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**GREAT CRESTED NEWT PRESENCE / ABSENCE
SURVEY & POPULATION SIZE CLASS ASSESSMENT**

At

Plot 3A

Wrexham Industrial Estate
Bryn Lane
Wrexham
LL13 9UT

NGR: SJ 339340 350457

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EXECUTIVE SUMMARY

A suite of ecological surveys were undertaken by United Environmental Services (UES) Ltd. at Plot 3A, Wrexham Industrial Estate in early 2022. These surveys included a great crested newt (GCN) *Triturus cristatus* impact assessment of all ponds on site and within 500m of the site (where accessible). The survey highlighted the likelihood that GCNs are present on site and recommended that further presence / absence surveys should be undertaken prior to the submission of the planning application. If GCN were found to be present then a population size class assessment (PSCA) should be undertaken. The development proposals are for the construction of three industrial units with associated parking and access roads. Ponds 1, 2 and 4 will be removed, whereas Ponds 3, 5 and 6 will be retained as part of the proposed development. All onsite ditches will be retained.

GCN presence / absence and PSCA surveys were undertaken by UES across March to June 2022. The objective of the surveys was to establish the presence or likely absence of GCNs in the ponds on-site and within 500m of the proposed development site boundary (where accessible) and, if present, assess the size of the population within each pond, in order to inform the necessary mitigation measures for the development to proceed.

The terrestrial habitats within the development footprint are broadly suitable for GCNs. The areas of woodland, hedgerows, tall ruderal, scrub and species-rich grassland habitats provide an array of moderate to high quality opportunities for foraging and commuting amphibians. Additionally, there are potential hibernation opportunities in the exposed tree root systems, mammal burrows and dense vegetation / leaf litter within the areas of scrub and woodland.

Six ponds and four ditches were identified within the boundaries of the proposed development site. Five ponds and three ditches are located within the development footprint and will be directly affected by the proposals. One pond (Pond 6) and one ditch (Ditch 6) are located within the proposed receptor site, located within the eastern section of the red line boundary. Numerous records of medium sized GCN populations have been recorded in the ponds on the development site; the most recent dating from 2016. Connectivity to the wider landscape is facilitated by good quality terrestrial habitat that provides abundant ground cover with ideal colonisation range between ponds. A further forty-seven mapped ponds and nine mapped ditches were identified within 500m of the proposed development site.

Thirteen ponds (six onsite and seven offsite) and seven ditches (four onsite and three offsite) had access granted to undertake presence / absence surveys. A medium population of GCNs was recorded in Ponds 3, 4, 5, 6, 24 and 26 (peak adult count of 8, 6, 13, 6, 8 and 8, respectively). Ponds 3 – 6 are within the red line boundary; Pond 4 is due to be removed and Ponds 3, 5 and 6 are due to be retained as part of the proposed development.

No evidence of GCNs was found in Pond 34 and Ditch 1, however samples taken from the waterbodies returned positive GCN DNA results. This indicates that GCNs use these waterbodies, although it is likely to be in very low numbers and / or on a transient basis.

No evidence of GCNs was found in Ponds 1, 2, 25, 29, 30, 31 and Ditches 2, 3, 6, 7A, 7B and 8. These ponds and ditches also returned negative eDNA results. GCNs are not considered to be present within these ponds and ditches.

The combined peak count of adult GCNs onsite and within a 500m radius is forty-nine individuals. However, several ponds did not have access granted, therefore, it is likely the GCN population in the area will be higher. The peak count of adult GCN onsite is



thirty-three individuals which infers that the development site hosts a “medium” GCN population.

It is considered likely that GCNs will be adversely impacted by the proposed works. Therefore, the works must proceed under a European Protected Species (EPS) mitigation licence issued by Natural Resources Wales.

A GCN method statement will also be required for submission with the planning application, which will outline the mitigation and compensation measures required in order to safeguard protected species throughout the duration of the development.

The report should be read in conjunction with appendices 1 to 6, which give visual representations of the survey results, and the following ecological survey reports which have been prepared for the site by UES:

- UES Preliminary Ecological Appraisal (report reference UES03448/01)
- UES GCN Impact Assessment (report reference UES03448/07)
- UES Ecological Impact Assessment (report reference UES02275/22)



1 INTRODUCTION

1.1 Author, surveyors, and qualifications

This report is compiled and written by Daniel Smith BSc MScRes, UES Ecologist.

Other surveyors include:

- Toby Hart BSc MCIEEM PIEMA, UES Managing Director. Toby is licensed by Natural Resources Wales to disturb, take and handle great crested newts under licence number S086784/1
- Tom Kenwright BSc MSc, UES Senior Ecologist.
- Alasdair Grubb BSc ACIEEM, UES Ecologist. Alasdair is licensed by Natural Resources Wales to disturb, take and handle great crested newts under licence number S090926-1.
- Mark Halliwell MBiol, UES Ecologist.
- Robert Mooney MSc, UES Graduate Ecologist
- Noah Fulton BSc, UES Graduate Ecologist
- Jacob Miller BSc, UES Graduate Ecologist
- James Stubbs BSc, UES Sub-contractor.
- Mark Jeffries, UES Sub-contractor
- Jenny Gibbs, UES Administrator

All surveyors have the knowledge, skills and experience identified within CIEEM's "Competencies for Species Survey: Great Crested Newt" (2013), or were under the supervision of a surveyor with the required competencies.

1.2 Survey objectives

UES was commissioned in March 2022 to conduct site surveys which include the following activities:

- Establish the presence / absence of GCN in all onsite ponds and in all offsite ponds within 500m of the site (where accessible)
- Assess the size class of the population likely to be affected by the development
- Evaluate the potential impacts of the development on GCN and associated habitats (if present)
- Provide advice on any potential requirement for mitigation or compensation.

1.3 Proposed development and previous survey information

The development proposals are for the construction of three industrial units with associated parking and access roads. Ponds 1, 2 and 4 will be removed, whereas Ponds 3, 5 and 6 will be retained as part of the proposed development. All onsite ditches will be retained.



1.4 Structure of the report

This report sets out the methodology, results, and recommendations in relation to a specific GCN survey. Recommendations are in line with statutory legislation and planning policy objectives.

The report should be read in conjunction with appendices 1 to 6, which give visual representations of the survey results, and the following ecological survey reports which have been prepared for the site by UES:

- UES Preliminary Ecological Appraisal (report reference UES03448/01)
- UES GCN Impact Assessment (report reference UES03448/07)
- UES Ecological Impact Assessment (report reference UES02275/22)



2 METHODOLOGY

2.1 Desk study

Aerial photographs and Ordnance Survey maps were used to identify all waterbodies on site and within a 500m radius of the site boundary.

UES was commissioned to undertake a records search through Cofnod – North Wales Environmental Information Service. Where necessary, the author has also used the National Biodiversity Network (NBN) Atlas website to inform the survey.

2.2 Field survey

The survey methodology followed that of Natural England's GCN mitigation guidelines (2001).

Standard presence / absence surveys require four site visits, however when presence has been confirmed, a further two visits (total of six) are required to assess the size of the population within a pond.

Throughout the survey period, the ponds surveyed were assessed using the Habitat Suitability Index. The HSI is a tool used to provide a numerical indication of the quality of a waterbody in terms of GCN breeding and associated habitat requirements on a scale of 0-1 (0 indicating unsuitable habitat, 1 representing optimal habitat).

Surveys used a combination of at least three of the four recommended survey methods (bottle trapping, netting, torching and egg searching), as detailed in the following subsections. All amphibian species observed during the surveys were recorded, along with their gender and life stage, if possible, to determine.

2.2.1 Bottle trapping

Bottle traps are placed around the margins of the pond and are left overnight, before collecting them early the following morning. Where safe to do so, traps should be set all around the pond at a density of one trap per two metres of shoreline. Some studies indicate that bottle trapping is the most reliable method for detecting the presence of GCN, and it is especially useful for surveying turbid or weed-covered ponds. This method also allows the accurate identification of any amphibians caught. Bottle traps should not be used where there is a risk of disturbance by people or animals, or when the overnight air temperature drops below 5°C, or during very hot weather when water temperatures will be high and dissolved oxygen levels low.

