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Begbroke Science Park Application

Great Crested Newt and Reptile Report

26 June 2018

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Client	The Tripartite
Project	Begbroke Science Park Application: Great Crested Newt and Reptile Report
Version	FINAL
Project number	P17-488 BegbrokeSciParkPlanningApp_GCN&ReptileReport

	Name	**Position**	**Date**
Originated	Tom Flynn	Senior Ecologist	24 May 2018
Reviewed	Laura Grant	Principal Ecologist	25 May 2018
Approved for issue to client	Laura Grant	Principal Ecologist	04 May 2018
Issued to client	Tom Flynn	Senior Ecologist	04 June 2018
Re-issued	Tom Flynn	Senior Ecologist	26 June 2018

Disclaimer

Contents

1 Summary

1.1 BSG Ecology was commissioned by the University of Oxford in March 2018 to undertake surveys for great crested newts and reptiles in relation to an application for outline planning permission for the development of residual areas of Begbroke Science Park. The methods, results and implications of these surveys are detailed in this report.

1.2 Begbroke Science Park is located off the A44 Woodstock Road, approximately 5 miles north of Oxford city centre. Close to the village of Begbroke, the main Science Park itself occupies approximately 4.8 hectares. The University of Oxford has submitted an application for outline planning permission (18/00803/OUT) to develop residual areas of the Science Park which have not yet been built out. This is to "renew" a previous outline planning permission for similar development granted in 2015, which is time-expired. Specifically, the application covers new buildings and car parking in three parts of the Science Park, as indicated in the Framework Plan included in Appendix 1 (i.e. new buildings in Zone B and Zone C and new parking in Zone D). Together these three zones (the "Development Site") cover an area of circa. 1.21 ha.

1.3 This Great Crested Newt and Reptile Report aims to evaluate in detail the potential impacts of the proposed development on great crested newt and reptiles (and to propose appropriate ecology mitigation measures).

1.4 An environmental DNA survey for great crested newt was carried out at all ponds within 500 m of the Development Site. A population size class survey was carried out at the single pond for which a positive eDNA result was obtained. This pond (Pond P4) is within the Science Park and located approximately 43 m outside the Development Site at its closest point.

1.5 A survey for reptiles was carried out at the Science Park, involving 28 artificial refuges which were checked seven times under suitable weather conditions.

1.6 The survey results indicate that a small population of great crested newt is present in Pond P4, that this species is likely absent from all other ponds within 500m of the Development (and within 500m of Pond P4) and that reptiles are likely absent from the Development Site and the Science Park.

1.7 Due to the nature of the habitats present and their distance from Pond P4, the value of the Development Site for great created newt, common toad and reptiles is considered to be negligible and these species are unlikely to be present at the Development Site.

1.8 No significant effects on these species are likely from the Proposed Development and the killing or injury of individuals is considered unlikely. A non-licenced precautionary approach to site clearance is recommended to further reduce this risk.

1.9 The enhancement of grassland detailed in the Ecology Report already submitted with the planning application will increase the habitat suitability of the wider Science Park for amphibians and reptiles.

2 Introduction

Background to commission

2.1 BSG Ecology was commissioned by the University of Oxford in March 2018 to undertake surveys for great crested newts *Triturus cristatus* and reptiles in relation to an application for outline planning permission to Cherwell District Council (planning reference 18/00803/OUT) for the development of residual areas of Begbroke Science Park. The methods, results and implications of these surveys are detailed in the current report.

2.2 These surveys follow the Ecology Report (BSG Ecology, 2018), based on a desk study and extended Phase 1 habitat survey, submitted with the above planning application. The ecology report identified potential for great crested newt and reptiles such as common lizard *Zootoca vivipara*, grass snake *Natirx natirx* and slow-worm *Anguis fragilis* to be present in the vicinity of the proposed development.

Site description

2.3 Begbroke Science Park is located off the A44 Woodstock Road, approximately 5 miles north of Oxford city centre. Close to the village of Begbroke, the main Science Park itself occupies approximately 4.8 hectares (excluding access). The building architecture comprises a mixture of large, modern office buildings; complemented by traditional buildings of historic value, such as the Jacobean farmhouse in the southern part of the Science Park. Landscaped gardens, including a walled garden, extensive lawns and a perimeter tree screen planted in 2001 along with associated grassland provide green space within the Science Park. There are six ponds within 500 m of the proposed development, none of which are present within the proposed development itself.

