

Formation of new lake to south of Newgate Farm, Hackness

bramhall benkharn

Design and Access Statement

November 2020

This statement accompanies a planning application for the formation of a new lake to the south of Newgate Farm, Rice Gate, Hackness, YO13 0JU. Proposed alterations and extensions to the existing house at Newgate Farm have recently been granted permission under decision **NYM/2019/0619/FL**. The application site for the proposed lake is under the same ownership as Newgate Farm and the applicants are Mr and Mrs Ramsey.

Overview

The application seeks to form a new lake to the south of Newgate Farm on what is currently a relatively narrow strip of agricultural pasture, running north-south to the west side of the access driveway to Newgate Farm. The proposed lake is approximately 161m long (north-south axis) and 36m wide at its widest point (east-west axis, northern end). The proposed lake is positioned along a stretch of the existing Highdales Beck watercourse, and it is intended that the new lake would have an inflow from Highdales Beck at its northern end, and an outflow to the existing beck at its southern end. It is proposed that the outflow to the south would be regulated via a flow control device.

The applicant has several reasons for wishing to form a lake in this location. The first is one of amenity, with potential southward views achieved across the lake from Newgate Farm to the north, and a desire to spend leisure time outside and the lake being an enjoyable landscape feature to spend time around. Allied to this is their desire to improve and enhance the wildlife and biodiversity value of the land that they own around Newgate Farm, taking enjoyment from the observation of wildlife occupying their land holding. Formation of a moderate-sized lake would provide considerable additional habitat and wildlife opportunity for the site. An Extended Phase 1 Habitat Survey and Preliminary Ecological Appraisal of the site was undertaken by Wold Ecology in April 2020 and their report accompanies the application.

The lake would also serve to provide a potential location for the installation of a water-source heat pump (WSHP) heating system, providing renewable heating for the residential dwelling and annexes at Newgate Farm (as approved under decision NYM/2019/0619/FL). The lake also has potential to reduce seasonal downstream flooding of Highdales Beck, through attenuation of rainwater runoff, which currently causes significant issues with flooding of the single-track access road to the south of the application site.

Topography

The siting of the proposed lake is positioned along a stretch of the existing Highdales Beck, which runs through the application site. The length of the existing beck that would be affected by the proposals is approximately 155m. The existing topography forms a valley to either side of the existing beck, being considerably steeper on the eastern side than the west. The existing access driveway to Newgate Farm sits to the immediate east side of this valley, with the access drive being around 4m higher than the beck level.

It is proposed that the lake is formed within this existing valley, through formation of an earth 'berm' at the southern end of the lake, providing a containment structure for water to pond behind. The ground would be reprofiled all the way around the perimeter of the proposed lake to adjust the existing levels as required to achieve the correct profile for the lake. It is intended that the lake would have a maximum depth of around 2.5 - 3m at its centre. Margins would be kept shallow, with stepped terraces below the water surface, to provide maximum opportunity for wildlife. A proposed water surface level of around +103.750 is approximately 2.86m higher than existing ground level at the southern end of the lake, where the containment berm will be formed, and approximately 0.62m lower than existing ground level at the northern end of the lake.

Renewable Technologies

Should the lake be granted planning approval, the applicant has an intention to install a water-source heat pump (WSHP) into the northern end of the lake, nearest to the house, to provide renewable heating and hot water for the house and its annexes. Water source heat pumps work by extracting heat from a body of water and converting it into useful energy to heat a building. They use a series of submerged pipes containing a working fluid to absorb the heat from a river, lake, large pond or borehole. This is then turned into useful heat for space heating and hot water, through compressing the working fluid so it can give the heat off at a higher temperature. It is intended that this technology could provide a good proportion of the heat demand of the house from a renewable source.

Seasonal Flooding

Parts of the existing single-track access road to Newgate Farm, and other properties located between Newgate Farm and Hackness village, suffer from seasonal flooding during periods of heavy rainfall. There is a vehicular ford with depth markers forming part of this road, to the south (downstream) of the application site. Here the surfaced carriageway is sunken between existing verges, which is particularly susceptible to flooding and can fill to considerable depth, making it difficult for some vehicles to safely pass through.

It is anticipated that the proposed lake can serve to alleviate some of this seasonal flooding by providing a certain amount of attenuation of water coming down Highdales Beck from the catchment of the valley floor to the north of the application site. Installation of a flow control device at the outlet from the southern end of the lake into the beck would enable moderation of the outflow, allowing some water to be held back during periods of heavy rainfall and then released more gradually over a longer period. This would help to regulate the flow of the beck, reducing flood peaks downstream.

Access

The application site is accessed from the existing single-track highway that provides access to Newgate Farm, running north-westwards from Hackness village. There is an existing track which joins the west side of the highway near Newgate Gills, fording the beck and then turning northwards into the application site. This is within the ownership of the applicant. The site is also contiguous with the access drive to Newgate Farm along its entire eastern boundary, providing further access opportunity.

Public Footpaths

The proposed location for the lake conflicts with an existing public footpath which runs through the centre of the application site on a north-south alignment. This footpath runs from Fewler Gate Wood to the south west, through Hard Dale, running through the application site and then joining a further footpath to the north of the application site that runs up the access drive to Newgate Farm. The footpath that runs through the application site has been identified by the North York Moors National Park Ranger team as Footpath 020, and the footpath that runs up the Newgate Farm access drive is Footpath 712.

The existing arrangement sees footpath 020 join footpath 712 to the north of the application site, south of Newgate Farm, crossing Highdales Beck to do so. As a section of footpath 020 would be extinguished by the proposed lake, it is intended that this path could be diverted to the south of the application site to join footpath 712 at a slightly earlier point. This could be achieved via the existing track that fords the beck to the south of the application site, allowing footpath users to cross the beck at an earlier point onto the existing highway, before turning northwards and joining footpath 712 at its southern end, continuing northwards along the Newgate Farm access drive, as existing.

Observation of footpath users by the applicant has shown that a number of walkers already use the route suggested above, crossing over onto the access drive to Newgate Farm via the existing access track to the south of the application site, and then continuing northwards along the Newgate Farm access drive, in preference to using the designated route of Footpath 020 further to the west. It is likely this is because crossing Highdales Beck further upstream on the designated route of Footpath 020, closer to Newgate

Farm, is actually quite difficult to achieve (particularly during periods of higher water flow), combined with the fact that simply following the access track out onto the highway and access drive is a more obvious route for footpath users 'on the ground'.

WOLD ECOLOGY LTD

2 Redwood Gardens, Driffield,
East Riding of Yorkshire. YO25 6XA
01377 200242



Chris Toohie M Sc. MCIEEM

www.woldecology.co.uk

Highdales Farm, Hackness, North Yorkshire

NYMNP

01/12/2020

EXTENDED PHASE 1 HABITAT SURVEY and PRELIMINARY ECOLOGICAL APPRAISAL

April 2020

	Staff Member	Position
Extended Phase 1 Habitat Survey and Preliminary Ecological Appraisal :	Chris Toohie MSc MCIEEM Daniel Lombard BSc MCIEEM	Ecologist
Report prepared by :	Chris Toohie MSc MCIEEM Daniel Lombard BSc MCIEEM	Ecologist
Signed off by :	Chris Toohie MSc MCIEEM	Signature protected
Notes :	This report contains sensitive information concerning protected species and caution should be exercised when copying and distributing to third parties.	
Disclaimer :	This report and its content are copyright © 2020 Wold Ecology Ltd. All rights reserved. You may not distribute or commercially exploit the content of this report until a non-draft version of this document has been issued. Any unauthorised redistribution or reproduction of part or all the contents of this report will constitute an infringement of copyright.	

TABLE OF CONTENTS

1.0	EXECUTIVE SUMMARY	2
2.0	INTRODUCTION	4
3.0	COMPANY PROFILE	7
4.0	PHASE 1 HABITAT SURVEY METHODOLOGY	10
5.0	LIMITATION OF FIELD SURVEY	11
6.0	DESK TOP STUDY	12
7.0	PHASE 1 FIELD SURVEY RESULTS	21
8.0	SPECIES APPRAISAL	25
9.0	HABITATS APPRAISAL	47
10.0	BIBLIOGRAPHY	61
11.0	APPENDICES	63

1.0 EXECUTIVE SUMMARY

- 1.1 In March 2020, Wold Ecology was commissioned by Bramhall Blenkharn to undertake an extended phase 1 habitat survey and a preliminary ecological appraisal on land at Highdales Farm, Hackness (national grid reference SE 95022 92901) in North Yorkshire.
- 1.2 In order to accomplish the brief, a desk top study, external consultation, an extended phase 1 field survey and preliminary ecological appraisal was undertaken by Wold Ecology staff.
- 1.3 The habitats within the Application Site comprise improved grassland, running water, semi-natural woodland, bare ground, orchard, plantation woodland and hedgerow, interspersed with several scattered trees located in an area of sub-urban housing, in a rural landscape.
- 1.4 The proposed development involves conversion and maintenance works to then buildings, partial site clearance, the creation of a small lake and part of the existing watercourse to be infilled and diverted underground.
- 1.5 The field survey and ecological appraisal targeted the following species and habitats relevant to the Application Site and the development proposal. The field surveys and preliminary ecological appraisal results are summarised below:

		Application Site Status
Further Surveys Required	White-clawed Crayfish	In order to comply with the requirements of the latest Natural England guidance (EN 2000), a presence or absence survey, must be undertaken. Crayfish surveys are best carried out during the period July to October, the peak time of activity and minimal disturbance.
Proceed with caution, timing constraints	Birds	The site is suitable for nesting birds with various designations. Any trees, shrubs, hedgerows and stream banks to be removed should be cleared outside of the bird nesting season (i.e. clearance should be undertaken between mid-September and early February inclusive) or be carefully checked by an ecologist to confirm no active nests are present - prior to removal during the summer period. If nesting birds are found during the watching brief, works will need to stop until the young have fledged.
Timing constraints	Fish	The spawn and spawning grounds of freshwater fishes are protected by law. Considering the information presented on brown trout and bullhead, it is recommended that any works on the watercourse are undertaken between July and September, allowing both species to have completed breeding and for the larvae to hatch. Consideration to the future impacts of watercourse management, including flow alteration and sedimentation should be considered and approved by the Environment Agency.