2.2.2 Torching

GCNs can be searched for at night using a powerful torch. In clear ponds this can be a very effective way of detecting and counting newts during the breeding season, but this method can be limited in heavily vegetated or turbid ponds. It is recommended that the entire margin of the pond is walked once, slowly checking for newts. Surveys should only take place when the night air temperature is > 5°C and there is no or little wind or rain to disturb the water's surface.

2.2.3 Netting



GCNs can be captured by sampling the area around the pond edge using a long-handled net. There should be at least 15 minutes of netting per 50m of shoreline. Netting should be undertaken with care so as to minimize damage to beds of submerged aquatic vegetation which may contain newt eggs and / or larvae.

2.2.4 Egg search

All native newts lay eggs singly on submerged leaves of aquatic plants and other suitable submerged items. Careful examination of pond vegetation can therefore be used to establish the presence of newts in a pond during the breeding season. GCN eggs can be distinguished from other newt species' eggs, therefore enabling species-specific presence / absence to be determined.

2.2.5 Environmental DNA (eDNA) testing

Where GCN presence had not already been confirmed through the other survey methods prior to 30th June, eDNA samples were also taken to aid in determining the likely presence or absence of GCNs.

eDNA testing provides a GCN presence / absence result from water samples taken from a pond, following specific protocols detailed in Biggs *et al.*, 2014. These protocols have been approved by Natural England as a method to determine GCN presence or absence in a waterbody, within the newt breeding season, from 15th April to 30th June.

Using the sterile kit provided from a laboratory, 20 water samples were taken from intervals around each pond and then mixed together. From there, a 15ml sample was transferred into each of the 6 sample tubes, which contained a preserving fluid. The samples were sent to the laboratory for analysis as soon as possible. If required, samples were refrigerated until they were sent to the laboratory.

2.3 Timings

Table 1 - Survey dates

Date	Site visit number							
	Pond 3	Pond 4	Pond 5	Pond 6	Pond 24	Pond 26	Pond 34	Ditch 1
21-22/03/2022	1	1	1	-	-	-	-	-
23-24/03/2022	-	-	-	-	1	1	-	-
07-08/04/2022	-	-	-	-	-	-	1	-
11-12/04/2022	2	-	2	1	-	-	-	-
19-20/04/2022	-	2	-	2	2	2	-	-
26-27/04/2022	3	3	3	3	3	3	-	1
01-02/05/2022	4	4	4	4	4	4	-	2
06-07/05/2022	5	-	5	-	-	-	-	-
07-08/05/2022	-	-	-	-	-	-	2	3
10-11/05/2022	-	5	-	-	-	-	3	-
21-22/05/2022	-	-	-	5	5	5	4	4
28-29/05/2022	6	6	6	-	-	-	5	5
13-14/06/2022	-	-	-	6	6	6	6	6



All surveys were undertaken during suitable weather conditions.

2.4 Survey limitations

Of the forty-seven offsite ponds located within 500m of the proposed development site, seven were granted access. Permission to gain access to undertake surveys of these ponds was sought by FI Real Estate Management through a letter, however access was not granted by the landowners of the other offsite ponds. This limitation has been considered and taken into account within the evaluation and recommendations sections of this report.

Pond 6 was dry during the last survey visit. Five visits were able to fully survey the pond and Visits 4 and 5 found no GCN present. Therefore, it is not considered to be a significant limitation to the survey.

Access to Pond 34 was not granted during the 4th visit due to security issues with the third-party owner. The other five visits found no presence of GCN and the eDNA only had 1 out of 12 replicants which suggests that the pond is used by a low number of GCN or used on a transient basis. Therefore, it is not considered to be a significant limitation to the survey.

A water vole *Arvicola amphibius* was found within one of the bottle traps in Ditch 1 during the 4th visit, therefore, no further bottle trapping was undertaken during visit 5 and 6. However, torching, netting and terrestrial refugia search were still undertaken which meets the recommendations set out in Natural England's GCN Mitigation Guidelines (2001). This is not considered to be a significant limitation to the survey.



3 RESULTS

3.1 Desk study

GCNs have been recorded on numerous occasions in the local area, including within the ponds onsite. The records returned are not specific to each pond and detail combined results from previous GCN surveys undertaken between 1992 and 2016. However, it can be determined that GCNs have previously been recorded within some of the six on site ponds and all records show small to medium sized counts, with a maximum count of 48 adults. Records of common frog *Rana temporaria*, common toad *Bufo bufo* and smooth newt *Lissotriton vulgaris* were also returned from the proposed development site. Records of palmate newt *Lissotriton helveticus* were not returned from the proposed development site; however, were returned offsite within 2km.

A review of the aerial photographs and Ordnance Survey maps identified fifty-three mapped ponds within 500m of the proposed development site.

3.2 Habitat assessment

3.2.1 Terrestrial habitats

The land parcel has an area of approximately 20.9ha and was formerly used for industrial and agricultural purposes, prior to being left unmanaged for several years. The site contains large semi-improved species-rich grassland fields interspersed with ponds, small stands of woodland, hedgerows and scattered trees. Large areas of the site have succeeded into dense scrub and areas of bare ground and ephemeral / short perennial are present on previously developed land within the south-eastern section of the site. The south-western section of the site contains an area of amenity grassland and a large hardstanding compound used to store vehicles. A shallow stream runs along the northern site boundary and wet ditches are present along the western and part of the eastern site boundaries.

Since the initial walkover survey, the site boundary has been amended to incorporate an additional 4.5ha of adjacent land. This land comprises two agricultural grassland fields that are divided and bordered by hedgerows and trees. A dry and unvegetated ditch runs along part of the eastern boundary a pond surrounded by willow scrub is present within the northernmost field.

Overall, the habitats on site are broadly suitable for sheltering, foraging and commuting GCN.

3.2.2 Aquatic habitats

There are six ponds (Ponds 1 to 6) within the ownership boundary, with five of the ponds located within the development boundary. A further forty-seven offsite mapped ponds are located within 500m of the proposed development site. Most of these ponds are situated within areas of woodland, amenity grassland or agricultural land.

The majority of the offsite ponds to the east and north are well connected to the site via agricultural hedgerows and treelines. There are some minor barriers such as large, open pastoral fields and country roads, but these are not considered to be significant enough to prevent amphibian movement. The offsite ponds to the west and south have greater barriers due to the busy Wrexham Industrial Estate being situated here.



Of the forty-seven offsite ponds located within 500m of the proposed development site, seven were granted access. Permission to gain access to undertake surveys of these ponds was sought by FI Real Estate Management through a letter, however access was not granted by the landowners of the other offsite ponds.

3.2.2.1 Onsite ponds and ditches

Pond 1 – Grid reference: SJ 39177 50299

This pond is located near the centre of the site directly west of the track which runs north to south in the middle of the site (see Appendix 1 – Pond plan). The pond is a large open body of water that is believed to be a man-made fishing pond (as evidenced by the presence of a liner, anecdotal evidence from previous surveys of the site and from talking to adjacent landowners), however the current presence of fish is uncertain. The pond was over 0.5m deep at the time of the survey and is likely over 1m deep within the centre. The pond measures approximately 2600m². No submerged vegetation was observed. The emergent vegetation present consists of reedmace *Typha sp.*, hard rush *Juncus inflexus*, soft rush *Juncus effusus*, Cypress sedge *Carex pseudocyperus*, water forget-me-not *Myosotis scorpioides* and great willowherb *Epilobium hirsutum*. There is also a sparse matt of a waterweed *Elodea sp.* and spiked water milfoil *Myriophyllum spicatum* present on the pond. The banks are comprised scattered broadleaved trees and scrub including pedunculate oak *Quercus robur*, grey willow *Salix cinerea* and hawthorn *Crataegus monogyna*. Within the understory dog rose *Rosa canina* and oxeye daisy *Leucanthemum vulgare* were observed. This pond will be removed as part of the development.

