



Botley West Solar Farm

Environmental Statement

Volume 3

Appendix 9.5: Great Crested Newt Survey Report

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Glossary

Term	Meaning
The Applicant	SolarFive Ltd
The Project	Botley West Solar Farm
The Developer: Photovolt Development Partners Gmbh	Photovolt Development Partners GmbH (PVDP).
Priority Species	Species listed as being of principal importance for conservation under Section 41 of the Natural Environment and Rural communities Act 2006.

Abbreviations

Abbreviation	Meaning
eDNA	Environmental DNA
ES	Environmental Statement
GCN	Great Crested Newt
HSI	Habitat Suitability Index
PVDP	Photovolt Development Partners GmbH
qPCR	Quantitative Polymerase Chain Reaction
TVERC	Thames Valley Environmental Records Centre

Units

Unit	Description
cm	Centimetres
km	Kilometres
m	Metres
ml	Millilitre

1 Introduction

1.1 Overview

1.1.1 This Appendix of the Environmental Statement (ES) has been prepared by RPS on behalf of Photovolt Development Partners GmbH. (PVDP) for the Applicant, SolarFive Ltd. (SolarFive).

1.1.2 The purpose of this technical report is to present the methodology and results of the great crested newt (GCN) *Triturus cristatus* surveys for the Project. The results of this report have been used to inform Chapter 9: Ecology and Nature Conservation in Volume 1 of the ES [EN010147/APP/6.3].

1.2 Relevant Legislation

1.2.1 GCN are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (and as amended), which affords the species protection under Section 9. The species is also listed on Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended). In combination, this makes it an offence to:

- Intentionally kill, injure or take (capture etc.) a GCN;
- Possess a GCN; and
- Intentionally or recklessly damage, destroy, obstruct access to any structure or place used by GCN for shelter or protection, or disturb any animal occupying such a structure or place; and sell, offer for sale, possess or transport for the purpose of sale (live or dead animal, part or derivative) or advertise for buying or selling such things.

1.2.2 Great crested newts are also listed as a species of principal importance for conservation in England under Section 41 of the Natural Environment & Rural Communities Act (2006).

2 Methodology

2.1 Desk Study

2.1.1 Records of GCN from the last 10 years, within 2 km of the Project site were requested from The Thames Valley Environmental Records Centre (TVERC) as part of the Ecology and Nature Conservation Desk Study (See Appendix 9.1: Desk Study [EN010147/APP/6.5]).

2.2 Field Surveys

2.2.1 Ponds and waterbodies within 500 m of the Project site were identified through a desk study using publicly available ordnance survey Maps. Requests for access were then submitted to all landowners where OS maps indicated ponds were present.

- 2.2.2 All accessible waterbodies within the Project site and within 500 m of the Project site boundary were initially subject to a Habitat Suitability Index (HSI) assessment.
- 2.2.3 All water bodies scoring average or higher on the HSI assessment, and which were physically accessible and where access was permitted were then subject to environmental DNA (eDNA) survey to confirm presence or likely absences of GCN.
- 2.2.4 Ponds testing positive for GCN DNA were subject to full survey using a range of traditional survey methods to provide a populations size class count for the pond.
- 2.2.5 Full methods for each survey technique are provided below.

2.3 Habitat Suitability Index Assessment

- 2.3.1 The HSI methodology used followed the UK Amphibian and Reptile Group's Advice Note 5 (ARGUK, 2010), which is an updated version of the original HSI methodology described in Oldham *et al.*, (2000).
- 2.3.2 The HSI methodology involved the assessment of the following ten key habitat indices thought to affect the likelihood of great crested newt presence:
- Geographical Location;
 - Pond area;
 - Permanence;
 - Water quality;
 - Shade;
 - Waterfowl;
 - Fish;
 - Pond count (e.g. other ponds within 1 km);
 - Terrestrial habitat ; and
 - Macrophytes .
- 2.3.3 Each pond was assigned a score for each index from 0.01 to 1. The final HSI score is calculated as the geometric mean of the ten individual scores. Based on the minimum and maximum possible scores for the individual indices, the total HSI score can range from 0.35 (extremely unsuitable) to 1 (optimally suitable). Within this range a qualitative descriptor of suitability is applied as follows (ArgUK, 2010):
- <0.5: poor;
 - 0.5 – 0.59: below average;
 - 0.6 – 0.69: average;
 - 0.7 – 0.79: good; and
 - >0.8: excellent.

2.4 Environmental DNA (eDNA) Sampling

- 2.4.1 The surveys were conducted by suitably licensed ecologists. The surveys followed the eDNA surveying and laboratory analysis techniques as described by Biggs *et al.* (2014).
- 2.4.2 Water samples were collected using sampling kits supplied by NatureMetrics Ltd and Surescreen Scientifics Ltd. Water samples were collected within the approved survey window between 15th April and 30th June.
- 2.4.3 Surveyors collected 30 ml water samples from the waterbodies using a sterile ladle. Water surveys were collected from the bank edge without the surveyor entering the water.
- 2.4.4 Where access allowed, the samples were collected from points evenly spaced along the bank to give as much coverage of the bank length and suitable marginal habitat as possible. Samples were spread out as much as possible to ensure a representative sample was collected and to ensure the effectiveness of the survey was not compromised.
- 2.4.5 The surveyors used the ladle to gently agitate the water to mix the water column, whilst taking care not to disturb or collect any sediment. The samples collected were emptied into a sterile plastic bag and homogenised by gently shaking the bag to ensure eDNA was evenly mixed through the sample.
- 2.4.6 A pipette was used to collect 15 ml subsamples of the homogenised sample into sterile tubes already containing 35 ml of ethanol to preserve the eDNA sample.
- 2.4.7 The samples were then removed from Project site and sent to NatureMetrics Ltd or Surescreen Scientifics Ltd for analysis. The water samples were analysed using the quantitative Polymerase Chain Reaction (qPCR) eDNA test.

