Survey and Assessment for Great Crested Newt (*Triturus cristatus*) and other Amphibian Species

Monckton Cokeworks

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Where field investigations have been carried out these have been restricted to a level of detail required to achieving the stated objectives of the work. Where any data supplied by the client or from other sources have been used it has been assumed that the information is correct. No responsibility can be accepted by AES - Ltd for inaccuracies in the data supplied by any other party.

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1.0 INTRODUCTION

BACKGROUND TO THE DEVELOPMENT (A BRIEF SUMMARY)

1.1 The proposals involve the reinstatement of a train link to an existing line to facilitate coke haulage from the existing works. The proposed work will require the removal of several juvenile trees and an area of unimproved grassland within which a pond is situated.

1.2 The Rapid risk assessment within the Great Crested Newt (GCN) Method Statement indicates that an offence would be *Highly Likely.* A licence will need to be sought for the development to proceed

SURVEY AND SITE ASSESSMENT

PRE-EXISTING INFORMATION ON GREAT CRESTED NEWTS AT THE SURVEY SITE

1.3 A data search for all amphibian species records within a 2km radius of the site boundary was requested from BBRC (Barnsley Biological Records Centre) and WYJS (West Yorkshire Joint Services). 44 records of four species of amphibian (great crested newt *Triturus cristatus,* common toad *Bufo bufo*, common frog *Rana temporaria* and smooth newt *Triturus vulgaris*) were provided. Nine of these records were for GCN. Records were provided from 1990 to 2012 and were from the adjacent Rabbit Ings area to the east of the site and from the Cold Hiendly area approximately 750m to the south of the site.

1.4 Two small populations of GCN were discovered in 2008 in the adjacent Rabbit Ings area, a site that covers 65.9 hectares (ha) of land. In 2009 a license was granted to undertake a translocation programme for the regeneration of the Rabbit Ings Country Park. The area was subject to a 30 day capture period between 24th August 2009 and 22nd September 2009 when a total of 156 great crested newts were caught. Large numbers of juvenile newts were recorded throughout the search period; their size and proximity to Pond 1 indicated they were from eggs laid during the 2009 breeding season and that their emergence from the pond coincided with the search period.

1.5 As part of the Natural England development licence, post-development monitoring surveys were undertaken in spring 2011. A small population of great crested newts (Peak count = 1) were found to be present in the northern area of the site (formerly Receptor Area A). No great crested newts were found within the main part of the site (the former development site) or the south of the site. Improvements have been made to some of the mitigation

ponds within the main part of the site by creating deeper areas and the addition of clay linings (Rabbit Ings Great Crested Newt Licence Return, WYG Environment, 2011).

1.6 A further presence / absence survey was undertaken during 2013 by Hazelwood Conservation assisted by Mick Birkinshaw and volunteers from the Rabbit Ings Friends Group.

1.7 The monitoring survey recorded a breeding population of GCN (peak count 4 GCN + eggs) in Taylors Pond, (AES-LTD Plan, Pond 1) and a breeding population of GCN (peak count 14 GCN + eggs) in Monkton pond west / Monckton wetlands (AES-LTD Plan, Pond 3.) No GCN or other amphibian species were recorded in Arundal Pond (AES- LTD Plan, Pond 2).

STATUS OF GREAT CRESTED NEWTS IN THE LOCAL / REGIONAL AREA

1.8 On a regional basis great crested newts have a scattered distribution in the Barnsley / Wakefield area but their full status and distribution is unknown. Barnsley has currently identified eight separate sites for this species. In Wakefield the great crested newt is currently recorded in 35 ponds at 31 sites and in a total of 28 one kilometre squares. 52% of all breeding populations are considered to be at threat in Wakefield Metropolitan District.

OBJECTIVES OF SURVEY

1.9 The objectives of the surveys undertaken in 2013 were to:

- Determine the presence of and identify amphibian species in ponds located in and adjacent to the site; and
- To undertake a population size class assessment if the presence of great crested newts was confirmed in or near the site.

SURVEY AREA

1.10 The survey area was the proposed development site (SE 372 123, approximate central point) and suitable adjacent habitat within a 500m radius of the site. One pond was located within the proposed development site (Pond 4). A further six ponds were found outside of the proposed site but within the 500m radius of the site. Three settlement lagoons and the Barnsley Canal were also recorded within the 500m radius of the site (see Pond Location Plan & Lagoon Location Plan).

