

Hinchliffe Mill,
Holmfirth, HD9 2NX

Ecological Impact Assessment

August 2022

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1 Introduction

1.1.1.1 This report presents an Ecological Impact Assessment (EclA) in relation to the following proposed development:

- Proposals: Redevelopment and change of use of former mill site to form seven residential units within the mill building and erection of 17 dwellings (within a Conservation Area).
- Location: Hinchliffe Mill, Water Street, Holmbridge, Holmfirth, HD9 2NX.
- Application number: 2021/62/90800/W.
- Site area extends to approximately 1.83 hectares and is centred at approximate grid reference SE12700707.
- Drawing: Overall Site Plan (drawing no. 3372 (0-) 623 G, dated 19.08.2022).

1.1.1.2 This report should be read in conjunction with the Preliminary Ecological Appraisal for the site, although all key information from the Preliminary Ecological Appraisal has been reproduced in this EclA:

- *Quants Environmental Ltd. (2021). Hinchliffe Mil, Holmfirth, HD9 2NX. Preliminary Ecological Appraisal. Rev 2. 8th February 2021.*

1.1.1.3 This EclA presents the results of specialist ecological surveys undertaken at the site and reviews relevant previous ecological survey information for the site and surroundings. In accordance with current guidelines¹, the aims of this EclA were to identify and evaluate all relevant ecological receptors, identify likely ecological impacts, identify mitigation / compensation measures and identify any residual effects.

Figure 1. Site area outlined red (aerial imagery dated 2020)



¹ CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition. Chartered Institute of Ecology and Environmental Management, Winchester.

Figure 2. Site location



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2 Methodology

2.1 Desk Study

2.1.1.1 As described in the previous report², West Yorkshire Ecology Service (WYES) was contacted for searches of protected sites and records of protected species within a 2 km radius of the site centre. In addition, the following data sources were searched for statutorily protected sites and additional ecological information of relevance to the assessment such as off-site waterbodies:

- Multi Agency Geographic Information for the Countryside (MAGIC).
- Ordnance Survey 1:10,000 mapping.
- Aerial imagery.

2.2 Personnel

2.2.1.1 This ecological impact assessment and the various ecological surveys undertaken in 2021 have been undertaken by Toby Fisher CEnv MCIEEM^{3, 4}.

2.3 Preliminary Ecological Field Survey

2.3.1.1 A Preliminary Ecological Appraisal of the site was conducted on 7th January 2021 by Toby Fisher CEnv MCIEEM in accordance with the standard survey methodology^{5, 6}.

2.3.1.2 The habitats on the site were assessed and categorised in order to provide baseline information and subsequent interpretation of the ecological value of the site. In addition, the site was searched for evidence of protected / notable species and assessed in terms of its potential to support protected / notable species such as badger, great crested newt, water vole, reptiles and bat species. The trees on the site were inspected from ground level for evidence of bats and for potential bat roost features, using close-focussing binoculars. The built structures at the site were searched for evidence of bats and were assessed in terms of their potential to support bat roosts. The building on the site was fully inspected internally and externally except for the basement which was not safely accessible.

2.4 Great Crested Newt (GCN) eDNA Survey

2.4.1.1 GCN eDNA⁷ sampling was undertaken at the Mill Pond within the site on 15th April 2021, in order to confirm the presence/absence of GCN in this pond.

2.4.1.2 Water samples were collected from the Mill Pond on 15th April 2021 by Toby Fisher CEnv MCIEEM⁴. The eDNA survey technique was approved by Defra and Natural England in 2014 as an alternative method for surveying for GCN. Natural England advise that "the results [of the testing of the method in 2013] show that the test can be more effective in confirming the presence or absence of GCN than a combination of conventional survey techniques". In aquatic environments, eDNA is diluted and distributed in the water. Sources of eDNA in pond water derive from faeces, mucous, gametes, shed skin and carcasses. The eDNA survey involves the collection of water samples for laboratory analysis for the DNA of species of interest, in this case GCN. The sampling procedure is prescribed in the published method and requires that the water sample be taken between mid-April and end-June.

² Quants Environmental Ltd. (2021). Hinchliffe Mil, Holmfirth, HD9 2NX. Preliminary Ecological Appraisal. Rev 2. 8th February 2021.

³ Natural England Class Licence Registration No. 2015-10756-CLS-CLS - CL18 Level 2 (Bats).

⁴ Natural England Class Licence Registration No. WML- CL08:2015-16681-CLS-CLS (Great Crested Newts).

⁵ JNCC, (2010), Handbook for Phase 1 habitat survey - a technique for environmental audit, ISBN 0 86139 636 7.

⁶ Chartered Institute of Ecology and Environmental Management (CIEEM). (2017). Guidelines for Preliminary Ecological Appraisal, Second Edition. December 2017. CIEEM, Winchester.

⁷ eDNA = Environmental Deoxyribonucleic Acid.

- 2.4.1.3 The Mill Pond was surveyed for GCN eDNA in accordance with the published method⁸. 20x samples of pond water were taken from the waterbody in accordance with standard protocol as approved by Defra and Natural England.
- 2.4.1.4 The 20x samples were subsequently mixed and stored in 6x tubes of ethanol for eDNA preservation. Appropriate measures were undertaken to avoid cross-contamination, e.g. the use of sterile gloves and avoiding heavy rain conditions when eDNA may inadvertently splash into the samples. The 20x samples of pond water were taken from suitable areas at different locations around the perimeter of each waterbody and care was taken to sample towards the base of the water column (eDNA tends to sink over time) both in areas of open water (potential GCN display areas) and from areas of potentially suitable GCN egg-laying vegetation.
- 2.4.1.5 The samples were collected during the appropriate time of year (i.e. between 15th April and 30th June) as per the approved protocol. The samples were subsequently labelled and refrigerated as per the approved protocol prior to being sent by courier for laboratory analysis by SureScreen Scientifics Ltd; a Natural England approved agency⁹.
- 2.4.1.6 The results of the eDNA GCN survey were received on 25th April 2021. The eDNA Technical Report from SureScreen Scientifics is reproduced at Appendix 1. The laboratory testing was conducted in two phases. The sample first went through an extraction process where all 6 tubes were pooled together to acquire as much eDNA as possible. The pooled sample was then tested via real time PCR¹⁰ (or q-PCR). This process amplifies the selected part of DNA allowing it to be detected and measured. All controls were acceptable and there were no significant limitations to the survey, sampling or analysis procedures.