Pond 2 – Grid reference: SJ 39346 50292

This pond is located within the broadleaved woodland in the centre of the site. The pond measures approximately 2050m². The water was at least 0.5m deep at the time of the survey. No submerged vegetation was observed. The emergent vegetation was minimal consisting of small amounts of *Typha sp.* The mature tree canopy consisted of pedunculate oak, silver birch *Betula pendula* and *Populus sp.* The scrub understory comprised dog rose, hawthorn and bramble. The diverse mix of ground flora consisted of lords-and-ladies *Arum maculatum*, cleavers *Galium aparine*, common nettle *Urtica dioica*, broadleaved dock *Rumex obtusifolius*, spurge-laurel *Daphne laureola*, cock's foot *Dactylis glomerata*, spear thistle *Cirsium vulgare*, creeping buttercup *Ranunculus repens*, self-heal *Prunella vulgaris*, common sorrel *Rumex acetosa*, common mouse-ear *Cerastium fontanum* and marsh thistle *Cirsium palustre*. Small quantities of hard rush and great willowherb were observed in the surrounding margins. The emergent and marginal vegetation present provides an abundance of egg-laying opportunities. This pond will be removed as part of the development.

Pond 3 – Grid reference: SJ 39458 50286

This pond is located within the south-eastern section of the site. The pond measures approximately 1600m². There is little open water present which has a maximum depth of approximately 30cm. The pond is a large field pond surrounded by dense willow and bramble scrub. The pond has been completely encroached by swamp vegetation and is lacking areas of open water. The floating vegetation observed includes common duckweed *Lemna minor*. *Typha sp.* is the most dominate species within the vegetation with emergent willow *Salix sp.* in the centre. Species included bittersweet *Solanum dulcamara*, Cypress sedge, lesser water parsnip *Berula erecta*, water horsetail *Equisetum fluviatile*, wild angelica *Angelica sylvestris* and gypsywort *Lycopus europaeus*. The swamp vegetation is similar to that within Pond 4,



however, hard rush, fool's watercress *Helosciadium nodiflorum* and water plantain *Alisma plantago-aquatica* were also observed. This pond will be retained as part of the development.

Pond 4 – Grid reference: SJ 39362 50525

This pond is located within the northern section of the site. The pond measures approximately 1100m². This is a large field pond that is surrounded by dense goat willow *Salix caprea*, grey willow, hawthorn, bramble and dog rose scrub. As with Pond 3, this pond is in a late successional stage and is being heavily encroached by swamp vegetation. Minimal submerged vegetation was observed including common duckweed and floating sweet-grass *Glyceria fluitans*. The emergent vegetation present includes *Typha* sp., soft rush, water plantain, water horsetail, great willowherb and Cypress sedge. The northern and western banks are predominantly of *Salix* sp. scrub with a ground flora composed of *Typha* sp., hard rush, soft rush, glaucous sedge *Carex flacca*, Cypress sedge, common hogweed *Heracleum sphondylium*, fleabane *Pulicaria dysenterica*, bramble, and clustered dock *Rumex conglomeratus*. This pond will be removed as part of the development.

Pond 5 – Grid reference: SJ 39582 50191

This pond is located within the south-eastern corner of the site. The pond appears to have been created for the previous use of the site and has a steep-sided basin amongst an area of dense scrub. The pond measures approximately 600m² and has a maximum depth of 30cm. No submerged vegetation was observed. Floating vegetation includes common duckweed, stonewort *Charales* sp. and fool's watercress. The emergent vegetation present is composed of *Typha* sp., hard rush and jointed rush *Juncus articulatus*. The banks of the pond are sloped with marginal vegetation including silver birch, *Salix* sp., hawthorn, bramble, spear thistle, hard rush, creeping buttercup, jointed rush, sedge *Carex* sp. and broad buckler-fern *Dryopteris dilatata*. The location is secluded with no disturbance. There is an abundance of egg-laying opportunities amongst the emergent and marginal vegetation. This pond will be retained as part of the development.

Pond 6 – Grid reference: SJ 39574 50368

This pond is located within the south-eastern section of the site which will be the receptor site for the proposed development. The pond measures approximately 345m². The pond is almost completely shaded by encroaching goat willow and grey willow scrub. The pond is shallow and has a large drawdown zone of emergent vegetation. The pond was completely damp but lacked any standing water at the time of the walkover survey, however the pond is known to hold standing water in the winter. Emergent species present within the drawdown zone include *Typha* sp., bittersweet, redshank *Persicaria maculosa*, gypsywort, Cypress sedge, soft rush, marsh bedstraw *Galium palustre* and hard rush. A band of marginal vegetation surrounds the pond, although it is limited where dense willow scrub dominates. Marginal species include great willowherb, silverweed *Argentina anserina*, creeping thistle *Cirsium arvense*, tufted vetch *Vicia cracca*, meadow vetchling *Lathyrus pratensis*, false fox sedge *Carex otrubae*, curled dock *Rumex crispus*, floating sweet-grass, reed canary grass *Phalaris arundinacea* and stinging nettle.

Ditch 1 – Grid reference: SJ 38995 50382

This ditch runs adjacent to the western and northern site boundaries. Observed submergent flora consisted of common duckweed and fool's watercress. Emergent flora consists of *Typha* sp., great willowherb and reed canary grass.

Ditch 2 – Grid reference: SJ 39505 50471



This ditch flows northwards, adjacent to the eastern site boundary and has been divided into three sections. Water levels measure approximately 10cm deep or less with widths ranging from 50cm to 1m.

The southern section measures approximately 221m in length with a depth of 10cm. This section is heavily shaded by dense vegetation; however, the immediate banks are bare. Species present include bramble, hawthorn, *Salix sp.*, *Typha sp.*, great willowherb, soft rush, cock's foot, alder *Alnus glutinosa*, fool's watercress, marsh-bedstraw *Galium palustre* and lesser celandine *Ficaria verna*.

The central section measures approximately 175m in length with a depth of 8-9cm. The immediate banks are open with limited surrounding scrub. The margins of this section are the same as the southern section; dominated by rushes and grasses with some leaf litter. Additional species include fleabane, common couch *Elymus repens*, false oatgrass *Arrhenatherum elatius* and Yorkshire fog *Holcus lanatus*.

The northern section measures approximately 96m in length with a depth of 10cm. This section is dominated by dense bramble scrub with occasional beech *Fagus sylvatica* saplings. The other species present are the same as both the southern and northern sections.

Ditch 3 – Grid reference: SJ 39240 50606

This ditch flows east, adjacent to the northern site boundary. No submerged vegetation was observed. The only floating vegetation present was common duckweed. The immediate banks are composed of ivy *Hedera helix* with a mature broadleaved woodland canopy. Marginal species include hart's-tongue fern *Asplenium scolopendrium*, lords-and-ladies, scaly male-fern *Dryopteris affinis*, hawthorn, pedunculate oak, ash *Fraxinus excelsior*, elder *Sambucus nigra*, rose *Rosa sp.*, bluebell *Hyacinthoides non-scripta*, daffodil *Narcissus sp.*, wood avens *Geum urbanum*, lesser celandine and crocus *Crocus sp.* Areas of rock and concrete substrate alongside a concrete culvert are present on the western section from the neighbouring site.

Ditch 6 – Grid reference: SJ 39777 50040

This ditch was previously located outside of the red line boundary; however, due to the inclusion of the receptor site into the red line boundary this ditch is now considered to be on site. The ditch is less than 10cm deep with no marginal or aquatic vegetation present. However, the ditch is surrounded by unmanaged dense scrub and scattered broadleaved trees. The scrub and tree species present include pedunculate oak, hawthorn, bramble, *Rosa sp.*, blackthorn and *Salix sp.* The ground flora includes lords-and-ladies, cleavers, ivy, stinging nettle and false oat-grass.

3.2.2.2 Offsite ponds and ditches

Pond 24 – Grid reference: SJ 39907 50094

This pond is located approximately 230m south-east from the site boundary. The pond measures approximately 300m². No submerged vegetation was observed. Floating vegetation consisted of small areas of common duckweed. The emergent vegetation consisted of a single crack willow *Salix fragilis*. Marginal vegetation consisted of hard rush, broadleaved dock, pendulous sedge *Carex pendula* and two mature pedunculate oaks.

Pond 25 – Grid reference: SJ 39622 50029



This pond is located approximately 140m south from the site boundary. The pond measures approximately 850m². No submerged or floating vegetation was present. Emergent vegetation consists of *Typha* sp., hard rush and *Salix* sp. Marginal vegetation includes soft rush, bramble, mature crack willows, pedunculate oak, hawthorn, crested dog's-tail *Cynosurus cristatus*, cock's foot, ivy, creeping buttercup, remote sedge *Carex remota*, *Epilobium* sp., broadleaved dock and meadow buttercup *Ranunculus acris*. This pond is fed by Ditch 7b which is less than 5cm deep.