HABITAT DESCRIPTION

1.11 The site exists in three distinct habitat types. The first is unimproved grassland, with scrub and an emphemeral pond located within it (Pond 4), the proposed rail link would then pass through the working area within Monckton Cokeworks and then onto the third area which had been a rail siding until the 1980's; it currently exists as an area of ballast material bordered either side with regenerated juvenile trees and scrub. The southern boundary of the site is Monckton Coke Works whilst to the north there is a mix of industrial works, woodland and grassland and the western boundary is a railway lane which is in use on a weekly basis. . The B6428 runs immediately adjacent to the eastern most boundary of the site beyond which is the Rabbit Ings Counrty Park. There is an underpass beneath the B6428 which directly links the habitat between Rabbit Ings and the unimproved grassland / Scrub area of the proposed development site.



1.12 Pond, Lagoons and Canal locations are shown on the Pond Location Plan. Specific Lagoon Locations are shown on the Lagoon Location Plan.

1.13 ***Pond 1***: located at grid reference: SE 37660 12206, was a newly established pond, surrounded by rough grassland habitat. The pond is dominated by Typha with more than 90% surface cover being recorded. The pond was approximately 20 x 20m in size with a depth ranging from approximately 10 cm to half a metre.



1.14 ***Pond 2***: located at grid reference SE 37872 12041, was a newly established pond, surrounded by rough grass with areas of scattered scrub. The pond had no observable macrophytic cover at the time of survey with the surface being open water. The pond is located adjacent to a public footpath and was approximately 7 x 30m in size with a depth ranging from 10cm to half a metre.



1.15 ***Pond 3***: located at grid reference SE 37992 12126 was a well-established pond surrounded on three sides by broadleaved trees and scrub. The pond is adjacent to a public footpath with one side open to rough grassland habitat. The pond appeared to be several metres deep in some areas, and was mostly open water with no obvious macrophytic surface cover.



1.16 ***Pond 4:*** located at grid reference SE 37992 12126, was an ephemeral water body surrounded by rough grassland and scrub habitat. The pond has a depth of 30 cm at its deepest point and was dominated by reedmace (*Typha angustifolia*). The pond was approximately 20 x 50min size.



1.17 ***Pond 5***: located at grid reference SE 37716 12573 is a well-established pond surrounded by rough grassland, rush and scrub habitat. The pond was totally dominated by Typha with almost no visible areas of open water being recorded. The pond was approximately 30 x 40m in size.



1.18 ***Pond 6***: located at grid reference SE 37693 12602 was an ephemeral water body surrounded by well grazed grass and hawthorn hedge. The pond appears to have formed from rainwater in a poorly drained field margin. The pond ranges in depth from 10 cm up to half a metre, and was approximately 25 x 50m in size.



1.19 ***Pond 7***: located at grid reference SE 37108 12310 was a well-established pond surrounded by areas of rough grassland and scrub habitat. The pond ranges from 10 cm up to one m deep. The pond is adjacent to the Barnsley Canal and was noted to have a high density of fish within it. Locals are known to fish the pond. (*Pers comm with member of the public).* The pond was approximately 25 x 70 m in size.



1.20 ***Lagoons 1,2,3***: are located at grid reference SE 37206 12391. The three settlement lagoons were constructed from concrete with vertical sides and are situated on the periphery of the Monckton Coke works. They were surrounded by areas of rough grassland and scrub on one side and the Monckton Coke Works on the other. The lagoons were several metres deep and are feed from mine water pumped from an adjacent mine. Lagoon 1 was approximately 50 x 20 min size. Lagoon 2 was approximately 15 x 20min size. Lagoon 3 was approximately 10 x 40m in size. Lagoon 1 was the only lagoon recorded as having macrophytic vegetation and was totally dominated by broadleaved pond weed (*Potamogeton natans*).



Lagoon 1



Lagoon 2



Lagoon 3

1.21 ***Barnsley Canal:*** survey area located at grid reference SE 37185 11894 and are areas within the 500 metre buffer to development. The canal was well established and surrounded by areas of rough grassland, broadleaved trees and scrub. The canal was several metres deep and slow flowing in nature. Areas of canal were recorded as completely dominated by Typha. The canal was approximately 20 m wide and several km long.