Description of project

2.4 The University of Oxford has submitted an application for outline planning permission to develop residual areas of the Science Park which have not yet been built out. This is to “renew” a previous outline planning permission for similar development granted in 2015, which is time-expired since the time period for the submission of all the reserved matters applications lapsed in May 2017. The permission was, however, implemented. Specifically, the application would cover new buildings and car parking in three parts of the Science Park, as indicated in the Framework Plan included in Appendix 1 (i.e. new buildings in Zone B and Zone C and new parking in Zone D). Together these three zones (the “Development Site”) cover an area of circa. 1.21 ha.

Aims of this study

2.5 This Great Crested Newt and Reptile Report aims to evaluate in detail the potential impacts of the proposed development on great crested newt and reptiles (and to propose appropriate ecology mitigation measures) based on the following:

- An environmental DNA (eDNA) survey of ponds in the vicinity of the Site for great crested newt to determine the presence or likely absence of this species.
- A population size class survey of ponds found to contain great crested newt eDNA.
- A reptile survey of areas of suitable habitat within the Science Park.
- Consideration of the location, nature and extent of the proposed development in relation to the results of the above surveys.

3 Methods

Identification of ponds

3.1 All ponds within 500 m of the Development Site were identified using Ordnance Survey maps and the results of a Biodiversity Survey carried out in 2015 (BSG Ecology, 2015). The six ponds within 500 m of the Development Site are indicated on Figure 1 in Section 9.

Great crested newt eDNA survey

3.2 Environmental DNA (eDNA) surveys can be used to determine presence/likely absence of great crested newt via a single survey visit between mid-April and late June (Biggs *et a*l., 2014). Water samples were collected from each of the six ponds within 500 m of the Site following the method of Biggs *et al*., (2014). See Figure 1 for pond locations. Sampling was carried out using eDNA sampling kits provided by ADAS (www.adas.uk). After collection, samples were refrigerated at 5°C and were sent by air conditioned courier to ADAS for eDNA analysis.

Great crested newt population size class survey

3.3 In order to determine the great crested newt (GCN) population size in the single pond which tested positive for eDNA, overnight surveys for this species were carried out over the period April–May 2018, based on industry standard guidance (English Nature, 2001; GOV.UK, 2018). This recommends that to determine population size class, six overnight survey visits should be completed (and three methods, preferably torch survey, bottle-trapping and egg search, should be applied at each of the six visits). Overnight surveys of ponds were carried out on 26 April–27 April, 02–03 May, 10–11 May, 17–18 May, 23–24 May and 30–31 May. All survey visits were undertaken at a suitable time of year (English Nature, 2001; GOV.UK, 2018).

3.4 On each survey, three survey methods were employed, these were torch survey, bottle trapping and egg searches:

- Torch survey: This method involved searching for GCN after sunset using a 1 million candle power torch. All accessible parts of the pond's margins were slowly walked and searched.
- Bottle trapping: Where water depth and bank side access allowed, bottle traps (constructed from 2 L plastic drinks bottles) were set in suitable parts of the pond at dusk and left in place overnight. Bottle traps were checked for amphibians the following morning within 12 hours of setting, and any animals caught were released at the point of capture.
- Egg search: Egg searches were conducted in order to determine whether GCN were breeding. This involved searching marginal and aquatic vegetation for the distinctive leaf folding pattern and egg of GCN. The presence of GCN eggs provides clear evidence of attempted breeding at a pond.

3.5 Surveys were carried out by Dr Tom Flynn, Senior Ecologist at BSG Ecology, who holds a Natural England survey licence for great crested newt (licence number 2015-17735).

Reptile survey

3.6 From the results of the Phase 1 habitat survey, up to 1.6 ha of habitat with some potential to be suitable for reptiles was identified at the Site, although much of this is sub-optimal due to the lack of long grass or scrub cover. In order to determine whether reptiles are present (and if so, which species), a presence/absence survey for reptiles following the industry standard guidance of Froglife (1999) was carried out in 2018.

3.7 A total of 28 artificial refuges (each comprising a sheet of roofing felt, 100 x 50 cm, i.e. 0.5 m^2) were placed within the suitable habitats at the Site (see Figure 2 for locations) on 14 March 2018. The density of refuges was 17.5/ha in potentially suitable habitats, which is above the density of 5–10

for general survey recommended by Froglife (1999). This higher density was employed to increase the likelihood of reptile presence being detected.

3.8 Survey visits were carried out on the dates and under the weather conditions indicated in Table 1. The surveyors were Pete Newbold, Principal Ecologist at BSG Ecology, Jamie Peacock, Ecologist at BSG Ecology, and Joe Bishop, Ecologist at BSG Ecology.

Table 1: Dates and weather conditions of reptile survey visits conducted in 2018.