Pond 26 – Grid reference: SJ 39731 49881

This pond is located approximately 320m south from the site boundary. The pond measures approximately 600m². No submerged vegetation was observed. The floating vegetation present includes floating sweet-grass, water starwort *Callitriche palustris* and brooklime *Veronica beccabunga*. Emergent vegetation observed includes hard rush, soft rush, *Typha* sp., *Salix* sp., floating sweet-grass and brooklime. Marginal species include hawthorn, creeping buttercup, jointed rush, bramble, common nettle, spear thistle, *Epilobium* sp., cleavers, ivy, a mature pedunculate oak, broadleaved dock, blackthorn and lords-and-ladies.

Pond 29 – Grid reference: SJ 39330 49953

This pond is located approximately 240m south from the site boundary. The pond measures approximately 700m². The pond has limited accessibility; however, can be viewed in its entirety from the south. No submerged or floating vegetation was observed. The emergent vegetation present includes soft rush, pedunculate oak and *Typha* sp. The marginal vegetation present includes hawthorn, bramble, *Salix* sp., garden privet *Ligustrum ovalifolium*, dandelion *Taraxacum officinale*, soft rush, *Typha* sp., common mullein *Verbascum thapsus*, common vetch *Vicia sativa*, common ragwort *Jacobaea vulgaris*, creeping cinquefoil *Potentilla reptans*, foxglove *Digitalis purpurea*, oxeye daisy, wild cherry *Prunus avium*, blackthorn and silver birch.

Pond 30 – Grid reference: SJ 39254 49951

This pond is located approximately 240m south from the site boundary. The pond measures approximately 600m². No submerged or floating vegetation was observed. The emergent vegetation consisted of predominantly reedmace *Typha* sp. The marginal vegetation observed includes bramble, hard rush, silver birch, dogwood *Cornus sanguinea*, *Salix* sp., hawthorn, garden privet, wild cherry, creeping thistle, common knapweed *Centaurea nigra* and tufted hair grass *Deschampsia cespitosa*.

Pond 31 – Grid reference: SJ 39117 50074

This pond is located approximately 90m south from the site boundary. The pond measures approximately 1600m². No submerged vegetation was observed. The only floating vegetation present was a small number of poor-quality water lily *Nymphaea* sp. The emergent vegetation solely composed of *Typha* sp. The marginal and bankside vegetation includes silver birch, hard rush, soft rush, *Salix* sp., bramble, *Epilobium* sp., dogwood, red fescue *Festuca rubra*, fleabane, orchid *Dactylorhiza* sp. and crack willow.

Pond 34 – Grid reference: SJ 38944 49896

This pond is located approximately 355m south from the site boundary. The pond measures approximately 600m². No aquatic vegetation is present. The emergent vegetation is dominated by *Typha* sp. and yellow iris *Iris pseudacorus*. The marginal vegetation is composed of a thin strip of scrub and trees including brambles, non-native pine *Pinus* sp.,



Salix sp., elder, wild cherry, garden privet, yellow variegated archangel *Lamium galeobdolon*, dogwood, alder and silver birch.

Ditch 7a – Grid reference: SJ 39581 49904

This ditch is located approximately 140m south from the site boundary. The ditch ranges from 10cm to 15cm deep at its deepest point, which transitions into a drier area towards the southern section. It is considered that the northern section of the ditch dries annually. The water quality is poor; therefore, no aquatic or emergent vegetation is present. The marginal and bankside vegetation is predominantly scattered scrub with scattered broadleaved trees. The marginal species present include hawthorn, pedunculate oak, hart's-tongue fern, brooklime, lesser water-parsnip, hard rush and soft rush.

Ditch 7b – Grid reference: SJ 39702 50054

This ditch is located approximately 215m south from the site boundary. The ditch ranges from 15cm to 20cm deep at its deepest point. No submerged or floating vegetation is present. The emergent vegetation includes hard rush and brooklime. Marginal vegetation is composed solely of broadleaved dock *Rumex obtusifolia* and common nettle.

Ditch 8 – Grid reference: SJ 39794 49884

This ditch is located approximately 265m south-east from the site boundary which connects to Ditch 6 at the northernmost point. The ditch runs northward and is less than 5cm deep. Large dry sections are present along the ditch which is covered by a hedgerow. Multiple mature scattered broadleaved trees are present along the ditch. No submerged or emergent vegetation is present. The species present along the ditch include *Salix sp.*, hawthorn, bramble, *Rosa sp.*, blackthorn, lords-and-ladies, creeping buttercup, broadleaved dock and soft rush.

3.3 Population size class assessment

The maximum adult GCN counts for each pond, per survey visit, are provided in Table 2 below. Full details of the survey results are provided in Appendix 5 – Survey results.

Table 2 – Survey results for each site visit at the ponds with confirmed GCN presence

SITE VISIT N ^o	MAX. ADULT GCN COUNT							
	Pond 3	Pond 4	Pond 5	Pond 6	Pond 24	Pond 26	Pond 34	Ditch 1
1	2	1	2	0	8	8	0	0
2	0	4	5	3	8	0	0	0
3	6	5	5	6	7	0	0	0
4	8	6	6	0	2	0	N/A	0
5	4	3	13	0	1	2	0	0
6	0	0	4	N/A	0	1	0	0

The peak count of adult GCNs in any one pond is thirteen and the combined peak count of adult GCNs within each pond is forty-nine, which represents a “medium” GCN population. Adult GCNs were found in Ponds 3, 4, 5, 6, 24 and 26, but not in Pond 34 and Ditch 1. GCN



eggs were found in Ponds 6 and 26 laid on water forget-me-not, great willowherb and fool's watercress.

Smooth newts were found in Ponds 3, 4, 5, 6, 24, 26 and 34, palmate newts were found in Ponds 4, 6 and 24, common toads were found in Ponds 3, 5, 6 and 26, and common frogs were found in Ponds 3, 4, 5, 26 and Ditch 1.

3.4 eDNA surveys

Water samples were taken from the ponds and ditches which had not returned positive GCN presence on 19th April 2022. No water samples were taken from Ponds 3, 4, 5, 24 and 26 for eDNA analysis as GCN presence had already been confirmed during the first presence / absence surveys.

Pond 6 – No water samples were taken from Pond 6 for eDNA analysis, as GCN presence had already been confirmed during the second presence / absence survey.

Pond 34 – The results from the eDNA survey showed 12/12 positive replicates of GCN DNA, indicating GCNs are likely to present with the pond.

Ponds 1, 2, 25, 29, 30 and 31 - The results from the eDNA survey showed 0/12 positive replicates of GCN DNA, indicating GCNs are likely absent from these ponds.

Ditch 1 – The results from the eDNA survey showed 1/12 positive replicates of GCN DNA, indicating that GCN DNA was present in Ditch 1, however the relatively low number of replicates suggests that the ditch is likely only used by a low number of GCNs and / or in a transitory capacity.

Ditches 2, 3, 6, 7A, 7B and 8 - The results from the eDNA survey showed 0/12 positive replicates of GCN DNA, indicating GCNs are likely absent from these ditches.



4 EVALUATION AND RECOMMENDATIONS

4.1 Evaluation of results

In summary, the proposed development site comprises a disused industrial estate with a mosaic of habitats that are broadly suitable for breeding GCNs. Terrestrial features within the development footprint with potential to support amphibians consist of areas of dense scrub, semi-improved neutral grassland, and broadleaved semi-natural woodland. Smaller areas of hardstanding with scattered scrub, scattered broadleaved trees and tall ruderal are also present providing less suitable habitats for breeding GCNs, however, could still be used by foraging and commuting newts alongside common amphibian species.

