Technical Note

PROJECT:	LD10361 – Appendix 7.2
SUBJECT:	Barnsley West GCN eDNA Survey
DATE:	12th October 2023 (Updated 16th May 2024)
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1 INTRODUCTION

1.1 Wardell Armstrong LLP was commissioned by Strata Sterling Barnsley West Ltd to undertake great crested net (GCN) environmental DNA (eDNA) surveys in support of a mixed use development scheme, located west of Barnsley, with an approximate central Ordnance Survey (OS) Grid Reference of SE 31778 07075.

1.2 The aim of the survey was to update the previously established baseline of eDNA data recorded during surveys carried out by WYG (2021). In 2021, 6 ponds were identified within 500m of the Site's boundary, of which 2 were accessible for survey (Ponds 1 and 4). In 2023, an additional 2 ponds were identified on Site (Ponds 7 and 8), which were surveyed in addition to Pond 1. Access was not possible for Pond 4 in 2023 due to its location within a residential garden. The location of all ponds is provided on Drawing LD10361/020.

1.3 During 2024, additional efforts were made to contact local residents for access to offsite waterbodies located within residential access to assess waterbody habitats and obtain a eDNA sample(where necessary). A site visit with the Council's Biodiversity Officer was also attended by WA ecology team, principally to confirm the status of wet ditches on site, with regard to their suitability for breeding GCN.

2 METHODS

Environmental DNA (eDNA) Survey

2.1 Suitably qualified ecologists attended Site on 12th May 2023 to carry out eDNA sampling on Pond 1, 7 and 8. Ponds 2 and 3 are linked hydrologically to Pond 1 and so were not separately surveyed. Ponds, 4, 5 and 6 are all located within residential gardens and therefore access for survey was not possible.

2.2 Twenty samples of water were taken from different locations around each waterbody, where access permitted. Where each sample was to be collected, a 30ml ladle was used to gently mix the water column before filling the ladle with water and emptying each sample into a collection bag.

2.3 Efforts were taken to avoid disturbing sediment whilst taking water samples and shallow water (5-10 cm) was not sampled. Where possible, water samples were collected from pond areas likely to be used by GCN, such as areas of vegetation or open areas used for displaying. Where access to the pond was limited or deemed unsafe, e.g. due to dense scrub or steep banks, water samples were spread out evenly across the accessible parts of the pond.

2.4 The collection bag was then shaken thoroughly to mix the water and DNA contents. A sterile plastic pipette was used to fill six 50ml sample tubes, stirring the water contents between filling each pipette to homogenise the sample. Once filled, all six sample tubes were shaken thoroughly to mix the DNA and preservative, preventing DNA degradation. Water samples were then sent to an approved laboratory for DNA testing.

2.5 Following analysis from an approved laboratory, eDNA identifies the presence/likely absence of GCN, to inform whether populations size class assessment surveys are required.

Habitat Suitability Index Assessment

2.6 On the 13th May 2024, private residential properties were visited by WA ecologists with a view to undertaking a Habitat Suitability Index (HSI) assessment of Pond 4, Pond 5 and Pond 6. In addition, ditches which are recorded as wet ditches within the PEA report (WA, 2023), were also assessed for their suitability to support GCN, using the HSI.

2.7 The Habitat Suitability Index (HSI) assessment is a rapid survey technique used to assist professionals in assessing the suitability of ponds for breeding great crested newt. The assessment followed Advice Note 5 methodology (Amphibian and Reptile Groups of the United Kingdom, 2010).

2.8 The HSI is a numerical index between 0 and 1, wherein a score of 1 represents optimal habitat for GCN, shown in Table 1. It is calculated by assigning a quantitative figure to each of ten variables known to influence the presence of GCN (Oldham et al., 2000). The tenth root of the product of these variables is then calculated, giving a figure for

habitat suitability. Since January 2008 it has been a requirement to include the results of HSI assessments in European Protected Species (EPS) Licence applications.