Proceed with caution	Working adjacent to watercourses	Potential discharge of foul water into the adjacent watercourses should be addressed by Land Drainage Consultant. Production of a silt management plan. A working adjacent to watercourses method statement is included in section 9.0.
Proceed with caution, Method Statement	Reptiles	Wold Ecology recommends that the proposed development works are undertaken in conjunction with a reptile method statement.
Management Plan	Habitats	The loss of a small part of the orchard and Highdales Beck and tributary should be compensated for through the production of a Wildlife Enhancement Plan.
No ecological constraints.	Great Crested Newt	The results of eDNA analysis did not detect the presence of any great crested newts in pond 1. No further great crested newt surveys or mitigation recommended.
	Bats	No further surveys recommended.
	Badger	
	Water vole	
Otter		

- 1.6 This report is valid until **October 2021**. After this time, additional surveys need to be undertaken to confirm that the status of the site for protected species, site habitat composition and conclusions within this report have not changed.
- 1.7 Species list within this report may be forwarded to the local biodiversity records centre to be included on their national database. No personal information will be sent. Please contact Wold Ecology if you do not wish the species accounts and grid references to be shared.

2.0 INTRODUCTION

2.1 In March 2020, Wold Ecology was commissioned by Bramhall Blenkharn to undertake an extended phase 1 habitat survey and a preliminary ecological appraisal on land at Highdales Farm, Hackness (national grid reference SE 95022 92901) in North Yorkshire.

2.2 An ecological assessment is a requirement of the Local Planning Authority (LPA), as part of the planning application process. This is specified in the following legislation:

- National Planning Policy Framework (NPPF): Conserving and Enhancing the Natural Environment.

2.3 To protect and enhance biodiversity and geodiversity, plans should:

- a) 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; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation.
- b) promote the conservation, restoration and enhancement 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.

2.4 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.

2.5 The following should be given the same protection as habitats sites:

- a) potential Special Protection Areas and possible Special Areas of Conservation;
- b) listed or proposed Ramsar sites; and

- c) 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.
- 2.6 In addition, an ecological assessment is also required so that the local authority comply with the Habitats and Species Regulations 2017 and to have regard to the purpose of conserving biodiversity in the exercise of their functions (Natural Environment and Rural Communities (NERC) Act 2006).
- 2.7 Planning authorities must determine whether the proposed development meets the requirements of Article 16 of the EC Habitats Directive before planning permission is granted (where there is a reasonable likelihood of European Protected Species being present). Therefore, during its consideration of a planning application, where the presence of a European protected species is a material consideration, the planning authority must satisfy itself that the proposed development meets three tests as set out in the Directive.
- 2.8 The LPA has to assess whether the development proposal would breach Article 12(1) of the Habitats Directive. If Article 12(1) would be breached, the LPA would have to consider whether Natural England was likely to grant a European protected species licence for the development; and in so doing the LPA would have to consider the three derogation tests:
- a) 'Preserving 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'
- In addition, the LPA must be satisfied that:
- (b) 'That there is no satisfactory alternative'
- (c) 'That the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range'.
- 2.9 Relevant Case Law
- Woolley v Cheshire East Borough (2009).
 - R.(Morge) v Hampshire County Council (2011).
 - Prideaux v. Buckinghamshire County Council and Fcc Environmental UK Limited (2013).
- 2.9.1 The rulings summarise that if it is clear or perhaps very likely that the requirements of the Directive cannot be met because there is a satisfactory alternative or because there are no conceivable 'other imperative reasons of over-riding public interest' then the authority should act on that and refuse permission.'
- 2.9.2 The conclusion of the judgement is that LPAs must ensure that the option/alternative that best takes into account all the relevant considerations (not just EPS) should be the preferred option assuming that the other two tests specified in Article 16 (1) are also met.
- 2.9.3 The judgements also clarified that it was not sufficient for planning authorities to claim that they had discharged their duties by imposing a condition on a consent that requires the developer to obtain a licence from Natural England. Natural England considers it essential that appropriate survey information supports a planning application prior to the determination. Natural England does not regard

the conditioning of surveys to a planning consent as an appropriate use of conditions.

- 2.10 In order to fulfil the brief, the following has been undertaken:
- A desktop study and consultation.
 - Field survey including accessible adjacent land up to 1km.
 - An extended phase 1 habitat survey.
 - Preliminary ecological appraisal.
- 2.11 This report describes the findings of the field survey and desktop study whilst identifying the requirement for further ecological surveys to ensure that a comprehensive study is undertaken.

3.0 COMPANY PROFILE

- 3.1 Wold Ecology Ltd was established in 2006 and are experienced in providing a bespoke service for environmental management and ecological assessments. Wold Ecology employs several experienced and qualified staff/associates to undertake specialist ecological contracts.
- 3.2 Wold Ecology provides a wide range of specialised advice aimed at integrating business with nature. We specialise in ecological surveys, land management planning and site assessments which include:
- **European Protected Species Surveys**
Bats, Birds, Great Crested Newts, Water Vole, Badger, Crayfish and Fungi surveys. Phase 1 and Phase 2 NVC Habitat Surveys and Ecological Impact Assessments.
 - **European Protected Species Licenses**
Bat Licenses - Chris Toohie is one of 186 Natural England Registered Consultant (February 2020) who can hold a Natural England Bat Mitigation Class Licence.
Great crested newt development license holders. Implementation of licenses (amphibian fencing, destructive searches, watching briefs and post development monitoring).
 - **Arboricultural Surveys.**
Arboricultural Impact Assessments, Root Protection Zones and CAD drawings.
 - **Ecological Construction Method Statements and Ecological Enhancements Plans.**
 - **Ecological Clerk of Works.**
- 3.3 Wold Ecology is committed to working towards the conservation of our natural heritage. Wold Ecology support The Wolds Barn Owl Study Group, Driffeld Millennium Green, Filey Bird Observatory, Cornfield Project (Ryedale Folk Museum), Butterfly Conservation (Yorkshire Branch) and RSPB projects with volunteer staff time and financial resources. Wold Ecology has adopted an important site for nature conservation on Flamborough Head.
- 3.4 Wold Ecology is an Associate Member of the RSPB and Corporate Member of the Bat Conservation Trust.
- 3.5 Surveyor Profile – Chris Toohie M Sc., MCIEEM.
- 3.5.1 Job title: Director.
- 3.5.1.1 Expertise.
- Chris has conducted over 850 bat surveys since 2006 and held over 110 development licenses - Natural England Bat Low Impact Class License Registered Consultant.
 - Phase 1 habitat field surveys and ecological appraisals including Building Research Establishment Environmental Assessment Method (BREEAM) assessments and Biodiversity Metric assessments.
 - Great crested newt and reptile surveys.
 - Management planning, woodland and orchard management and community environmental projects including funding applications.

- 3.5.2 Qualifications.
- M Sc. Arboriculture and Community Forest Management.
 - HND Countryside Management.
 - Great Crested Newt License – 2016-19412-CLS-CLS (held concurrently since 2009).
 - Class 2 bat license – RC027 and 2019-44215-CLS-CLS (held concurrently since 2009).
- 3.5.3 Professional Membership.
- Member of the Chartered Institute of Ecology and Environmental Management (held concurrently since 2007).
- 3.6 Surveyor Profile – Daniel Lombard B Sc., MCIEEM.
- 3.6.1 Job title: Senior Field Ecologist.
- 3.6.2 Expertise.
- Phase 1 habitat field surveys and biodiversity assessments including BREEAM assessments.
 - Bat surveys, bat ecology, bats and wind turbine assessments, bat sound analysis and monitoring.
 - Great crested newt and reptile surveys.
 - Mammal surveys including water vole, otter, and badger.
 - Ornithological surveys including bird ringing (ringing officer at Filey Bird Observatory).
 - Invertebrates studies, principally Lepidoptera, Odonata, Coleoptera and Diptera plus habitat management/creation for these groups.
 - Management planning, pond, and wetland management.
- 3.6.3 Qualifications.
- B Sc. Environmental Science.
 - Great Crested Newt License – 2015-17182-CLS-CLS
 - Bat License – 2015-11490-CLS-CLS
 - Bird Ringing A Licence – A/6298
- 3.6.4 Professional Membership.
- Member of the Chartered Institute of Ecology and Environmental Management.
- 3.7 A detailed surveyor profile is included in Appendix 5.
- 3.8 Chris Toohie M Sc. MCIEEM meets the criteria for a suitably qualified ecologist by:
- Holding a Master’s degree in Community Forestry and Arboriculture;
 - Being employed as a practising ecologist since 1995, with over 25 years’ relevant experience (also within the last five years) and;
 - Being a full member of the Institute of Ecology and Environmental Management (this makes him subject to peer review and bound by a professional code of conduct).
- 3.9 Daniel Lombard meets the criteria for a suitably qualified ecologist by:

- Holding a Bachelor of Science degree (hons) in Environmental Science;
- Being employed as a practising ecologist since 2007, with over 10 years' relevant experience and;
- Being a full member of the Institute of Ecology and Environmental Management (this makes him subject to peer review and bound by a professional code of conduct).