2.5 Breeding Bird Surveys

- 2.5.1.1 Five breeding bird surveys were undertaken at the site on 19th March; 6th April; 15th April; 29th April; and 7th May 2021 during suitable conditions by experienced ornithologist Toby Fisher MCIEEM CEnv.
- 2.5.1.2 The surveys followed the standard Common Birds Census (CBC) method¹¹. During each survey visit, all bird observations were recorded on 1:10,000 scale maps using standard British Trust for Ornithology (BTO) notation including information on behaviour and evidence of breeding. The survey transect route involved walking a transect route through the site and along the site boundaries such that all parts of the site were approached within approximately 100 metres and to enable visual and audible coverage of all the landforms within the site and land immediately adjacent to the site.
- 2.5.1.3 The data collected were subject to territory mapping analysis in order to determine the number and distribution of breeding bird species within the area. In addition, birds were classified as Non-breeding, Possible, Probable and Confirmed breeding dependent on the activity recorded. A description for defining each breeding classification is provided in the table below.

⁸ Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F 2014. Analytical and methodological development for improved surveillance of the Great Crested Newt. Defra Project WC1067. Freshwater Habitats Trust: Oxford.

⁹ <http://www.gov.uk/great-crested-newts-surveys-and-mitigation-for-development-projects>

¹⁰ Polymerase Chain Reaction.

¹¹ Gilbert, G., Gibbons, D.W. & Evans, J. (1998) Bird Monitoring Methods. RSPB, Sandy.

2.5.1.4 In relation to the development proposals, particular attention was focused on Species of Principal Importance¹² and BoCC Red List species¹³.

2.5.1.5 All surveys were undertaken in suitable weather conditions. The survey conditions are presented in the table below. The surveys were undertaken during the optimal season for breeding bird surveys and were spaced at least 1 week apart. There were no significant survey limitations.

Table 1. Breeding Bird Survey Conditions

Date	Survey time	Weather conditions	Visibility
19 th March 2021	07:00 – 08:30	Dry, wind Bft 1-2, cloud 8/8, 7°C – 7°C.	Excellent
6 th April 2021	07:10 – 08:40	Dry, wind Bft 1, cloud 0/8, 0°C – 2°C.	Excellent
15 th April 2021	06:50 – 08:20	Dry, wind Bft 0, cloud 0/8, 1°C – 2°C.	Excellent
29 th April 2021	06:00 – 07:30	Dry, wind Bft 0, cloud 8/8, 5°C – 6°C.	Excellent
7 th May 2021	06:10 – 07:40	Dry, wind Bft 1, cloud 8/8, 6°C – 7°C.	Excellent

Table 2. A Description for Defining Each Breeding Classification

Breeding likelihood	Activity recorded
Non-breeding	Passage flight only
	Bird on migration
	Non breeding males
Possible breeding	Observed in suitable nesting habitat
	Singing male
Probable breeding	Pair in suitable nesting habitat
	Permanent territory (defended over at least one week or, a number of males all singing in the same area)
	Visiting probable nest site
	Agitated behaviour
	Brood patch of incubating bird (from bird in hand)
	Nest building or excavating nest hole
Confirmed breeding	Distraction display or injury feigning
	Used nest or eggshells found from this season
	Recently fledged young or downy young

¹² Species listed on Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 as Species of Principal Importance for the conservation of biodiversity in England.

¹³ Green; Amber; Red; Unlisted as defined in: Eaton, M.A., N.J. Aebischer, A.F. Brown, R.D. Hearn, L. Lock, A.J. Musgrove, D.G. Noble, D.A. Stroud & R.D. Gregory. 2015. Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. British Birds 108: 708-746.

Breeding likelihood	Activity recorded
	Adults entering or leaving nest site in circumstances indicating Occupied nest
	Adult carrying faecal sac or food for young
	Nest containing eggs
	Nest with young seen or heard

2.6 Otter and Water Vole Surveys

- 2.6.1.1 In accordance with standard methodologies^{14, 15, 16, 17} all suitable accessible areas of the Mill Pond and the River Holme within 100 metres of the proposed development footprint were surveyed for evidence of otter and water vole on 6th April 2021 and 29th April 2021. For both species, in addition to the Mill Pond within the site, the survey extended approximately 100 metres upstream and downstream but was limited to spot checks due to land access and health and safety considerations associated with steep banks.
- 2.6.1.2 For otter, the surveys involved detailed searches of all accessible sections of the Mill Pond and River Holme within 100 metres of the site for signs of otter such as spraints, jelly, holts, lying-up places, footprints and slides.
- 2.6.1.3 For water vole, the surveys involved detailed searches of all sections of the Mill Pond and River Holme within 100 metres of the site for signs of water vole such as burrows, runs, grazed lawns, latrines, droppings, footprints, live/dead animals and feeding remains.
- 2.6.1.4 At the time of each of the surveys, the water level on the River Holme was low due to limited recent rainfall such that any evidence of otters such as spraints would not have been washed away by recent flood waters.
- 2.6.1.5 There were no significant survey limitations. Areas of the banks which were not accessed due to health and safety reasons were viewed remotely using close-focussing binoculars.
- 2.6.1.6 In addition to the searches for otter and water vole field signs, a static motion-sensitive video camera was installed at various locations on the banks of the Mill Pond for a total of 15 nights during April 2021.

2.7 Ecological Impact Assessment

- 2.7.1.1 The Ecological Impact Assessment (EclA) has been undertaken in accordance with the standard guidelines¹.

¹⁴ National Rivers Authority (1993). Otters and River Habitat Management. Conservation Technical Handbook Number 3.

¹⁵ Macdonald DW, Mace G and Rushton S (1998). Proposals for future monitoring of British mammals. DETR, London.

¹⁶ Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). The Water Vole Mitigation Handbook (Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. Mammal Society London.

¹⁷ Strachan, R., Moorhouse, T., & Gelling, M (2011) Water Vole Conservation Handbook; 3rd Edition. Wildlife Conservation Research Unit, Abingdon.

3 Results

3.1 Desk Study

3.1.1.1 Information provided by WYES is presented in the previous report² and the key information is summarised below for ease of reference.

3.1.2 Internationally / Nationally Protected Sites

3.1.2.1 **Rake Dike SSSI** (Site of Special Scientific Interest) is a geological SSSI located approximately 1.91 km south-west of the site.