Visit no.	Date	Surveyors	Temperature	Weather
Setup	14th March	Mark Norriss	N/A	N/A
1	13th & 16th April	Jamie Peacock	13th: 10–11°C 16th: 12–13°C	13th: Cloudy (8/8 oktas), calm – light breeze (bf 0–2), sun occasional–none 16th: Cloudy (7/8 oktas), calm–light breeze (bf 0–2), sun occasional–occasional/strong
2	19th April	Pete Newbold	11–19°C	Clear sky (0/8 oktas), light air–calm (bf 1–0), sun strong
3	25th April	Joe Bishop	10–13°C	Moderate cloud (4–5/8 oktas), light–moderate (bf 2–4), sun occasional–none
4	1st May	Joe Bishop	10–14°C	Clear sky (0/8 oktas), light breeze (bf 2), sun strong
5	8th May	Joe Bishop	16–19°C	Clear sky (0/8 oktas), light–gentle breeze (bf 2–3), sun strong
6	14th May	Joe Bishop	15–18°C	Clear sky (0/8 oktas), gentle breeze (bf 3), sun strong
7	25th May	Joe Bishop	14–17°C	Rain prior to survey. Cloudy, wind light (bf 1).

Survey limitations

3.9 Aquatic and emergent vegetation grew throughout the great crested newt survey period, with aquatic vegetation covering the majority of base of Pond P4, and emergent vegetation covering around 20% of the surface of Pond P4 by the end of the survey period. However, due to the shallow nature of the pond, and the generally low turbidity, the presence of this vegetation was not considered to have unduly affected the reliability of the survey. Young brown goldfish were seen within the vegetation, and it is expected that great crested newts would have generally been visible if present.

3.10 On two of the reptile survey visits, the temperature had reached 19°C by the end of the survey, which is 1°C above the maximum recommended in the standard industry guidance. However, due to the density of artificial refuges used significantly exceeding the standard number, and the majority of refuges having been checked within suitable temperature conditions on these two survey visits, this factor is not considered to have significantly affected the reliability of the survey.

4 Results

Great crested newt eDNA survey

4.1 The eDNA survey indicated the presence of great crested newt eDNA in Pond P4 (the pond at the Science Park), and its absence from all other ponds that were surveyed. Results are provided in Table 2. There was no evidence of degradation or inhibition of DNA (e.g. due to substances in the water which damage or bind to DNA), indicating that the eDNA survey results are likely to be reliable. Analysis results obtained from ADAS are shown in full in Appendix 2.

Table 2: Great crested newt eDNA survey results returned on 24/04/2018.

Pond number	GCN eDNA result	Degradation/inhibition
P1	Negative	None
P2	Negative	None
P3	Negative	None
P4	Positive	None
P5	Negative	None
P6	Negative	None

Great crested newt population size class survey

4.2 A peak count of two great crested newts was found in Pond P4 at the Science Park. Results of the survey are provided in Table 3.

Table 3: Great crested newt population size class survey results for Pond P4.

Visit No.	Date	Peak count of great crested newt	Method yielding peak count	Great crested newt eggs	Other amphibians or fish recorded (peak count)
1	26/04/18 – 27/04/18	1	Torch survey	N	Many tens of young goldfish, Toad tadpoles (2) Smooth newt *Lissotriton vulgaris* (3) Common toad (1)
2	02/05/18 – 03/05/18	0	NA	N	
3	10/05/18 – 11/05/18	2	Bottle trapping	N	
4	17/05/18 – 18/05/18	0	NA	N	
5	23/05/17 – 24/05/18	0	NA	N	
6	30/05/17 – 31/05/18	0	NA	N	

Reptile survey

4.3 No reptiles or common toad *Bufo bufo*[1] were found during the reptile survey. Results of the survey are provided in Table 4.

Table 4: Reptile survey results.

Species	Peak adult count	Peak juvenile count
Grass snake	0	0
Common lizard	0	0
Slow-worm	0	0
Common toad	0	0

[1] Common toad is a Species of Principal Importance (SPI) amphibian species often found under artificial reptile refuges.

5 Evaluation of Ecological Features

5.1 Table 5 provides a geographic evaluation of the ecological features associated with the Site covered by this report (i.e. great crested newt and reptiles). Common toad is also included because this species was recorded during the surveys and is a Species of Principal Importance in England. A summary of relevant policy, legislation and other instruments is provided in Appendix 3.

Table 5: Evaluation of ecological features.