3.10 Chris Toohie M Sc. MCIEEM has read and reviewed the report and confirms that it:

- Represents sound industry practice
- Reports and recommends correctly, truthfully, and objectively
- Is appropriate, given the local site conditions and scope of works proposed
- Avoids invalid, biased, and exaggerated statements

4.0 PHASE 1 HABITAT SURVEY METHODOLOGY

- 4.1 A Phase 1 Habitat Survey was undertaken at the Application Site on 13th March 2020 and 28th April 2020. During the site visit, the whole of the Application Site and accessible neighbouring land was examined in detail.

Survey	Date	Wind Speed	Wind Direction	Temperature		Rainfall	Cloud Cover
				Start	Finish		
Field	13/03/2020	10mph	NE	7°C	7°C	None	100%
Field and Water sampling	28/04/2020	5mph	E	10°C	10°C	None	70%

- 4.2 The habitats within the Application Site were mapped (see Appendix 2) according to the techniques described in the publication *Handbook for Phase 1 Habitat Survey* (JNCC 2010).
- 4.3 Target notes (if applicable) provide descriptions of the main habitats found on the site, including information about species composition, habitat structure, evidence of management, habitats too small to map and transitional or mosaic habitats.
- 4.4 Sufficient detail on the composition of the vegetation was obtained from the Phase 1 Habitat Survey, which enabled it to be successfully characterised and assessed.
- 4.5 During the site visit, notes were made of features of potential value to other groups such as birds, mammals, amphibians, reptiles, or invertebrates, paying particular attention to species protected by law:

Species/Group	Indicative habitat	Field signs (in addition to sightings)
Bats	Roosts - Trees, buildings, bridges, caves etc. Foraging areas - e.g. Parkland, waterbodies, wetlands, woodland, hedgerows Commuting routes - Linear features (e.g. hedgerows, water courses, tree lines).	Potential roost sites: Droppings, urine splashes, staining and feeding remains.
Badger	Habitat mosaic in rural and many urban habitats	Excavations and tracks, sett entrances, latrines, hairs, well-worn paths, prints, scratch marks on trees
Otter	Rivers, streams, canals, ponds, lakes, ditches, drains and coastal areas.	Holts (or dens), prints, spraints, slide marks into watercourses and feeding signs.
Water Vole	Rivers, streams, canals, ponds, lakes, ditches, drains and marshes.	Burrow entrances, prints, distinctive latrine areas and feeding signs.
Birds	Habitat mosaic	Nests, droppings below nest sites (especially in buildings of trees); tree holes
Reptiles	Habitat mosaic	Sloughed skins
Great Crested Newt	Ponds within 500m of suitable habitat within the site boundary. Habitat Suitability Index (HSI assessment)	Egg wraps and animals (depending on time of year)

5.0 LIMITATION OF FIELD SURVEY

- 5.1 Whilst the majority of the Application Site was examined at the macro scale, many species will have been overlooked at the micro level because it is not the purpose of a phase 1 habitat survey to classify all taxa occurring in the Application Site. In addition, whilst the actual timing of the survey was adequate to classify the habitat types, there is undoubtedly a strong seasonal element to the presence of species within the site and species occurring outside of the survey period will have been missed.
- 5.2 This report will serve to indicate the possible value of the site in nature conservation terms based upon the initial field survey and desk top data gathered. As with any survey of this kind, it cannot be a definitive description of the site and its associated habitats and species.
- 5.3 Access was only granted within the Application Site and land owned by the client; neighbouring land was only studied from vantage points, maps within the public domain and aerial photography, it is possible that habitats important to the ecology of the Application Site may not have been recorded fully.
- 5.4 However, a phase 1 habitat survey of this nature, supported by a thorough desk top survey, is sufficient to make a number of general assumptions about the ecology of the site.

6.0 DESKTOP STUDY

6.1 General description

6.1.1 The Application Site is located 1.6km north east of Broxa village; in a rural location. The Application Site is less than 2 ha, it is approximately 109m above sea level and is located in a sheltered location within High Dale. The Application Site is immediately surrounded by grazed pasture and plantation forestry.

6.1.2 Habitats within 2km surrounding the Application Site primarily comprises undulating river valleys on the southern edge of the North York Moors. Arable and pastoral farming occur in most valley bases with plantation forestry on hill tops and hill sides too steep for agriculture. Woodland cover within 2km is excellent and occurs as forest, semi natural woodland, plantations and shelterbelts adjacent to farms and small holdings; small amounts of ancient woodland are also present. The watercourse (Highdales Beck) and riparian woodland running through the centre of the site and the expanses of woodland edge and forest offer excellent habitat connectivity to the wider countryside.

6.1.3 A summary of the surrounding habitat is (radius of < 2km from the site):

- Buildings – farm buildings and residential properties
- Hedgerow
- Mature trees and woodland
- Broxa Forest
- Spring Wood West
- Haggland Wood
- Fewler Gate Wood
- Hunter's Wood
- Highgarth Wood
- Roothill Wood
- Haggland Wood
- Arable
- Mature private gardens
- Ponds and watercourses
- Highdales Beck
- Whipserdales Beck
- River Derwent
- Grazed pasture

6.2 Desktop Study.

6.2.1 Natural England, the North & East Yorkshire Ecological Data Centre (NEYEDC), www.magic.gov.uk, social media, local authority planning portal and Wold Ecology employees, field surveyors and network of associate ecologists were consulted in order to obtain any ecological information that they hold of relevance to the Application Site and surrounding area.

6.2.2 The desk top study identifies land parcels of nature conservation value within 2 km of the Application Site. Relevant extracts from associated documentation are highlighted below. The following data resources were searched:

- Sites of Special Scientific Interest (SSSI)
- Special Protection Areas (SPA)
- National Parks
- National Reserves
- Special Areas of Conservation (SAC)
- Ramsar sites
- Areas of Outstanding Natural Beauty (AONB)
- Local Nature Reserves (LNR)
- Local wildlife sites (LWS) or equivalent
- Natural England Habitat Inventories
- Natural Character Area documentation
- European protected species records
- UK Biodiversity Action Plan habitats and species records
- Local Biodiversity Action Plan habitats and species records
- Notable species records

6.2.3 International Designated Sites

6.2.3.1 There are no International Designated Sites within 2 km of the Application Site.

6.2.4 Nationally Designated Sites

6.2.4.1 The Application Site is located within the following National Designated Sites (see figure 1):

<i>Designation</i>	<i>Name or location of site</i>	<i>Grid Reference</i>
National Park	North York Moors	Whole of search area

6.2.4.2 North York Moors National Park is described by Natural England as:

- The North York Moors consist of a moorland plateau, intersected by a number of deep dales or valleys containing cultivated land or woodland. The largest dale is Eskdale, the valley of the River Esk which flows from west to east and empties into the North Sea at Whitby. The Cleveland Hills rise north of Eskdale. At the western end of Eskdale, the valley divides into three smaller dales, Westerdale (the upper valley of the River Esk), Baysdale and Commondale. A series of side dales drain into Eskdale from the moors on its southern side, from west to east Danby Dale, Little Fryup Dale, Great Fryup Dale, Glaisdale and the Goathland valley. Kildale, west of Commondale and separated only by a low watershed, is drained by the River Leven, which flows west to join the River Tees.
- On their south side the moors are demarcated by a series of dales which drain into tributaries of the River Derwent. The westernmost dale is Rye Dale, to the west of which rise the Hambleton Hills. Bilsdale is a side dale of Rye Dale. East of Bilsdale Bransdale, Farndale, Rosedale and Newton Dale cut into the moors. In the south east, the landscape is marked by the narrow valleys of the upper reaches of the Derwent and its upper tributaries.
- About 22 per cent of the North York Moors is under woodland cover (mostly located to the south-west and south-east), equivalent to more than 300 square kilometres of trees. It is home to the largest concentration of ancient and

veteran trees in northern England.

- The Derwent crosses the Vale of Pickering flowing westwards, turns southwards at Malton and flows through the eastern part of the Vale of York before emptying into the River Ouse at Barmby on the Marsh.

6.2.4.3 The Application Site lies fully within the boundaries of the Nationally Designated Site.

6.2.5 Locally Designated Sites

6.2.5.1 There are no Locally Designated Sites within 2 km of the Application Site.

6.2.6 Natural England Habitat Inventories

6.2.6.1 All the Natural England Priority Habitat inventories were searched, including the woodland inventory and grassland inventory. The following areas of notable habitat from the Habitat Inventories list were found within 2 km of the Application Site (see Figure 2).