4.1.1 Onsite ponds and ditches

Table 3 - Summary of survey results for onsite ponds and ditches

Waterbody number	HSI score	P/A and PSCA surveys	eDNA
P1	Good	No GCN recorded	Negative
P2	Good	No GCN recorded	Negative
P3	Excellent	Max. count of 8 adult GCN	N/A
P4	Excellent	Max. count of 6 adult GCN	
P5	Excellent	Max. count of 13 adult GCN	
P6	Excellent	Max. count of 6 adult GCN (+ confirmed breeding)	
D1	Average	No GCN recorded	1/12 replicates of GCN DNA. Due to the low HSI score, lack of evidence of GCNs during the PSCA surveys and low number of eDNA replicates, it is considered unlikely that GCNs use this pond as a breeding pond; it is considered more likely that they use the pond in a transitional capacity
D2, D3 & D6	Not possible	No GCN recorded	Negative



4.1.2 Offsite ponds

Table 4 - Summary of survey results for offsite ponds and ditches

Waterbody number	HSI score	P/A and PSCA surveys	eDNA
P24	Good	Max. count of 8 adult GCN	N/A
P25	Excellent	No GCN recorded	Negative
P26	Excellent	Max. count of 8 adult GCN (+ confirmed breeding)	N/A
P29	Excellent	No GCN recorded	Negative
P30	Excellent	No GCN recorded	Negative
P31	Below average	No GCN recorded	Negative
P34	Excellent	No GCN recorded	12/12 replicates of GCN DNA. Due to the lack of evidence of GCNs during the PSCA surveys, it is considered unlikely that GCNs use this pond as a breeding pond; it is considered more likely that they use the pond in a transitional capacity.
D7A, D7B & D9	Not possible	No GCN recorded	Negative

The combined peak count of adult GCNs within a 500m radius of the site is forty-nine individuals. However, as many ponds did not have access granted it is likely the GCN population in the area will be higher. The peak count of adult GCN onsite is thirty-three individuals which infers that the site hosts a “medium” GCN population. It is considered likely that more individuals are present than were recorded during the surveys, however it is highly unlikely that the upper threshold value of a “medium” population is met on the proposed development site.

4.2 Impacts

The following rapid risk assessment tool has been developed by Natural England in order to establish whether it is necessary to apply for a licence. The development proposals will result in the loss of up to 20.9ha of terrestrial habitat in which the majority of the site is suitable to support GCN. Three onsite ponds will be removed as part of the proposed development, and three will be retained and enhanced. Enhancement and compensation measures for amphibians will be built into the development design. Currently sixteen new ponds are planned to be constructed as part of the proposed development.

The key components of the risk assessment contributing to the result of ‘Red: offence highly likely’ are the loss of GCN breeding ponds, the size of the development area and proximity to the ponds.



Component	Likely effect (select one for each component; select the most harmful option if more than one is likely; lists are in order of harm, top to bottom)	Notional offence probability score
Great crested newt breeding pond(s)	Damaged or destroyed	1
Land within 100m of any breeding pond(s)	>1 ha lost or damaged	0.9
Land 100-250m from any breeding pond(s)	5 - 10 ha lost or damaged	0.5
Land >250m from any breeding pond(s)	No effect	0
Individual great crested newts	No effect	0
Maximum:		1
Rapid risk assessment result:	RED: OFFENCE HIGHLY LIKELY	

"Red: offence highly likely" indicates that the development activities are of such a type, scale and location that an offence is highly likely. In this case, you should attempt to re-design the development location, layout, timing, methods or duration in order to avoid impacts (see **Non-licensed avoidance measures tool**), and re-run the risk assessment. You may also wish to run a site-specific risk assessment to check that this is a valid conclusion. If you cannot avoid the offences, then a licence should be applied for.

4.3 Mitigation and compensation measures

Due to the likelihood of development impacts on GCNs and their habitat, the works must be completed under an EPS mitigation licence issued by Natural Resources Wales. This can only be applied for once planning permission has been granted but must be secured prior to the start of any works that could adversely impact GCNs or their terrestrial or aquatic habitats. Natural Resources Wales aim to process applications within 30 working days of receipt.

A GCN method statement will also be required for submission with the planning application, which will outline the mitigation and compensation measures required in order to safeguard protected species throughout the duration of the development.

The measures implemented to protect GCNs will also protect common amphibian species that are known to be present within the proposed development site.



5 CONCLUSION

Six ponds and four ditches were identified within the boundaries of the proposed development site. A further forty-seven mapped ponds and nine mapped ditches were identified within 500m of the proposed development site.

Thirteen ponds (six onsite and seven offsite) and seven ditches (four onsite and three offsite) had access granted to undertake presence / absence surveys and population size class assessment surveys (if required). A medium population of GCNs was recorded in Ponds 3, 4, 5, 6, 24 and 26 (total peak adult count of forty-nine individuals). No evidence of GCNs was found in Pond 34 and Ditch 1, however samples taken from the waterbodies returned positive GCN DNA results. This indicates that GCNs use these waterbodies, although it is likely to be in very low numbers and / or on a transient basis.

Several ponds did not have access granted, therefore, it is likely the GCN population in the area will be higher. The peak count of adult GCN onsite is thirty-three individuals which infers that the development site hosts a “medium” GCN population.

It is considered likely that GCNs will be adversely impacted by the proposed works. Therefore, the works must proceed under a European Protected Species mitigation licence issued by Natural Resources Wales.

A GCN method statement will also be required for submission with the planning application, which will outline the mitigation and compensation measures required in order to safeguard protected species throughout the duration of the development.



6 REFERENCES

Anon (2010) *Natural England Great Crested Newt Licence Method statement (wmla142_tcm6-4103) / Conversions avoidance*

Anon (2001) *Natural England Great crested newt mitigation guidelines*

Chartered Institute of Ecology and Environmental Management (2013). *Competencies for Species Survey: Great Crested Newts*.

Department for Communities and Local Government (2021). *National Planning Policy Framework*.

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.



APPENDICES

Appendix 1 – Pond plan



Pond Plan - 500m

Site: Plot 3a, Wrexham Industrial Estate
 Author: Tom Kenwright
 Date: 24/02/2022



KEY:
 Pond
 Ditch
 Survey boundary
 500m buffer

THIS PLAN IS BASED UPON MAP DATA © 2022 GOOGLE, IMAGERY © 2022 GOOGLE

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Appendix 2 – Aerial photographs



Plot 3a – Wrexham Industrial Estate

Close aerial photograph

— Site boundary



Plot 3a – Wrexham Industrial Estate

Wide aerial photograph

 Site location





Appendix 3 – Photographs



Photograph 1 – Pond 1.



Photograph 2 – Pond 2.



Photograph 3 – Pond 3.



Photograph 4 – Pond 4.



Photograph 5 – Pond 6.



Photograph 6 – Ditch 1.



Photograph 7 – Ditch 2.



Photograph 8 – Ditch 3.



Photograph 9 – Pond 24.



Photograph 10 – Pond 25.



Photograph 11 – Ditch 7a present to the west of Pond 25, flowing east and connecting to Ditch 6.



Photograph 12 – Pond 26.



Photograph 13 – Pond 29.



Photograph 14 – Pond 30.



Photograph 15 – Pond 31.



Photograph 16 – Pond 34.



Appendix 4 – PSCA and HSI survey results

GCN HSI Calculations

ONSITE PONDS & DITCHES

	Pond number	P1	P2	P3	P4	P5	P6	D1
	Grid reference	SJ 39177 50299	SJ 39346 50292	SJ 39458 50286	SJ 39362 50525	SJ 39582 50191	SJ 39574 50368	SJ 38995 50382
SI number	SI description	SI values						
1	Geographic location	1	1	1	1	1	1	1
2	Pond area	0.8	0.86	0.86	0.95	1	0.7	0.4
3	Pond permanence	0.9	0.9	0.9	0.9	0.9	1	1
4	Water quality	0.67	0.67	1	0.67	1	0.67	0.33
5	Shade	1	0.4	0.8	1	1	0.6	0.4
6	Water fowl	0.67	0.67	1	0.67	1	1	1
7	Fish	0.67	0.67	1	0.67	1	1	0.67
8	Pond density	1	1	1	1	1	1	1
9	Terrestrial habitat	0.67	1	1	1	1	1	0.67
10	Macrophyte cover	0.55	0.3	1	1	0.6	0.9	0.35
HSI score:		0.78	0.70	0.95	0.87	0.94	0.87	0.62
Pond suitability:		Good	Good	Excellent	Excellent	Excellent	Excellent	Average

