Hope ARM Import and Storage Facility

Ecology Baseline Report

Appendix 7.1

August 2020

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BSG | ecology

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Client	Breedon Cement Limited
Project	Hope ARM Import and Storage Facility, Ecology Baseline Report
Version	FINAL
Project number	P18-451 Hope Cement Works Ecology Baseline Report

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Contents

1 Summary

1.1 BSG Ecology was commissioned by Wardell Armstrong LLP on behalf of Breedon Cement Ltd on 11 June 2018 to carry out a series of ecological surveys on land within the existing Breedon cement works at Hope, Derbyshire (the Site). The purpose of the surveys is to provide an ecological baseline to inform a planning application submission for a Proposed development within the Site.

1.2 The Site is 2.70 ha in extent and lies wholly within the existing cement works. The planning application is for the construction of new rail loading facilities, closed conveyors, a bulk storage facility and transfer tower to enable the import of a range of Alternative Raw Materials (ARM's) by rail and road.

1.3 This report presents the methods and results of baseline ecology survey work to inform a formal ecological impact assessment of the Proposed development at the Site as part of an Environmental Assessment under The Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

1.4 The scope of the baseline surveys is based on extended Phase 1 habitat survey undertaken in 2018 and 2019 and a desk study carried out in July 2018. Further surveys undertaken subsequent to the outcome of the extended Phase 1 habitat surveys are a preliminary bat roost assessment of trees, bat activity survey, climbed inspection survey of trees and great crested newt survey. Environmental DNA (e-DNA) sampling in relation to great crested newt was undertaken for selected ponds in 2018 (Pond 1 only) and 2020 (Ponds 1, 4, 5, 6 and 7).

1.5 There are no statutory or non-statutory designated sites within or adjacent to the Site; the closest statutory site is Dirtlow Rake and Pindale Site of Special Scientific Interest (SSSI) which is 177 m west of the Site. Hadfields Quarry Derbyshire Wildlife Trust nature reserve also lies 113 m west of the Site.

1.6 The main habitats present at the Site are hard-standing, amenity grassland, buildings, immature mixed plantation woodland, ephemeral and tall ruderal vegetation, introduced trees and shrubs and scrub. None of the habitats is considered to meet the definition of a Habitat of Principal Importance (NERC Act, 2006).

1.7 The results of surveys have found that the Site supports the following protected species: foraging and commuting bats. The Site also supports localised habitat areas suitable for use by hedgehog, which is a Species of Principal Importance in England. One tree within the Site has bat roost potential. Habitats (trees, shrubs and scrub) within the Site are suitable for nesting birds.

2 Introduction

Background to commission

2.1 BSG Ecology was commissioned by Wardell Armstrong LLP on behalf of Breedon Cement Ltd on 11 June 2018 to carry out a series of ecological surveys on land within the existing Breedon cement works at Hope, Derbyshire (the Site). The purpose of the surveys is to provide an ecological baseline to inform a planning application submission for the Proposed development within the Site.

Site description

2.2 The Site location and boundary, 2.70 ha, is shown on Figure 1[1]. The Site supports hard-standing, amenity grassland, buildings, immature mixed plantation woodland, ephemeral and tall ruderal vegetation, introduced trees and shrubs and scrub. The Site is located to the south of Pindale Road, Hope, Derbyshire and is centred at OS grid reference SK 16455 82514.

Description of project

2.3 Breedon Cement Ltd is preparing a planning application submission for the construction of new rail loading facilities, closed conveyors, a bulk storage facility and transfer tower to enable the import of a range of Alternative Raw Materials (ARM's) by rail.

Scope of this report

2.4 This ecology report presents the methods and results of desk based studies and baseline ecology survey work relating to the Site undertaken primarily between June 2018 and July 2019; subsequent eDNA sampling of selected ponds and associated analysis was undertaken in May 2020. The scope of the ecology survey work is based on the outcome of desk study and extended Phase 1 habitat survey in 2018 that was subsequently updated in 2019 (based on proposed scheme design iterations).

2.5 The overall aim of the baseline surveys is to provide the ecology baseline information relevant and necessary to inform a formal ecological impact assessment for the Proposed development at the Site as part of an Environmental Assessment under The Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

2.6 The objectives of the report are as follows:

- To establish whether any statutory or non-statutory designated sites are present within or close to the Site, and to provide a summary of their wildlife interest.
- To map and describe the habitats present within the Site.
- To determine the potential of the Site to support protected and/or notable species.
- To determine whether any protected and/or notable species or species groups are present at the Site and to provide information on their distribution within and their use of the Site.
- To provide an interpretation of the desk study and field survey outcomes to inform the ecological impact assessment.

2.7 Given the sensitive nature of badger records, these are provided in a separate report which is available upon request. The survey methodologies and results are provided within that document.

[1] Wardell Armstrong drawing entitled Application boundary (reference number NT14126/100/001) dated April 2020.

3 Consultation & Liaison

Peak District National Park Authority

3.1 Hazel Crowther, Ecology officer at Peak District National Park Authority, provided comments in the Pre-Application Advice (Enquiry Reference ENQ/35840, dated 30 August 2019) with regards to the ecology survey requirements.

Breedon Cement Ltd

3.2 There has been regular and frequent liaison with key Breedon Cement Ltd personnel, specifically Keith Rowland (Quarries Development Manager), in relation to his existing knowledge of the Site and the Breedon Cement Ltd landholding.

Derbyshire Wildlife Trust

3.3 Liaison has been undertaken with Derbyshire Wildlife Trust in relation to the data search elements of the desk study and specifically in relation to existing great crested newt records for Hadfield's Quarry nature reserve.

Client project team

3.4 There has been regular and frequent liaison with relevant members of the project team led by Wardell Armstrong Ltd throughout the design stages of the Proposed development.

4 Methods

Desk study

4.1 A desk study was carried out which included a data trawl to determine the presence of any protected and/or notable species records or designated non-statutory sites of conservation value (such as Local Wildlife Sites) within a 2 km radius from the centre of the Site. Derbyshire Wildlife Trust (DWT) was contacted to supply this information, which was received on 4 July 2018. Samantha Willis (DWT Reserves Officer) was contacted to supply information on great crested newt records for Hadfield's Quarry DWT reserve which was received on 2 July 2019.

4.2 Publically available aerial photographs and mapping (Google Maps and OS Maps, accessed 10 July 2018 and subsequently 4 March 2019) of the Site and its surroundings were reviewed to identify ponds within 500 m of the Site and assist in the characterisation of buildings and habitats within the Site. The Multi-Disciplinary Agency for Geographical Information in the Countryside (MAGIC) was consulted for the presence of statutory designated sites within 5 km of the Site and European Protected Licences (EPSL) granted within 2 km of the Site.

Field survey

4.3 All surveys were undertaken with reference to relevant survey methodologies for habitats or species. The reference sources used are cited in the following paragraphs.

Extended Phase 1 habitat survey

4.4 Ecologist Emily Moore Grad CIEEM and Senior Ecologist Sophie Olejnik undertook an extended Phase 1 habitat survey of the Site on 27 July 2018. The weather was warm and dry with a temperature of 25^{o}C and sparse cloud cover. The Site was walked over and the habitats were described and mapped (see Figure 1) with reference to current standard guidelines for Phase 1 habitat survey (JNCC, 2010).

4.5 The survey was extended to include an assessment of the habitats present to determine their suitability for supporting protected species. This also included making searches for any incidental signs of protected species such as nesting birds. Habitats within the Site were also assessed for their suitability to potentially support reptiles, birds and great crested newt *Triturus cristatus*.

4.6 Potential nesting habitats for breeding birds were identified and any incidental sightings of birds were noted. The Site was also searched for the presence of invasive non-native plant species, such as Japanese knotweed *Fallopia japonica* and Himalayan balsam *Impatiens glandulifera*.

4.7 The Phase 1 habitat survey data were updated by Sophie Olejnik which involved a further site survey visit on 30 May 2019. This was because of changes to the Proposed development design.

Bat survey

Preliminary bat roost assessment of trees and buildings

4.8 An assessment of the bat roosting potential of trees within the Site was made by the use of close-focussing binoculars from ground level. The trees were inspected for potential roost features (PRF) suitable for use by bats (such as knot holes, woodpecker holes, loose bark and splits) with reference to the Bat Conservation Trust survey guidance, in particular Chapter 6 (Collins, 2016) and BTHK (2018).