2.5 Population Class Size Assessment

- 2.5.1 Waterbodies with confirmed presence of GCN eDNA were subsequently subject to population class size assessment surveys.
- 2.5.2 The population class size assessments consisted of a total of 6 survey visits per pond with three different traditional survey methods used during each visit as per the GCN Mitigation Guidelines (English Nature, 2001). Numbers of GCN found using each survey method were recorded along sex and life stage (larval / juvenile / adult).
- 2.5.3 In accordance with Natural England guidelines the population assessment for this species was undertaken between mid-March and June with three of the six visits between mid-April and mid-May.
- 2.5.4 The population size class was estimated based on the peak count of adult GCN found on any single survey night (English Nature 2001) as follows:
- Small: 1 – 10 GCN;
 - Medium: 11 – 100 GCN; and
 - Large: 101+ GCN.

2.5.5 The survey methods used for the population size class assessment area described below.

Bottle Trapping

2.5.6 The bottle traps were constructed from 2 litre plastic drinks bottles. The top 10-15 cm was cut off and inverted inside the bottle creating a funnel by which newts could enter but not leave. Air holes were pierced in the bottom of the bottle. The traps were partially submerged upside down in the water, leaving the base of the bottle above the water-level with a pocket of air at the exposed end to prevent any trapped animals drowning. The traps were held in the water with bamboo canes pushed through the trap into pond substrate.

2.5.7 Traps were set around the margins of the water body and where access safely allowed, at a density of approximately one trap every two metres.

2.5.8 Traps were set around 1-2 hours before sunset and collected early the following morning. Surveyors recorded the number, sex, and life stage of any captured GCN was recorded. Incidental records were also made of other amphibians where present.

Torchlight Search

2.5.9 All accessible parts of each pond were systematically surveyed for GCN at night by shining a 1,000,000 candle power torch across the surface of the water. Torchlight surveys commenced 30 minutes after sunset and continued until the water body was sufficiently surveyed. Surveyors walked slowly around the edge of the waterbody recording the number and, where possible, the sex and life stage, of any GCN or other amphibians observed.

2.5.10 Factors that could impact the effectiveness of the survey were recorded, such as water clarity, accessibility, and dense vegetation. Periods of moderate to heavy rain or wind that could disturb the surface of the water or disturb sediment were avoided.

Egg Search

2.5.11 The eggs of GCN are distinctive and recognisable different from the eggs of other newt species. All suitable submerged aquatic plants with leaves large enough for egg laying were inspected for GCN eggs, where access and safety permitted. Any folded leaves that could hide GCN eggs were carefully opened to determine presence or likely absence. As soon as GCN presence was confirmed, the egg search survey was stopped to avoid any unnecessary further disturbance of eggs.

Net survey

2.5.12 All accessible parts of a waterbody were systematically sampled using a long-handled net with a fine mesh small enough to catch adult newts and larvae with minimal risk of injury. After each sweep of the net, the contents were carefully inspected to record GCN. Net surveys have the potential to harm newts and other wildlife and were used only where bottle traps, torchlight surveys and egg surveys were not possible.

2.6 Limitations

Access Restrictions

- 2.6.1 Access to all ponds within 500 m was not possible due to access to private land being refused or no response from landowners.
- 2.6.2 One inaccessible pond (P04) was subject to HSI assessment from adjacent land and was assessed as having good suitability. However, access to the pond was not permitted for eDNA analysis.

Physical Survey Limitations

- 2.6.3 Netting and torching at all waterbodies were limited to safely accessible shoreline. In some cases, the number of netting locations or percentage of accessible shoreline for torching was restricted for safety reasons, or to protect amphibians from excessive disturbance or damage by surveyors. In these cases, the maximum amount of each survey technique was employed with respect to these limitations. Given the combination of survey techniques used alongside netting and torching, limited physical access is not considered to have significantly affected the survey effectiveness.
- 2.6.4 Pond P21 was almost dry by the fifth population assessment visit. As such, no sixth visit was completed for this pond. Only one GCN had been found using three survey methods on each of the previous four visits providing confidence in the conclusion that the pond supports a small population.
- 2.6.5 Pond P47 could not be surveyed with torches or netting due to the dense cover of duckweed. The population size class assessment comprised two survey methods, egg search and bottle trapping. With a peak count of six GCN in bottle traps, it is possible that torching would have resulted in a larger peak count pushing the size class into medium rather than small.

Other limitations

- 2.6.6 A number of ponds were subject to some survey but did not have follow-up surveys completed in 2024 as data only became available towards the end of the survey season such that further survey was not possible. Ponds P64 and P83 were found to have GCN eDNA and, as such, have been treated as supporting a population. Further population estimate surveys will be completed to inform any necessary licensing, given the proximity of these ponds to the Project site. However, the surveys do not limit the ability to complete a robust assessment of the potential impacts.

3 Results

3.1 Desk Study

- 3.1.1 There were 567 records of GCN within 2 km of the Project site within the last 10 years. The most recent record was from 2022. Eggs and or immature and juvenile GCN were recorded in 36 separate locations indicating the presence of breeding populations.

3.1.2 None of these historical records were recorded within the Project site but GCN have been recorded from 11 locations within 500 m of the site, with breeding populations in at least four locations within 500 m.

3.2 HSI Survey

3.2.1 A total of 86 ponds / waterbodies were identified from OS maps. Where accessible, these ponds were visited and HSI survey undertaken. The results of the HSI surveys are given in Annex C and summarised below.

3.2.2 Of the 86 ponds identified on the OS plan:

- Three ponds were not present (P27, P41 and P82);
- Five ponds were dry and could not be surveyed (P31, P36, P60, P61 and P62);
- Seven ponds were not accessible (P37, P44, P72, P73, P74, P75 and P76);
- Three ponds could not be surveyed due to time constraints of when access became available (P20, P45 and P84);
- Three ponds were part of watercourse and not suitable for GCN (P57, P65 and P67);
- 18 ponds were surveyed in 2022; and
- 46 ponds were surveyed in 2024.