OFFSITE PONDS

	Pond number	P24	P25	P26	P29	P30	P31	P34
	Grid reference	SJ 39907 50094	SJ 39622 50029	SJ 39731 49881	SJ 39330 49953	SJ 39254 49951	SJ 39117 50074	SJ 38944 49896
SI number	SI description	SI values						
1	Geographic location	1	1	1	1	1	1	1
2	Pond area	0.6	0.98	1	1	1	0.87	1
3	Pond permanence	0.9	0.9	0.9	0.9	0.9	0.9	0.9
4	Water quality	0.67	0.67	0.67	0.67	0.67	0.67	0.67
5	Shade	1	1	1	0.8	0.8	1	1
6	Water fowl	1	0.67	0.67	1	1	0.67	1
7	Fish	1	1	1	1	1	0.01	1
8	Pond density	1	1	1	1	1	1	1
9	Terrestrial habitat	0.67	1	1	0.67	0.67	0.67	0.33
10	Macrophyte cover	0.35	0.35	0.55	0.4	0.9	0.4	0.6
HSI score:		0.78	0.82	0.86	0.81	0.88	0.50	0.81
Pond suitability:		Good	Excellent	Excellent	Excellent	Excellent	Below average	Excellent

HSI Score	Pond Suitability
< 0.50	Poor
0.50 - 0.59	Below average
0.60 - 0.69	Average
0.70 - 0.79	Good
> 0.80	Excellent

POND 3					Method:	Torch			Bottle-trap			Net			Egg search eggs found?	Larvae larvae found? (any method)				
No. of survey visits to this pond:		6				Torch power: 1 Million CWP			No. of traps used in pond: 95								Other species			
Sex/life stage:					Male	Female Imm.		Male	Female Imm.		Male	Female Imm.				Smooth	Palmate	Toad	Frog	
(1) Date:	Air temp	Veg % cover	Turbidity		1	1	0	2	0	0	0	0	0	0	No	No	24 female and 13 male		1 and spawn found	
21-22/03/2022	6°C	60	2	Adult totals:	2		0	2		0	0		0	0	0	0		0		0
(2) Date:	Air temp	Veg % cover	Turbidity		3	0	0	0	0	0	0	0	0	0	No	No	22 female, 12 male			
11-12/04/2022	10°C	50	2	Adult totals:	0		0	0		0		0		0	0	0		0		0
(3) Date:	Air temp	Veg % cover	Turbidity		4	2	0	1	0	0	0	0	0	0	No	No				
26-27/04/2022	10°C	50	2	Adult totals:	6		0	1		0		0		0	0	0	10 total	0	0	1
(4) Date:	Air temp	Veg % cover	Turbidity		4	4	0	0	0	0	0	0	0	0	No	No	2 female, 3 male			
01-02/05/2022	12°C	50	1	Adult totals:	8		0	0		0		0		0	0	0		0	3	0
(5) Date:	Air temp	Veg % cover	Turbidity		0	1	0	1	3	0	0	0	0	0	No	No	9 female, 8 male			
06-07/05/2022	13°C	50	1	Adult totals:	1		0	4		0		0		0	0	0		0	2	2
(6) Date:	Air temp	Veg % cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No				
28-29/05/2022	12°C	50	1	Adult totals:	0		0	0		0		0		0	0	0	1 total	0	0	0
Peak adult count for this pond in any one visit (by torch, trap or net):					8															
Comments and constraints:																				

POND 4				Method:	Torch			Bottle-trap			Net			Egg search eggs found?	Larvae larvae found? (any method)					
No. of survey visits to this pond:		6			Torch power: 1 Million CWP			No. of traps used in pond: 40								Other species				
Sex/life stage:				Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.					Smooth	Palmate	Toad	Frog
(1) Date:	Air temp	Veg % cover	Turbidity		0	0	0	1	0	0	0	0	0	No	No	2 Male	0	0	0	
21-22/03/2022	6°C	80	3	Adult totals:	0		0	1		0	0	0	0	0	0					
(2) Date:	Air temp	Veg % cover	Turbidity		1	3	0	0	3	0	0	0	0	No	No	3	0	0	0	
19-20/04/2022	8°C	80	2	Adult totals:	4		0	3		0	0	0	0	0	0					
(3) Date:	Air temp	Veg % cover	Turbidity		0	0	0	3	2	0	0	0	0	No	No	5	0	0	0	
26-27/04/2022	10°C	80	2	Adult totals:	0		0	5		0	0	0	0	0	0					
(4) Date:	Air temp	Veg % cover	Turbidity		3	3	0	0	0	0	0	0	0	No	No	1 female	2	0	1	
01-02/05/2022	12°C	80	2	Adult totals:	6		0	0		0	0	0	0	0	0					
(5) Date:	Air temp	Veg % cover	Turbidity		2	1	0	0	2	0	0	0	0	No	No	2 male and 2 female	0	0	0	
10-11/05/2022	13°C	80	3	Adult totals:	3		0	2		0	0	0	0	0	0					
(6) Date:	Air temp	Veg % cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No	0	0	0	0	
28-29/05/2022	12°C	30	2	Adult totals:	0		0	0		0	0	0	0	0	0					
Peak adult count for this pond in any one visit (by torch, trap or net):										6										
Comments and constraints:				21/03/22 Netted - water hog lice, damselfly larvae, water beetle.																

POND 5				Method:	Torch			Bottle-trap			Net			Egg search eggs found?	Larvae larvae found? (any method)	Other species				
No. of survey visits to this pond:		6			Torch power: 1 Million CWP			No. of traps used in pond: 30								Smooth	Palmate	Toad	Frog	
Sex/life stage:				Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.								
(1) Date:	Air temp	Veg % cover	Turbidity		2	0	0	0	0	0	0	0	0	No	No	7 female and 2 male	0	1000's of spawn	7 frog and spawn	
21-22/03/2022	6°C	40	2	Adult totals:	2		0	0		0		0	0	0	0					
(2) Date:	Air temp	Veg % cover	Turbidity		0	0	0	3	2	0	0	0	0	No	No	3 male, 6 female	0	1000's of tadpole	0	
11-12/04/2022	10°C	40	3	Adult totals:	0		0	5		0		0	0	0	0					
(3) Date:	Air temp	Veg % cover	Turbidity		3	1	0	4	1	0	0	0	0	No	No	13 total	0	0	0	
26-27/04/2022	10°C	40	2	Adult totals:	4		0	5		0		0	0	0	0					
(4) Date:	Air temp	Veg % cover	Turbidity		3	3	0	0	1	1	0	0	0	No	No	1 male, 3 female	0	Toad spawn	0	
01-02/05/2022	12°C	30	1	Adult totals:	6		0	1		1		0	0	0	0					
(5) Date:	Air temp	Veg % cover	Turbidity		10	3	0	1	1	0	0	0	0	No	No	8 female, 7 male	0	Toad tadpoles	0	
06-07/05/2022	13°C	30	1	Adult totals:	13		0	2		0		0	0	0	0					
(6) Date:	Air temp	Veg % cover	Turbidity		4	0	0	0	0	0	0	0	0	No	No	1 total	0	1	0	
28-29/05/2022	12°C	10	1	Adult totals:	4		0	0		0		0	0	0	0					
Peak adult count for this pond in any one visit (by torch, trap or net):								13												
Comments and constraints:				21/03/2022 Netted - Dragonfly larvae, water beetle, backswimmer, damselfly larvae, water hoglice, water snails, caddisfly larvae during torching.																