FIELD SURVEY

1.22 Field surveys were undertaken between 9th May and 27th June 2013.

2.0 METHODS

HABITAT SUITABILTY INDICES

2.1 A Habitat suitability index was calculated for all waterbodies within the survey area (undertaken in April 2013). The Habitat Suitability Index (HSI) for the great crested newt was developed by Oldham *et al*. (2000)[1]. HSI scoring systems were originally developed by the US Fish and Wildlife Service as a means of evaluating habitat quality and quantity. An HSI is a numerical index, between 0 and 1. 0 indicates unsuitable habitat, 1 represents optimal habitat. The HSI for the great crested newt incorporates ten suitability indices, all of which are factors thought to affect great crested newts. The resulting score can be used to categorise Pond suitability for great crested newts as shown below:

HSI score	Categorisation of HSI scores
<0.5	poor
0.5 – 0.59	below average
0.6 – 0.69	average
0.7 – 0.79	good
> 0.8	excellent

2.2 The HSI for great crested newts is a measure of habitat suitability. **It is not a substitute for newt surveys.** In general, ponds with high HSI scores are more likely to support great crested newts than those with low scores. However, the system is not sufficiently precise to allow the conclusion that any particular pond with a high score will support newts, or that any pond with a low score will not do so.

GREAT CRESTED NEWT SURVEYS

2.3 Pond 4, Lagoons 1, 2, 3 and the Barnsley Canal were all surveyed for great crested newt during the survey period. Ponds 1, 2, and 3 were not surveyed by AES-LTD. These ponds were excluded from the survey because the area had been subject to a recent GCN translocation programme (2009 -2011) under licence, it was also apparent that the ponds were being monitored (for GCN) during the season due to the presence of artificial refugia and bottle traps. Requests were made to obtain the data. Despite several attempts by Hargreaves (UK) Services Ltd the owner of the land where Pond's 5 and 6 were located could not be determined and therefore access to these ponds was not authorised.

[1] 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.

Surveyors are not permitted to enter onto unauthorised property for reasons of health and safety. Pond 7 was scoped out of the survey effort due to its high fish density.

2.3 Standard methodology, for surveying for great crested newt as described in English Nature's *Great crested newt mitigation guidelines* (2001)[2] were followed and are detailed below. Surveys were undertaken in two stages, daytime surveys and evening / night time surveys. Ambient temperatures were recorded from a standard thermometer.

2.4 **Daytime surveys**: involved the visual and physical examination of ponds and adjacent habitat for the presence of suitable spawning areas, egg-laying plants, tadpoles, juveniles, sub-adults and adult amphibians of all species. Potential egg-laying plants were closely inspected for the presence of amphibian eggs. In addition to this, hand searches were made of other suitable areas situated in the survey area that may have been providing temporary refugia for terrestrial based amphibians; Including potential natural refugia and additionally 50 artificial refugia (50 x 50 cm mats cut from roofing felt). During the hand searching periods, stones, boulders, vegetation, and other materials such as occasional litter were visually inspected on their undersides for the presence of amphibian species. Ambient temperatures were recorded from a standard thermometer as detailed below.

2.5 **Evening surveys**: involved undertaking torchlight surveys at each survey location. The surveyor slowly walked around the water body shining a powerful (one million candle power) lamp through the water surface in a sweeping (side to side) motion. Using this torchlight survey method, amphibians are usually detected in the light beam. This method usually allows sufficient time for the species and often the sex of the individual to be identified. Netting was undertaken at Pond 4 and the Barnsley Canal for a minimum of 15 minutes per 20 metres of shoreline. Bottle traps were installed in Ponds 4 on the evening of each survey day. Bottle trapping involved setting bottle traps (made from clear 2-litre plastic bottles) around each of the pond margins. Traps were laid at a density of one trap every two metres of shoreline. Traps were set at dusk and were left set overnight. Traps were checked and removed before 0800 hours the following morning. Bottle trapping and netting could not be conducted on Lagoons 1, 2, and 3 due to health and safety issues. Areas of the Barnsley Canal adjacent to the proposed development were torched, netted and hand searched, but were not bottle trapped due to the impracticality of this method for the canal.

[2] English Nature (2001). *Great Crested Newt Mitigation Guidelines*. English Nature, Peterborough.