3.1.2.2 There is one site within 2 km of the site which is comprehensively designated as a SSSI/SAC/SPA¹⁸. The site is located approximately 1.93 km south of the site and is designated as follows:

- **Dark Peak SSSI.** The SSSI has 24 Monitored Features:
 - Acid grassland (upland)
 - Aggregations of breeding birds - Curlew, Numenius arquata
 - Aggregations of breeding birds - Golden plover, Pluvialis apricaria
 - Aggregations of breeding birds - Merlin, Falco columbarius
 - Aggregations of breeding birds - Short-eared owl, Asio flammeus
 - Aggregations of non-breeding birds - Dunlin, Calidris alpina alpina
 - Assemblages of breeding birds - Upland moorland and grassland with water bodies
 - Blanket bog and valley bog (upland)
 - EO - Namurian
 - EW - Namurian
 - FB - Quaternary of the Pennines and adjacent areas
 - IA - Fluvial Geomorphology
 - IA - Mass Movement
 - Invert. assemblage F221 montane & upland
 - IS - Quaternary of the Pennines and adjacent areas
 - Lowland dry acid grassland (U4/20)
 - Mire grasslands and rush pastures (upland)
 - Population of declining plant species and species at the edge of their range - Vaccinium x intermedium, Hybrid Bilberry
 - Population of dragonfly - Cordulegaster boltonii, Golden-ringed Dragonfly
 - Short sedge acidic fen (upland)
 - Subalpine dwarf-shrub heath
 - Upland oakwood
 - Wet heath (upland)
 - Wet woodland.
- **South Pennine Moors SAC.** The SAC Qualifying Features are listed as follows:
 - H4010. Northern Atlantic wet heaths with Erica tetralix; Wet heathland with cross-leaved heath
 - H4030. European dry heaths
 - H7130. Blanket bogs*
 - H7140. Transition mires and quaking bogs; Very wet mires often identified by an unstable 'quaking' surface
 - H91A0. Old sessile oak woods with Ilex and Blechnum in the British Isles.
- **Peak District Moors (South Pennine Moors Phase 1) SPA.** The SPA Qualifying Features are listed as follows:
 - A098 Falco columbarius; Merlin (Breeding)
 - A140 Pluvialis apricaria; European golden plover (Breeding)
 - A222 Asio flammeus; Short-eared owl (Breeding).

¹⁸ SSSI = Site of Special Scientific Interest; SAC = Special Area of Conservation; SPA = Special Protection Area.

3.1.3 *Locally Designated Sites*

3.1.3.1 WYES confirmed the presence of five Local Wildlife Sites (LWS) within 2 km of the site. All five of these sites are within 1 km of the site:

- Malkin House Wood located approximately 260 metres north-east of the site.
- Carr Green Meadows Holmbridge located approximately 570 metres north-west of the site.
- Yateholme Reservoirs and Plantations located approximately 695 metres south-west of the site.
- Digley Reservoir / Marsden Clough located approximately 725 metres south-west of the site.
- New Laithe Fields Holmbridge located approximately 850 metres north-west of the site.

3.1.4 *Other Non-Statutory Designations*

3.1.4.1 WYES confirmed the presence of several areas of Kirklees Wildlife Habitat Network (KWHN) within 2 km of the site; the mill pond within the site and the River Holme along the northern edge of the site are included within the KWHN.

3.1.4.2 WYES confirmed that there are no areas of woodland listed on the West Yorkshire Ancient Woodland Inventory within 2 km of the site.

3.1.5 *Species Records*

Amphibians

3.1.5.1 WYES provided no records of amphibians within 2 km of the site.

Reptiles

3.1.5.2 WYES provided two records of reptiles; both are over 100 years old and located over 1 km from the site (grass snake record dated 1913; and viviparous lizard record dated 1914).

Birds

3.1.5.3 WYES provided multiple records of birds within 2 km of the site. The only records within 500 metres of the site comprised barn swallow and goldfinch. No records of barn owl or kingfisher.

Invertebrates

3.1.5.4 WYES provided several records of notable invertebrates within 2 km of the site including several West Yorkshire Priority Species from grid reference SE12320694 approximately 260 metres west of the site.

Crustaceans

3.1.5.5 No records.

Brown hare

3.1.5.6 WYES provided four records of brown hare but none within 500 metres of the site.

Hedgehog

3.1.5.7 No records.

Water vole

3.1.5.8 No records.

Otter

3.1.5.9 No records.

Bats

3.1.5.10 WYES provided 84 records of bats comprising the following species: common pipistrelle, soprano pipistrelle, pipistrelle species, noctule, Leisler's, Daubenton's, whiskered, brown long-eared and unidentified bat. The following records are from within 500 metres of the site:

- A roost of 1 common pipistrelle bat within the site itself at grid reference SE1274707096, dated 01/06/2010.
- Field records of common pipistrelle, soprano pipistrelle, pipistrelle, noctule, Daubenton's and unidentified bat within the site itself at grid references SE1274707096 and SE127071, dated 18/08/2007 and 01/06/2010.
- Roost of pipistrelle at grid ref. SE1253007140 approximately 115 metres north-west of the site, dated 10/07/2007.
- Field records of common pipistrelle and unidentified *Myotis* species bat at grid reference SE1244207092 approximately 155 metres north-west of the site, dated 09/07/2013.
- 1 grounded unidentified bat at grid reference SE12470721 approximately 210 metres north-west of the site, dated 17/08/2007.
- Field records of common pipistrelle at grid reference SE128074 approximately 250 metres north-north-east of the site, 30/06/2008.
- Field record of 5 common pipistrelles at grid reference SE122068 approximately 350 metres west of the site, dated 06/09/2015.
- 1 adult unidentified bat in building at grid reference SE12540651, approximately 480 metres south of the site, dated 21/08/2003.
- Field record of 3 common pipistrelles at grid reference SE122067 approximately 350 metres south-west of the site, dated 06/09/2015.
- Maternity roost of common pipistrelle at grid reference SE1232306569 approximately 495 metres south-west of the site, dated 2010 - 2015.

Badger

3.1.5.11 WYES confirmed that there are no badger records within 200 metres of the site centre. The nearest sett record is approximately 773 metres from the centre of the site. The site falls within the area of increased probability of badger activity, as defined by WYES.