Feature	**Geographic level of Importance**	**Justification**
Great crested newt	Offsite great crested newt population within Pond P4: **Local.** Value of habitats within Development Site for great crested newt: **Negligible.**	This species is protected under UK and European legislation and is a Species of Principal Importance in England. There is one pond (Pond P4) that supports this species in the vicinity (within 500 m) of the Development Site. This is a formal goldfish pond within the Science Park, located approximately 43 m from the Development Site at its closest point. The population size class here is small. This population is considered to be isolated from all other populations because there are no other populations within at least 500 m of this pond. The low number of individuals observed, high density of ornamental fish in the pond, operation of a large external pond filter, and lack of any observed eggs suggest that this population may be a relict population in decline. The habitats within the Development Site are generally hardstanding and amenity grassland which offer poor terrestrial habitat for great crested newt. A small area of semi-improved neutral grassland, which provides more suitable habitat for this species is present in Zone B, but this is located a minimum of 200 m from the pond using the shortest feasible route an amphibian could take, beyond buildings and hardstanding. The Development Site is therefore not considered to provide habitat of value to great crested newt, and this species is unlikely to be present there.
Common toad	Value of habitats within Development Site for common toad: **Negligible.**	This species is a Species of Principal Importance in England. One adult individual was found within Pond P4 during the great crested newt survey. This pond is located approximately 43 m from the Development Site at its closest point. Two tadpoles (from their dark black colour, likely to be toad tadpoles) were also seen within the pond. The habitats within the Development Site are generally hardstanding and amenity grassland which offer poor terrestrial habitat for common toad. A small area of semi-improved neutral grassland, which provides more suitable habitat for this species is present in Zone B, but this is located a minimum of 200 m from the pond using the shortest feasible route an amphibian could take, beyond buildings and hardstanding. The Development Site is therefore not considered to provide habitat of value to common toad, and this species is unlikely to be present there.
Reptiles	Value of habitats within Development Site for	Common reptile species such as grass snake, common lizard and slow-worm are Species of Principal Importance in England and are protected under the Wildlife and Countryside Act 1981 (as

	reptiles: **Negligible.**	amended). The reptile survey found no reptiles in the areas of potentially suitable habitat at the Science Park. Therefore reptiles are considered likely to be absent from the Science Park and from the Development Site.

6 Potential Ecological Impacts

6.1 Table 6 characterises potential ecological impacts and effects of the proposed development on the two ecological features described in the previous section. Features determined to be of low ecological value in Table 5 are excluded from Table 6 and further analysis.

Table 6: Evaluation of ecological features.

Feature	Potential Impacts	Assessment of Ecological Effects	Significance
Great crested newt	Loss of habitat during construction	Habitat suitable for great crested newt at the Development Site is limited in extent and poorly connected to the nearest pond. This species is therefore unlikely to be present at the Site and loss of this habitat will not have a significant effect on the local population of this species.	No significant effect. Limited potential for breach of wildlife legislation.
	Habitat fragmentation	Given the unsuitability of habitats at the Development Site for this species, the fact that the Science Park is surrounded by large arable fields (which are also unsuitable habitat) and the fact that there are no ponds within 500 m of the population of great crested newts, the Proposed Development will not cause significant additional habitat fragmentation for this species.	
	Killing or injury of individuals during construction	Habitat suitable for great crested newt at the site is limited in extent and poorly connected to the nearest pond, and the nearest pond provides poor breeding habitat. The population present in the pond at the Science Park is small. This species is therefore unlikely to be present at the Site, and the potential for killing or injury is very limited. However, non-licenced precautionary measures are recommended to further minimise the risk of breaching wildlife legislation.	
Common toad	Loss of habitat during construction	Habitat suitable for this species is limited in extent and poorly connected to the nearest pond. This species is therefore unlikely to be present at the Site and loss of this habitat will not have a significant effect on the local population of this species.	No significant effect.
	Habitat fragmentation	Given the unsuitability of habitats at the Development Site for this species, the fact that the Science Park is surrounded by large arable fields (also unsuitable habitat) and the fact that there are no ponds within 500 m of the	

		pond at the Science Park, the Proposed Development will not cause significant additional habitat fragmentation for this species.	
	Killing or injury of individuals during construction	Habitat suitable for common toad at the site is limited in extent and poorly connected to the nearest pond, and the nearest pond provides poor breeding habitat. This species is therefore unlikely to be present at the Site, and the potential for killing or injury is very limited. However, precautionary measures are recommended to further minimise the risk of killing or injury.	

7 Mitigation and Enhancement

7.1 Table 7 outlines any appropriate avoidance, mitigation compensation and enhancement measures for the ecological features and effects identified in the previous section.

Table 7. Recommended ecological mitigation.