TIMING

2.6 Surveys were undertaken on the 9th/10th, 15th/16th May and 6th/7th, 13th/14th, 20th/21st and 27th/28th June 2013.

WEATHER CONDITIONS

2.7 Throughout the survey period ambient temperatures were recorded on each survey day.

Date	Temperature	Weather conditions
May 9th/10th 2013	9 ^{0}C	Overcast / light wind
May 15th/16th 2013	7 ^{0}C	Fair / light wind
June 6th/7th 2013	13 ^{0}C	Fair
June 13th/14th 2013	11 ^{0}C	Overcast / light wind
June 20th/21st 2013	13 ^{0}C	Overcast / light rain
June 27th/28th 2013	12 ^{0}C	Overcast

PERSONNEL

2.8 All survey work was undertaken by Christopher Madine (AES-LTD) licensed amphibian worker.

3.0 RESULTS

3.1 The table below gives the results of the HSI assessment.
(L = Lagoon BC = Barnsley Canal)

Table 1: HSI Scores

Pond reference	1	2	3	4	5	6	7
SI1 – Location	1	1	1	1	1	1	1
S12 – Pond area	0.8	0.4	0.8	0.95	0.85	0.85	0.85
SI3 – Pond Drying	0.5	0.9	0.9	0.5	0.1	0.9	0.9
S14 – Water Quality	0.67	0.33	0.67	0.67	0.67	0.67	0.67
SI5 – Shade	1	1	1	1	1	1	1
SI6 – Fowl	1	1	0.67	1	1	1	0.67
SI7 - Fish	1	1	0.67	1	1	1	0.01
SI8 – Ponds	0.8	0.8	0.8	0.8	0.8	0.8	0.8
SI9 – Terrestrial Habitats	1	0.33	1	1	1	1	1
SI10 - Macrophytes	1	0.35	0.5	0.9	0.8	0.6	0.6
HSI	**0.86**	**0.64**	**0.78**	**0.86**	**0.90**	**0.86**	**0.53**

Table 1 continued: HSI Scores

Pond reference	L1	L2	L3	BC			
SI1 – Location	1	1	1	1			
S12 – Pond area	0.95	0.6	0.8	0.8			
SI3 – Pond Drying	0.09	0.09	0.09	0.9			
S14 – Water Quality	0.33	0.33	0.01	0.67			
SI5 – Shade	1	1	1	1			
SI6 – Fowl	1	1	1	0.67			
SI7 - Fish	0.67	0.67	0.67	0.01			
SI8 – Ponds	0.8	0.8	0.8	0.8			
SI9 – Terrestrial Habitats	0.33	0.33	0.33	1			
SI10 - Macrophytes	0.9	0.3	0.3	0.5			
HSI	**0.58**	**0.50**	**0.36**	**0.51**			

Table 2: Presence / absence of amphibian species in ponds

(L = Lagoon BC = Barnsley Canal)

Pond number	Presence / absence				
	Great crested newt	Smooth newt	Palmate newt	Frog	Toad
4	✓	✓	0	0	✓
L1	0	0	0	0	0
L2	0	✓	0	0	0
L3	0	0	0	0	0
BC	0	0	0	0	0

✓* Species present; 0* Species unrecorded

Table 3: Population size class assessment (see Amphibian species record sheets: raw data)

Pond number	Summary of total counts of amphibian species				
	Great crested newt	Smooth newt	Palmate newt	Frog	Toad
4	1	8	0	0	1
L1	0	0	0	0	0
L2	0	7	0	0	0
L3	0	0	0	0	0
BC	0	0	0	0	0

Figures represent the highest number of individuals of each species observed / captured.

4.0 DISCUSSION

PRESENCE / ABSENCE OF ALL AMPHIBIAN SPECIES

4.1 Great crested newt, smooth newt, and common toad were recorded within Pond 4 during the survey period. Smooth newt were also recorded in Lagoon 2 during the survey period.

POPULATION SIZE CLASS ASSESSMENT – GREAT CRESTED NEWT

4.2 A small population of great crested newt was recorded within Pond 4.

SITE STATUS ASSESSMENT

4.3 Parts of the site offer good habitat for amphibian species. There is high potential for Great crested newt and other amphibian species being present in and around Pond 4. Pond 4 and the 'good quality' terrestrial habitat within this immediate area was the most suitable area in terms of habitat suitability for amphibian species to be recorded during the survey effort. It is likely that this area is used as a continuum of habitat from the great crested newt breeding pond on the Rabbit Ings site which is located 50m from the proposed development site boundary.