3.2.3 Of the 64 ponds successfully HSI surveyed:

- Eight were assessed as having 'excellent' suitability;
- 16 were assessed as having 'good' suitability;
- 11 were assessed as having 'average' suitability;
- 11 were assessed as having 'below average' suitability; and
- 18 were assessed as having 'poor' suitability.

3.2.4 The results of the HSI survey are show in Annex A. Error! Reference source not found.

3.3 eDNA Analysis

3.3.1 The 35 ponds assessed as having average, good or excellent suitability, 34 were subject to eDNA survey. Results of the eDNA analysis are provided in Annex C.

3.3.2 The following ponds returned positive eDNA results (shown in Annex B):

- P16;
- P19;
- P21;
- P47;

- P64; and
- P83.

3.3.3 Ponds P16, P19 P21 and P47 were subject to further survey effort to determine the population size. These results are described below.

3.4 Population Class Size Assessment

3.4.1 Population size assessment survey visits were undertaken between April and June on ponds. Detailed survey results tables including weather conditions during the surveys are provided in Annex D. The results are also shown in Annex B.

3.4.2 No GCN were found in Pond P16. The eDNA analysis confirmed GCN presence and it is assumed the pond supports a small population given the absence of GCN in the populations size assessment surveys.

3.4.3 GCN were found in Pond 19 with a peak count of one adult newt indicating a small population.

3.4.4 GCN were found in Pond 21 with a peak count of no adult newts and only one newt larva indicating a small population. This pond is to the north of the River Evenlode within the Blenheim Estate. Given the barriers to dispersion present it is unlikely the population associated with this pond are present on the Project site.

3.4.5 GCN were found in Pond 47 with a peak count of six adult newts indicating a small population. It is located within south Cassington so the newts from this pond are unlikely to be present on the Project site.

3.4.6 These populations are very disparate across the Project site. As such, they are likely to represent individual populations and are not treated as a meta population.

4 Summary

4.1.1 Surveys identified 86 ponds within the Project site boundary or within 500 m of the Project site.

4.1.2 GCN surveys were undertaken of accessible ponds in 2022 and 2024 comprising HSI assessments, eDNA surveys of any ponds with an HIS suitability of average or higher, and population size class assessment surveys of any ponds testing positive for eDNA.

4.1.3 Of the ponds surveyed, GCN presence was confirmed in six ponds. Four were subject to population size class assessment surveys while two ponds will be surveyed prior to the submission of any licence. The results were as follows

- P16 – small GCN population;
- P19 – small GCN population;
- P21– small GCN population;
- P47– small GCN population;

- P64 – GCN present, no size class; and
- P83 GCN present, no size class.

4.1.4

All of the ponds where GCN were recorded fall outside of the Project site boundary with two (P21 and P47) considered to fall behind significant physical barriers to dispersion onto the Project site from those locations.

5 References

ARG UK Advice Note 5: Great Crested Newt Habitat Suitability Index.

Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA. Freshwater Habitats Trust, Oxford.

English Nature (2001). Great Crested Newt Mitigation Guidelines. Available from: <http://webarchive.nationalarchives.gov.uk/>.

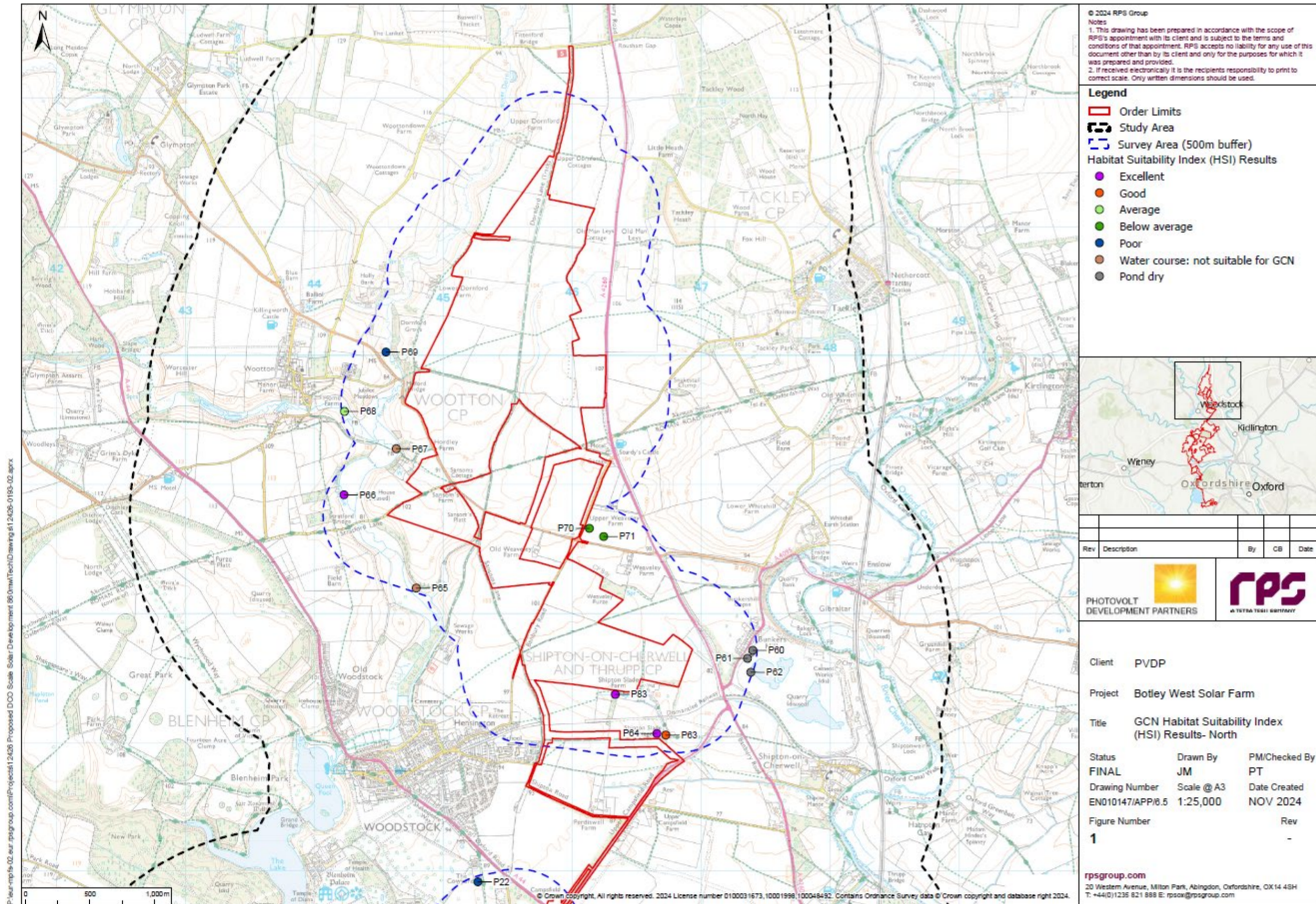
Gent & Gibson. (2003). Herpetofauna Worker's Manual. JNCC, Peterborough.

Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000). Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). *Herpetological Journal* 10(4), 143-155.

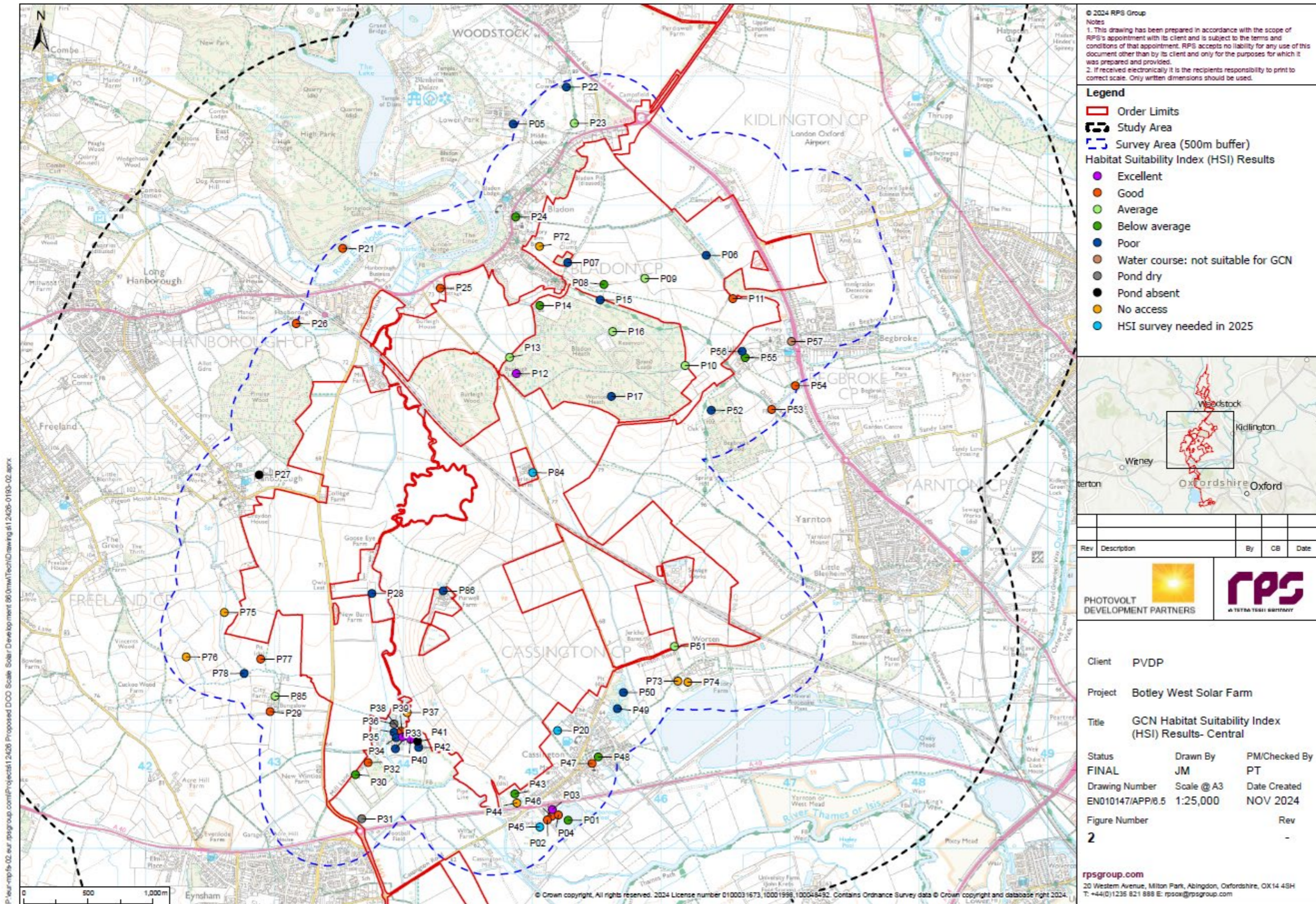
Annex A

HSI Figure Results