Ancient Woodland Inventory

Version: *Ancient Woodlands*

July 2019

<i>Habitat type</i>	<i>Location or comments</i>
Ancient and Semi-Natural Woodland	Stony/Holm/Hagg Woods; Oak Rigg Wood; Chapman Banks; Greengate/ Walker Flat Woods; several very small unnamed areas up side valleys from Whisper Dales
Planted Ancient Woodland Sites	Stony/Holm/Hagg Woods; Cow Heights Wood; Oak Rigg Wood; Spring Woods East and West; Chapman Banks; Greengate/ Walker Flat Woods; several very small unnamed areas up side valleys from Whisper Dales

Priority Habitat Inventory

Version: *Priority Habitats Inventory*

August 2017

<i>Habitat type</i>	<i>Location or comments</i>
Deciduous woodland	Numerous parcels throughout search area
Good quality semi-improved grassland	Low Dales
Lowland meadows	Low Dales

Figure 1.

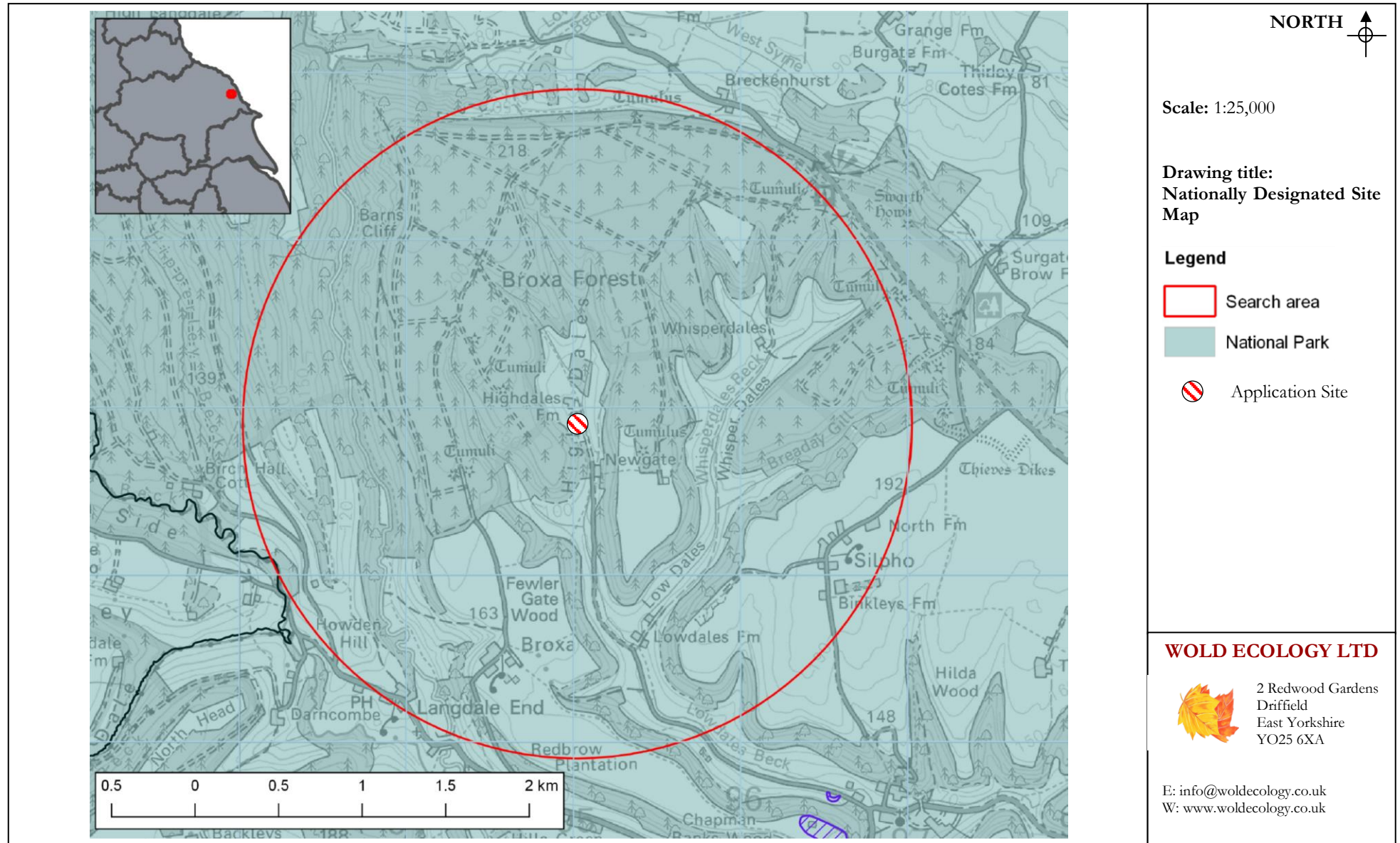
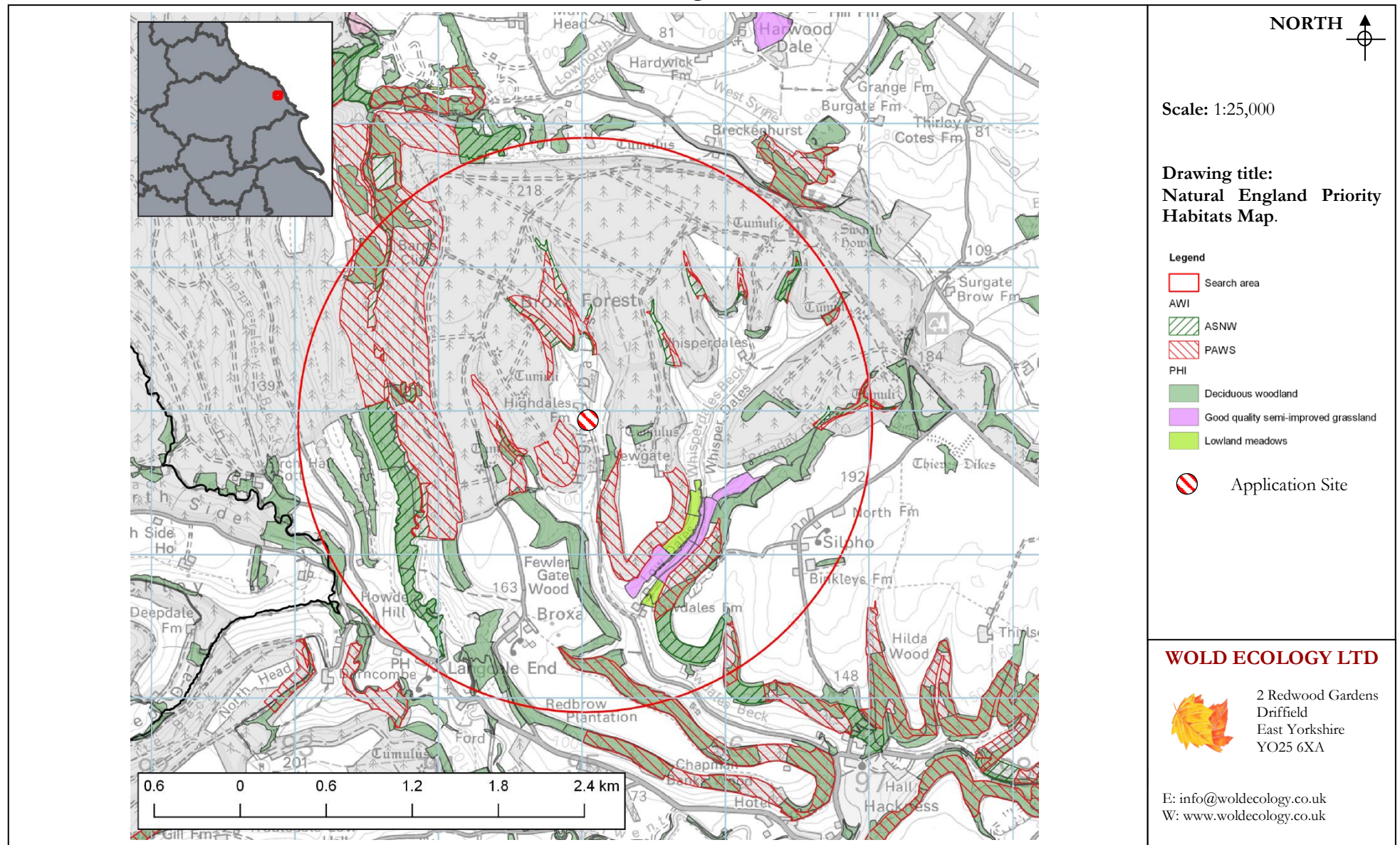


Figure 2.