4.4 The three lagoons offered sub-optimal habitat to amphibian species due to their sheer sided concrete walls and lack of suitable terrestrial habitat and the Barnsley Canal was noted as supporting a high density of stickleback (*Gasterosteus aculeatus*) and other fish species.

CONSTRAINTS

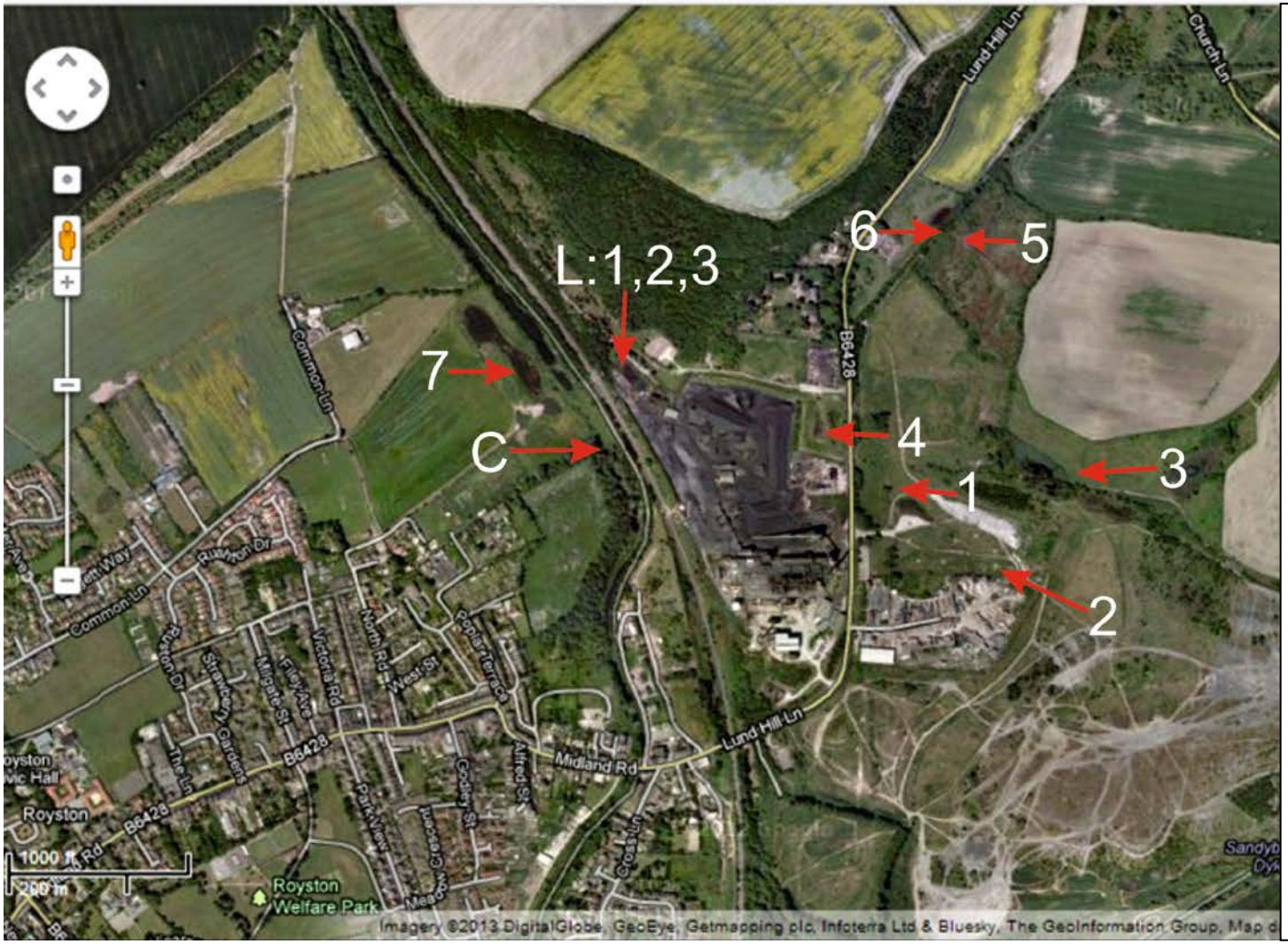
4.5 Pond 5 and 6 could not be surveyed due to access issues. Lagoons 1, 2, and 3 could only be surveyed using the torching method due to health and safety issues.