4.9 A preliminary bat roost assessment of all buildings within the Site boundary was also undertaken. The exteriors of all the buildings were inspected from ground level for evidence of bats or potential bat access points with reference to Bat Conservation Trust guidance (Collins, 2016; in particular

Chapter 7). Building 1 was also inspected internally; however access was not possible for Building 2.

4.10 The trees and buildings were assigned a category for their potential to support roosting bats based on the presence of potential roosting features as summarised in Table 1.

Table 1: Tree/structure potential to support roosting bats (adapted from Collins, 2016)

Suitability	Roosting habitat
Negligible	A tree/structure with no or negligible potential roost features (PRFs), which is isolated from suitable foraging habitat.
Low	A tree/structure with one or more PRFs which have a very limited potential to be used by individual opportunistic bats. Any identified features do not have the correct dimensions or conditions and/or are not connected to suitable foraging habitat that could be used by a larger number of bats.
Moderate	A tree/structure with one or more PRFs which could be used by bats because of their dimension and conditions. However these features are unlikely to support a roost of high conservation status with respect to roost type only. The tree may also have PRFs which are obscured or not possible to survey from the ground level. The surrounding habitat is continuous and/or well connected to the wider landscape.
High	A tree/structure with one or more PRFs which are obviously suitable for use by a larger number of bats on a more regular basis and potentially for longer periods of time, due to their dimensions and conditions. The surrounding habitat is high quality, continuous and/or well connected to the wider landscape.
Confirmed roost	Presence of bats or evidence of recent use by bats.

Climbed tree inspection

4.11 Trees which were allocated as having low or higher bat roost potential were further subjected to a climbed inspection by a suitably qualified[2] ecologist with a Natural England bat licence. Sophie Olejnik and Emily Moore (Level 2 Class Licence ref: 2018-35792-CLS-CLS), both qualified tree climbers undertook the climbed inspection on 31 July 2019.

Emergence survey of B1

4.12 One building (B1) was identified to have low bat roost potential. Buildings assigned as having low bat roost potential are recommended to have one dusk emergence survey undertaken during the active period for bats (May to September) (Collins, 2016).

4.13 A dusk emergence survey of B1 was undertaken by Senior Ecologists Daniel Foster (Level 2 Class Licence ref: 2015-14980-CLS-CLS) and Sophie Olejnik on 1 August 2019. The weather conditions were dry, temperature of 18ºC falling to 16ºC and a light breeze. The survey started at 20:50 and ended at 22:33. Sunset was at 21:03. Figure 2 shows the locations of the surveyors.

4.14 A combination of heterodyne, time expansion and frequency division bat detectors were used to aid bat identification in the field. Each surveyor recorded calls so that species could later be confirmed by studying sonograms with appropriate computer software.

4.15 Prior to the commencement of the dusk emergence bat survey, B1 was re-inspected for any evidence of bats such as bat droppings associated with the identified suitable bat roosting features. Any signs of nesting birds were also recorded at this time.

Great crested newt survey

4.16 Waterbodies within 500 m of the Site boundary were assessed for their potential to support great crested newt *Triturus cristatus*, and a Habitat Suitability Index (HSI) assessment (Oldham et al,

[2] To CS38 or equivalent.

2000) was undertaken either in 2018 or 2020. The Habitat Suitability Index (HSI) scoring method is a quantitative means of evaluating habitat quality for great crested newts using ten suitability indices. These suitability indices are:

a. UK location
b. Pond surface area
c. No. of years out of 10 in which the pond dries out
d. Water quality
e. Percentage shade
f. No. of waterfowl
g. Presence of fish
h. No. of ponds within 1 km
i. Area of suitable terrestrial habitat within 500 m and accessibility of this habitat
j. Percentage of macrophyte cover.

4.17 The HSI provides a numerical index between 0 and 1 where 0 indicates very poor habitat with minimal probability of great crested newt occurrence and 1 represents optimal habitat with a high probability of occurrence. A score of ≥ 0.5 is considered indicative that the pond contains features that are likely to be suitable to support a population of great crested newt.

eDNA Survey

4.18 Great crested newt DNA is released into aquatic environments through shed skin cells, urine, faeces and saliva. It can persist in water for several weeks and can be collected. A test has been developed for detecting the eDNA of the species which can be an effective way to determine presence or absence of great crested newt.

4.19 Principal Ecologist Jim Fairclough MCIEEM and Emily Moore, both of whom hold a Natural England great crested newt scientific survey licence (2015-11221-CLS-CLS and 2015-17866-CLS-CLS respectively), undertook eDNA sample collection from Pond 1 (P1) located on 26 June 2018. At the time the 2018 sampling was undertaken Pond 1 was 274 m east of the Site, however, following an application boundary change (as shown on drawing reference NT14126/100/001Wardell Armstrong, April 2020), the pond is now 230m east of the Site.

4.20 On 20 April 2020 Senior Ecologist Daniel Foster MCIEEM, who holds a Natural England great crested newt scientific survey licence (2015-19152-CLS-CLS), undertook eDNA sample collection from Pond 1 (P1, located 230 m east of the Site), Pond 4 (P4, located 202 m south west of the Site), Pond 5 (P5, located 180 m south west of the Site), Pond 6 (P6, located 165 m south west of the Site) and Pond 7 (P7, located 12 m north east of the Site).

4.21 All named BSG Ecology personnel above have received training in the collection of eDNA samples, The sample collection followed ADAS's eDNA sample protocol and is in accordance with the published methodology (Biggs *et al*., 2014).

4.22 In 2018, following collection of the eDNA samples, the kits were returned to the laboratory on 27 June 2018. In 2020, following collection of the eDNA samples, the kits were returned to the laboratory on 22 April 2020.

4.23 eDNA analysis was carried out in accordance with the published methodology (Biggs *et al*, 2014), and the results were reported back to BSG Ecology in 2018 on 10 July 2018 and in 2020 on 23 April 2020.

Limitations to methods

4.24 Internal access to Building 2 was not possible during the preliminary bat roost assessment due to a lack of landowner permission. However, Building 2 is considered to have no bat roost potential and is unlikely to be directly or indirectly impacted by the proposed works so this was not considered to be a significant constraint to the assessment.

4.25 In 2018 access was not available to the waterbodies P4, P5 and P6 within Hadfields Quarry Derbyshire Wildlife Trust nature reserve to assess the habitat suitability of the ponds for great crested newt. This is not considered to be a significant constraint because the ponds were subsequently accessed for HSI during 2020 and for eDNA sampling.

5 Results and Interpretation

Designated sites

Statutory designated sites

5.1 There are 16 statutory designated sites within 5 km of the Site, 14 of which are Sites of Special Scientific Interest (SSSI), one is a Special Protection Area (SPA) and one is a Special Area of Conservation (SAC). The location, designation and description for each site are described in Table 2.

Table 2: Statutory designated sites within the desk study area

Site name	Designation	Distance from the Site	Description
Dirtlow Rake and Pindale	SSSI	177 m west	Notified for geological interest.
South Lee Meadows	SSSI	225 m south-east	South Lee Meadows SSSI supports a nationally important example of unimproved seasonally-inundated floodplain grassland.
Castleton	SSSI	1.37 km west	Notified for geological interest and species-rich grassland.
Bradwell Dale and Bagshaw Cavern	SSSI	1.2 km south	Notified for geological interest.
Bradwell Meadows	SSSI	1.65 km south	These grasslands are among the very few remaining unimproved hay meadows in the Peak District. Throughout the site there is a complex pattern of grassland types which exhibit a considerable variation in species composition. The swards are classified as neutral grasslands although there are local influences which produce patches of a more calcareous nature.
Hallam Barn Grasslands	SSSI	2.2 km north-east	Hallam Barn Grasslands SSSI is a nationally important site for its lowland unimproved neutral grassland, comprising the nationally scarce National Vegetation Classification (NVC) type MG5 crested dog's-tail *Cynosurus cristatus* – common knapweed *Centaurea nigra* grassland.