6.3 Natural Character Areas

- 6.3.1 National Character Areas (NCAs) divide England into 159 distinct natural areas. Each is defined by a unique combination of landscape, biodiversity, geodiversity, and cultural and economic activity. Their boundaries follow natural lines in the landscape rather than administrative boundaries, making them a good decision-making framework for the natural environment. As part of its responsibilities in delivering the Natural Environment White Paper, Biodiversity 2020 and the European Landscape Convention, Natural England is revising its National Character Area profiles to make environmental evidence and information easily available to a wider audience.
- 6.3.2 NCA profiles are guidance documents which will help to achieve a more sustainable future for individuals and communities. The profiles include a description of the key ecosystem services provided in each character area and how these benefit people, wildlife, and the economy. They identify potential opportunities for positive environmental change and provide the best available information and evidence as a context for local decision making and action.
- 6.3.3 The Application Site lies within Natural Character Area 25 North York Moors and Cleveland Hills and is summarised below:
- 6.3.3.1 The North York Moors and Cleveland Hills National Character Area (NCA) comprises a well-defined upland area, rising from the Tees Lowlands to the north, the Vale of Mowbray and Howardian Hills to the west and the Vale of Pickering to the south. To the east it is bordered by the North Sea, the extensive stretches of high coastal cliffs exposing the geology that shaped these uplands. Some 85 per cent of the area falls within the North York Moors National Park.
- 6.3.3.2 The North York Moors and Cleveland Hills are an elevated upland of sandstone geology, incised by valleys, which features the largest continuous expanse of upland heather moorland in England, internationally recognised for its important habitats and the moorland bird population it supports. The expansive, largely treeless, central moorland plateau contrasts strongly with the enclosed valleys; some are narrow and wooded, while others such as the Esk are wider, with an upland landscape of walled and hedged pastures. Over 25 per cent of the area is semi-natural moorland habitat (upland heathland and blanket bog), much of which is designated as Sites of Special Scientific Interest, and the area has about 21 per cent woodland cover (mostly located to the south-west and south-east). It is largely unpopulated, with scattered farmsteads and small villages, and the main population centres lie along the coast and southern edge.
- 6.3.3.3 A substantial part of the area forms the North York Moors National Park, with both its natural and cultural heritage shaping a distinctive sense of place, drawing many visitors from afar. Sustainably managed uplands provide many ecosystem services of benefit to the wider area. These services include storing carbon in soils, preventing its loss to the air and water; holding rainfall in these wetland habitats and other vegetation, slowing its journey to major rivers and thence regulating flow through more densely populated areas vulnerable to river flooding; providing an expansive, open landscape, long views and a sense of remoteness.

- 6.3.3.4 Providing functioning ecosystems and preventing fragmentation of habitats presents a real challenge, particularly in the face of environmental change, as we increasingly depend on a resilient landscape supported by sustainable land management practices. There are opportunities here to strengthen the networks of semi-natural habitats, particularly wetlands, native woodland and species rich grassland, enhancing their regulation of natural processes and provision of the public benefits mentioned. At the coast the dynamic processes of erosion and accretion can be accommodated, thus creating a more resilient natural environment that is capable of both ameliorating and adapting to climate change. Sustainable management of these natural resources will ensure that the landscape continues to provide food, clean water, energy, and inspiration and enjoyment to people locally, regionally and beyond.
- 6.3.3.5 The following Statements of Environmental Opportunities (SEO) are relevant to the Application Site:
- **SEO 3:** Protect and improve access to and quiet enjoyment of the countryside, particularly in the North York Moors National Park, conserving the sense of tranquillity and relative remoteness, maintaining public access to the landscape, encouraging specialist forms of recreation appropriate to the area, conserving and providing interpretation of its history and numerous archaeological, biological and geological assets, and protecting the strong sense of place.
 - **SEO 4:** Seek opportunities to restore lowland fens, reedbeds, flood plain grazing marsh, flushes and riparian habitat to enhance biodiversity and contribute to regulating flood flows, enhancing water quality, aquifer recharge, carbon sequestration and storage, leading to benefits being experienced within the NCA and beyond to NCAs downstream.
 - **SEO 5:** Positively manage woodlands, trees, wood pasture and historic parklands for their contribution to the characteristic landscapes of the area, their priority habitats and the species that they support, as well as their potential for carbon storage, regulation of peak flood flows and provision of renewable materials.

6.4 European Protected Species records (relevant to the Application Site)

6.4.1

6.4.2 Bats

- Wold Ecology employees, field surveyors and network of associate ecologists have recorded brown long-eared *Plecotus auritus*, noctule *Nyctalus noctula*, Natterer's *Myotis nattereri*, Daubenton's *Myotis daubentonii*, Brandt's *Myotis brandtii*, whiskered *Myotis mystacinus*, soprano pipistrelle *Pipistrellus pygmaeus* and common pipistrelle *Pipistrellus pipistrellus* within 5km of the Application Site. Wold Ecology bat records date from 2006 and include over 1000 bat activity surveys.
- There are no known Natural England development licenses relating to bats within 2km of the Application Site (source – www.magic.gov.uk).

- Wold Ecology bat activity surveys within 5km of the Application Site have recorded the following roosts:

Date	Taxon Name	Common Name	Location	County	Grid reference	Record Type	Abundance
May 2018	Plecotus auritus	Brown long-eared	Thirley Cotes	N. Yorkshire	SE 97596 95092	Day x 2	5
May 2018	Pipistrellus pipistrellus	Common pipistrelle	Thirley Cotes	N. Yorkshire	SE 97596 95092	Day	4
June 2018	Pipistrellus pygmaeus	Soprano pipistrelle	Thirley Cotes	N. Yorkshire	SE 97596 95092	Day x 3	3
June 2018	Pipistrellus pygmaeus	Soprano pipistrelle	Thirley Cotes	N. Yorkshire	SE 97596 95092	Maternity	144
June 2018	Pipistrellus pygmaeus	Soprano pipistrelle	Thirley Cotes	N. Yorkshire	SE 97596 95092	Satellite	36
June 2018	Plecotus auritus	Brown long-eared	Thirley Cotes	N. Yorkshire	SE 97596 95092	Maternity	10
June 2016	Pipistrellus pipistrellus	Common Pipistrelle	Langdale End	N. Yorkshire	SE 93701 91338	Day	1
06/05/16	Pipistrellus pipistrellus	Common Pipistrelle	Roadside Farm	N. Yorkshire	SE 98054 95368	Day	1
2012	Pipistrellus pipistrellus	Common Pipistrelle	Langdale End	N. Yorkshire	SE92274 91499	Day x 9	13
2012	Plecotus auritus	Brown Long-eared Bat	Langdale End	N. Yorkshire	SE92274 91499	Maternity/Day	10

- Wold Ecology bat activity surveys at the adjacent farm buildings have recorded the following roosts (see separate Bat Report, Wold Ecology 2020):

Date	Taxon Name	Common Name	Location	County	Grid reference	Record Type	Abundance
June/July 2019	Pipistrellus pipistrellus	Common Pipistrelle	Highdales Farm, Hackness	N. Yorkshire	SE 94971 93028	Day x 9	48
June/July 2019	Pipistrellus pipistrellus	Common Pipistrelle	Highdales Farm, Hackness	N. Yorkshire	SE 94971 93028	Maternity	47
June/July 2019	Plecotus auritus	Brown long-eared	Highdales Farm, Hackness	N. Yorkshire	SE 94971 93028	Maternity	19
June/July 2019	Plecotus auritus	Brown long-eared	Highdales Farm, Hackness	N. Yorkshire	SE 94971 93028	Day	1
June/July 2019	Pipistrellus pygmaeus	Soprano pipistrelle	Highdales Farm, Hackness	N. Yorkshire	SE 94971 93028	Day x 2	4
June/July 2019	Myotis Brandt's	Brandt's	Highdales Farm, Hackness	N. Yorkshire	SE 94971 93028	Day	1
March 2020	Pipistrellus pipistrellus	Common Pipistrelle	Highdales Farm, Hackness	N. Yorkshire	SE 94971 93028	Hibernation	2

6.4.3 Great crested newts

- There are no records of great crested newts *Triturus cristatus* within the surrounding 2km radius (source - NEYEDC 2020).
- There are no Natural England eDNA records within 2km of the Application Site (source - <https://naturalengland-defra.opendata.arcgis.com/datasets/great-crested-newts-edna-pond-surveys-for-district-level-licensing-england>)
- There are no great crested newt Natural England development licenses within 1km of the Application Site (source – www.magic.gov.uk).
- Great crested newts occur within the wider 5km radius of the Application Site and are abundant around the Scarborough area and the Vale of Pickering (source – NEYEDC, Natural England, Magic.gov.uk 2020 Wold Ecology pers comm)

6.4.4 Water vole

- Water vole *Arvicola amphibious* is recorded within the surrounding 2km radius with records in association with the River Derwent and its catchments
- Wold Ecology have recorded water voles in Langdale Forest (2km West) within the past 5 years (Wold Ecology pers comm).

6.4.5 Otter

- Otter *Lutra lutra* is recorded within the surrounding 2km radius with records at:

Location	Distance from site	Direction
River Derwent (Bridge Farm)	1.9km	SW
Lowdales Beck	1.9km	SE
source – NEYEDC 2020 and Wold Ecology network pers comm		

6.4.6 Reptiles

- Adder *Vipera berus*, common lizard *Zootoca vivipara*, slow worm *Anguis fragilis* are recorded within the surrounding 2km radius with records abundant within Broxa Forest (source – NEYEDC 2020 and Wold Ecology network pers comm).

6.4.7 White-clawed crayfish

- White-clawed crayfish *Austropotamobius pallipes* is recorded within 2km of the Application Site along the River Derwent and its catchments (source – NEYEDC 2020 and Wold Ecology network pers comm).