POND 6				Method:	Torch			Bottle-trap			Net			Egg search eggs found?	Larvae larvae found? (any method)	Other species			
No. of survey visits to this pond:		6			1 Million CWP			25								Smooth	Palmate	Toad	Frog
Sex/life stage:					Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.						
(1) Date:	Air temp	Veg % cover	Turbidity		0	0	0	0	0	0	0	0	0	Yes	No				
11-12/04.2022	10°C	20	1	Adult totals:	0		0	0		0		0		12	0	1 female	0	0	0
(2) Date:	Air temp	Veg % cover	Turbidity		0	0	0	2	1	0	0	0	0	No	No				
19-20/04/2022	8°C	20	2	Adult totals:	0		0	3		0		0		0	0	3	0	0	0
(3) Date:	Air temp	Veg % cover	Turbidity		3	3	0	1	1	0	0	0	0	No	No	3 male, 4 female			
26-27/04/2022	10°C	40	4	Adult totals:	6		0	2		0		0		0	0		0	0	0
(4) Date:	Air temp	Veg % cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No				
01-02/05/2022	12°C	50	4	Adult totals:	0		0	0		0		0		0	0	0	0	2	0
(5) Date:	Air temp	Veg % cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No				
21-22/05/2022	13°C	50	4	Adult totals:	0		0	0		0		0		0	0	0	2 female	0	0
(6) Date:	Air temp	Veg % cover	Turbidity		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No				
13-14/06/2022	N/A	N/A	N/A	Adult totals:	N/A		N/A	N/A		N/A		N/A		0	0	0	0	0	0
Peak adult count for this pond in any one visit (by torch, trap or net):								6											
Comments and constraints:				11-12/04/2022. Dozens of GCN egg folds found on water forget-me-not along southern margin of pond. Water beetle, caddie fly larvae, water hog lice. Lots of leaf litter in centre and filamentous algae. The pond was dry during the final survey.															
				13-14/06/2022: Constraints - pond was dry and so the survey could not take place.															

POND 24				Method:	Torch			Bottle-trap			Net			Egg search eggs found?	Larvae larvae found? (any method)	Other species			
No. of survey visits to this pond:		6			Torch power: 1 Million CWP			No. of traps used in pond: 25								Smooth	Palmate	Toad	Frog
Sex/life stage:				Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.							
(1) Date:	Air temp	Veg % cover	Turbidity		0	0	0	2	6	0	0	0	0	No	No	1 male, 2 female	0	0	0
23-24/03/2022	8°C	10	4	Adult totals:	0		0	8		0		0	0	0	0				
(2) Date:	Air temp	Veg % cover	Turbidity		1	0	0	2	6	0	0	0	0	No	No	2 total	0	0	0
19-20/04/2022	8°C	20	3	Adult totals:	1		0	8		0		0	0	0	0				
(3) Date:	Air temp	Veg % cover	Turbidity		0	0	0	0	7	0	0	0	0	No	No	1 female	0	0	0
26-27/04/2022	11°C	20	3	Adult totals:	0		0	7		0		0	0	0	0				
(4) Date:	Air temp	Veg % cover	Turbidity		0	0	0	0	2	0	0	0	0	No	No	2 female, 1 male	0	0	0
01-02/05/2022	12°C	30	3	Adult totals:	0		0	2		0		0	0	0	0				
(5) Date:	Air temp	Veg % cover	Turbidity		0	0	0	1	0	0	0	0	0	No	No	2 female	1 pregnant female	0	0
21-22/05/2022	13°C	30	5	Adult totals:	0		0	1		0		0	0	0	0				
(6) Date:	Air temp	Veg % cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No	0	0	0	0
13-14/06/2022	12°C	20	3	Adult totals:	0		0	0		0		0	0	0	0				
Peak adult count for this pond in any one visit (by torch, trap or net):				8															
Comments and constraints:				23-24/03/2022 Netted - Back swimmer, diving beetle, water shrimp, water hoglice															

POND 26				Method:	Torch			Bottle-trap			Net			Egg search eggs found?	Larvae larvae found? (any method)	Other species			
No. of survey visits to this pond:		6	1 Million CWP			55			Smooth	Palmate						Toad	Frog		
Sex/life stage:					Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.						
(1) Date:	Air temp	Veg % cover	Turbidity		0	0	0	6	2	0	0	0	0	No	No	3 male, 5 female	0	0	2
23-24/03/2022	8°C	20	3	Adult totals:	0	0	0	8	0	0	0	0	0	0	0				
(2) Date:	Air temp	Veg % cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No	4 total	0	0	0
19-20/04/2022	8°C	20	4	Adult totals:	0	0	0	0	0	0	0	0	0	0	0				
(3) Date:	Air temp	Veg % cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No	3 female	0	0	0
26-27/04/2022	10°C	20	5	Adult totals:	0	0	0	0	0	0	0	0	0	0	0				
(4) Date:	Air temp	Veg % cover	Turbidity		0	0	0	0	0	0	0	0	0	Yes	No	1 female	0	0	3 adults
01-02/05/2022	12°C	30	4	Adult totals:	0	0	0	0	0	0	0	0	4	0	0				
(5) Date:	Air temp	Veg % cover	Turbidity		0	2	0	0	1	0	0	0	0	Yes	No	0	0	1	0
21-22/05/2022	13°C	30	4	Adult totals:	2	0	0	1	0	0	0	0	20	0	0				
(6) Date:	Air temp	Veg % cover	Turbidity		0	0	0	0	1	0	0	0	0	No	No	0	0	0	0
13-14/06/2022	12°C	30	4	Adult totals:	0	0	0	1	0	0	0	0	0	0	0				
Peak adult count for this pond in any one visit (by torch, trap or net):								8											
Comments and constraints:				23-24/03/22 Netted - back swimmer, water beetle, water hoglice, diving beetle, water boatman, damselfly larvae, 1 female smooth newt.															
				21-22/05/2022 - lots of egg folds in great willowherb.															
				1-2/05/2022 - GCN eggs on fools watercress															

POND 34				Method:	Torch			Bottle-trap			Net			Egg search eggs found?	Larvae larvae found? (any method)	Other species			
No. of survey visits to this pond:		6			Torch power: 1 Million CWP			No. of traps used in pond: 20								Smooth	Palmate	Toad	Frog
Sex/life stage:				Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.							
(1) Date:	Air temp	Veg % cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No				
07-08/04/2022	6°	40	2	Adult totals:	0		0	0		0		0	0	0	0	0	0	0	0
(2) Date:	Air temp	Veg % cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No				
07-08/05/2022	13°C	40	1	Adult totals:	0		0	0		0		0	0	0	0	0	0	0	0
(3) Date:	Air temp	Veg % cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No				
10-11/05/2022	13°C	60	3	Adult totals:	0		0	0		0		0	0	0	0	0	0	0	0
(4) Date:	Air temp	Veg % cover	Turbidity		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
21-22/05/2022	N/A	N/A	N/A	Adult totals:	N/A		N/A	N/A		N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
(5) Date:	Air temp	Veg % cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No				
28-29/05/2022	12°C	50	3	Adult totals:	0		0	0		0		0	0	0	0	0	1 Female	0	0 Tadpoles
(6) Date:	Air temp	Veg % cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No				
13-14/06/2022	12°C	40	3	Adult totals:	0		0	0		0		0	0	0	0	0	0	0	0
Peak adult count for this pond in any one visit (by torch, trap or net):					0														
Comments and constraints:				07-08/04/2022 - Constraints - 33% of pond margin accessible, very deep with a dense mat of reedmace. High invertebrate activity. 21-22/05/2022 - Constraints - Access was not granted for this day.															

Ditch 1				Method:	Torch	Bottle-trap	Net			Egg search eggs found?	Larvae larvae found? (any method)	Other species						
No. of survey visits to this pond:		6	Torch power: 1 Million CWP		No. of traps used in pond: 20													
Sex/life stage:					Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.	Smooth	Palmate	Toad	Frog	
(1) Date:	Air temp	Veg % cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No			
26-27/04/2022	11°C	90	2	Adult totals:	0		0	0		0	0		0	0	0	0	0	
(2) Date:	Air temp	Veg % cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No			
01-02/05/2022	12°C	90	2	Adult totals:	0		0	0		0	0		0	0	0	0	0	
(3) Date:	Air temp	Veg % cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No			
07-08/05/2022	13°C	90	2	Adult totals:	0		0	0		0	0		0	0	0	0	0	
(4) Date:	Air temp	Veg % cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No			
21-22/05/2022	13°C	90	2	Adult totals:	0		0	0		0	0		0	0	0	0	1	
(5) Date:	Air temp	Veg % cover	Turbidity		0	0	0	N/A	N/A	N/A	0	0	0	No	No			
28-29/05/2022	12°C	90	2	Adult totals:	0		0	N/A	N/A	N/A	0	0	0	0	0	0	0	
(6) Date:	Air temp	Veg % cover	Turbidity		0	0	0	N/A	N/A	N/A	0	0	0	No	No			
13-14/06/2022	12°C	90	2	Adult totals:	0		0	N/A	N/A	N/A	0	0	0	0	0	0	0	
Peak adult count for this pond in any one visit (by torch, trap or net):					0													
Comments and constraints:				21-22/05/2022 - Constraints - one water shrew caught in trap														



Appendix 5 – eDNA results

Folio No: E12803
Report No: 1
Purchase Order: UES 03448
Client: UNITED ENVIRONMENTAL
SERVICES LTD
Contact: Jenny Gibbs

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS (TRITURUS CRISTATUS)

SUMMARY

When great crested newts (GCN), *Triturus cristatus*, inhabit a pond, they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm GCN habitation or establish GCN absence.