Feature	Avoidance/Mitigation/Compensation/Enhancement
Great crested newt and common toad	<u>Precautionary Mitigation</u> Killing or injury of individual amphibians is considered unlikely but a precautionary approach will be taken to further reduce this risk by turf stripping and site clearance being carried out prior to construction under supervision of a professional ecologist and following a precautionary non-licenced method statement. This work will be carried out outside the hibernation period (i.e. outside October to March inclusive). If any amphibians or reptiles other than great crested newts) are found during this process, these will be moved to a suitable location in the wider Science Park in lidded buckets (amphibians) or cloth bags (reptiles). In the unlikely event that great crested newts are encountered during works at the Site, site works will be halted and a professional ecologist will be consulted. It may be necessary to obtain a European Protected Species licence before preparation and/or construction works can continue. <u>Enhancement</u> The proposed enhancement of grassland described in the Ecology Report will increase the foraging value of this off-site area for reptiles and amphibians. New habitat for reptiles and amphibians will be created within the wider Science Park in the form of two amphibian and reptile habitat mounds in suitable locations. These will be a minimum of 2 m × 1.5m in area by 1.5 m high, constructed from inert rubble and untreated logs and turfed with turf removed during site preparation works for the development. These habitat mounds are intended to provide suitable shelter, basking and hibernation sites for reptiles and hibernation and shelter sites for great crested newt. Location and construction will be under the advice of a professional ecologist, but are expected to be to the south of Zone A, which is the closest practicable area to the pond at the Science Park (Pond P4).

8 References

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.

BSG Ecology (2015) *Land around Begbroke Science Park: Biodiversity Survey*. Report to Oxford University.

English Nature (2001) *Great Crested Newt Mitigation Guidelines.* English Nature.

GOV.UK (2018). *Guidance. Great crested newts: surveys and mitigation for development projects.* Natural England, Worcester.

9 Figures

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PROJECT TITLE
BEGBROKE SCIENCE PARK

DRAWING TITLE
Figure 1: Ponds within 500m of the Site

DATE: 04.06.2018 CHECKED: TF SCALE: 1:5,000
DRAWN: COH APPROVED: AM VERSION: 1.1

LEGEND

- Site boundary
- 500 m radius from Site boundary
- P1 Ponds surveyed for great crested newt

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PROJECT TITLE
BEGBROKE SCIENCE PARK

DRAWING TITLE
Figure 2: Reptile survey

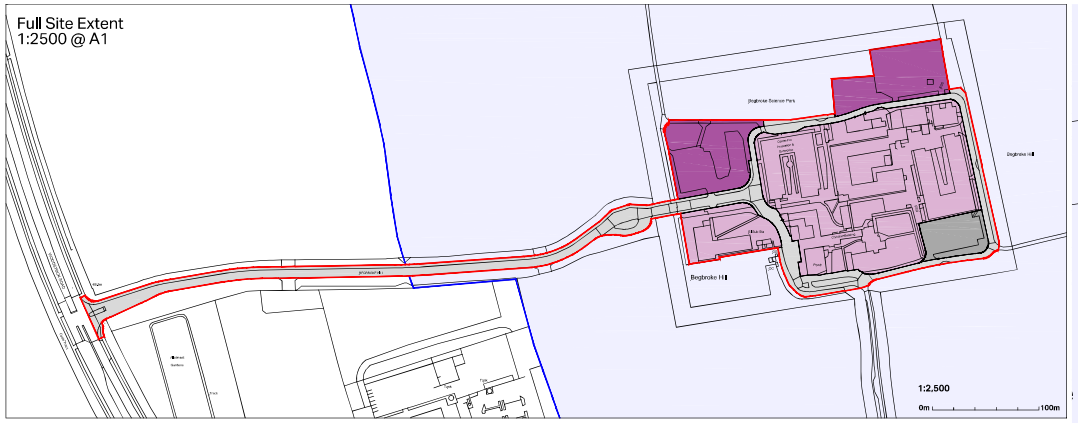
DATE: 04.06.2018 CHECKED: TF SCALE: 1:2,000
DRAWN: COH APPROVED: AM VERSION: 1.1

LEGEND

Site boundary

Locations of artificial reptile refuges

10 Appendix 1: Location of Proposed Development



Site Area (5.54ha)

Other Land Under the Control of the Applicant

Existing Built Development

Proposed Employment Area

Existing Infrastructure

Proposed Parking

NOTE:
All building heights up to 12.6m above existing ground level (excluding point features and plant)