CONCLUSION

4.6 The extended search area was surveyed for the presence of amphibian species between 9th May and 28th June 2013. There was no access to Ponds 5 and 6, and Ponds 1, 2 3 and 7 were scoped out of the survey effort. Pond 4 (the main water body to be effected by the proposed development), the three Lagoons and areas of the Barnsley Canal within the 500 metre buffer were all surveyed during this time. Constraints were placed on survey effort in Lagoons 1, 2, and 3 survey due to health and safety issues. However a reasonable sampling effort was achieved on all of the surveyed water bodies.

4.7 A small population of great crested newts were recorded within Pond 4, and the proposals represent a high risk to this species and other amphibian species recorded in and immediately around Pond 4. A license will need to be obtained from Natural England to

translocate / exclude GCN and other amphibian species from this area. The license application will include offsite mitigation on the adjacent Rabbit Ings County Park.



KEY

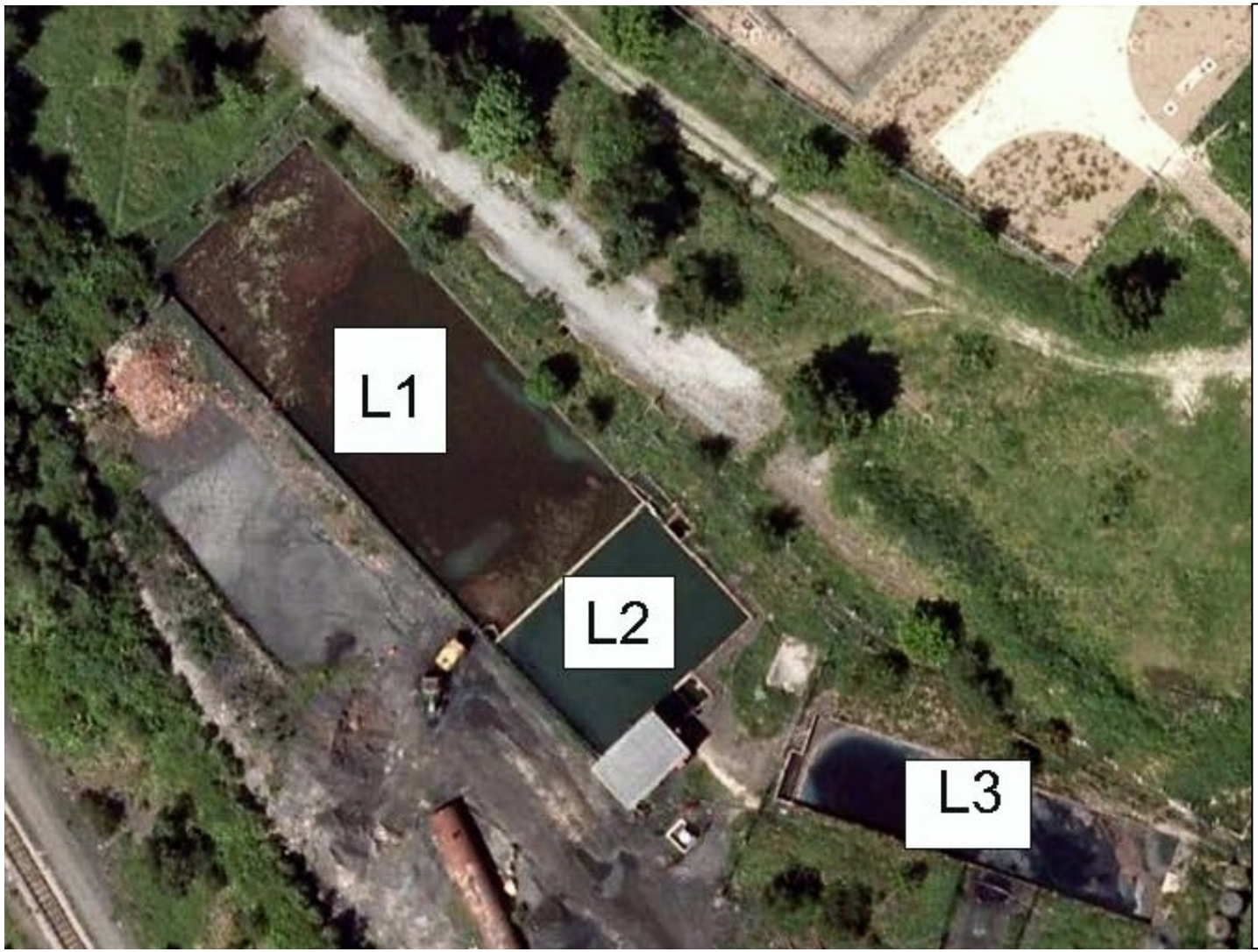
Pond locations are numbered 1-7

L Lagoon

C Barnsley Canal

Pond Identification Plan

AES-LTD
Ramshaw House, Ramshaw
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KEY