Site name	Designation	Distance from the Site	Description
Oxlow Rake	SSSI	3.1 km south-west	Oxlow Rake is one of the largest remaining areas of vegetated lead rakes in the South Pennines, where an open vegetation characteristic of substrates rich in heavy metals occurs. On areas of lower toxicity, parts of the site support a closed turf similar to typical limestone grassland plant communities along with other communities characteristic of acid grassland. This intimate mix of different grassland types is a key feature of the site.
Portway Mine	SSSI	3.5 km south-west	Notified for geological interest.
Lower Hollins	SSSI	3.8 km north-west	Lower Hollins SSSI is a nationally important site for its lowland unimproved neutral grassland which mainly consists of the nationally scarce National Vegetation Classification (NVC) type MG5 crested dog's-tail – common knapweed grassland.
Abney and Bretton Cloughs	SSSI	3.7 km south-east	Notified for their range of gritstone/shale plant communities consisting of ancient semi-natural broadleaved woodland, unimproved acidic grasslands and dwarf shrub heaths, wet flushes and chalybeate (containing iron) springs, bracken covered slopes and scrub.
River Derwent at Hathersage	SSSI	3.9 km east	Notified for geological interest.
South Pennine Moors	SAC	4.3 km north	Northern Atlantic wet heaths with Erica tetralix for which the area is considered to support a significant presence. European dry heaths for which this is considered to be one of the best areas in the United Kingdom. Old sessile oak woods with Ilex and Blechnum in the British Isles for which this is considered to be one of the best areas in the United Kingdom. Blanket bogs for which this is considered to be one of the best areas in the United Kingdom.

Site name	Designation	Distance from the Site	Description
Peak District Moors (South Pennine Moors Phase 1)	SPA	4.2 km north	The site is an extensive tract of moorland and moorland-fringe habitat. The moorland habitats include extensive tracts of blanket bog and dry heath, which together with wet heath, acid grassland, small flushes, gritstone edges and boulder slopes, streams and moorland reservoirs, fringing semi-natural woodland and enclosed farmland, represents the full range of upland vegetation characteristic of the South Pennines.
Tideslow Rake	SSSI	4.2 km south-west	Tideslow Rake is the largest surviving site in the South Pennines where an open vegetation characteristic of substrates rich in heavy metals (in this case principally lead) occurs.
Eastern Peak District Moors	SSSI	4.6 km east	The Eastern Peak District Moors are of special interest for their breeding birds, upland vegetation, lower plants, invertebrates and geological features. The combination of blanket bog, wet and dry heaths, acid grasslands and small flushes, together with gritstone edges, cliffs and boulder slopes, streams and moorland reservoirs, and fringing woodland represents the full range of upland vegetation characteristic of the South Pennines and supports several important species assemblages.

Site name	Designation	Distance from the Site	Description
Dark Peak	SSSI	4.7 km north	The main moorland area of the Peak District, known as the Dark Peak, lies to the north of the central limestone dome of the White Peak and extends through the Counties of West and South Yorkshire to the boundary of the National Park at Standedge. It includes the summits of Kinder Scout and Bleaklow in Derbyshire and Black Hill in West Yorkshire. This is wild, open and more or less continuous moorland, predominantly at an altitude of 400–600 m and broken only by transpennine roads from Manchester to Sheffield, over the Snake Pass; from Manchester to Barnsley along the Longdendale valley and over the Woodhead Pass and from Oldham to Huddersfield over Wessenden Head Moor. The Peak District moorlands overlie the grits, shales, sandstones and mudstones of the Millstone Grit series. The whole area is part of the Pennines anticline; the rocks sloping gently towards the east such that most of the gritstone edges face west where they occur along abrupt faults of downfolds in the strata.

5.2 The Site is within the Impact Risk Zone for South Lee Meadows SSSI. The Impact Risk Zone (IRZ) is a GIS tool developed by Natural England to make a rapid initial assessment of the potential risks posed by development proposals to SSSIs, SACs, SPAs and Ramsar sites. They define zones around each site the extent of which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts (Natural England, 2017). The types of development which may have an effect on the South Lee Meadows SSSI which are cited by Natural England are:

- Planning applications for quarries, including: new proposals, Review of Minerals Permissions (ROMP), extensions, variations to conditions etc.
- Oil & gas exploration/extraction.
- Any development that could cause AIR POLLUTION [Natural England emphasis] (including industrial/commercial processes).
- Pipelines, pylons and overhead cables. Any transport proposal including road, rail and by water (excluding routine maintenance).

Non-statutory designated sites

5.3 There is one non-statutory designated site within the desk study area; Hadfield's Quarry Derbyshire Wildlife Trust Reserve is owned by Breedon Cement Ltd and managed by Derbyshire Wildlife Trust. It is located 113 m to the west of the Site and is designated for its patchwork of species-rich grassland, small-scale wetland, woodland and bare rock in and around a disused limestone quarry.

Habitats

5.4 The type, extent and distribution of habitats within the Site were mapped during the Phase 1 habitat survey and are shown in Figure 1, Section 7 of this report. Photographs of the habitats found within the Site are shown in Section 8 of this report and the habitats recorded are described below.

Hard-standing 2.004 ha

5.5 Hard-standing and compacted gravel form vehicular access roads, car parking areas, pedestrian footpaths and railway sidings within the Site (Photograph 1).

Amenity grassland 0.166 ha

5.6 There are areas of managed amenity grassland within the Site in areas alongside buildings and hard-standing roads and footpaths (Photograph 2). Several grasses and broad-leaved herbs typical of enriched grassland are present. Plant species include couch-grass *Elymus repens,* Yorkshire fog *Holcus lanatus*, creeping bent *Agrostis stolonifera*, chickweed *Stellaria media*, field horsetail *Equisetum arvense*, groundsel *Senecio vulgaris*, yarrow *Achillea millefolium*, creeping buttercup *Ranunculus repens*, ragwort *Jacobaea vulgaris*, dandelion *Taraxacum* agg., ribwort plantain *Plantago lanceolata*, silverweed *Argentina anserina,* herb Robert *Geranium robertianum*, and ox-eye daisy *Leucanthemum vulgare*.

Mixed plantation woodland 0.359 ha

5.7 A young mixed plantation woodland is partly within and outside the Site (Photograph 3) and supports, ash *Fraxinus excelsior*, sycamore *Acer pseudoplatanus*, silver birch *Betula pendula*, alder *Alnus glutinosa*, Scots pine *Pinus sylvestris*, , and cherry *Prunus avium*. A shrub layer and field layer comprises hawthorn *Crataegus monogyna*, dog rose *Rosa canina* agg., bramble *Rubus fruticosus* agg. and stinging nettle *Urtica dioica*.

Buildings 0.010 ha

5.8 There are two buildings (B1 and B2) within the Site alongside several temporary structures (PortaKabin type) (Photograph 4) and associated cement works infrastructure such as conveyor lines (Photograph 5) and pipework.

5.9 Building 1 (B1, Photograph 6) is a large single-skin corrugated metal storage area with steep sloping sides.

5.10 Building 2 (B2, Photograph 7) is a single storey breezeblock structure with a flat concrete roof.

Ephemeral & tall ruderal vegetation 0.049 ha

5.11 Rubble and spoil mounds delineating the Site boundary, parking and temporary office structures to the northwest are vegetated with ephemeral and tall ruderal vegetation (Photograph 8) comprising coltsfoot *Tussilago farfara*, Yorkshire fog *Holcus lanatus*, false oat-grass *Arrhenatherum elatius*, ragwort, creeping cinquefoil *Potentilla reptans*, cocksfoot *Dactylis glomerata*, curled dock *Rumex crispus* and stinging nettle.

Introduced trees and shrubs 0.075 ha

5.12 Small copses of broadleaved tree and shrub species are scattered within the Site. Species include sycamore, Norway maple *Acer platanoides*, snowberry *Symphoricarpos albus*, hawthorn, silver birch, cherry, rowan *Sorbus aucuparia* and spindle *Euonymus europaeus*.

Scrub 0.033 ha

5.13 Areas of scrub are located on the rubble and spoil mounds described above, along the western side of the railway tracks, and in small localised areas within the Site. Species include butterfly bush *Buddleia davidii*, willow *Salix* sp., blackthorn *Prunus spinosa,* dog rose, hawthorn, and gorse *Ulex europaea*.

5.14 Dense scrub is present within the Site and consists of hawthorn, dog rose, hazel *Corylus avellana*, elder *Sambucus nigra*, , guelder rose *Viburnum opulus*, lilac *Syringa vulgaris* and sycamore.

Drain

5.15 A flowing drain lies 32 m off-Site to the east of the Site boundary within the golf course (Photograph 9), and this is approximately 50 cm wide and 30 cm deep. Occasional reed canary-grass *Phalaris arundinacea* is present but there is no aquatic vegetation.

