red line boundary
- Study area - 500m buffer

Habitat suitability index

- Excellent (Blue dot)
- Good (Green dot)
- Average (Yellow dot)
- Below average (Orange dot)
- Poor (Red dot)

Great crested newt eDNA result

- Positive (Green circle)
- Negative (Black circle)



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A47 BLOFIELD TO NORTH BURLINGHAM

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DRAWING TITLE
ANNEX B - GREAT CRESTED NEWT SURVEY:
HSI ASSESSMENT AND EDNA SURVEY RESULTS
TR010040/APP/6.2

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Annex C. Full habitat suitability index (HSI) assessment results

Ref	Geographic location	Surface area (m2)	Waterbody permanence	Water quality	Shading (%)	Impact of waterfowl	Fish	No of waterbodies within 1km	Terrestrial habitat quality	Macrophyte cover (%)	HSI score Total
8	Zone A	150	Sometimes dries	Moderate	0	Absent	Possible	15	Poor	100	Average 0.67
	1.00	0.30	0.50	0.67	1.00	1.00	0.67	1.00	0.33	0.80	
9	Zone A	100	Never dries	Moderate	20	Absent	Possible	19	Poor	0	Average 0.62
	1.00	0.20	0.90	0.67	1.00	1.00	0.67	1.00	0.33	0.30	
11	Zone A	5	Dries annually	Good	10	Minor	Possible	21	Good	80	Below average 0.54
	1.00	0.05	0.10	1.00	1.00	0.67	0.67	1.00	1.00	1.00	
13	Zone A	400	Never dries	Moderate	70	Major	Possible	23	Good	40	Below Average 0.53
	1.00	0.80	0.90	0.67	0.80	0.01	0.67	1.00	1.00	0.70	
17	Zone A	25	Dries annually	Poor	0	Absent	Absent	21	Moderate	100	Below average 0.50
	1.00	0.05	0.10	0.33	1.00	1.00	1.00	1.00	0.67	0.80	
19	Zone A	50	Never dries	Good	5	Minor	Major	20	Good	40	Poor 0.46
	1.00	0.10	0.90	1.00	1.00	0.67	0.01	1.00	1.00	0.70	
20 + 21	Zone A	1500	Rarely dries	Moderate	95	Absent	Possible	16	Good	0	Good 0.72
	1.00	0.87	1.00	0.67	0.30	1.00	0.67	1.00	1.00	0.30	

Ref	Geographic location	Surface area (m2)	Waterbody permanence	Water quality	Shading (%)	Impact of waterfowl	Fish	No of waterbodies within 1km	Terrestrial habitat quality	Macrophyte cover (%)	HSI score Total
25	Zone A	3750	Never dries	Moderate	50	Minor	Major	17	Good	30	Below Average 0.51
	1.00	N/A	0.90	0.67	1.00	0.67	0.01	1.00	1.00	0.60	
28	Zone A	150	Dries annually	Moderate	80	Absent	Absent	13	Moderate	5	Below average 0.56
	1.00	0.30	0.10	0.67	0.60	1.00	1.00	1.00	0.67	0.35	
29	Zone A	450	Never dries	Moderate	5	Major	Major	11	Moderate	30	Poor 0.34
	1.00	0.90	0.90	0.67	1.00	0.01	0.01	0.95	0.67	0.60	
30	Zone A	10	Dries annually	Poor	90	Absent	Absent	6	Poor	0	Poor 0.37
	1.00	0.05	0.10	0.33	0.40	1.00	1.00	0.82	0.33	0.30	
35	Zone A	300	Dries annually	Moderate	0	Absent	Absent	6	Poor	0	Below average 0.56
	1.00	0.60	0.10	0.67	1.00	1.00	1.00	0.82	0.33	0.30	
40 (At Poplar Farm)	Zone A	25	Sometimes dries	Moderate	25	Major	Possible	14	Moderate	5	Poor 0.35
	1.00	0.05	0.50	0.67	1.00	0.01	0.67	1.00	0.67	0.35	