3.2 Habitats

3.2.1 Bare ground, hard standing and walls

3.2.1.1 The bare ground, hard standing and walls at the site are largely devoid of vegetation except for sparse vegetation comprising species such as silver birch *Betula pendula*, Yorkshire fog *Holcus lanatus*, red fescue *Festuca rubra*, red valerian *Centranthus ruber*, groundsel *Senecio vulgaris*, creeping bent *Agrostis stolonifera*, creeping buttercup *Ranunculus repens*, false oat-grass *Arrhenatherum elatius*, ribwort plantain *Plantago lanceolata*, spear thistle *Cirsium vulgare*, smooth sow-thistle *Sonchus oleraceus*, foxglove *Digitalis purpureum*, hart's-tongue fern *Asplenium scolopendrium*, common nettle *Urtica dioica*, sycamore *Acer pseudoplatanus*, ivy-leaved toadflax *Cymbalaria muralis* and creeping thistle *Cirsium arvense*.

3.2.2 Ephemeral / short perennial

3.2.2.1 Ephemeral / short perennial vegetation has become established on former bare ground in the eastern part of the site. Species present include common bent *Agrostis capillaris*, red fescue, spear thistle, broad-leaved dock *Rumex obtusifolius*, Yorkshire fog, butterfly bush *Buddleja davidii*, tufted hair-grass *Deschampsia cespitosa*, common ragwort *Senecio jacobaea*, silver birch, ribwort plantain, greater willowherb *Epilobium hirsutum*, rosebay willowherb *Chamerion angustifolium* and bramble *Rubus fruticosus* agg.

3.2.3 Semi-improved grassland

3.2.3.1 Semi-improved grassland at the site is unmown and supports species including cock's-foot, Yorkshire fog, yarrow *Achillea millefolium*, tufted hair-grass, red clover *Trifolium pratense*, creeping buttercup, common bent, ribwort plantain, creeping thistle, common ragwort, soft rush, grey willow,

bramble, foxglove, creeping bent, soft rush *Juncus effusus*, common mouse-ear *Cerastium fontanum* and white clover with toad rush *Juncus bufonius* present in waterlogged areas.

3.2.4 Broad-leaved trees and semi-natural woodland

3.2.4.1 Broad-leaved trees and semi-natural woodland is dominated by sycamore and goat willow *Salix caprea* with occasional ash *Fraxinus excelsior* and alder *Alnus glutinosa*. Where the trees form a closed canopy, the ground flora and shrub layer includes bramble, common nettle, male fern, cock's-foot, dog rose *Rosa canina*, opposite-leaved golden saxifrage *Chrysosplenium oppositifolium*, hogweed *Heracleum sphondylium*, tufted hair-grass, holly Ilex aquifolium, creeping buttercup and honeysuckle *Lonicera periclymenum*. Within the woodland in the southern part of the site (Target Note 1, Figure 3), a channel of flowing water upto approximately 30cm wide and 2-3cm deep flowed through the woodland.

3.2.5 Scrub

3.2.5.1 Scrub is abundant at the site and is generally dominated by grey willow *Salix cinerea*. Additional woody species present include bramble, ash, butterfly bush, silver birch and sycamore.

3.2.6 Open water (flowing)

3.2.6.1 The River Holme flows west to east along the site's northern boundary. At the time of the survey, the water was fast flowing with boulders and stones present and the channel held water approximately 6 metres wide and upto 50 cm deep. Species present at the margins include bramble, greater woodrush *Luzula sylvatica*, common nettle, greater willowherb, grey willow, sycamore, soft rush, rosebay willowherb, holly and pendulous sedge *Carex pendula*.

3.2.7 Open water (still)

3.2.7.1 The mill pond within the site extends to approximately 2400 square metres (part of this open water area is covered with scrub). No submerged vegetation was observed at the time of the survey. Species present at the margins include grey willow, soft rush, goat willow, hawthorn, purple loosestrife *Lythrum salicaria* and tufted hair-grass.

3.2.8 Invasive weeds

3.2.8.1 One invasive weed listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) (Sch 9 WCA) was recorded at the site: a small area of variegated yellow archangel *Lamium galeobdolon* subsp. *argenteum* is present to the south of the mill pond. The previous survey¹⁹ identified small areas of Japanese knotweed *Fallopia japonica*, Himalayan balsam *Impatiens glandulifera* and cotoneaster *Cotoneaster horizontalis* within the site and it is possible that an update survey during May-September would identify the continued presence of these Schedule 9 species within the site.

3.3 Great Crested Newt (GCN) Surveys

3.3.1 eDNA Survey

3.3.1.1 The eDNA survey result for the Mill Pond was negative (see Appendix 1) and it is considered that GCN are likely absent from the site.

3.3.1.2 Common toads are known to breed in the mill pond on the site.

¹⁹ Whitcher Wildlife Ltd. (2020). Hinchcliffe Mill, Holmfirth. OS Ref: Se 12721 07089. Extended Phase I Habitat Survey. Ref No: 200829. Date: 21st August 2020

3.4 Breeding Bird Surveys

- 3.4.1.1 During the PEA survey on 7th April 2021, a limited range of birds was observed including blue tit, blackbird, woodpigeon, feral pigeon, grey wagtail, wren, goldfinch, mallard, great tit, coal tit and robin.
- 3.4.1.2 The breeding bird survey results are shown in Table 3 below and in Appendix 2. Overall, 35 bird species were recorded during the surveys including five species listed on Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 as Species of Principal Importance for the conservation of biodiversity in England²⁰: bullfinch, dunnock, house sparrow, song thrush and starling. Of these, bullfinch (1 pair), dunnock (3-4 pairs) and song thrush (2 pairs) probably bred within the site. House sparrow and starling appear to nest in houses outside the site boundaries.
- 3.4.1.3 Five species which are Red listed as Birds of Conservation Concern²¹ (BoCC) were recorded: grey wagtail, house sparrow, mistle thrush, song thrush and starling. Of these, grey wagtail (1 pair) and song thrush (2 pairs) possible/probably bred within the site. Five Amber list species were recorded: bullfinch, dunnock, dipper, mallard and willow warbler.
- 3.4.1.4 Overall, the site supports a typical mix of farmland, woodland, wetland and urban fringe species. No species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) such as kingfisher or barn owl were recorded.
- 3.4.1.5 No species listed as Qualifying Features for Peak District Moors (South Pennine Moors Phase 1) SPA (merlin; European golden plover; short-eared owl) were recorded within or adjacent to the site during the surveys.