Invasive non-native species

5.16 Snowberry was recorded on the west railway bank. This species is a non-native species that can be invasive; however, it is not included on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

Protected and notable species

5.17 Protected species are those that are protected under the Wildlife and Countryside Act 1981 (as amended), and/or the Conservation of Habitats and Species Regulations 2017 (as amended) and for badgers only, the Protection of Badgers Act 1992. Further information on relevant legislation is provided in Appendix 1.

Bats

5.18 All UK bats are European Protected Species (EPS) under the Conservation of Habitats and Species Regulations 2017 (as amended) and several are Species of Principal Importance under the provisions of the Natural Environment and Rural Communities (NERC) Act 2006. Bats are protected against disturbance, killing or injuring and their roosts are protected against obstruction, damage or destruction. A bat roost may be any structure a bat uses for breeding, resting, shelter or protection. It is important to note that since bats tend to re-use the same roost sites, a bat roost is typically considered to be protected from damage or destruction whether or not the bats are present at the time. Appendix 1 provides further details of the relevant legislation, including guidance on important aspects of planning policy such as the National Planning Policy Framework (NPPF) and Government Circular 06/2005.

5.19 DWT provided 14 records of bat roosts within the desk study area. The closest record is for an unidentified bat roost located 870 m north of the Site, recorded in 2006.

5.20 There are two Natural England European Protected Species Licences within the desk study area. Both licences are for bats (covering common pipistrelle *Pipistrellus pipistrellus*, natterer's *Myotis nattereri*, soprano pipistrelle *Pipistrellus pygmaeus* and brown long-eared *Plecotus auritus*, the latter two both being Species of Principal Importance/Priority Species[3] (Maddock *et al.,* 2011) and

[3]Species/Habitats of Principal Importance are those habitats shown on the England Biodiversity List published by the Secretary of State under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006, referred to as Priority Habitats within the NPPF. .

are located 1.3 km from the Site; one to the west which was granted in 2014 and one to the south which was granted in 2012.

Bat roost potential of buildings

5.21 The buildings within the Site offer varied suitability for roosting bats.

5.22 Building B1 is considered to have low bat roost potential due to the presence of small crevices where the corrugated metal sheeting meets the overhang of flat metal sheeting on the gables of the building. The building appears to have several areas of damage allowing daylight through to the inside and the building is also artificially lit from the inside. It is understood that the building is in use up to 24 hours a day for automated extraction of material and a large automated conveyor belt is set in the eaves of the building for feed material and is in use from around 7 am until 10 pm (Monday to Wednesday) and 8 am to 4 pm (Thursday to Friday) and 7 am to 1 pm on Saturday and Sunday (confirmed by Rowland, K. *pers.comm*. 28 October 2019). It is considered that the small crevices identified on the gables of the building, particularly on the north-east elevation which is adjacent to the mixed plantation woodland is suitable for use by crevice dwelling bat species such as common pipistrelle.

5.23 Building B2 is considered to have no bat roost potential. It is a single storey building constructed from breezeblocks and has a flat concrete roof. Overall, the building is well sealed with no signs or evidence of potential entry points.

Emergence survey of B1

5.24 No bats were recorded emerging from the north-east part of B1.

5.25 Up to two common pipistrelle *Pipistrellus pipistrellus* were recorded commuting and foraging along the woodland edge, particularly to the north-west of B1. The earliest common pipistrelle pass was recorded at 21:25 (22 minutes after sunset) by both surveyors. The timing of the first pass suggests that there may be a small common pipistrelle roost nearby to the Site.

5.26 One noctule *Nyctalus noctula* bat pass was recorded by Surveyor 2 at 21:35 (32 minutes after sunset). The timing of this pass is late with reference to the typical emergence period of this species which is between 0 -20 minutes after sunset (Russ, 2012).

5.27 A bright security light is located to the south-east of B1 which is considered to have reduced the suitability of this part of the Site for bat foraging purposes, with Surveyor 1 recording the least bat activity.

Climbed inspection of T1

5.28 A mature sycamore in the south-west of the Site (T1) has one potential roost feature suitable for use by bats. The climbed inspection of this tree found that the split limb feature has low potential to support roosting bats. The split extends >30 cm horizontally narrowing to an apex (Photograph 10). Internally, the split was observed as being moist (heavy rain preceded the survey) and dusty.

5.29 Overall assessment of bat activity within the Site

5.30 Overall, there is suitable habitat for foraging and commuting bats within the Site; mixed plantation woodland, introduced trees and shrubs, and scrub. The woodland is connected to areas of more suitable habitat beyond the Site within the surrounding landscape. Artificial lighting within the Site is considered to reduce the suitability of parts of the Site for foraging and commuting bats. The surveys undertaken in 2018 and 2019 did not identify any evidence of bat roosts within the Site.

Breeding birds

5.31 All nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs.

5.32 DWT did not provide any records for notable protected bird species within the desk study area.

5.33 Incidental sightings of several bird species were recorded during the field surveys: blackbird *Turdus merula*, pied wagtail *Motatacilla alba*, magpie *Pica pica*, wren *Troglodytes troglodytes*, buzzard *Buteo buteo* and wood pigeon *Columba palumbus*. Evidence of wood pigeon and magpie nests were recorded in trees within the Site.

5.34 Overall, it is considered that there is limited habitat available within the Site for breeding birds. The mixed plantation woodland, introduced trees and shrubs, and scrub are suitable for breeding birds. Off-Site habitat (i.e. the more established mixed plantation woodland) is considered to offer better opportunities for breeding birds.

5.35 The Site is not considered to be suitable for ground nesting birds given the extent of human-related disturbance, the number of tall structures and trees that could act as predator perches and the height of the sward of the amenity grassland.

5.36 Given the limited extent of suitable habitats for nesting birds within the Site, proximity of suitable bird breeding habitat outside the Site and the incorporation of scrub and woodland planting within the Proposed development, no further survey or assessment for breeding birds is considered necessary.

Great crested newt

5.37 Great crested newt is an EPS and is protected, along with its habitats in water and on land, by the Wildlife and Countryside Action 1981 (as amended) and by the Conservation of Habitats and Species Regulations 2017. Great crested newt is also listed as a Species of Principal Importance under the provisions of the NERC Act 2006.

5.38 Five records of great crested newt were provided by DWT, the nearest is a record located 204 m to the east of the Site within Bradwell Golf Course, recorded in 1990.

5.39 No waterbodies are present within the Site. The majority of the Site supports terrestrial habitats that are suboptimal for great crested newt. There are discreet areas of ephemeral, tall herb and scrub vegetation within the Site which include piles of rubble that are suitable for great crested newt. The mixed plantation woodland which lies to the west of the Site provides suitable terrestrial habitat for great crested newt. All of these terrestrial habitats lie to the north and west of the Site haul road and railway line and sidings.

5.40 Seven waterbodies are located within 500 m of the Site, as indicated on Figure 3. The results of the HSI and eDNA analysis are shown in Appendix 2, and a summary is presented in Table 3.

5.41 The water sample taken from pond P1 on 26 June 2018 to test for great crested eDNA presence, returned a negative result. The 2020 eDNA analysis returned a positive result for great crested newt for the same pond. P1 is surrounded by suitable terrestrial habitat (in the golf course) for great crested newts and it is into this habitat that most newts are likely to disperse outside the breeding season. It therefore follows that great crested newts would be unlikely to travel to suitable terrestrial habitats that are present within the northern and western parts of the Site given that the separation distance is more than 250 m and taking into account the extent of hard surface associated with the haul road and railway line and sidings, which is considered likely to present a physical barrier to amphibian movement. The haul road is in regular and frequent use. Research shows that newts typically move less than 100 m from a breeding pond if suitable habitat is present (Cresswell and Whitworth, 2004).

5.42 However, terrestrial habitat associated with P1 is connected to the railway sidings within the eastern part of the Site. The ballast that is present in the sidings may provide places of shelter and rest suitable for great crested newt. Further consideration and assessment is necessary in relation to great crested newt and P1, given the presence of the ballast materials, which will be temporarily affected by the construction phase of the Proposed development.

5.43 Three of the waterbodies, consisting of small pools and a ditch (P4, P5 and P6), are located within Hadfield's Quarry DWT Reserve. These waterbodies have been subject to single torching surveys in May 2012, May 2015 and April 2018 by DWT. No great crested newt was recorded present. The results of the 2020 eDNA analysis are negative for P4, P5 and P6.