7.0 PHASE 1 FIELD SURVEY RESULTS

7.1 The following habitat types were recorded within the Application Site:

Phase 1 Habitat Classification	JNCC Reference Code
Broad-leaved semi-natural woodland	A1.1.1
Broad-leaved plantation woodland	A1.1.2
Improved grassland	B4
Running water	G2
Intact species poor hedge	J2.1.2
Bare ground	J4

7.2 Broad-leaved semi-natural Woodland

7.2.1 A belt of semi-natural riparian woodland runs along most of the length of Highdales Beck running through the Application Site. Trees within this habitat are less than 100 years old and it is likely this land was once open, but re-colonisation of trees has occurred on the steep banks due to reduced grazing pressure in this area. Tree species are dominated by broad-leaved trees of local provenance with no evidence of planting. The canopy and understory show an ecologically poor structure although basal vegetation is severely damaged by high numbers of pheasants *Phasianus colchicus* and appeared to have damaged the basal floral assemblage to an unfavourable condition. Fallen and standing deadwood is limited but present and there is no evidence of regular or substantial past management.

7.2.2 Species which form the canopy is primarily dominated by alder *Alnus glutinosa* with an understory merging into the canopy containing hawthorn *Crataegus monogyna*, holly *Ilex aquifolium*, crab apple *Malus sylvestris*, dog rose *Rosa canina*, blackthorn *Prunus spinosa*, elder *Sambucus nigra*, rowan *Sorbus aucuparia* and hazel *Corylus avellana*.

7.2.3 The basal community has been damaged by high densities of pheasants and to a lesser extent by grazing and consequently, it is in an unfavourable condition. It is dominated by primrose *Primula vulgaris*, pignut *Conopodium majus*, opposite-leaved golden saxifrage *Chrysosplenium oppositifolium*, red campion *Silene dioica*, ground elder *Aegopodium podagraria*, sanicle *Sanicula europaea*, small nettle *Urtica urens*, crosswort *Cruciata laevipes*, slender speedwell *Veronica filiformis*, snowdrop *Galanthus nivalis*, bugle *Ajuga reptans*, selfheal *Prunella vulgaris*, hard fern *Blechnum spicant*, ivy *Hedera helix*, wood avens *Geum urbanum*, herb Robert *Geranium robertianum*, wood speedwell *Veronica montana* and wild strawberry *Fragaria vesca*.

7.3 Broad-leaved plantation Woodland

7.3.1 Two distinct parcels of broad-leaved plantation woodland occur within the Application Site. The first is a small patch of traditional orchard which occurs on the northern part of the stream bank. This orchard is small comprising 10 apple *Malus domestica* trees, although trees contain standing deadwood and features of increased ecological value. Basal vegetation comprises improved grassland.

7.3.2 A section of plantation woodland less than 30 years old occurs adjacent to the western boundary of the site. This habitat has possibly been planted in association with a grant or stewardship scheme and is currently used for pheasant rearing, with

pheasant feeders etc present. The canopy is the same age and dominated by oak *Quercus robur* with smaller amounts of beech *Fagus sylvatica*. There is no notable shrub or basal understory within this habitat, likely through suppression from leaf litter, shading and pheasant disturbance.

7.4 Improved grassland

7.4.1 Grassland habitats within the Application Site are characterised by improved grassland which is grazed annually through the summer months. This appears to be largely used as grazed sheep pasture, with high levels of stock and has associated areas of poaching on bank sides and gate entrances. The sward is unselectively grazed and is short and lush without forming into tussocks. Several damp depressions occur in the western half of the site, the remainder of the site is well drained, with the eastern section forming a west facing slope. Soils are nitrogen rich; they appear slightly acidic and have been used in agriculture throughout the areas recent past.

7.4.2 Species diversity is reduced by grazing and is characterised by grasses including Yorkshire fog *Holcus lanatus*, cocks-foot *Dactylus glomerata*, rough meadow grass *Poa trivialis*, perennial ryegrass *Lolium perenne*, annual meadow grass *Poa annua*, red fescue *Festuca rubra* and sheep's fescue *Festuca ovina*. Broad-leaved plants within the sward include spear thistle *Cirsium vulgare*, broad-leaved dock *Rumex obtusifolius*, common mouse-ear *Cerastium fontanum*, germander speedwell *Veronica chamaedrys*, small nettle, field speedwell *Veronica persica*, field wood rush *Luzula campestris*, common ragwort *Jacobaea vulgaris*, creeping buttercup *Ranunculus repens*, cow parsley *Anthriscus sylvestris*, white clover *Trifolium repens*, daffodil *Narcissus pseudonarcissus*, common sorrel *Rumex acetosa*, pignut, lesser celandine *Ficaria verna*, prickly sow thistle *Sonchus asper*, field forget-me-not *Myosotis arvensis*, common vetch *Vicia sativa*, cats-ear *Hypochaeris radicata* and welted thistle *Carduus crispus*. Damp areas do not appear diverse and include creeping bent grass *Agrostis stolonifera*, creeping buttercup, marsh thistle *Cirsium palustre*, soft rush *Juncus effusus* and hard rush *Juncus inflexus*.

7.5 Running Water

7.5.1 A small stream (Highdales Beck) runs through the Application Site in a north to south flow direction, with a single tributary joining in the northern part of the site. Highdales Beck sits at the base of a steep bank system between 1 and 6 metres deep, banks slopes generally become deeper towards the southern part of the site. Most of the immediate embankments of Highdales Beck contain riparian woodland with northern parts more open. An old row of trees dominated by holly, hawthorn and dog rose have been felled on the banks along the western tributary.

7.5.2 Highdales Beck itself contains a rocky and gravel base with limited amounts of silts and occasional tree roots. The channel varies between 1-2m in width and never exceeds 50cm in depth. Structurally, it meanders and contains riffles, eddies and slack water increasing its ecological value. The water quality is clear, has a moderate flow speed and appears unpolluted, although adjacent livestock may increase water phosphate and nitrate levels as well as poach banks increasing silt.

7.5.3 Submerged and marginal vegetation on this section are restricted to brooklime *Veronica beccabunga*, soft rush, floating sweet grass *Glyceria fluitans* and great willowherb *Epilobium hirsutum*.

7.6 In-tact species poor hedge

Hedge 1			
Location	A small section of hedge running on the eastern side of the orchard/woodland in a north to south direction.		
Height	1m	Width	1m
Cross Section	Boxed		
Gap – hedge base	Gap between ground and base of canopy more than 0.5 m for more than 90% of length.		
Gap - hedge canopy continuity	Gaps make up less than 10% of total length No canopy gaps greater than 5m		
Undisturbed ground and perennial vegetation	Understory severely suppressed by grazing and pheasants, with limited botanical value. Adjacent land use (within 10m) comprises cattle grazed pasture, watercourse, woodland and orchard.		
Species composition	Hawthorn is the only woody species encountered within this hedge. More than 90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species.		
Species rich (four woody species per 30m length)	The hedgerow is not species rich and there are no ancient woodland or hedgerow communities associated with these hedges.		
Management and current damage	Regularly cut, no evidence of coppicing or laying. Deadwood abundant within the hedge structure and it is likely to be over-managed resulting in its poor condition. It is also considered likely to be an old landscape feature associated with the orchard, albeit of reduced ecological value.		

7.7 Bare ground

7.7.1 Bare ground habitats comprise the site access road, which comprises a single vehicle width road made up of soil and crushed chalk, with a central grassy verge. This habitat is of no ecological significance and supports marginal vegetation found in improved grassland habitats.

7.8 The following species were recorded during the field survey:

- Blackbird *Turdus merula*
- Song thrush *Turdus philomelos*
- Robin *Erithacus rubecula*
- Wren *Troglodytes troglodytes*
- Great tit *Parus major*
- Coal tit *Periparus ater*
- Blue tit *Cyanistes caeruleus*
- Marsh tit *Poecile palustris*
- Treecreeper *Certhia familiaris*
- Goldcrest *Regulus regulus*
- Long-tailed Tit *Aegithalos caudatus*
- Chaffinch *Fringilla coelebs*

- Goldfinch *Carduelis carduelis*
- Bullfinch *Pyrrhula pyrrhula*
- Woodpigeon *Columba palumbus*
- Pied wagtail *Motacilla alba*
- Grey wagtail *Motacilla cinerea*
- Dunnock *Prunella modularis*
- Pheasant *Phasianus colchicus*
- Buzzard *Buteo buteo*
- Rabbit *Oryctolagus cuniculus*
- Field vole *Microtus agrestis*
- Brown rat *Rattus norvegicus*
- Roe deer *Capreolus capreolus*
- Mole *Talpa europaea*

8.0 SPECIES APPRAISAL

8.1 The habitats within and surrounding the Application Site is potentially important, and the development area may impact upon mobile species. Consequently, the extended phase 1 survey and preliminary ecological appraisal targeted the following species relevant to the Application Site and proposed development:

- Bats
- Great crested newt
- Badger
- Reptiles
- Birds
- Hedgehog
- Water vole
- Otter
- White-clawed crayfish
- Fish

8.2 Bats

8.2.1 Legislation

8.2.1.1 All bats and their roosts are fully protected under the Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000) and are further protected under the Conservation of Habitats and Species Regulations 2017.