Table 3. Breeding Bird Survey Results

BTO code	Common name	Notes	BoCC ²¹ / S41 NERC Act ²²
B	Blackbird	4-5 pairs probably bred within the site	
Bc	Blackcap	1 pair possibly bred within the site	
Bf	Bullfinch	1 pair probably bred in the woodland in the southern part of the site	BoCC Amber List / S41 NERC Act
Bt	Blue tit	3-4 pairs probably bred within the site	
Bz	Common buzzard	Did not breed within the site. Seen overhead once.	
Ch	Chaffinch	2-3 pairs probably bred within the site	
C	Carrion crow	1-2 pairs probably bred in trees within the site	
Cc	Chiffchaff	4-5 pairs probably bred within the site	
Cg	Canada goose	Did not appear to breed within the site. Pair seen on the mill pond once.	
Ct	Coal tit	1 pair possibly bred within the site	

²⁰ Species / Habitats listed on Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 as Species of Principal Importance for the conservation of biodiversity in England.

²¹ Amber / Red List as defined in: Eaton, M.A., N.J. Aebischer, A.F. Brown, R.D. Hearn, L. Lock, A.J. Musgrove, D.G. Noble, D.A. Stroud & R.D. Gregory. 2015. Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. British Birds 108: 708-746.

²² Species listed on Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 as Species of Principal Importance for the conservation of biodiversity in England.

BTO code	Common name	Notes	BoCC²¹ / S41 NERC Act²²
D	Dunnock	3-4 pairs probably bred within the site	BoCC Amber List / S41 NERC Act
Di	Dipper	1 pair probably bred on the River Holme within approx 200 metres of the site	
Fp	Feral pigeon	Several pairs confirmed breeding within the old mill building on the site	
Gj	Greylag goose	Did not breed within the site. Seen overhead once.	
Gl	Grey wagtail	1 pair possibly bred within the site	BoCC Red List
Go	Goldfinch	3 pairs probably bred within the site	
Gt	Great tit	1-2 pairs probably bred within the site	
Gr	Greenfinch	2-3 pairs probably bred within the site / immediately adjacent to the site	
Hs	House sparrow	Nests in houses outside the site to the south and north.	BoCC Red List / S41 NERC Act
J	Jay	Did not appear to breed within the site. Likely breeds outside the site.	
Jd	Jackdaw	1-2 pairs possibly bred within the site. Several pairs bred in buildings outside the site. Max flock size 14 on site edge.	
Lt	Long-tailed tit	Did not appear to breed within the site. Likely breeds outside the site.	
Ma	Mallard	2-3 pairs confirmed breeding within the site	BoCC Amber List
Mh	Moorhen	1 pair probably bred within the site	
Mt	Mistle thrush	1 pair probably bred just outside the site	BoCC Red List
Ph	Common pheasant	1 pair possibly bred within the site. 1-2 further pairs just outside the site	
R	Robin	4-5 pairs probably bred within the site	
Rv	Raven	Did not breed within the site. Seen overhead once.	
St	Song thrush	2 pairs probably bred within the site	BoCC Red List / S41 NERC Act
Sg	Starling	Nests in houses outside the site to the south and north. Regularly observed passing over the site	BoCC Red List / S41 NERC Act
Sk	Siskin	1 pair probably bred within the site.	
Sl	Barn swallow	Did not breed within the site. Seen flying over fields to south-east of the site.	
Wp	Woodpigeon	4-54 pairs probably bred within the site	
Wr	Wren	5-6 pairs probably bred within the site	

BTO code	Common name	Notes	BoCC ²¹ / S41 NERC Act ²²
Ww	Willow warbler	3 pairs probably bred within the site	

3.5 Bats

- 3.5.1.1 Previous surveys undertaken at the site¹⁹ identified two common pipistrelle bats entering and leaving from the eaves in the north-west corner of the mill building on 24th June 2010. During a dusk emergence survey on 15th September 2010, two common pipistrelle bats were seen to emerge from two separate locations behind the gutter at the south-west corner of the building¹⁹. On 6th September 2017, bat droppings were found scattered on the first floor of the mill building and this was attributed to bats foraging within the building¹⁹. The previous report²³ states that during a dusk emergence survey on 6th September 2017, 3x common pipistrelle bats emerged from the eaves of the mill building; one at the south-east corner of the building; two from above the fifth window on the west side; one from the eaves at the southern end (it is noted that this totals 4 bats; not 3). On 6th September 2017, a high level of common pipistrelle foraging activity was recorded around the mill building (including bats flying in and out through the mill windows) and Daubenton's bats were recorded foraging along the river. During a dawn survey on 22nd September 2017¹⁹, no bats were seen to enter or exit the mill building. During a daytime inspection survey on 17th August 2020¹⁹, no evidence of bats was observed within the building or on the exterior. During a dusk emergence survey on 17th August 2020¹⁹, a high level of common pipistrelle foraging activity was observed, particularly around the mill itself; two common pipistrelle bats emerged from the south-west corner of the mill (one emerged from the eaves between the 3rd and 4th windows on the western side of the mill and one possibly emerged from the north-west corner of the mill).
- 3.5.1.2 During the survey on 7th January 2021, no evidence of bats was identified at the site. The mill building remains as previously described, i.e. a large derelict two/three storey stone building (approx 50 x 17 metres) with a hipped-gable roof covered with stone-slates and lined with a lath-and-plaster lining. There are multiple direct flight paths to the interior of the building via broken windows and open doorways. There are multiple potential bat roost features within the roof structure, e.g. gaps at the eaves and gaps beneath roof stone-slates. The masonry is generally well-sealed otherwise, although there a small number of potential bat roost features within areas of external masonry and in gaps over doorways etc.
- 3.5.1.3 The mill building is considered to be a confirmed bat roost, with a maximum of 4x common pipistrelle bats having been recorded roosting in the building in 2017.
- 3.5.1.4 The walls alongside the River Holme and along the south side of the mill pond provide potential bat roost features. The walls elsewhere at the site appear to be unsuitable for roosting bats due to the absence of suitable roost features. The bridge over the River Holme to the north of the mill building could also support bat roosts, although it was not possible to safely inspect the underside of the bridge on 7th January 2021 due to health and safety considerations.

3.6 Otter and Water Vole

- 3.6.1.1 Despite specific searches and static video camera surveys, no evidence of otter or water vole was observed within or adjacent to the site.

4 Evaluation and Potential for Impacts

4.1.1.1 The valuation of the nature conservation interest of the ecological features present on the site and whether or not they are subject to detailed impact assessment is summarised in Table 1 below.