5.44 It is acknowledged that, on its' own, the DWT survey effort does not meet the standard Natural England survey guidance requirements. When considered alongside the eDNA data, however, it is considered unlikely that great crested newt is present within these ponds and no further survey or assessment is considered necessary.

5.45 The closest pond to the Site, P7, returned a negative result for eDNA. This pond is stocked with Koi carp *Cyprinus* sp. It is considered unlikely that great crested newt is present within P7 and no further survey or assessment is considered necessary.

5.46 Table 3 below summarises the results of the HSI assessments and eDNA analysis for the waterbodies scoped into the assessment. Reasons for inclusion/exclusion from further great crested newt survey or assessment are also given.

Table 3: Waterbody descriptions, eDNA results and HSI

Waterbody ID	**Description**	**Distance from the Site**	**HSI score and eDNA result**	**Screening decision**
P1	A pond located within the golf course to the east of the Site (Photograph 11).	230 m to the east.	0.73 (good) 2018. Negative eDNA 2018. Positive eDNA 2020.	Screened in due to its suitability and connectivity to suitable terrestrial habitat.
P2	Large reservoir used as a fishing and boating lake.	255 m to the east.	0.34 (poor) 2018. eDNA sampling not required due to HSI.	Screened out due to size and fish stocking.
P3	Large reservoir used as a fishing and boating lake.	255 m to the east.	0.34 (poor) 2018. eDNA sampling not required due to HSI.	Screened out due to size and fish stocking.

Waterbody ID	Description	Distance from the Site	HSI score and eDNA result	Screening decision
P4	Small ditch (Photograph 12).	202 m to the south-west.	0.52 (below average) 2020. Negative eDNA 2020.	Screened out due to negative presence / absence survey including eDNA.
P5	Small pool (Photograph 13).	180 m to the south-west.	P5 0.53 (below average) 2020	Screened out due to negative presence / absence survey including eDNA.
P6	Long ditch (Photograph 14).	165 m to the south-west.	P6 0.53 (below average) 2020	Screened out due to negative presence / absence survey including eDNA.
P7	Koi pond (Photograph 15).	12 m to the east.	0.40 (poor) 2020. Negative eDNA 2020.	Screened out due to fish stocking including eDNA.

Other amphibians

5.47 Data received from DWT identified records of palmate newt *Lissotriton helveticus*, smooth newt *Lissotriton vulgaris*, common frog *Rana temporaria* and common toad *Bufo bufo* within Hadfield's Quarry DWT reserve.

5.48 The majority of the Site supports terrestrial habitats that are suboptimal for amphibians. There are discreet areas of ephemeral, tall herb and scrub vegetation within the Site which include piles of rubble that are suitable for amphibians and the mixed plantation woodland also provides suitable terrestrial habitat. The nature reserve provides suitable aquatic and terrestrial habitat for amphibians. The topography between the nature reserve and the Site is steep sided and it is considered highly likely that amphibians recorded within the nature reserve will remain in the proximate terrestrial habitat rather than moving towards the Site. It is considered unlikely that other amphibians are present within the Site or will be affected by the Proposed development.

Reptiles

5.49 Grass snake *Natrix helvetica*, slow-worm *Anguis fragilis*, common lizard *Zootoca vivipara* and adder *Vipera berus* are protected by the Wildlife and Countryside Act 1981 (as amended) from killing and injury. They are also SPIs under the NERC Act 2006.

5.50 DWT returned three records for reptiles within the desk study area; one record each for common lizard, slow worm and grass snake. The closest record was for a grass snake recorded in 1990 and was located 1 km south of the Site.

5.51 The majority of the Site (i.e. hard standing, amenity grassland) is considered to provide sub-optimal habitat to support reptiles. The areas of scrub and tall ruderal vegetation are considered to provide

suitable habitat for common species of reptile such as grass snake and slow worm. It is considered that, due to the high amount of human-related activity and the limited nature of suitable habitat on-Site, reptiles are unlikely to be present on the Site and will not be affected by the Proposed development.

5.52 No further survey or assessment of reptiles is considered necessary.

Water vole

5.53 Water vole is fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 and is a Species of Principal Importance.

5.54 DWT returned 50 records for water vole within the desk study area. The closest record was taken approximately 550 m south of the Site in 1987.

5.55 The flowing drain located off-Site 115 m to the east is considered to provide sub-optimal habitat for water vole due to the fast flow and lack of suitable marginal and aquatic vegetation.

5.56 No further survey or assessment of water vole is considered necessary.

Otter

5.57 Otter is an EPS and is also protected under sections 9 and 11 of the Wildlife and Countryside Act 1961 (as amended).

5.58 DWT provided no records of otter within the desk study area.

5.59 No evidence of otter was identified within the Site or in suitable habitat nearby i.e. the flowing drain located to the east of the Site. It is not considered that habitats within the Site are suitable for otter due to the high disturbance and lack of foraging opportunities.

5.60 No further survey or assessment for otter is considered necessary.

Invertebrates

5.61 DWT provided six records of dingy skipper *Erynnis tages* within the desk study area. All records were attributed to Hadfield's Quarry, 160 m to the west of the Site and the latest record was from 2014. The waterbodies within Hadfield's Quarry are also identified as notable invertebrate ponds for beetles and bugs.

5.62 The larval foodplant for dingy skipper is birds-foot trefoil which has not been recorded present within the Site.

5.63 No other invertebrate records were supplied by DWT.

5.64 There are no significant suitable features present for invertebrates within the Site. There are localised areas of suitable habitats within the Site, which are likely to be suitable for common species of invertebrates, for example due to nectar and pollen sources provided by ephemeral/tall ruderal vegetation, scrub and snowberry. Similarly, the ephemeral/tall ruderal vegetation provides egg-laying opportunities for invertebrates.

5.65 Overall, there is no evidence of habitats suitable for rare, specialist or notable invertebrate species within the Site.

5.66 No further survey or assessment of invertebrates is considered necessary.

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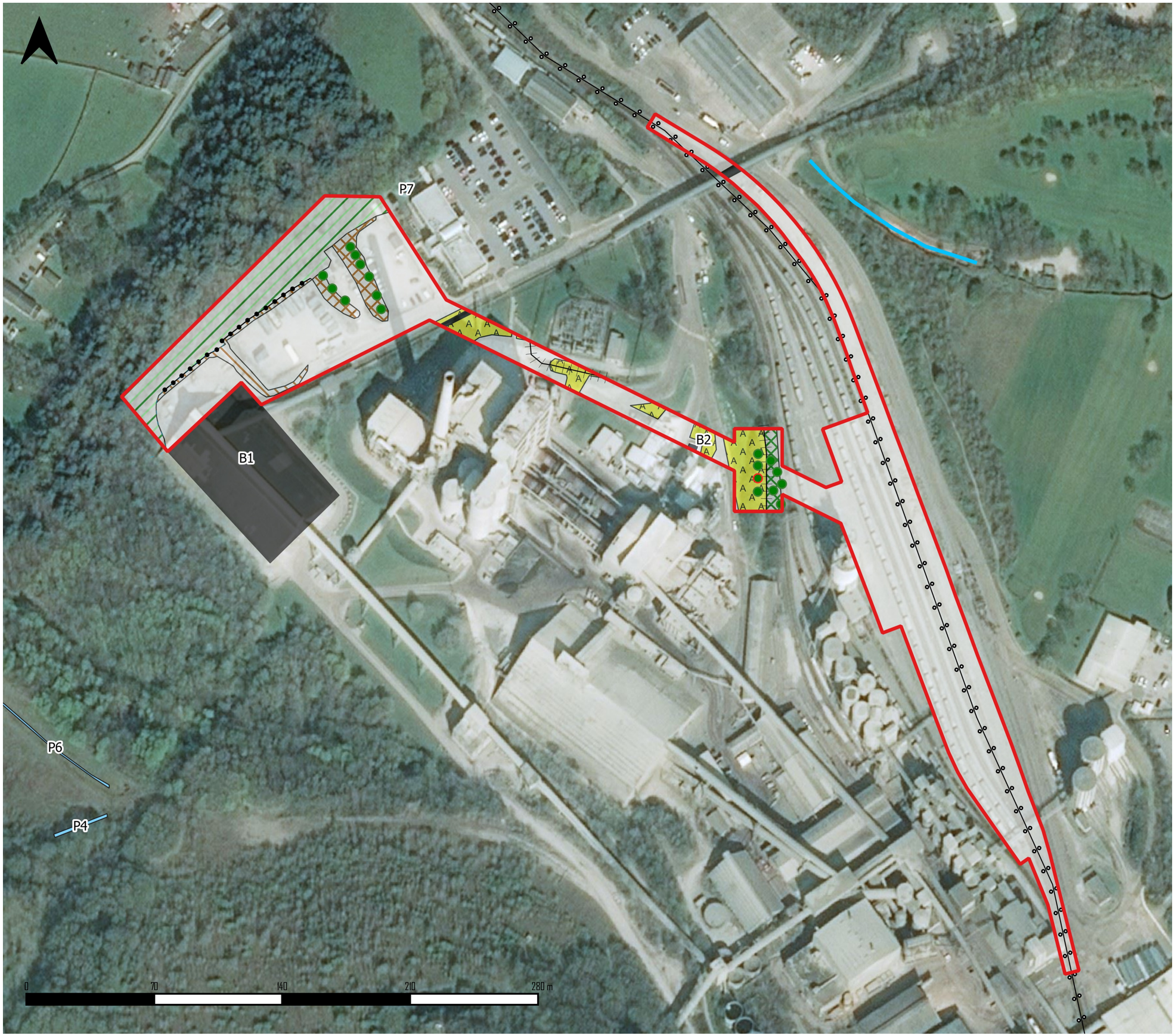
7 Figures