L1 **Lagoon 1**

L2 **Lagoon 2**

L3 **Lagoon 3**

Lagoon Identification Plan

AES-LTD
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01388 835084

REFERENCES AND BIBLIOGRAPHY

Baker, JMR & Halliday, TR (1999) Amphibian colonisation of new ponds in an agricultural landscape. Herpetological Journal 9: 55-64

British herpetological society (1996) Surveying for amphibians. London: BHS

Cooke, AS & Frazer, JFD (1976) Characteristics of newt breeding sites. Journal of Zoology, London. 178:223-236

Cresswell, W & Whitworth, R. (2004). An assessment of the efficiency of capture techniques and the value of different habitats for the great crested newt *Triturus cristatus*. English Nature Research Report: Number 576

Department of the Environment, Transport and the Regions and English Nature (2000) European protected species: Guidance note.

Durkin, J (2008) Amphibian Atlas of Northeast England.

Edgar, P. & Griffiths, RA (2004). An evaluation of the effectiveness of great crested newt *Triturus cristatus* mitigation projects in England, 1990 – 2001. English Nature Research Report 575

English Nature (2001) Great crested newt mitigation guidelines

Foster, J (1997) The ecology, conservation and management of the great crested newt (*Triturus cristatus*). Information and advisory note no. 92. Edinburgh: Scottish Natural Heritage

Gent, AH & Gibson, SD (eds.) (1998) Herpetofauna Worker's Manual. Peterborough: Joint Nature Conservation Committee

Green, D (2001) Identification – egg laying and larval development of great crested newts. British Wildlife 12(4) 252-255

Kupfer, A & Kneitz, S (2000) Population ecology of the great crested newt (*Triturus cristatus*) in an agricultural landscape: dynamics, pond fidelity and dispersal. Herpetological Journal: 10(4): 165-171

NCC (1990) Handbook for Phase 1 habitat survey: a technique for environmental audit. Nature Conservancy Council, Peterborough.

Oldham, RS & Humphries, RN (2000) Evaluating the success of great crested newt (*Triturus cristatus*) translocation. Herpetological Journal: 10(4): 183-190

Stockton-on-Tees Borough Council (2007) Stillington Forest Park Local Nature Reserve Management Plan 2008 – 2012.

Swan, MJS & Oldham, RS (1993) Herptile sites volume 1: national amphibian survey final report. English Nature Research Report No. 38. Peterborough, English Nature.

Appendix A

Amphibian Species Record Sheet (raw data) **Pond: 4**

Date	Temp (ºC)	Weather conditions	Methods (Tick methods used)						Species captured / observed & number (Indicate sex / life stage)				
			Hand search	Egg search	Torch	Net	Bottle trap	Pitfall trap	Great crested newt	Smooth newt	Palmate newt	Frog	Toad
May 9th/10th 2013	9 ^{0}C	Overcast / light wind	✓	✓	✓	✓	✓		0	1Am,1Af	0	0	0
May 15th/16th 2013	7 ^{0}C	Fair / light wind	✓	✓	✓	✓	✓		0	3Am,2Af	0	0	0
June 6th/7th 2013	13 ^{0}C	Fair	✓	✓	✓	✓	✓		1Af	5Am,3Af	0	0	0
June 13th/14th 2013	11 ^{0}C	Overcast / light wind	✓	✓	✓	✓	✓		1j	2Am,3Af	0	0	0
June 20th/21st 2013	13 ^{0}C	Overcast / light rain	✓	✓	✓	✓	✓		0	1Af	0	0	1A
June 27th/28th 2013	12 ^{0}C	Overcast	✓	✓	✓	✓	✓		0	0	0	0	0