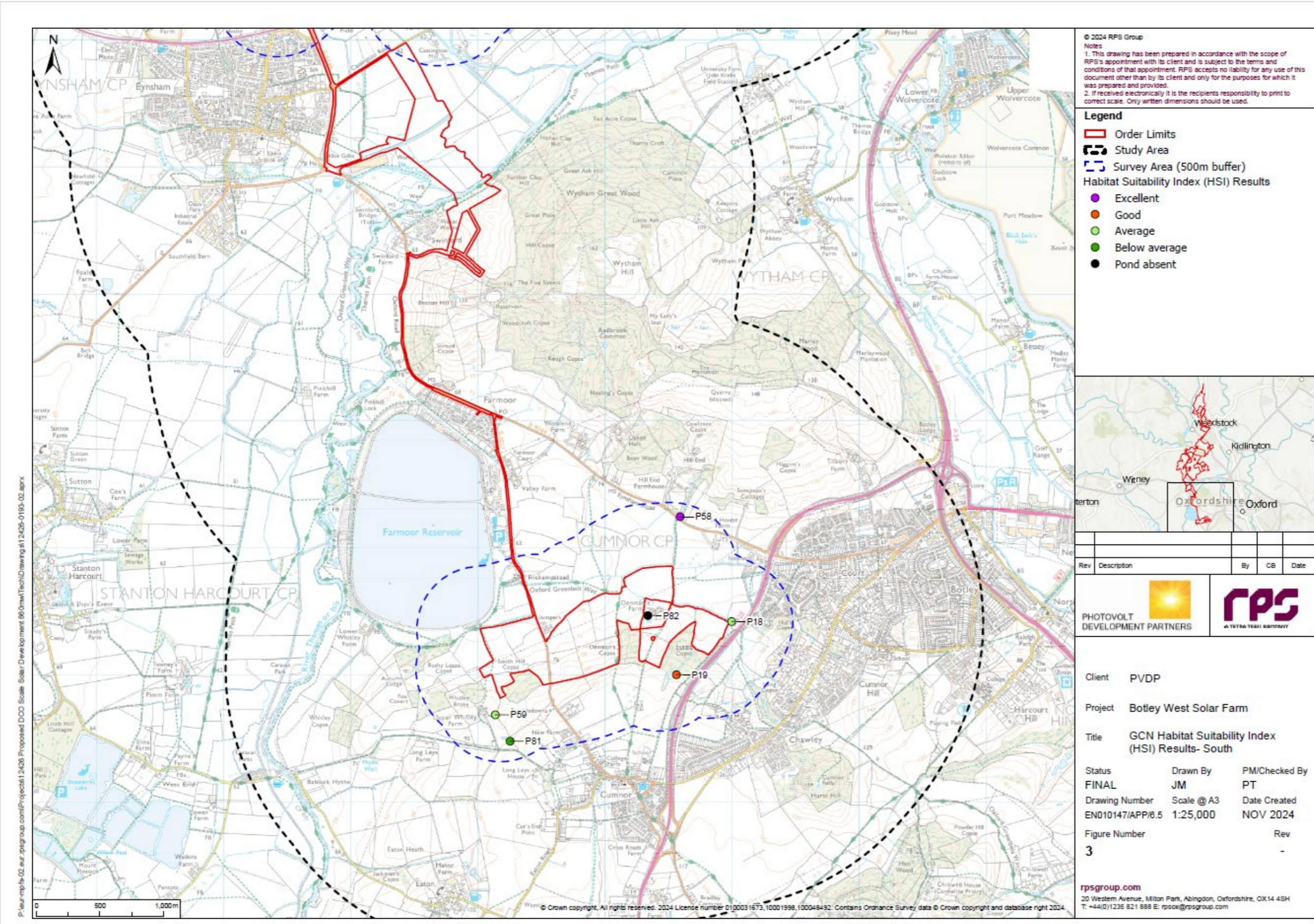
Anx Figure 1 GCN HSI Survey Results - North.



Anx Figure 2 GCN HSI Survey Results - Central.



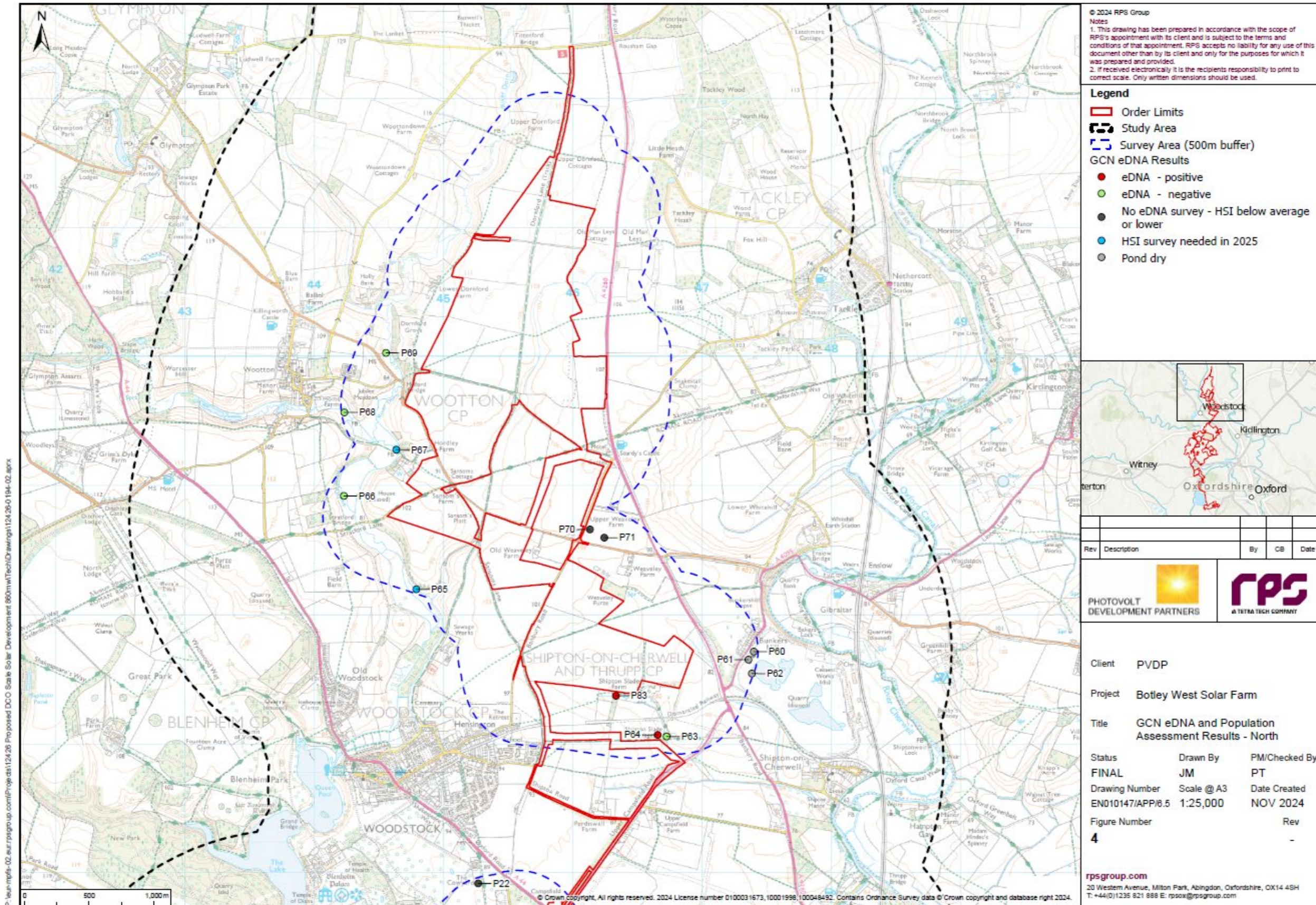
Anx Figure 3 GCN HSI Survey Results - South.