(overleaf)



Legend

- Site boundary
- Broadleaved tree with low bat roost potential
- Broadleaved tree with no bat roost potential
- Mixed plantation woodland
- Dense scrub
- Tall ruderal vegetation
- Amenity grassland
- Introduced shrub
- Building
- Hard-standing
- Running water
- Fence
- Earth bank
- Railway

BSG ecology

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JOB REF: P18-451

PROJECT TITLE

HOPE ARM IMPORT AND RAIL STORAGE FACILITY PROJECT

DRAWING TITLE

Figure 1: Extended Phase 1 habitat survey results plan

DATE: 11.05.2020 CHECKED: KK SCALE: 1:2,000

DRAWN: EM APPROVED: KK VERSION: 1.0

Sources: BSG Ecology survey data

Document path

Legend

- Site Boundary
- Building and reference number
- Surveyor Locations

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PROJECT TITLE

HOPE ARM IMPORT AND RAIL STORAGE FACILITY PROJECT

DRAWING TITLE

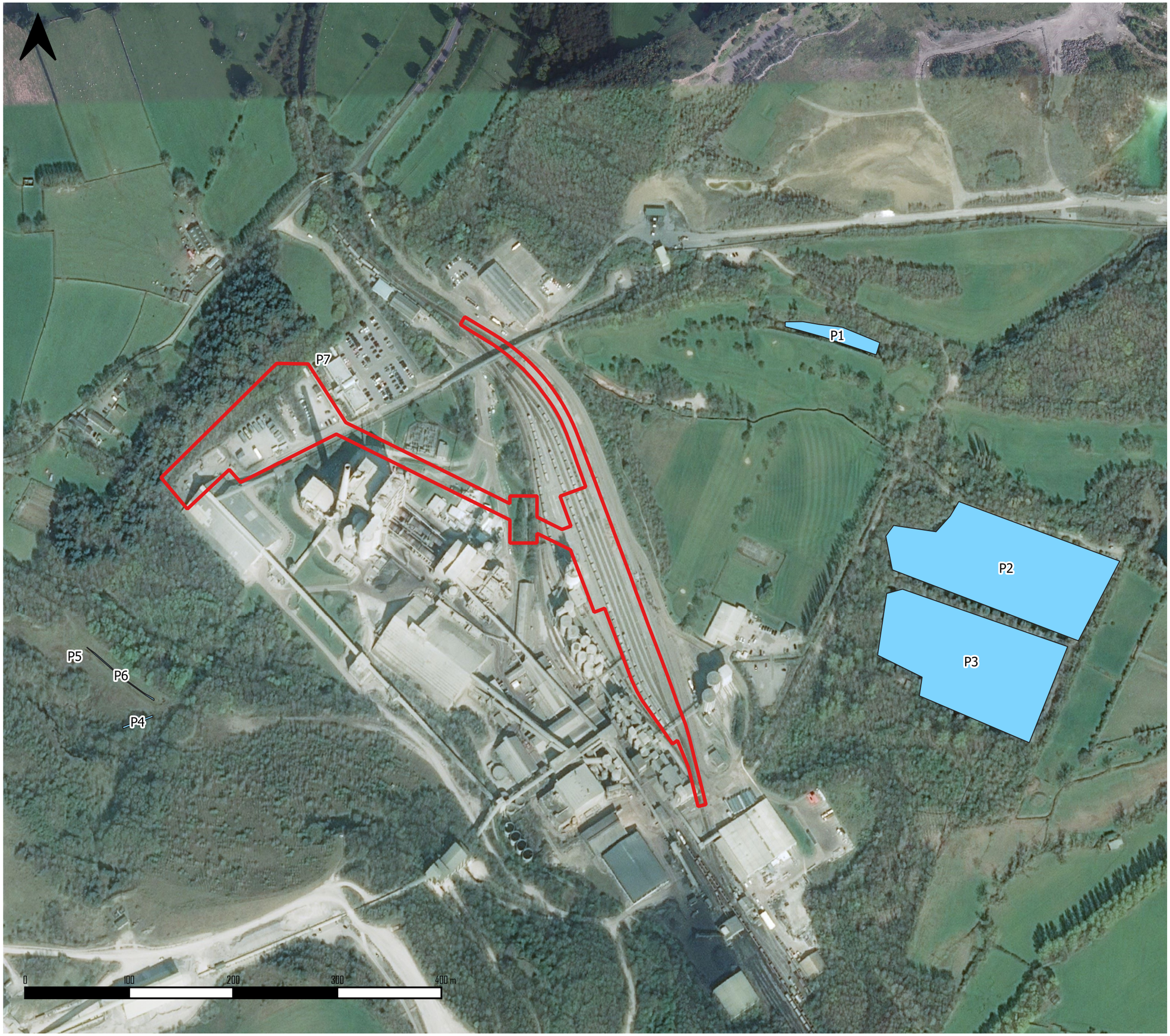
Figure 2: Dusk Bat Emergence Surveyor Locations

DATE: 11.05.2020 CHECKED: KK SCALE: 1:500

DRAWN: EM APPROVED: KK VERSION: 1.0

Sources: BSG Ecology survey data

Document path



Legend

- Site Boundary
- Pond with reference number

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JOB REF: P18-451

PROJECT TITLE

Hope ARM Import and Storage Facility

DRAWING TITLE

Figure 3: Waterbody Locations

DATE: 11.05.2020 CHECKED: KK SCALE: 1:3,500

DRAWN: EM APPROVED: KK VERSION: 1.0

Document path

8 Photographs

Photograph 1: Example of hardstanding area

Photograph 2: Example of amenity grassland area

Photograph 3: Mixed plantation woodland

Photograph 4: Portakabin style units

Photograph 5: Conveyor line infrastructure

Photograph 6: Building 1

Photograph 7: Building 2

Photograph 8: Earth bund comprising tall ruderal vegetation and scrub

Photograph 9: Flowing drain nearby the Site

Photograph 10: Split limb on mature sycamore with low bat roost potential

Photograph 11: Pond P1

Photograph 12: Pond P4

Photograph 13: Pond P5

Photograph 14: Pond P6

Photograph 15: Pond P7

Appendix 1: Summaries of Relevant Policy, Legislation and Other Instruments

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

National Planning Policy Framework (England)

8.1 The Government revised the National Planning Policy Framework (NPPF) on 19 February 2019. Text excerpts from the NPPF are shown where they may be relevant to planning applications and biodiversity including protected sites, habitats and species.

8.2 The Government sets out the three objectives for sustainable development (economy, social and environmental) at paragraphs 8-10 to be delivered through the plan preparation and implementation level and 'are not criteria against which every decision can or should be judged.' At paragraph 8c) the planning system's environmental objective refers to 'protecting and enhancing our natural, built and historic environment' and to 'helping to improve biodiversity'

8.3 In conserving and enhancing the natural environment, the NPPF (Paragraph 170) states that 'planning policies and decisions should contribute to and enhance the natural and local environment' by:

- Protecting and enhancing...sites of biodiversity value... '(in a manner commensurate with their statutory status or identified quality in the development plan)'.
- Recognising the wider benefits from natural capital and ecosystem services including trees and woodland.
- Minimising impacts on and providing net gains in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.
- Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability.