Park

Zone B
0.47ha

ESS

Zone C
0.52ha

Centre For Innovation & Enterprise

Zone A
2.47ha

B

ESS

Zone A
0.38ha

El Sub Sta

Zone D
0.22ha

Christian Building

GG

GG

Pond

Begbroke Hill

Rev	Description	Date

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Client:
University of Oxford

Land at Begbroke

Framework Plan

Scale@A1:	Drawn:	Designed:	Approved:
1:500	ADW	DC	---

0m 20m

Drawing Number: TRI001/015
Revision: A
Date: 27.02.18

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11 Appendix 2: EDNA Analysis Results

11.1 Note that due to the ponds referenced as P1-P6 in this report forming part of a larger set of ponds being surveyed by BSG Ecology in 2018, pond numbers specified in the ADAS analysis results differ from those specified in this report as indicated I the following table:

Table 11-1: Pond numbers.

Pond number in current report	Pond number in ADAS analysis results
P1	P1
P2	P2
P3	P3
P4	P4
P5	P7
P6	P8

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ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 516747
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: 2018-0192	Condition on Receipt: Good	Volume: Passed
Client Identifier: P2 Begbroke	Description: pond water samples in preservative	
Date of Receipt: 19/04/2018	Material Tested: eDNA from pond water samples	

Determinant	**Result**	**Method**	**Date of Analysis**
Inhibition Control[†]	2 of 2	Real Time PCR	21/04/2018
Degradation Control[§]	Within Limits	Real Time PCR	21/04/2018
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	23/04/2018
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)[#]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	24/04/2018	Date of issue:	24/04/2018

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[§] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[#]Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Sample Condition

Upon sample receipt we score your samples according to quality: good, low sediment, medium sediment, high sediment, white precipitate, and presence of algae.

There are three reasons as to why sediment should be avoided:

1. It is possible for DNA to persist within the sediment for longer than it would if it was floating in the water which could lead to a false positive result i.e. in this case GCN not recently present but present a long time ago
2. In some cases sediment can cause inhibition of the PCR analysis used to detect GCN eDNA within samples which could lead to an indeterminate result.
3. In some cases sediment can interfere with the DNA extraction procedure resulting in poor recovery of the eDNA which in turn can lead to an indeterminate result.

Algae can make the DNA extraction more difficult to perform so if it can be avoided then this is helpful.

Sometimes samples contain a white precipitate which we have found makes the recovery of eDNA very difficult. This precipitate can be present in such high amounts that it interferes with the eDNA extraction process meaning that we cannot recover the degradation control (nor most likely the eDNA itself) at sufficient levels for the control to be within the acceptable limits for the assay, therefore we have to classify these type of samples as indeterminate.

What do my results mean?

A positive result means that great crested newts are present in the water or have been present in the water in the recent past (eDNA degrades over around 7-21 days).

A negative result means that DNA from the great crested newt has not been detected in your sample.

On occasion an inconclusive result will be issued. This occurs where the DNA from the great crested newt has not been detected but the controls have indicated that either: the sample has been degraded and/or the eDNA was not fully extracted (poor recovery); or the PCR inhibited in some way. This may be due to the water chemistry or may be due to the presence of high levels of sediment in samples which can interfere with the DNA extraction process. A re-test could be performed but a fresh sample would need to be obtained. We have successfully performed re-tests on samples which have had high sediment content on the first collection and low sediment content (through improved sample collection) on the re-test. If water chemistry was the cause of the indeterminate then a re-test would most likely also return an inconclusive result.

The results will be recorded as indeterminate if the GCN result is negative and the degradation result is recorded as:

1. evidence of decay - meaning that the degradation control was outside of accepted limits
2. evidence of degradation or residual inhibition - meaning that the degradation control was outside of accepted limits but that this could have been due to inhibitors not being removed sufficiently by the dilution of inhibited samples (according to the technical advice note)

12 Appendix 3: Summaries of Relevant Policy, Legislation and Other Instruments

12.1 This section briefly summarises the legislation, policy and related issues that are relevant to the main text of the report. The following text does not constitute legal or planning advice.

National Planning Policy Framework

12.2 The Government published the National Planning Policy Framework (NPPF) on 27 March 2012. Text excerpts from the NPPF are shown where they may be relevant to planning applications and biodiversity including protected sites, habitats and species.

12.3 In conserving and enhancing the natural environment, the NPPF (Paragraph 109) states that 'the planning system should contribute to and enhance the natural and local environment' by:

a. Recognising the wider benefits of ecosystem services;

b. Minimising impacts on biodiversity and providing net gains in biodiversity, where possible contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;

c. Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability.