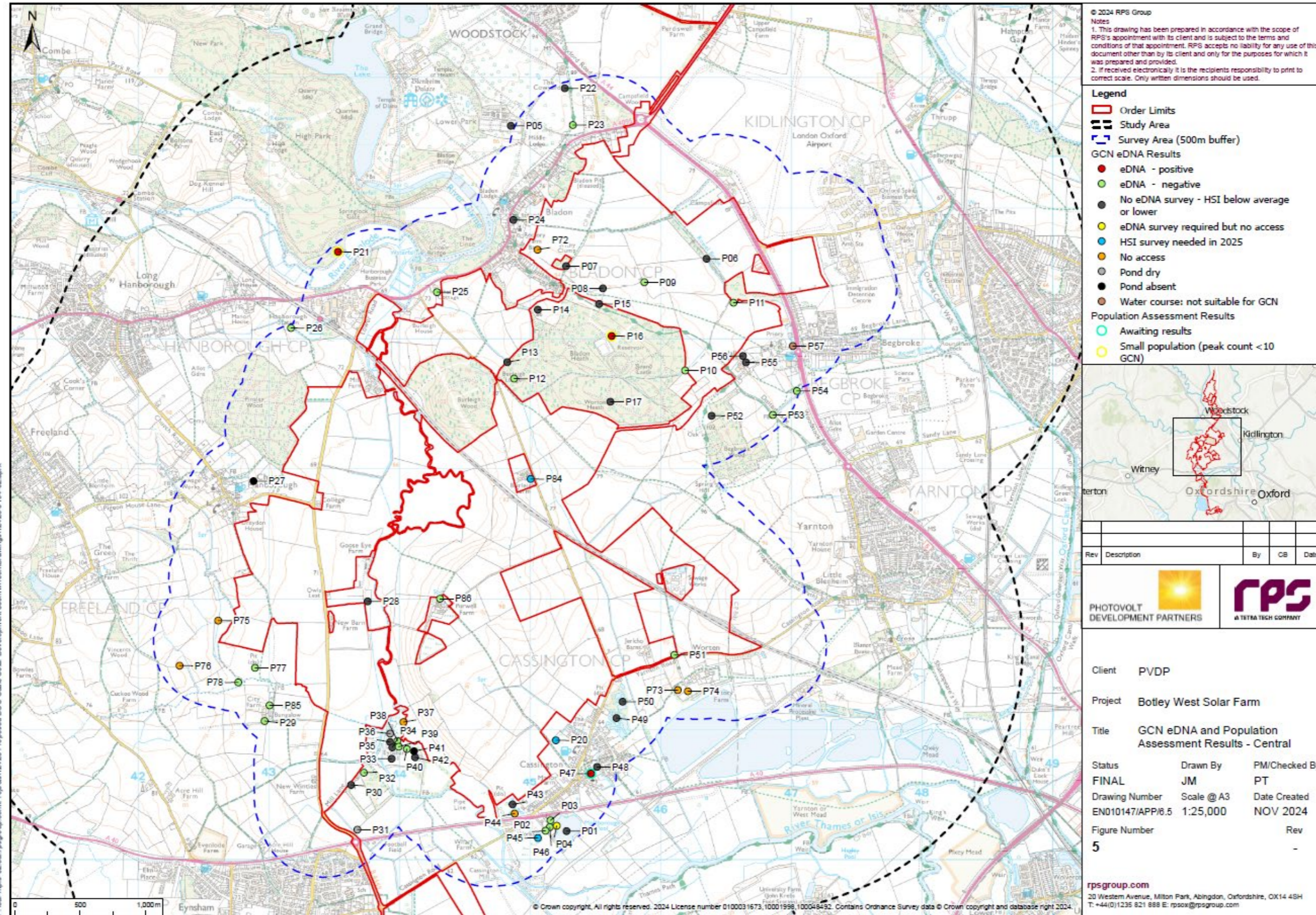
Annex B

GCN eDNA and Populations Size Assessment Figure Results

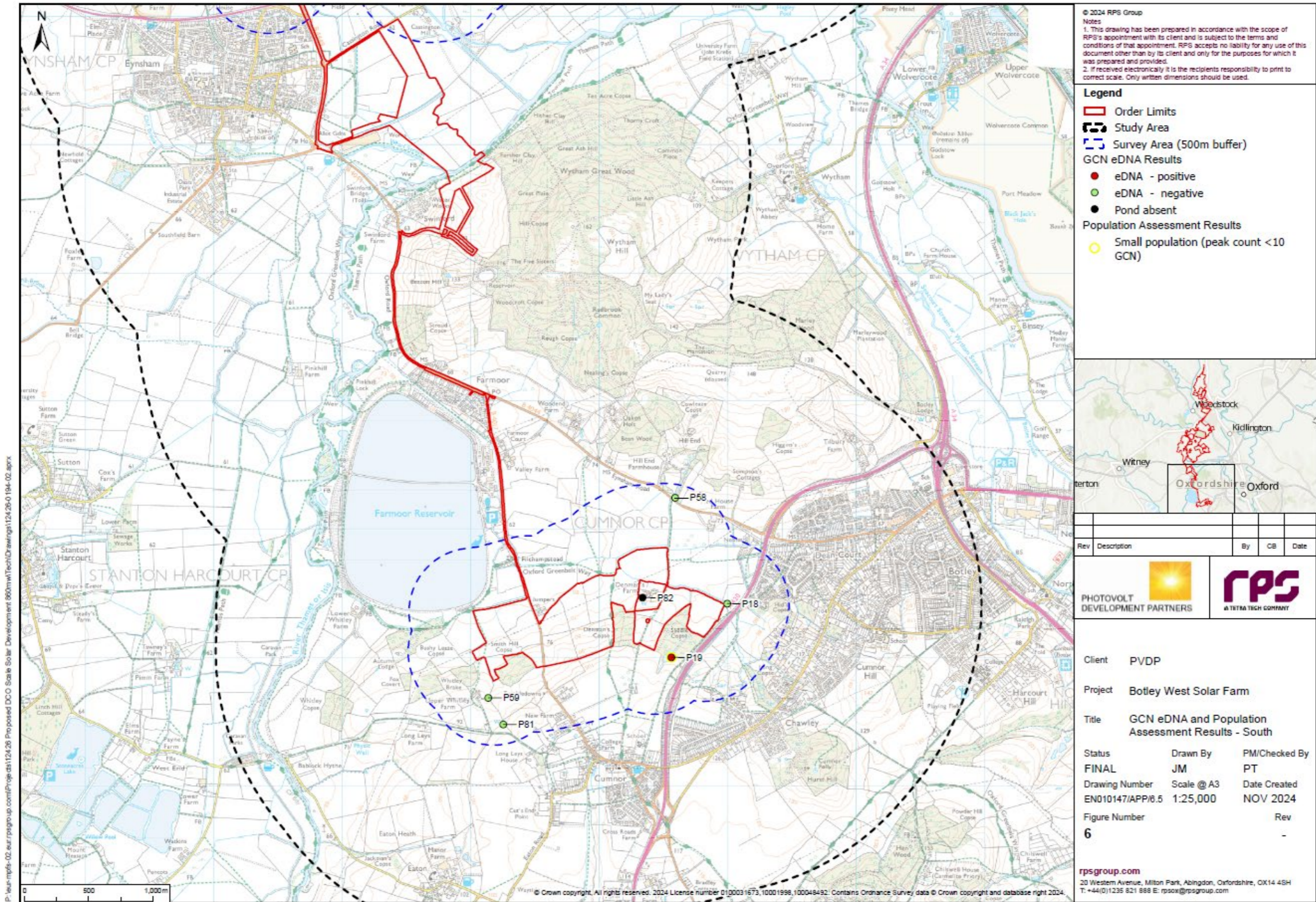
Anx Figure 4 GCN eDNA and populations size assessment results - North.



Anx Figure 5 GCN eDNA and populations size assessment results – Central.



Anx Figure 6 GCN eDNA and populations size assessment results - South.



Annex C

HSI, eDNA and Population Size Class Assessment Survey Results

Anx Table 1 HSI, eDNA and Population Size Class Assessment Survey Results.

Pond Number	Year Surveyed	HSI Score	HSI Suitability	eDNA Survey Carried Out	eDNA Result	Population Size Class Assessment Results
P01	2022	0.47	Below average	No	n/a	n/a
P02	2022	0.64	Good	Yes	Negative	n/a
P03	2022	0.83	Excellent	Yes	Negative	n/a
P04	2022	0.75	Good (surveyed from adjacent land)	No – Not accessible	n/a	n/a
P05	2022	0.27	Poor	No	n/a	n/a
P06	2022	0.49	Poor	No	n/a	n/a