8.4 In respect of protected sites, at paragraph 171, the NPPF requires local planning authorities to distinguish, at the plan level, '…between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value...take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.'

8.5 Paragraph 174 refers to how plans should aim to protect and enhance biodiversity. Plans should: 'identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity [a footnote refers to ODPM Circular 06/2005 for further guidance in respect of statutory obligations for biodiversity in the planning system], wildlife corridors and stepping stones that connect them and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation;' and to 'promote the conservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.'

8.6 Paragraph 175 advises that, when determining planning applications, '…local planning authorities should apply the following principles:

a. if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;

b. development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments) should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;

c. development resulting in the loss or deterioration of irreplaceable habitats, (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and

d. development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.'

8.7 In paragraph 176, the following should be given the same protection as habitats sites[4]:

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

ii. listed or proposed Ramsar sites; and

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

8.8 In paragraph 177 the NPPF refers back to sustainable development in relation to appropriate assessment and states: 'the presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site'.

8.9 In paragraph 178, the NPPF refers to planning policies and decisions taking account of ground conditions and risks arising from land instability and contamination at sites. In relation to risks associated with land remediation account is to be taken of 'potential impacts on the natural environment' that arise from land remediation.

8.10 In paragraph 180 the NPPF states that planning policies and decisions should ensure that development is appropriate to the location and take into account likely effects (including cumulative) on the natural environment and , in doing so, they 'should limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.'

Government Circular ODPM 06/2005 Biodiversity and Geological Conservation (England only)

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

8.12 Paragraph 99 of Government Circular 06/2005[5] advises that "it is essential that the presence or otherwise of protected species, and the extent that they may be affected by the proposed

[4] Habitats sites are defined in the glossary as 'Any site which would be included within the definition at regulation 8 of the Conservation of Habitats and Species Regulations 2017 (as amended) for the purpose of those regulations, including candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation, Special Protection Areas and any relevant Marine Sites.'
[5] *ODPM Circular 06/2005. Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impacts within the Planning System* (2005). HMSO Norwich.

development, is established before the planning permission is granted, otherwise all relevant material considerations may not have been addressed in making the decision. The need to ensure ecological surveys are carried out should therefore only be left to coverage under planning conditions in exceptional circumstances, with the result that the surveys are carried out after planning permission has been granted".

Standing Advice (GOV.UK - England only)

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

8.14 The standing advice (originally from Natural England and now held and updated on GOV.UK[6]) provides advice to planners on deciding if there is a 'reasonable likelihood' of protected species being present. It also provides advice on survey and mitigation requirements.

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

Natural Environment and Rural Communities (NERC) Act 2006 – Habitats and species of principal importance (England)

8.16 The Natural Environment and Rural Communities (NERC) Act came into force on 1st October 2006. Section 41 (S41) of the Act require the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The list has been drawn up in consultation with Natural England as required by the Act. In accordance with the Act the Secretary of State keeps this list under review and will publish a revised list if necessary, in consultation with Natural England.

8.17 The S41 list is used to guide decision-makers such as public bodies, including local authorities and utilities companies, in implementing their duty under Section 40 of the NERC Act 2006, to have regard to the conservation of biodiversity in England, when carrying out their normal functions, including development control and planning. This is commonly referred to as the 'Biodiversity Duty.'

8.18 Guidance for public authorities on implementing the Biodiversity Duty[7] has been published by Defra. One of the key messages in this document is that 'conserving biodiversity includes restoring and enhancing species populations and habitats, as well as protecting them.' In England the administration of the planning system and licensing schemes are highlighted as having a 'profound influence on biodiversity conservation.' Local authorities are required to take measures to "promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species. The guidance states that 'the duty aims to raise the profile and visibility of biodiversity, clarify existing commitments with regard to biodiversity, and to make it a natural and integral part of policy and decision making.'

8.19 In 2007, the UK Biodiversity Action Plan (BAP) Partnership published an updated list of priority UK species and habitats covering terrestrial, freshwater and marine biodiversity to focus conservation action for rarer species and habitats in the UK. The UK Post-2010 Biodiversity Framework[8], which

[6] https://www.gov.uk/protected-species-and-sites-how-to-review-planning-proposals#standing-advice-for-protected-species
[7] Defra, 2007. *Guidance for Public Authorities on Implementing The Biodiversity Duty*. (http://www.defra.gov.uk/publications/files/pb12585-pa-guid-english-070516.pdf)
[8] JNCC and Defra (on behalf of the Four Countries' Biodiversity Group). 2012. *UK Post-2010 Biodiversity Framework*. July 2012. (http://jncc.defra.gov.uk/page-6189)

covers the period from 2011 to 2020, now succeeds the UK BAP. The UK priority list contained 1150 species and 65 habitats requiring special protection and has been used as a reference to draw up the lists of species and habitats of principal importance in England.

8.20 In England, there are 56 habitats of principal importance and 943 species of principal importance on the S41 list. These are all the habitats and species found in England that were identified as requiring action in the UK BAP and which continue to be regarded as conservation priorities in the subsequent UK Post-2010 Biodiversity Framework.

European protected species (Animals)

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

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

a. Intentionally or deliberately capture, injure or kill any wild animal included amongst these species

b. Possess or control any live or dead specimens or any part of, or anything derived from a these species

c. deliberately disturb wild animals of any such species

d. deliberately take or destroy the eggs of such an animal, or

e. intentionally, deliberately or recklessly damage or destroy a breeding site or resting place of such an animal, or obstruct access to such a place

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

a. to impair their ability—

   i. to survive, to breed or reproduce, or to rear or nurture their young, or

   ii. in the case of animals of a hibernating or migratory species, to hibernate or migrate; or

b. to affect significantly the local distribution or abundance of the species to which they belong.

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

a. The proposal is necessary 'to preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment'

b. 'There is no satisfactory alternative'

c. The proposals 'will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

Definition of breeding sites and resting places

8.25 Guidance for all European Protected Species of animal, including bats and great crested newt, regarding the definition of breeding and of breeding and resting places is provided by The

European Council (EC) which has prepared specific guidance in respect of the interpretation of various Articles of the EC Habitats Directive.[9] Section II.3.4.b) provides definitions and examples of both breeding and resting places at paragraphs 57 and 59 respectively. This guidance states that 'The provision in Article 12(1)(d) [of the EC Habitats Directive] should therefore be understood as aiming to safeguard the ecological functionality of breeding sites and resting places.' Further the guidance states: 'It thus follows from Article 12(1)(d) that such breeding sites and resting places also need to be protected when they are not being used, but where there is a reasonably high probability that the species concerned will return to these sites and places. If for example a certain cave is used every year by a number of bats for hibernation (because the species has the habit of returning to the same winter roost every year), the functionality of this cave as a hibernating site should be protected in summer as well so that the bats can re-use it in winter. On the other hand, if a certain cave is used only occasionally for breeding or resting purposes, it is very likely that the site does not qualify as a breeding site or resting place.'

Competent authorities

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

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

Birds

8.28 All nesting birds are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs. In addition to this, for some rarer species (listed on Schedule 1 of the Act), it is an offence to disturb them whilst they are nest building or at or near a nest with eggs or young, or to disturb the dependent young of such a bird.

8.29 The Conservation of Habitats and Species Regulations 2017 (as amended) places duties on competent authorities (including Local Authorities and National Park Authorities) in relation to wild bird habitat. These provisions relate back to Articles 1, 2 and 3 of the EC Directive on the conservation of wild birds (2009/147/EC, 'Birds Directive'[10]) (Regulation 10 (3)) requires that the objective is the 'preservation, maintenance and re-establishment of a sufficient diversity and area of habitat for wild birds in the United Kingdom, including by means of the upkeep, management and creation of such habitat, as appropriate, having regard to the requirements of Article 2 of the new Wild Birds Directive…' Regulation 10 (7) states: 'In considering which measures may be appropriate for the purpose of security or contributing to the objective in [Regulation 10 (3)] Paragraph 3, appropriate account must be taken of economic and recreational requirements'.