Table 1. Summary of Evaluation of Nature Conservation Interest and Potential for Impacts

Receptor	Evaluation Rationale	Value of receptor or Value of site to receptor	Potential for Impact	Subject to detailed assessment
Designated sites:				
Rake Dike SSSI	Geological SSSI – therefore scoped out	n/a	n/a	No
Dark Peak SSSI	Designated for its national value. 1.93 km from site. No SSSI bird species recorded during breeding bird surveys at the site.	National	No – distance and lack of connectivity.	No
South Pennine Moors SAC	Designated for its international value.	International	No – distance and lack of connectivity.	No
Peak District Moors (South Pennine Moors Phase 1) SPA	Designated for its international value. 1.93 km from site. No SPA Qualifying Species recorded during breeding bird surveys at the site.	International	No – distance and lack of connectivity.	No
Local Wildlife Sites	Designated for their local value.	District	No – distance and lack of connectivity.	No
Kirklees Wildlife Habitat Network (KWHN)	Designated for local wildlife value. The mill pond and River Holme are included within KWHN but rest of site is not.	Local	No – development layout avoids impacts to mill pond and River Holme.	No
Habitats:				
Bare ground, hard standing and walls	Common, widespread and easily recreated.	Less than local	Yes – direct habitat loss	No, due to low value
Ephemeral / short perennial	Common, widespread and easily recreated.	Less than local	Yes – direct habitat loss	No, due to low value
Semi-improved grassland	Common, widespread and easily recreated.	Less than local	Yes – direct habitat loss	No, due to low value
Broad-leaved trees and semi-natural woodland	Common, widespread and easily recreated.	Less than local	Yes – direct habitat loss	No, due to low value
Scrub	Common, widespread and easily recreated.	Less than local	Yes – direct habitat loss	No, due to low value

Receptor	Evaluation Rationale	Value of receptor or Value of site to receptor	Potential for Impact	Subject to detailed assessment
Open water (flowing)	Habitat of Principal Importance – Section 41 of NERC Act 2006 ²² .	Local	No	No
Open water (still)	Habitat of Principal Importance – Section 41 of NERC Act 2006.	Local	No	No
Fauna:				
Great crested newt	Absent	n/a	No	No
Birds	Three Section 41 species ²² bred on the site: bullfinch (1 pair), dunnock (3-4 pairs) and song thrush (2 pairs).	Less than local	Yes – direct habitat loss	Yes
Bats	Roost of upto 4 common pipistrelle bats in the Mill Building on the site. Trees, woodland and wetland habitats likely to be of moderate value for foraging/commuting bats.	Less than local	Yes – direct loss of bat roost. Potential for disturbance of foraging/commuting bats	Yes
Common toad	Breeds in mill pond (Section 41 NERC Act species ²²).	Less than local	No impacts to mill pond.	No
Hedgehog	Hedgehog could occur within the site (Section 41 NERC Act species ²²).	Less than local	Yes – direct habitat loss for hedgehog	Yes

4.1.1.2 Therefore, the following ecological receptors are taken forward for further assessment:

- Birds.
- Bats.
- Hedgehog.

5 Likely Significant Effects

5.1.1.1 The proposed development has been designed so as to minimise potential ecological impacts via the following measures:

- Mill pond is to be retained in full.
- No impacts on River Holme.
- No artificial lighting of the mill pond or River Holme.
- Majority of trees and woodland to be retained in situ.

5.1.1.2 Activities which could affect the identified ecological receptors comprise the following:

- Direct removal of trees and scrub.
- Renovation of mill building (bat roosts and nesting birds).
- Disturbance from artificial lighting.

5.1.1.3 The potential impacts on the identified ecological receptors resulting from these activities are assessed below. Mitigation is then considered before an assessment of residual impacts.

5.1.1.4 This assessment is based on the following information:

- Overall Site Plan (drawing no. 3372 (0-) 612 L, dated 17.05.2021).

5.2 Construction Phase

5.2.1.1 Impacts during the construction phase comprise the following:

- Direct removal of trees and scrub
- Renovation of mill building (bat roosts and nesting birds).

5.2.1.2 These impacts are assessed below.

5.2.2 Direct removal of trees and scrub

5.2.2.1 The development will result in the loss of approximately 0.11 ha of trees and scrub. The Biodiversity Net Gain Calculations are shown in Section 6 below. The potential for impacts on birds, bats and hedgehogs is assessed below.

5.2.3 Birds

5.2.3.1 The removal of vegetation at the site will result in the loss of habitat for a number of common and widespread bird species. In terms of species listed on Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 as Species of Principal Importance for the conservation of biodiversity in England and BoCC Red and Amber List species this habitat loss is predicted to result in the loss of habitat for 1 pair of dunnock and 1 pair of willow warbler. The habitats of all other S41 / Red / Amber List species are to be retained as part of the development proposals.

5.2.3.2 In the absence of mitigation, the impact on breeding birds is not predicted to be significant at the site level. However, legal compliance mitigation measures to protected nesting birds are presented below.

5.2.4 Bats

5.2.4.1 The development will result in the loss of a roost of upto 4 common pipistrelle bats. In the absence of mitigation, this impact could be significant at the site level.

5.2.4.2 Given the retention of the wetland habitats and the vast majority of trees and woodland, the impacts of habitat loss on bat foraging and commuting bats are not predicted to be significant at the site level.

5.2.5 *Hedgehog*

- 5.2.5.1 The removal of vegetation at the site will result in the loss of habitat which could be used by hedgehog; a species listed on Section 41 of the NERC Act 2006 as a Species of Principal Importance for the conservation of biodiversity in England.
- 5.2.5.2 In the absence of mitigation, the impact could be significant at the site level.

5.3 *Operational Phase*

- 5.3.1.1 Impacts during the operational phase comprise the following:

- Disturbance of bats from artificial lighting.

- 5.3.1.2 This impact is assessed below.

5.3.2 *Disturbance from Artificial Lighting*

- 5.3.2.1 Increased disturbance from artificial lighting could affect nocturnal fauna including bats which use the wetland, tree and scrub habitats at the site for foraging and commuting purposes.
- 5.3.2.2 Current guidelines on bats and artificial lighting²³ state: *“Artificial night lighting is disturbing to many bat species, including some of our rarest and most vulnerable bat species. Some fast-flying bats, such as common and soprano pipistrelle bats, are more tolerant of light and feed on the insect congregations around street lamps. However, this exposes the bats to predation...”*
- 5.3.2.3 In the absence of mitigation, the impact of disturbance from lighting on bats could be significant at the site level, in the absence of mitigation.