P07	2022	0.42	Poor	No	n/a	n/a
P08	2022	0.56	Below average	No	n/a	n/a
P09	2022	0.61	Average	Yes	Negative	n/a
P10	2022	0.69	Average	Yes	Negative	n/a
P11	2022	0.71	Good	Yes	Negative	n/a
P12	2022	0.90	Excellent	Yes	Negative	n/a
P13	2022	0.67	Average	Yes	Negative	n/a
P14	2022	0.53	Below average	No	n/a	n/a
P15	2022	0.26	Poor	No	n/a	n/a
P16	2022	0.69	Average	Yes	Positive	
P17	2022	0.40	Poor	No	n/a	n/a
P18	2022	0.66	Average	Yes	Negative	n/a
P19	2024	0.76	Good	Yes	Positive	
P20	To be surveyed 2025	To be surveyed 2025	To be surveyed 2025	Pending HSI in 2025	Pending HSI in 2025	Pending HSI in 2025
P21	2024	0.71	Good	Yes	Positive	
P22	2024	0.47	Poor	No	n/a	n/a
P23	2024	0.64	Average	Yes	Negative	n/a
P24	2024	0.50	Below average	No	n/a	n/a
P25	2024	0.71	Good	Yes	Negative	n/a
P26	2024	0.73	Good	Yes	Negative	n/a
P27	2024	n/a	No pond present	No	n/a	n/a
P28	2024	0.28	Poor	No	n/a	n/a