8.2.1.2 The Conservation of Habitats and Species Regulations 2017, provision 41 states an offence is committed if a person:

- (a) Deliberately captures, injures, or kills any wild animal of a European protected species (i.e. bats),
- (b) Deliberately disturbs wild animals of any such species,
- (c) Deliberately takes or destroys the eggs of such an animal, or
- (d) Damages or destroys a breeding site or resting place of such an animal.

8.2.1.3 Section 9 of the Wildlife and Countryside Act (1981) states:

- It is an offence for anyone without a licence to kill, injure, disturb, catch, handle, possess or exchange a bat intentionally. It is also illegal for anyone without a licence to intentionally damage or obstruct access to any place that a bat uses for shelter or protection.

8.2.1.4 Bat roosts are protected throughout the year, whether or not bats are occupying a roost site.

8.2.2 Field Survey Methodology

8.2.2.1 The daytime assessment identified whether the trees had any signs of occupancy and/or bat usage. This took the form of a methodical external search for actual roosting bats and their sign. Specifically, the visual survey involved the following:

8.2.2.2 Trees

- a. Assessment and evaluation of the trees and their potential to support bats;
- b. Tree hazard assessment including tree characteristics, health, site conditions,

and defects in relation to a trees potential to support bats. Features that might indicate the presence of bats are as follows:

- Trees that contained a cavity or space of at least 10mm
 - Woodpecker holes, rot holes, cavities, loose bark and ivy, examples of known roost sites
 - Tree diameter at chest height of > 20cm (less indicates that bats are less likely to be present)
 - Trees < 80 years of age are less likely to be attractive to bats
 - Droppings, scratch marks and staining on beams, cavities and under bark.
- a. Assessment of crevices and cracks to assess their importance for roosting bats.
 - b. The duration of the daytime, visual inspection was 45 minutes

8.2.3 Field Survey Results

8.2.3.1 No potential roost sites exist within the studied trees on site, predominantly due to a lack of suitable roosting cavities within the trees, immature age and form.

8.2.4 Site Status Assessment

8.2.4.1 The Application Site and habitats within 100m are an important habitat corridor for transient bats occupying nearby roosts to access foraging habitats in the valley bottom. The combination of a watercourse with riparian woodland offers excellent commuting habitat. It is also likely that bats also use plantation edge habitats further up the valley sides for commuting. These surrounding habitats will remain post development and in addition, the creation of a lake will also provide additional linear commuting habitat.

8.2.4.2 The wider area supports several extensive woodland and forest habitats which offer alternate foraging habitat for bats. These surrounding habitats will remain post development and in addition, the creation of a lake will also provide additional bat foraging habitat.

8.2.5 Biodiversity Gains and Recommendations

8.2.5.1 A detailed bat mitigation strategy for the farm house and barn are included in the Highdales Farm Bat Report (Wold Ecology, 2020).

8.2.5.2 Specially designed bat boxes can be located on site. Schwegler Bat Boxes are recommended and well tested boxes. The following bat boxes provide additional roost habitats and are available from Wold Ecology:

- The **2FN** bat box has two entrances - one at the front and one at the rear against the tree. Bats often creep into the rear entrance but leave by the front. It has a domed roof to allow the bats to form roosting clusters for warmth and this bat box is also designed to be effective against small predators and excludes draughts and light. Due to the opening on the bottom, this bat box does not require cleaning.

8.2.5.3 The majority of these boxes are self-cleaning as they are designed so that the droppings fall out of the entrance. This reduces the possibility of smell during the

summer months. For more information on designs and installation of bat boxes see: www.schwegler-natur.de and www.bct.org.uk.

- 8.2.5.4 Wold Ecology recommends that at least 4 bat boxes are sited on perimeter trees on site. Bat boxes should be erected on south, east or west elevations; 3-5 metres above ground level or close to roof lines.
- 8.2.5.5 Lighting has a detrimental effect on bat activity; many bats will actually avoid areas that are well lit. Lighting can cause habitat fragmentation by preventing bats from commuting between roosts and foraging grounds (A.J Mitchell-Jones 2004).
- 8.2.5.6 The impact on bats can be minimised by the use of low pressure sodium lamps or high-pressure sodium instead of mercury or metal halide lamps where glass glazing is preferred due to its UV filtration characteristics.
- 8.2.5.7 Luminaire and light spill accessories - Lighting should be directed to where it is needed, and light spillage avoided. This can be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvres and shields to direct the light to the intended area only.
- 8.2.5.8 If applicable, the height of lighting columns in general should be as short as is possible as light at a low level reduces the ecological impact. However, there are cases where a taller column will enable light to be directed downwards at a more acute angle and thereby reduce horizontal spill. For pedestrian lighting this can take the form of low level lighting that is as directional as possible and below 3 lux at ground level. Aim for lighting column of 5m or less, hooded and cowed to prevent light spill, for main lighting columns
- 8.2.5.9 Security lighting power, it is rarely necessary to use a lamp of greater than 2000 lumens (150 W) in security lights. The use of a higher power is not as effective for the intended function and will be more disturbing for bats. Many security lights are fitted with movement sensors which, if well installed and aimed, will reduce the amount of time a light is on each night. This is more easily achieved in a system where the light unit and the movement sensor are able to be separately aimed. If the light is fitted with a timer this should be adjusted to the minimum to reduce the amount of 'lit time'. The light should be aimed to illuminate only the immediate area required by using as sharp a downward angle as possible. This lit area must avoid being directed at, or close to, any bats' roost access points or flight paths from the roost. A shield or hood can be used to control or restrict the area to be lit. Avoid illuminating at a wider angle as this will be more disturbing to foraging and commuting bats as well as people and other wildlife.
- 8.2.5.10 Lights will **not** be mounted where they will shine directly on to bat boxes/bat lofts or the surrounding woodland/hedgerow/aquatic habitat used by foraging and commuting bats.

8.3 Great crested newt.

8.3.1 Legislation

8.3.1.1 The great crested newt is protected under European and British legislation. Under European legislation it is protected under EC Directive (92/43/EEC) 'The Conservation of Natural Habitats and of Wild Fauna and Flora', being listed under Annexes IIa and IVa. This is implemented in Britain under the Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000) and is further protected under the Conservation of Habitats and Species Regulations 2017. This prohibits the intentional killing of newts, the deliberate taking or destruction of eggs, damage or destruction of a breeding site or resting place, intentional/reckless damage to or obstruction of a place used for shelter or protection, possession of a great crested newt and any form of trade of great crested newts.

8.3.1.2 Under British legislation, the great crested newt is given full protection under section 9 of the Wildlife and Countryside Act 1981 (as amended). This Act transposes into UK law the Convention on the Conservation of European Wildlife and Natural Habitats (commonly referred to as the 'Bern Convention'). This prohibits the intentional killing, injuring or taking, possession or disturbance of great crested newts whilst occupying a place used for shelter or protection and the destruction of these places. Protection is given to all stages of life (e.g. adults, sub-adults, larvae, and ovae).

8.3.1.3 In combination the above legislation prohibits the following:

- Intentionally kill, injure or take a great crested newt;
- Possess or control any live or dead specimen or anything derived from a great crested newt;
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a great crested newt;
- Intentionally or recklessly disturb a great crested newt while it is occupying a structure or place which it uses for that purpose;
- Deliberately capture or kill a great crested newt;
- Deliberately disturb a great crested newt;
- Deliberately take or destroy eggs of a great crested newt;
- Damage or destroy a breeding site or resting place of a great crested newt.

8.3.1.4 The great crested newt is therefore described as 'fully protected'.

8.3.2 Field Survey Methodology

8.3.2.1 A habitat assessment was completed on the proposed development area and surrounding land (500 metres radius) accessible at the time of the surveys. The assessment combined Great Crested Newt Mitigation Guidelines (English Nature 2001) and Evaluating the Suitability of Habitat for the Great Crested Newt (R. S. Oldham, J. Keeble, M. J. S. Swan and M. Jeffcote, undated) methodology.

8.3.2.2 The entire Application Site was assessed for its potential to support great crested newts, whilst conducting a walkover survey. In addition, aerial photographs, maps and physical searches of the surrounding landscape gave an impression of how the

Application Site is connected to ponds within the locality and potentially great crested newt populations.

8.3.2.3 Amphibians can take refuge under logs, bark and stones whilst in terrestrial habitat. All available features within the Application Site were turned over to search for the presence of amphibians. This method is not an effective method of presence/absence; however, it can be used as a general indication of amphibians within an area. Despite the time of year amphibians are occasionally found outside of hibernacula in such situations, especially during mild damp weather such as that prior and during the field survey.

8.3.2.4 Habitat Suitability Index (HSI) Evaluation.

8.3.2.4.1 The likely presence of great crested newts in ponds can be predicted by examining aquatic habitat features such as the presence of fish, waterfowl, and water quality. This data is used to calculate a habitat suitability index (Oldham *et. al.* 2000). The HSI is represented by a number from 0 to 1, the higher the number the more likely the pond is to be occupied by great crested newt.

8.3.2.4.2 The HSI system is not sufficiently precise to allow the conclusion that any high score will support great crested newts, or that a pond with a low score will not do so.

8.3.3 Field Survey Results

8.3.3.1 There are no records of great crested newt occur within 500m of the Application Site although great crested newts are present within the wider landscape.

8.3.3.2 One pond (pond 1) was observed during the walkover survey (see figure 3).

8.3.3.3 A second pond was dry at the time of the survey and does not appear to have held water for a number of years. Part of the bank had been collapsed to aid drainage and prevent water retention.