5.4 *Mitigation Measures*

5.4.1 *Construction Environmental Management Plan (CEMP)*

- 5.4.1.1 In order to protect habitats, species and the KWHN, it is recommended that a Construction Environmental Management Plan (CEMP) should be prepared. The CEMP should include the following measures:

1. Minimisation of Vegetation Removal: The removal of trees, woodland and scrub will be minimised as far as practicable by minimising working areas.
2. Schedule 9 Invasive Weed Management Plan: An Invasive Weed Management Plan will be prepared in order to prevent the illegal spread of Variegated Yellow Archangel within and beyond the site.
3. Minimisation of Dust and Noise: Standard measures should be employed to minimise dust and noise; potentially involving sheeting to minimise dust entering the mill pond and River Holme from the construction site.
4. Protection of Bat Roosts.
5. Protection of Nesting Birds.

5.4.2 *Tree Planting*

- 5.4.2.1 New tree planting will be undertaken at the site comprising native species of local provenance.

5.4.3 *Protection of Bat Roosts*

- 5.4.3.1 A European Protected Species Mitigation (EPSM) licence will be required to allow an activity to occur that would otherwise be classed as unlawful i.e. damage/destruction of bat roosts in the mill building and/or disturbance of individual bats. Natural England can issue bat EPSM licences for this purpose

²³ Bat Conservation Trust (2011). Statement on the impact and design of artificial light on bats, May 2011.

on application and presentation of evidence-based mitigation. Before issuing a licence, Natural England will need to be satisfied that the following '3 tests' are met (this will include measures to minimise impacts on bats through design/mitigation/timings etc.):

1. That the action is for the purpose of preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature;
2. that there is no satisfactory alternative; and
3. that the action authorised will not be detrimental to the maintenance of the species concerned at a favourable conservation status in their natural range.

5.4.3.2 It is considered that the proposed development could proceed using standard mitigation measures to ensure legal compliance and to maintain the favourable conservation status of bats at the site. It is considered likely that Natural England would issue an EPSM licence for the development.

5.4.4 Protection of Nesting Birds

5.4.4.1 Any works affecting potential bird nesting habitat will be undertaken outside the main bird nesting period of 1st March to 31st August where possible. If works affecting vegetation or built structures is unavoidable during this period, a nesting bird check must be undertaken by a suitably qualified ecologist no more than 48 hours prior to the start of such works. In the event that an 'in use' bird nest is present or likely to be present, it must be retained in situ undisturbed until the nest is no longer in active use. A nest is classed as 'in use' when it contains eggs or chicks and when it is being built.

5.4.5 Provision of Bat Boxes and Bird Nest Boxes

5.4.5.1 In order to provide permanent bat roosting and bird nesting opportunities at the site, it is recommended that the following boxes should be installed at the site:

- Minimum of 4x bat boxes to be attached to the mill building
- Minimum of 4x bat boxes to be attached to retained trees at the site.
- Minimum of 4x house sparrow nesting terraces.
- Minimum of 4x swift bricks to be installed in the mill building.
- Minimum of 4x open-fronted bird nest boxes to be attached to retained trees.
- Minimum of 4x hole-entrance bird nest boxes to be attached to retained trees.

5.4.6 Lighting Design

5.4.6.1 In accordance with current guidelines²³, the following measures will be adopted as part of the detailed lighting design for the development:

- Retain the following areas as 'Dark Corridors' for bats:
 - Mill Pond.
 - River Holme.
 - All retained trees and woodland.
- Use narrow spectrum bulbs to lower the range of species affected by lighting; and
- Reduce light-spill so that light reaches only areas needing illumination. Shielding or cutting light can be achieved through the design of the luminaire or with accessories, such as hoods, cowls, louvers and shields to direct the light; and
- Limit the times that lights are on to provide some dark periods for wildlife.

5.4.7 Hedgehog

5.4.7.1 In order to enable hedgehogs to maintain territories at the site and move freely, hedgehog gaps will be installed at the base of new garden walls/fences.

5.4.8 Update Surveys

5.4.8.1 Depending on the proposed construction start date, update surveys for protected species (bats and nesting birds) will be undertaken as necessary.

5.5 *Residual Effects*

- 5.5.1.1 Given the proposed mitigation measures, it is considered that there will be no significant adverse effects on ecological receptors.

6 Net Gain for Biodiversity

6.1 *Methodology*

- 6.1.1.1 The current version of the DEFRA Biodiversity Metric²⁴ has been used to calculate the baseline value of the site (before development) and the post-development value in order to calculate the Total Net Unit Change.

6.2 *Results*

- 6.2.1.1 The development will result in a Total Net Unit Change of -2.81 Habitat Units (loss).