RESULTS

Date sample received at Laboratory: 21/04/2022
Date Reported: 25/04/2022
Matters Affecting Results: None

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
1986	Ditch 8	SJ 39786 49980	Pass	Pass	Pass	Negative	0
1988	D 7A	SJ 39757 49979	Pass	Pass	Pass	Negative	0
1989	Ditch 7B	SJ 39669 50042	Pass	Pass	Pass	Negative	0
1990	Pond 25	SJ 39640 50008	Pass	Pass	Pass	Negative	0
1991	Pond 34	SJ 38954 49925	Pass	Pass	Pass	Positive	12
1992	Pond 2	SJ 3939150316	Pass	Pass	Pass	Negative	0
1993	D6	SJ 39762 50181	Pass	Pass	Pass	Negative	0



1994	Ditch 1	SJ 39042 50490	Pass	Pass	Pass	Positive	1
1995	Pond 29	SJ 39317 49940	Pass	Pass	Pass	Negative	0
1996	68-69 Clywedog Road	SJ 37292 49566	Pass	Pass	Pass	Positive	1
1997	Pond 31	SJ 39104 50073	Pass	Pass	Pass	Negative	0
1998	Ditch 3	SJ 39115 50529	Pass	Pass	Pass	Negative	0
1999	Pond 30	SJ 39260 49935	Pass	Pass	Pass	Negative	0
2000	D2		Pass	Pass	Pass	Negative	0
2001	Pond 1	SJ 39215 50299	Pass	Pass	Pass	Negative	0

If you have any questions regarding results, please contact us: ForensicEcology@surescreen.com

Reported by: Chris Troth

Approved by: Esther Strafford

METHODOLOGY

The samples detailed above have been analysed for the presence of GCN eDNA following the protocol stated in DEFRA WC1067 'Analytical and methodological development for improved surveillance of the Great Crested Newt, Appendix 5.' (Biggs et al. 2014). Each of the 6 sub-sample tubes are first centrifuged and pooled together into a single sample which then undergoes DNA extraction. The extracted sample is then analysed using real time PCR (qPCR), which uses species-specific molecular markers to amplify GCN DNA within a sample. These markers are unique to GCN DNA, meaning that there should be no detection of closely related species.

If GCN DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If GCN DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. True positive controls, negative controls and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared and reported. Stages of the DNA analysis are also conducted in different buildings at our premises for added security.

SureScreen Scientifics Ltd is ISO9001 accredited and participate in Natural England's proficiency testing scheme for GCN eDNA testing. We also carry out regular inter-laboratory checks on accuracy of results as part of our quality control procedures.

INTERPRETATION OF RESULTS



SIC: Sample Integrity Check [Pass/Fail]

When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results.

DC: Degradation Check [Pass/Fail]

Analysis of the spiked DNA marker to see if there has been degradation of the kit or sample between the date it was made to the date of analysis. Degradation of the spiked DNA marker may lead indicate a risk of false negative results.

IC: Inhibition Check [Pass/Fail]

The presence of inhibitors within a sample are assessed using a DNA marker. If inhibition is detected, samples are purified and re-analysed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.

Result: Presence of GCN eDNA [Positive/Negative/Inconclusive]

Positive: GCN DNA was identified within the sample, indicative of GCN presence within the sampling location at the time the sample was taken or within the recent past at the sampling location.

Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for GCN presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. In accordance with Natural England protocol, even a score of 1/12 is declared positive. 0/12 indicates negative GCN presence.

Negative: GCN eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of GCN absence, however, does not exclude the potential for GCN presence below the limit of detection.





Appendix 6 – Statutory and planning context

STATUTORY AND PLANNING CONTEXT

Ecological assessments

Ecological assessments play an important part within the planning context; they include an initial assessment which highlights any specific interests of a site. From the initial site assessment, the surveyor assesses the suitability of habitats within the site to support protected species and makes recommendations for further survey works if required. The following paragraphs provide a brief interpretation of the legislative protection that is relevant to the findings of this report.

Habitats

Section 7 of the Environment Act (Wales) places a duty on Welsh Ministers to publish, review and revise lists of types of habitats and species in Wales which they consider are of key significance to sustain and improve biodiversity. The Welsh Ministers must also take all reasonable steps to maintain and enhance the habitats published in these lists, and encourage others to take such steps.

Amphibians

Great crested newts

Great crested newts (GCN) *Triturus cristatus* and their habitat (aquatic and terrestrial) are afforded full protection by the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017. If both national and international legislation are taken together, it is an offence to:

- Deliberately, intentionally or recklessly kill, injure or capture GCN
- Deliberately, intentionally or recklessly disturb GCN in such a way to be likely to significantly affect:
 - their ability to survive, breed, reproduce, rear or nurture their young
 - their ability to hibernate or migrate
 - their local distribution or abundance
- Deliberately, intentionally or recklessly take or destroy the eggs of GCN
- Damage or destroy breeding sites or resting places of GCN
- Intentionally or recklessly disturb sheltering GCN, or obstruct access to their resting place
- Keep, transport, sell or exchange, or offer for sale or exchange any live or dead GCN, any part of GCN or anything derived from GCN

Penalties for offences include fines of up to £5000, plus up to six months imprisonment, for each offence committed.

GCN are also protected by the Protection of Animals Act 1911, which prohibits cruelty and mistreatment. Releasing a GCN in such a way as to cause undue suffering may be an offence under the Abandonment of Animals Act 1960.

In addition to the above, there are various statutory provisions relating to the transport of animals, designed to ensure their welfare. GCN are also listed under Section 7 of the Environment (Wales) Act 2016.

It is important to identify the presence of GCN individuals and also to identify suitable habitat on sites so that legal obligations regarding this species can be observed. If a survey identifies the presence of GCN on the site, an assessment of the population size class is required. This can then inform a mitigation scheme, which would need to be developed in liaison with the local Natural Resources Wales (NRW) team, and which minimises direct threats to newts and compensates for any loss of habitat. A licence issued by NRW is required for the legal implementation of a mitigation scheme.

An NRW mitigation licence application requires a Mitigation Method Statement and a Reasoned Statement of Application. The Mitigation Method Statement contains details of the proposed mitigation works. The Reasoned Statement needs to provide a rational and reasoned justification as to why the proposed development meets the requirements of the Conservation (National Habitats & c.) regulations 1994, namely Regulations 44(2)(e), (f) or (g), and 44(3)(a).

Other amphibians

More common British amphibians, such as common frog *Rana temporaria*, common toad *Bufo bufo*, smooth newt *Triturus vulgaris* and palmate newt *Triturus helveticus* are protected only by Section 9(5) of the Wildlife and Countryside Act 1981 (as amended). This section prohibits sale, barter, exchange, transporting for sale and advertising to sell or to buy.

The above named species are also listed as UK Species of Conservation Concern. Due to general declines in most British amphibian species in recent years, many local authorities require amphibian surveys as a planning condition, or as part of environmental information submitted as part of a planning application, even where the presence of GCN is ruled out.

Natterjack toad *Bufo calamita* and pool frog *Pelophylax lessonae* are also offered the same level of protection as GCN, through the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017.

Natterjack and common toad are also listed under Section 7 of the Environment (Wales) Act 2016.

Water bodies that support all five (more common) species of British amphibians in high numbers, may be afforded protection in local plans, as Sites of Importance for Nature Conservation (SINC), or a similar equivalent, for sites of local importance. A site may require statutory protection as a Site of Special Scientific Interest (SSSI).

Planning Policy

National planning guidance is issued in the form of Planning Policy Wales (PPW - 2018). The most relevant sections are included in Chapter 6: Distinctive and Natural Places. This chapter details the policies on issues such as the protection of trees, woodlands, species, and designated sites. The document is free and available to view online