Pond Number	Year Surveyed	HSI Score	HSI Suitability	eDNA Survey Carried Out	eDNA Result	Population Size Class Assessment Results
P29	2024	0.78	Good	Yes	Negative	n/a
P30	2024	0.53	Below Average	No	n/a	n/a
P31	2024	n/a	Pond was dry	No	n/a	n/a
P32	2024	0.71	Good	Yes	Negative	n/a
P33	2024	0.47	Poor	No	n/a	n/a
P34	2024	0.42	Poor	No	n/a	n/a
P35	2024	0.48	Poor	No	n/a	n/a
P36	2024	n/a	Pond was dry	No	n/a	n/a
P37	No Access	n/a	No Access	No	n/a	n/a
P38	2024	0.71	Good	Yes	Negative	n/a
P39	2024	0.85	Excellent	Yes	Negative	n/a
P40	2024	0.82	Excellent	Yes	Negative	n/a
P41	2024	N/A	No pond present	No	n/a	n/a
P42	2024	0.42	Poor	No	n/a	n/a
P43	2024	0.51	Below average	No	n/a	n/a
P44	No Access	n/a	No Access	No	n/a	n/a
P45	To be surveyed 2025	To be surveyed 2025	To be surveyed 2025	Pending HSI in 2025	Pending HSI in 2025	Pending HSI in 2025
P46	2024	0.73	Good	Yes	Negative	n/a
P47	2024	0.73	Good	Yes	Positive	
P48	2024	0.54	Below average	No	n/a	n/a
P49	2024	0.48	Poor	No	n/a	n/a
P50	2024	0.48	Poor	No	n/a	n/a
P51	2024	0.68	Average	Yes	Negative	n/a
P52	2024	0.46	Poor	No	n/a	n/a
P53	2024	0.75	Good	Yes	Negative	n/a
P54	2024	0.79	Good	Yes	Negative	n/a
P55	2024	0.59	Below average	No	n/a	n/a
P56	2024	0.48	Poor	No	n/a	n/a
P57	2024	n/a	Water course - not suitable for GCN	n/a	n/a	n/a
P58	2024	0.88	Excellent	Yes	Negative	n/a
P59	2024	0.65	Average	Yes	Negative	n/a
P60	2024	n/a	Pond was dry	No	n/a	n/a
P61	2024	n/a	Pond was dry	No	n/a	n/a
P62	2024	n/a	Pond was dry	No	n/a	n/a
P63	2024	0.75	Good	Yes	Negative	n/a

Pond Number	Year Surveyed	HSI Score	HSI Suitability	eDNA Survey Carried Out	eDNA Result	Population Size Class Assessment Results
P64	2024	0.84	Excellent	Yes	Positive	To be surveyed 2025
P65	2024	n/a	Water course - not suitable for GCN	n/a	n/a	n/a
P66	2024	0.88	Excellent	Yes	Negative	n/a
P67	2024	n/a	Water course - not suitable for GCN	n/a	n/a	n/a
P68	2024	0.68	Average	Yes	Negative	n/a
P69	2024	0.41	Poor	No	n/a	n/a
P70	2024	0.59	Below average	No	n/a	n/a
P71	2024	0.57	Below average	No	n/a	n/a
P72	No access	N/A	N/A	No	n/a	n/a
P73	No access	N/A	N/A	No	n/a	n/a
P74	No access	N/A	N/A	No	n/a	n/a
P75	No access	N/A	N/A	No	n/a	n/a
P76	No access	N/A	N/A	No	n/a	n/a
P77	2024	0.78	Good	Yes	Negative	n/a
P78	2024	0.49	Poor	No	n/a	n/a
P81	2024	0.57	Below average	No	n/a	n/a
P82	2024	N/A	No pond present	No	n/a	n/a
P83	2024	0.81	Excellent	Yes	Positive	To be surveyed 2025
P84	To be surveyed 2025	To be surveyed 2025	To be surveyed 2025	Pending HSI in 2025	Pending HSI in 2025	Pending HSI in 2025
P85	2024	0.68	Average	Yes	Negative	n/a
P86	2024	0.35	Poor	No	n/a	n/a

Annex D

Detailed Population Size Class Assessment Survey Results

Anx Table 2 Population Assessment Results for Pond P16.

Date	Temperature (°C)	Weather Conditions	Bottle Trapping	Netting	Torch count	Egg Search
12/04/2022	13	Overcast, little wind	0	0	0	0
09/05/2022	12	Overcast, slight wind	0	0	0	0
12/05/2022	10	Clear, slight wind	0	0	0	0
24/05/2022	12	Clear, slight wind	0	0	0	0
16/06/2022	21	Clear, slight wind	0	0	0	0
19/06/2022	13	Overcast, slight wind	0	0	0	0

Anx Table 3 Population Assessment Results for Pond P19.

Date	Temperature (°C)	Weather Conditions	Bottle Trapping	Netting	Torch count	Egg Search
28/04/2022	11	Clear, slight wind	0	0	0	0
09/05/2022	12	Overcast, slight wind	0	0	0	0
12/05/2022	10	Clear, slight wind	0	0	1 GCN male	0
24/05/2022	12	Clear, slight wind	0	0	0	0
16/06/2022	21	Clear, slight wind	0	0	0	0
19/06/2022	13	Overcast, slight wind	0	0	0	0

Anx Table 4 Population Assessment results for Pond P21.

Date	Temperature (°C)	Weather Conditions	Bottle Trapping	Netting	Torch count	Egg Search
13/04/2022	15	Clear, little wind	0	0	0	0
10/05/2022	13	Clear, slight wind	0	0	0	0
12/05/2022	10	Clear, slight wind	0	0	1 GCN larva	0
24/05/2022	12	Clear, slight wind	0	0	0	0

16/06/2022 21 Clear, slight wind 0 0 0 0

Anx Table 5 Population Assessment Results for Pond P47.

Date	Temperature (°C)	Weather Conditions	Bottle Trapping	Netting	Torch count	Egg Search
30/4/2024	13	Cloudy, slight wind	2 male smooth newts	X	X	0
8/05/2024	14	Clear, slight wind	2 GCN female	X	X	Yes
14/05/2024	13	Partly cloudy, slight wind	1 GCN female, 1 GCN male, 2 male smooth newts	X	X	0
28/05/2024	15	Cloudy, slight wind, moderate rain shower directly before survey	6 GCN Female, 3 male smooth newts	X	X	0
4/6/2024	12	Cloudy, slight wind, moderate rain shower directly before survey	5 GCN female, 1 GCN male	X	X	0
11/6/2024	12	Cloudy, still.	0	X	x	0