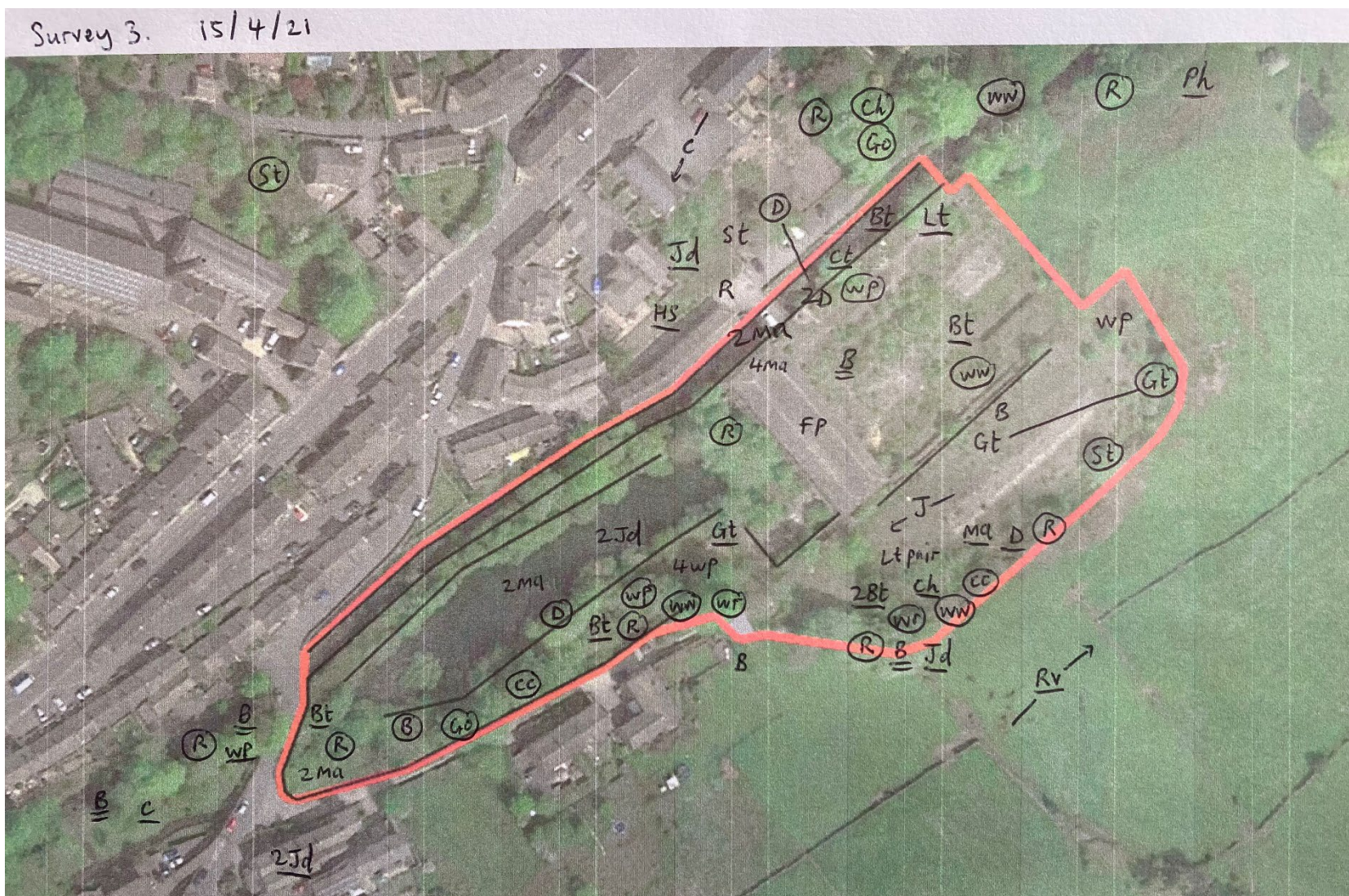
²⁴ DEFRA Biodiversity Metric 2.0 (JP029) <http://nepubprod.appspot.com/publication/5850908674228224>

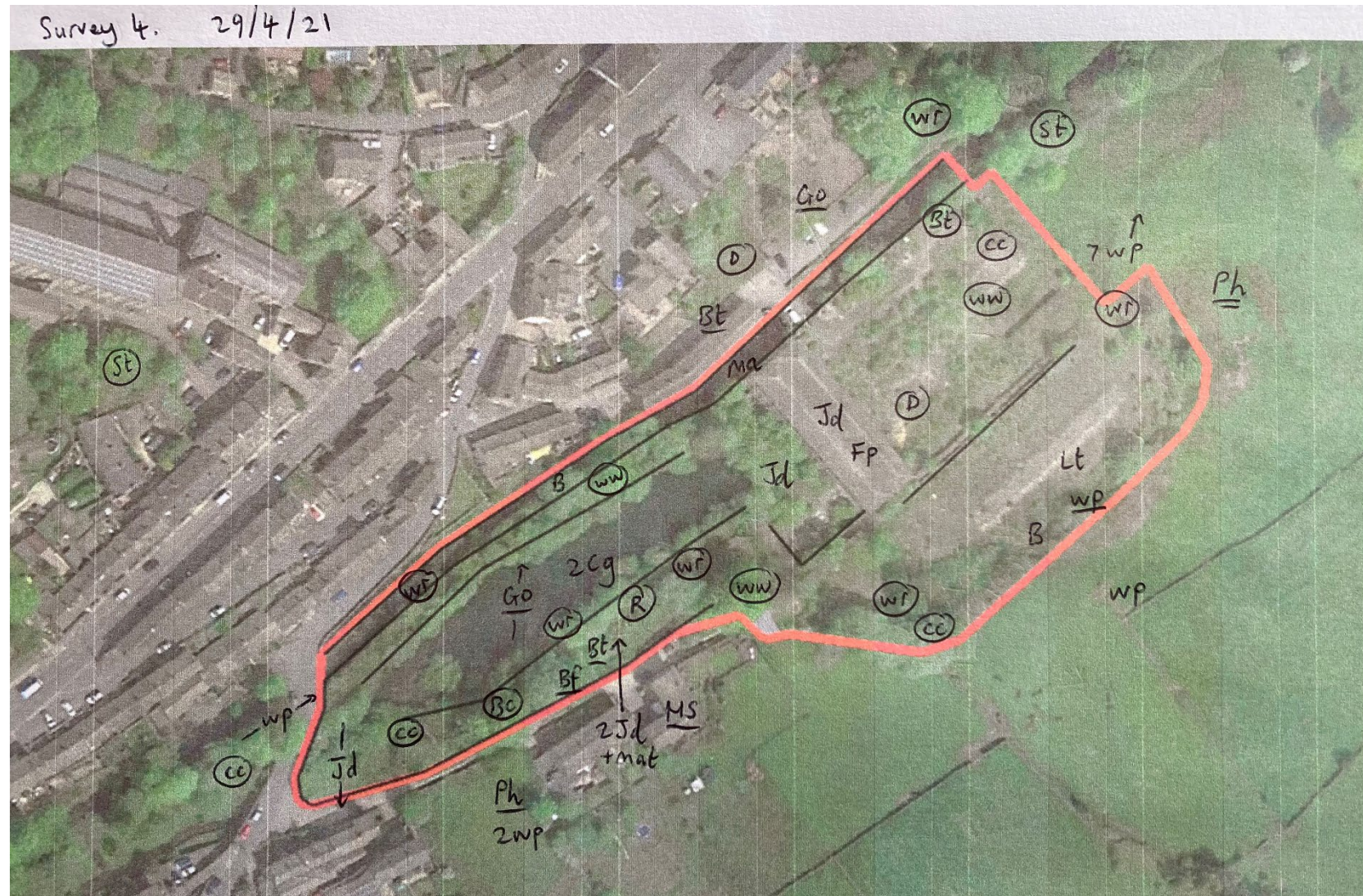
Appendix 1. eDNA Technical Report (Mill Pond)

Appendix 2. Breeding Bird Survey Results











Folio No: E9210
Report No: 1
Purchase Order: 1507
Client: QUANTS ENVIRONMENTAL
Contact: Toby Fisher

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: 16/04/2021
Date Reported: 25/04/2021
Matters Affecting Results: None

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
1516	Hinchliffe Mill	SE126 070	Pass	Pass	Pass	Negative	0

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

Reported by: Chris Troth

Approved by: Chris Troth



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.