8.30 In relation to the duties placed on competent authorities under the 2017 Regulations, Regulation 10 (8) states: 'So far as lies within their powers, a competent authority in exercising any function [including in relation to town and country planning] in or in relation to the United Kingdom must use all reasonable endeavours to avoid any pollution or deterioration of habitats of wild birds (except habitats beyond the outer limits of the area to which the new Wild Birds Directive applies).'

[9] Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC. (February 2007), EC.
[10] 2009/147/EC Birds Directive (30 November 2009. European Parliament and the Council of the European Union.

Reptiles

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

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

8.33 Current Natural England Guidelines for Developers[11] states that 'where it is predictable that reptiles are likely to be killed or injured by activities such as site clearance, this could legally constitute intentional killing or injuring.' Further the guidance states: 'Normally prohibited activities may not be illegal if 'the act was the incidental result of a lawful operation and could not reasonably have been avoided'. Natural England 'would expect reasonable avoidance to include measures such as altering development layouts to avoid key areas, as well as capture and exclusion of reptiles.'

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

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

Water vole

8.35 Water vole is protected under the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to kill, injure or take any water vole, damage, destroy or obstruct access to any place of shelter or protection that the animals are using, or disturb voles while they are using such a place. Water vole is listed as a Species of Principal Importance under the provisions of the NERC Act 2006 in England and under the provisions of the Environment (Wales) Act 2016.

Wild mammals in general

8.36 The Wild Mammals (Protection) Act 1996 (as amended) makes provision for the protection of wild mammals from certain cruel acts, making it an offence for any person to intentionally cause suffering to any wild mammal. In the context of development sites, for example, this may apply to rabbits in their burrows.

[11] English Nature, 2004. *Reptiles: guidelines for developers.* English Nature, Peterborough. https://webarchive.nationalarchives.gov.uk/20150303064706/http://publications.naturalengland.org.uk/publication/76006

Appendix 2: Habitat Suitability Index (HSI) and eDNA Survey Results

	Pond 1		**Pond 4**		**Pond 5**		**Pond 6**	
HSI criteria	HSI Score		HSI Score		HSI Score		HSI Score	
Location	Zone A	1	Zone A	1	Zone A	1	Zone A	1
Pond area	1380 m^2	0.91	40 m^2	0.05	27 m^2	0.05	10 m^2	0.05
Pond drying	Never	0.90	Frequently	0.1	Frequently	0.1	Frequently	0.1
Water quality	Moderate	0.67	Moderate	0.67	Moderate	0.67	Moderate	0.67
Shade	45%	1	60%	1	0%	1	0%	1
Waterfowl	Minor	0.67	Absent	1	Absent	1	Absent	1
Fish	Minor	0.33	Absent	1	Absent	1	Absent	1
Pond density	13	1	9	0.9	9	0.9	9	0.9
Terrestrial habitat	Moderate	0.67	Good	1	Good	1	Good	1
Macrophyte	25%	0.56	20%	0.51	30%	0.61	30%	0.61
Overall HSI score	**0.73**		**0.52**		**0.53**		**0.53**	
GCN suitability	**Good**		**Below average**		**Below average**		**Below average**	

	Pond 7	
HSI criteria	HSI Score	
Location	Zone A	1
Pond area	21 m^2	0.05
Pond drying	Never	0.90
Water quality	Good	1
Shade	0%	1
Waterfowl	Absent	1
Fish	Major	0.01
Pond density	11	0.98
Terrestrial habitat	Moderate	0.67
Macrophyte	5%	0.36
Overall HSI score	**0.40**	
GCN suitability	**Poor**	

SureScreen Scientifics

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Report No: 1
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Date: 10/07/2018

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS

Date sample received at Laboratory: 27/06/2018
Date Reported: 10/07/2018
Matters Affecting Results: None

RESULTS

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
		-					
		-					
3396	Hope Cements Works, Pond 1	-	Pass	Pass	Pass	Negative	0

SUMMARY

When Great Crested Newts (GCN); Triturus cristatus inhabit a pond, they deposit traces of their DNA in the water as evidence of their presence. By sampling the water, we can analyse these

small environmental DNA (eDNA) traces to confirm GCN habitation, or establish GCN absence.

The water samples detailed below were submitted for eDNA analysis to the protocol stated in DEFRA WC1067 (Latest Amendments). Details on the sample submission form were used as the unique sample identity.

RESULTS INTERPRETATION

Lab Sample No.- When a kit is made it is given a unique sample number. When the pond samples have been taken and the kit has been received back in to the laboratory, this sample number is tracked throughout the laboratory.

Site Name- Information on the pond.

O/S Reference – Location/co-ordinates of pond.

SIC- Sample Integrity Check. Refers to quality of packaging, absence of tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to results errors. Inspection upon receipt of sample at the laboratory. To check if the Sample is of adequate integrity when received. Pass or Fail.

DC- Degradation Check. Analysis of the spiked DNA marker to see if there has been degradation of the kit since made in the laboratory to sampling to analysis. Pass or Fail.

IC- Inhibition Check- PCR inhibitors can cause false results. Inhibitors are analysed to check the quality of the result. Every effort is made to clean the sample pre-analysis however some inhibitors cannot be extracted. An unacceptable inhibition check will cause an indeterminate sample and must be sampled again.

Result- NEGATIVE means that GCN eDNA was not detected or is below the threshold detection level and the test result should be considered as no evidence of GCN presence. POSITIVE means that GCN eDNA was found at or above the threshold level and the presence of GCN at this location at the time of sampling or in the recent past is confirmed. Positive or Negative.

Positive Replicates- To generate the results all of the tubes from each pond are combined to produce one eDNA extract. Then twelve separate analyses are undertaken. If one or more of these analyses are positive the pond is declared positive for the presence of GCN. 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.

METHODOLOGY

The laboratory testing adheres to strict guidelines laid down in WC1067 Analytical and Methodological Development for Improved Surveillance of The Great Crested Newt, Version 1.1

The analysis is conducted in two phases. The sample first goes through an extraction process where all six tubes are pooled together to acquire as much eDNA as possible. The pooled sample is then tested via real time PCR (also called q-PCR). This process amplifies select part of DNA allowing it to be detected and measured in ‘real time’ as the analytical process develops. qPCR combines PCR amplification and detection into a single step. This eliminates the need to detect products using gel electrophoresis. With qPCR, fluorescent dyes specific to the target sequence are used to label PCR products during thermal cycling. The accumulation of fluorescent signals during the exponential phase of the reaction is measured for fast and objective data analysis. The point at which amplification begins (the Ct value) is an indicator of the quality of the sample. True positive controls, negatives and blanks as well as spiked synthetic DNA are included in every analysis and these have to be correct before

any result is declared so they act as additional quality control measures.

The primers used in this process are specific to a part of mitochondrial DNA only found in GCN ensuring no DNA from other species present in the water is amplified. The unique sequence appropriate for GCN analysis is quoted in DEFRA WC 1067 and means there should be no detection of closely related species. We have tested our system exhaustively to ensure this is the case in our laboratory. We can offer eDNA analysis for most other species including other newts.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. Kits are manufactured by SureScreen Scientifics to strict quality procedures in a separate building and with separate staff, adopting best practice from WC1067 and WC1067 Appendix 5. Kits contain a 'spiked' DNA marker used as a quality control tracer (SureScreen patent pending) to ensure any DNA contained in the sampled water has not deteriorated in transit. Stages of the DNA analysis are also conducted in different buildings at our premises for added

SureScreen Scientifics Ltd also participate in Natural England's proficiency testing scheme and we also carry out inter-laboratory checks on accuracy of results as part of our quality procedures.

Reported by: Sam Humphrey **Approved by:** Derry Hickman

End Of Report

SureScreen Scientifics

Folio No: E6877
Report No: 1
Purchase Order: P18-451
Client: BSG ECOLOGY LTD
Contact: Daniel Foster

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: 22/04/2020
Date Reported: 23/04/2020
Matters Affecting Results: None

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
1081	Pond P1		Pass	Pass	Pass	Positive	4
1082	Pond P4		Pass	Pass	Pass	Negative	0
1083	Pond P7		Pass	Pass	Pass	Negative	0
1084	Pond P5		Pass	Pass	Pass	Negative	0
1085	Pond P6		Pass	Pass	Pass	Negative	0

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

Reported by: Chris Troth **Approved by:** Sarah Evans

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.