12.4 In paragraph 111, the NPPF refers to brownfield land as follows: 'planning policies and decisions should encourage the effective use of land by re-using land that has been previously developed (brownfield land), provided that it is not of high environmental value.'

12.5 Paragraph 117 refers to how planning policies should aim to minimise impacts on biodiversity, to: 'identify and map components of the local ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity, wildlife corridors and stepping stones that connect them and areas identified by local partnerships for habitat restoration or creation;' and to 'promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species populations, linked to national and local targets, and identify suitable indicators for monitoring biodiversity in the plan.'

12.6 Paragraph 118 of the National Planning Policy Framework advises how, when determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the mitigation hierarchy. The mitigation hierarchy advises that if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused.

12.7 Where proposals or activities require planning permission, the NPPF states that '…local planning authorities should aim to conserve and enhance biodiversity by applying the following principles:

d. Proposed development on land within or outside a Site of Special Scientific Interest likely to have an adverse effect on a Site of Special Scientific Interest (either individually or in combination with other developments) should not normally be permitted. Where an adverse effect on the site's notified special interest features is likely, an exception should only be made where the benefits of the development, at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific Interest;

e. Development proposals where the primary objective is to conserve or enhance biodiversity should be permitted;

f. Opportunities to incorporate biodiversity in and around developments should be encouraged;

g. Planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss; and

h. The following wildlife sites should be given the same protection as European sites:

i. potential Special Protection Areas and possible Special Areas of Conservation

ii. listed or proposed Ramsar sites; and

iii. sites identified, or required, as compensatory measures for adverse effects on European sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.'

12.8 In respect of protected sites, the NPPF requires local planning authorities to make 'distinctions…between the hierarchy of international, national and locally designated sites so that protection is commensurate with their status and gives appropriate weight to their importance and the contribution that they make to wider ecological networks.'

12.9 In paragraph 125 the NPPF states that 'by encouraging good design, planning policies and decisions should limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.' This applies to protected species that are a material consideration in the planning process including bats and may also apply to other light sensitive species.

Government Circular ODPM 06/2005 Biodiversity and Geological Conservation

12.10 Paragraph 98 of Government Circular 06/2005 advises that "the presence of a protected species is a material consideration when a planning authority is considering a development proposal that, if carried out, would be likely to result in harm to the species or its habitat. Local authorities should consult Natural England before granting planning permission. They should consider attaching appropriate planning conditions or entering into planning obligations under which the developer would take steps to secure the long-term protection of the species. They should also advise developers that they must comply with any statutory species' protection provisions affecting the site concerned..."

12.11 Paragraph 99 of Government Circular 06/2005[2] advises that "it is essential that the presence or otherwise of protected species, and the extent that they may be affected by the proposed development, is established before the planning permission is granted, otherwise all relevant material considerations may not have been addressed in making the decision. The need to ensure ecological surveys are carried out should therefore only be left to coverage under planning conditions in exceptional circumstances, with the result that the surveys are carried out after planning permission has been granted".

Standing Advice (GOV.UK)

12.12 The GOV.UK website provides information regarding protected species and sites in relation to development proposals: 'Local planning authorities should take advice from Natural England or the Environment Agency about planning applications for developments that may affect protected species.' GOV.UK advises that 'some species have standing advice which you can use to help with planning decisions. For others you should contact Natural England or the Environment Agency for an individual response.'

12.13 The standing advice (originally from Natural England and now held and updated on GOV.UK[3]) provides advice to planners on deciding if there is a 'reasonable likelihood' of protected species being present. It also provides advice on survey and mitigation requirements.

[2] *ODPM Circular 06/2005. Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impacts within the Planning System* (2005). HMSO Norwich.

[3] https://www.gov.uk/protected-species-and-sites-how-to-review-planning-proposals#standing-advice-for-protected-species

12.14 When determining an application for development that is covered by standing advice, in accordance with guidance in Government Circular 06/2005, Local planning authorities are required to take the standing advice into account. In paragraph 82 of the aforementioned Circular, it is stated that: 'The standing advice will be a material consideration in the determination of the planning application in the same way as any advice received from a statutory consultee…it is up to the planning authority to decide the weight to be attached to the standing advice, in the same way as it would decide the weight to be attached to a response from a statutory consultee.'

European protected species (Animals)

12.15 The Conservation of Habitats and Species Regulations 2017 consolidates various amendments that have been made to the 2010 and original (1994) Regulations which transposed the EC Habitats Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Council Directive 92/43/EEC) into national law.