2.9 The variables to which a quantitative figure is assigned are:

1. Location
2. Pond area
3. Pond drying
4. Water quality
5. Shade
6. Wildfowl presence
7. Fish presence
8. No. of ponds within 1km
9. Quality of terrestrial habitat
10. Presence of macrophytes

Table 1: Habitat Suitability Index Assessment Scoring System	
HSI Score	**Pond Suitability for GCN**
< 0.5	Poor
0.5 – 0.59	Below average
0.6 – 0.69	Average
0.7 – 0.79	Good
> 0.8	Excellent

3 RESULTS

3.1 Table 1 below provides a summary of the survey results.

Table 1: eDNA and HSI Survey Results

Waterbody Description	**Photo**	**Survey Results 2021**	**Survey Results 2023/2024**	**HSI Score**
Pond 1 Located within Craven Wood, on the northern half of the Site. At the time of survey, water levels were very low and restricted to the centre of the waterbody. The pond is functionally linked to a stream which runs south-north through the wood, and also links to Ponds 2 and 3 in the north east. The pond contains dense bullrush and willowherb, and is surrounded by dense nettles and bramble scrub.		eDNA: Negative	100% of the waterbody margins were sampled. HIS: 0.48 (poor) eDNA: **Negative**	n/a
Pond 4 Former garden pond with ornamental fish. **Pond now removed** (c.January 2024)	No photo	eDNA: negative	Infilled	n/a

Pond 5 No. 22 St John's Avenue. Ornamental garden pond, kidney shaped approximately 3m x 1m. Steep sided and concrete lined ornamental water feature with a complete absence of any plants, considered entirely unsuitable as a breeding pond for GCN. Pond is set within paved garden area.	No photo.	No access	Unsuitable	0.10 (Poor)
Pond 6 18 St John's Avenue. Ornamental garden **pond. Infilled in 2021**, prior to extension on dwelling house.	No photo	No access	Infilled	n/a
Pond 7 Adjacent to the south western boundary of the Site and the M1 motorway. Pond is approximately 30x20m and is a depression in a sheep-grazed field. Waterfowl are present, water turbidity is high and there is no emergent/aquatic vegetation.		Not surveyed in 2021.	100% of the waterbody margins were sampled. HSI: 0.38 (poor) eDNA: **Negative**	n/a
Pond 8 Located directly to the north of a hawthorn hedgerow with a horse-grazed field. Water levels were very low at the time of survey with moderate turbidity. Dense vegetation includes willowherb, bullrush, meadow foxtail, creeping buttercup, bitter dock, cuckoo flower, and nettle. No waterfowl or fish present.		Not surveyed in 2021.	100 % of the waterbody margins were sampled. HSI: 0.48 (poor) eDNA: **Negative**	n/a

Ditch 2 and Ditch 3 Ditch 2 and 3 are a stream that runs through Craven Wood. The water has a slow to moderate flow (south to North). The watercourses are devoid of any vegetation and shallow. In combination they are not considered to be suitable for breeding/foraging GCN.		Unsuitable	Unsuitable	0.33 (Poor)
Ditch 4 Ditch 4 is a partially culverted ditch which flows beneath Hermit Lane and adjoins D2. The channel is narrow <0.5m wide in places with a red discolouration. Where the culvert is broken there is some limited emergent vegetation floating sweet-grass *Glyceria fluitans* and brooklime *Veronica beccabunga*, however, the watercourse is flowing and shallow and offers negligible opportunities for breeding and foraging GCN.		Unsuitable	Unsuitable	0.19 (Poor)
Ditch 8 Possibly man-made ditch in the centre of a modified grassland field. The ditch at the time of the PEA survey held very shallow water (approximately 0.05m). However, on a return visit, after a particularly wet winter the drain was dry. NO aquatic vegetation is present.		Unsuitable	Unsuitable	0.23 (Poor)

4 CONCLUSIONS

4.1 The update surveys and HSI assessments of wet onsite ditches (D2, D3, D4 and D8) and Pond 5 confirm the likely absence of great crested newt from site. The

removal/infilling of residential ponds 4 and 6 inclusive meant that no update surveys could be undertaken however, pond 4 was accessed by WYG in 2021 and the survey results were negative. Ponds 2 and 3 are linked by the stream flowing through Craven Wood, to Pond 1 and hence any GCN populations within any of these waterbodies would likely have been sampled by the survey of Pond 1, which returned a negative result for GCN. Pond 4 was eDNA sampled originally in 2021 with a negative result, follow up surveys revealed this pond was removed earlier in the year by the homeowner. Pond 6 has also been infilled during 2021. Access was not granted for Pond 5, but a HSI assessment from the boundary of the premises concluded that this ornamental pond is unsuitable for GCN.

4.2 As the survey results confirm the likely absence of this species from site, no further surveys or specific mitigation/licensing is required. However, it is recommended that eDNA surveys should be repeated should there be a delay of 2 years to the onset of habitat clearance works associated with the scheme.