Key: A = adult; j = juvenile; m = male; f = female; 0 = not recorded

Amphibian Species Record Sheet (raw data) **Lagoon: 1**

Date	Temp (ºC)	Weather conditions	Methods (Tick methods used)						Species captured / observed & number (Indicate sex / life stage)				
			Hand search	Egg search	Torch	Net	Bottle trap	Pitfall trap	Great crested newt	Smooth newt	Palmate newt	Frog	Toad
May 9th/10th 2013	9 ^{0}C	Overcast / light wind			✓				0	0	0	0	0
May 15th/16th 2013	7 ^{0}C	Fair / light wind			✓				0	0	0	0	0
June 6th/7th 2013	13 ^{0}C	Fair			✓				0	0	0	0	0
June 13th/14th 2013	11 ^{0}C	Overcast / light wind			✓				0	0	0	0	0
June 20th/21st 2013	13 ^{0}C	Overcast / light rain			✓				0	0	0	0	0
June 27th/28th 2013	12 ^{0}C	Overcast			✓				0	0	0	0	0

Key: A = adult; j = juvenile; m = male; f = female; 0 = not recorded

Amphibian Species Record Sheet (raw data) **Lagoon: 2**

Date	Temp (°C)	Weather conditions	Methods (Tick methods used)						Species captured / observed & number (Indicate sex / life stage)				
			Hand search	Egg search	Torch	Net	Bottle trap	Pitfall trap	Great crested newt	Smooth newt	Palmate newt	Frog	Toad
May 9th/10th 2013	9 ^{0}C	Overcast / light wind			✓				0	0	0	0	0
May 15th/16th 2013	7 ^{0}C	Fair / light wind			✓				0	2Am,5Af	0	0	0
June 6th/7th 2013	13 ^{0}C	Fair			✓				0	1Af	0	0	0
June 13th/14th 2013	11 ^{0}C	Overcast / light wind			✓				0	0	0	0	0
June 20th/21st 2013	13 ^{0}C	Overcast / light rain			✓				0	1Af	0	0	0
June 27th/28th 2013	12 ^{0}C	Overcast			✓				0	1Am,1Af	0	0	0

Key: A = adult; j = juvenile; m = male; f = female; 0 = not recorded

Amphibian Species Record Sheet (raw data) **Lagoon: 3**

Date	Temp (ºC)	Weather conditions	Methods (Tick methods used)						Species captured / observed & number (Indicate sex / life stage)				
			Hand search	Egg search	Torch	Net	Bottle trap	Pitfall trap	Great crested newt	Smooth newt	Palmate newt	Frog	Toad
May 9th/10th 2013	9 ^{0}C	Overcast / light wind			✓				0	0	0	0	0
May 15th/16th 2013	7 ^{0}C	Fair / light wind			✓				0	0	0	0	0
June 6th/7th 2013	13 ^{0}C	Fair			✓				0	0	0	0	0
June 13th/14th 2013	11 ^{0}C	Overcast / light wind			✓				0	0	0	0	0
June 20th/21st 2013	13 ^{0}C	Overcast / light rain			✓				0	0	0	0	0
June 27th/28th 2013	12 ^{0}C	Overcast			✓				0	0	0	0	0

Key: A = adult; j = juvenile; m = male; f = female; 0 = not recorded

Amphibian Species Record Sheet (raw data) **Barnsley Canal**

Date	Temp (ºC)	Weather conditions	Methods (Tick methods used)						Species captured / observed & number (Indicate sex / life stage)				
			Hand search	Egg search	Torch	Net	Bottle trap	Pitfall trap	*Great* crested *newt*	Smooth newt	Palmate newt	Frog	Toad
May 9th/10th 2013	9 ^{0}C	Overcast / light wind	✓	✓	✓	✓			0	0	0	0	0
May 15th/16th 2013	7 ^{0}C	Fair / light wind	✓	✓	✓	✓			0	0	0	0	0
June 6th/7th 2013	13 ^{0}C	Fair	✓	✓	✓	✓			0	0	0	0	0
June 13th/14th 2013	11 ^{0}C	Overcast / light wind	✓	✓	✓	✓			0	0	0	0	0
June 20th/21st 2013	13 ^{0}C	Overcast / light rain	✓	✓	✓	✓			0	0	0	0	0
June 27th/28th 2013	12 ^{0}C	Overcast	✓	✓	✓	✓			0	0	0	0	0

Key: A = adult; j = juvenile; m = male; f = female; 0 = not recorded