12.16 "European protected species" (EPS) of animal are those which are present on Schedule 2 of the 2017 Regulations. They are subject to the provisions of Regulation 43 of those Regulations. All EPS are also protected under the Wildlife and Countryside Act 1981 (as amended). Taken together, these pieces of legislation make it an offence to:

a. Intentionally or deliberately capture, injure or kill any wild animal included amongst these species
b. Possess or control any live or dead specimens or any part of, or anything derived from a these species
c. deliberately disturb wild animals of any such species
d. deliberately take or destroy the eggs of such an animal, or
e. intentionally, deliberately or recklessly damage or destroy a breeding site or resting place of such an animal, or obstruct access to such a place

12.17 For the purposes of paragraph (c), disturbance of animals includes in particular any disturbance which is likely—

a. to impair their ability—
    i. to survive, to breed or reproduce, or to rear or nurture their young, or
    ii. in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
b. to affect significantly the local distribution or abundance of the species to which they belong.

12.18 Although the law provides strict protection to these species, it also allows this protection to be set aside (derogated) through the issuing of licences. The licences in England are currently determined by Natural England (NE) for development works and by Natural Resources Wales in Wales. In accordance with the requirements of the Regulations (2017), a licence can only be issued where the following requirements are satisfied:

a. The proposal is necessary 'to preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment'
b. 'There is no satisfactory alternative'
c. The proposals 'will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

Definition of breeding sites and resting places

12.19 Guidance for all European Protected Species of animal, including bats and great crested newt, regarding the definition of breeding and of breeding and resting places is provided by The European Council (EC) which has prepared specific guidance in respect of the interpretation of

various Articles of the EC Habitats Directive.[4] Section II.3.4.b) provides definitions and examples of both breeding and resting places at paragraphs 57 and 59 respectively. This guidance states that 'The provision in Article 12(1)(d) [of the EC Habitats Directive] should therefore be understood as aiming to safeguard the ecological functionality of breeding sites and resting places.' Further the guidance states: 'It thus follows from Article 12(1)(d) that such breeding sites and resting places also need to be protected when they are not being used, but where there is a reasonably high probability that the species concerned will return to these sites and places. If for example a certain cave is used every year by a number of bats for hibernation (because the species has the habit of returning to the same winter roost every year), the functionality of this cave as a hibernating site should be protected in summer as well so that the bats can re-use it in winter. On the other hand, if a certain cave is used only occasionally for breeding or resting purposes, it is very likely that the site does not qualify as a breeding site or resting place.'

Competent authorities

12.20 Under Regulation 7 of the Conservation of Habitats and Species Regulations 2017 a "competent authority" includes "any Minister of the Crown…, government department, statutory undertaker, public body of any description or person holding a public office.

12.21 In accordance with Regulation 9, "a competent authority must exercise their functions which are relevant to nature conservation, including marine conservation, so as to secure compliance with the requirements of the [Habitats and Birds] Directives. This means for instance that when considering development proposals a competent authority should consider whether EPS or European Protected Sites are to be affected by those works and, if so, must show that they have given consideration as to whether derogation requirements can be met.

Reptiles

12.22 All native reptile species receive legal protection in Great Britain under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Viviparous lizard, slow-worm, grass snake and adder are protected against killing, injuring and unlicensed trade only. Sand lizard and smooth snake receive additional protection as "European Protected Species" under the provisions of the Conservation of Habitats and Species Regulations 2017 and are fully protected under the Wildlife and Countryside Act 1981 (as amended).

12.23 All six native species of reptile are included as 'species of principal importance' for the purpose of conserving biodiversity under Section 41 (England) of the NERC Act 2006 and Section 7 of the Environment (Wales) Act 2016.

12.24 Current Natural England Guidelines for Developers[5] states that 'where it is predictable that reptiles are likely to be killed or injured by activities such as site clearance, this could legally constitute intentional killing or injuring.' Further the guidance states: 'Normally prohibited activities may not be illegal if 'the act was the incidental result of a lawful operation and could not reasonably have been avoided'. Natural England 'would expect reasonable avoidance to include measures such as altering development layouts to avoid key areas, as well as capture and exclusion of reptiles.'

12.25 The Natural England Guidelines for Developers state that 'planning must incorporate two aims where reptiles are present:

- To protect reptiles from any harm that might arise during development work;
- To ensure that sufficient quality, quantity and connectivity of habitat is provided to accommodate the reptile population, either on-site or at an alternative site, with no net loss of local reptile conservation status.'

[4] Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC. (February 2007), EC.
[5] English Nature, 2004. *Reptiles: guidelines for developers.* English Nature, Peterborough. http://publications.naturalengland.org.uk/publication/76006?category=31018