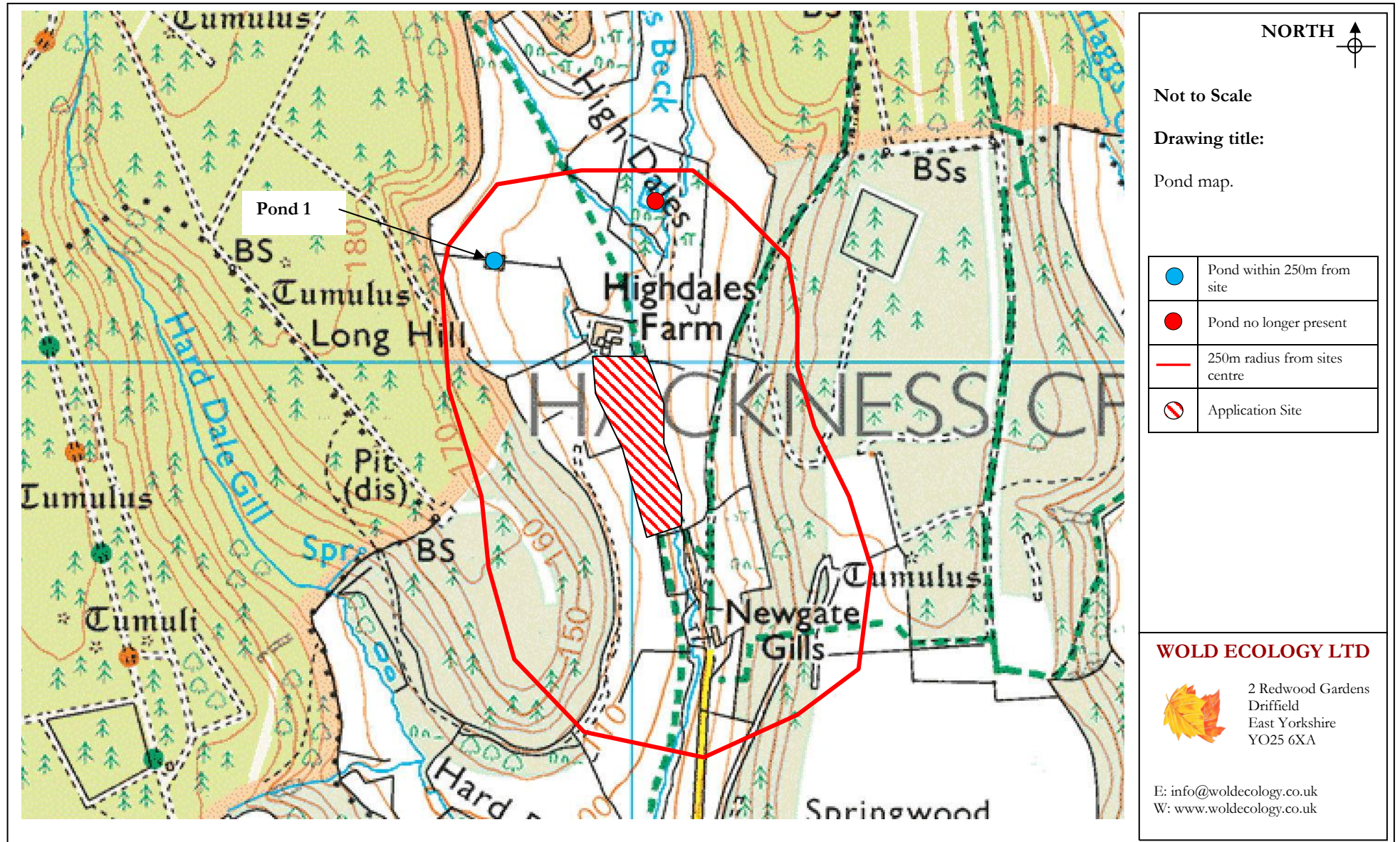
8.3.3.4 The wider habitat contains a network of other ponds and waterbodies, which span across the adjacent landscape.

8.3.3.5 Summary of HSI Scoring

Pond	HSI Score (tenth root of total)	Suitability
1	0.80	Excellent

8.3.3.5.1 Full details of the HSI scoring can be viewed in Appendix 7.

Figure 3.



8.3.4 eDNA sampling

8.3.4.1 Water samples were taken from pond 1 on 28th April 2020, the samples were sent to Surescreen Scientifics for analysis in order to establish whether great crested newt are present within pond 1. The eDNA sampling was undertaken in line with the following methodology:

- Twenty samples were collected from the waterbody using sterile equipment provided by Surescreen Scientifics, at points evenly spread out along the pond perimeter, such that a minimum of 80% of the margins were sampled. The water at each sampling area was gently stirred using a sterile ladle before samples were taken, to mix up DNA, which tends to sink, whilst ensuring that sediment on the pond bottom was not disturbed, where historical DNA can persist.
- The samples were then fixed in an ethanol preserving solution, and sent to Surescreen Scientifics laboratory for analysis, using the Natural England approved method contained within Biggs et al. (2014). According to Biggs et al. (2014) great crested newt DNA can be detected within the pond water for up to 21 days after a great crested newt (including efts) has left the water; a 99.3 % detection rate is achieved when 80 – 90 % of the waterbody margin is sampled.
- In order to avoid contamination, the surveyors avoided entering the water. Latex gloves were worn when sampling and only sterile equipment came into contact with the water.

8.3.4.2 Twenty samples were taken from the aforementioned pond on 28th April 2020; this was within the correct time period of between 15th April and 30th June. The samples were taken by Chris Toohie.

8.3.4.3 The samples were sent to Surescreen Scientifics for analysis on 30th April 2020.

8.3.4.4 **The results of eDNA analysis did not detect the presence of any great crested newts in pond 1.** No further great crested newt surveys or Natural England licenses are recommended in relation to the Application Site.

8.3.4.5 Full details of the HSI scoring can be viewed in Appendix 8.

8.3.5 No further surveys or mitigation are recommended for great crested newts.

8.4 Birds

8.4.1.1 Birds are afforded various levels of protection and levels of conservation status on a species by species basis. The most significant general legislation for British birds lies within Part 1 of the Wildlife and Countryside Act 1981 (as amended). Under this legislation, it is an offence to, kill, injure or take any wild bird, take, damage or destroy the nest of any wild bird while that nest is in use or being built, take or destroy an egg of any wild bird.

8.4.1.2 Schedule 1 Birds

8.4.1.2.1 Schedule 1 birds are rare or scarce species afforded the same protection as above (8.4.1.1), but also have additional protection under Part 1 of the Wildlife and Countryside Act 1981 (as amended). This further protection protects these species

from being intentionally or recklessly disturbed whilst nesting, either at or close to the nest site.

8.4.1.3 Planning consent for a development does not provide a defence against prosecution under this act.

8.4.2 Field Survey Methodology

8.4.2.1 All bird species recorded by either sight, song or call were noted, in addition particular attention was given to key species of conservation concern and which habitat within the Application Site they were recorded using. All active (and disused) nests, territorial, breeding, and foraging birds were recorded in further detail to analyse how breeding birds use the Application Site.

8.4.2.2 The survey followed guidance and methods recommended within *Bird Monitoring Methods, a manual of techniques for key UK species* Gilbert et.al RSPB 1998, *Common Standards Monitoring Guidance for Birds* JNCC 2004 and *Survey Techniques Leaflet 8*.

8.4.2.3 Wold Ecology assessed the site for schedule 1 listed species recorded having bred or attempted to breed in Yorkshire (Wold Ecology, NEYEDC), which have the potential to breed within the Application Site and/or surrounding adjacent local area or breed elsewhere whilst using the Application Site to forage or roost.

8.4.3 Field Survey Results

8.4.3.1 Schedule 1 Listed Birds

8.4.3.1.2 Summary of the Application Site's suitability to support schedule 1 birds:

Species recorded within 2km	Suitability of Application Site
Barn Owl <i>Tyto alba</i>	No suitable cavities for nesting in trees within the Application Site. Grazing reduces the value for foraging, although limited opportunities occur. Works likely to increase wetland edge habitat good for foraging in the long term.
Honey Buzzard <i>Pernis apivorus</i>	Breeds in the wider landscape, no suitably structured high canopy trees for nesting on site. Limited foraging value, may occasionally eat amphibians, insects and reptiles which would still occur post development.
Common Crossbill <i>Loxia curvirostra</i>	Breeds in the wider landscape, no suitable coniferous woodland within the Application Site. May on occasion come to drink from the site during extended periods of hot weather, opportunities will remain post development.
Firecrest <i>Regulus ignicapilla</i>	Breeds in the wider landscape although breeding habitat limited within the Application Site. Given scarcity as a local breeder, it is unlikely to be impacted upon by the proposed development.
Goshawk <i>Accipiter gentilis</i>	Breeds in the wider landscape with no suitably structured high canopy trees for nesting within the Application Site. Limited foraging value but may occasionally hunt in/over the site.
Hobby <i>Falco subbuteo</i>	Breeds in the wider landscape, no suitably structured high canopy trees for nesting on site. Limited foraging value but may occasionally hunt in/over the site. A lake would increase foraging potential on dragonflies and Hirundines.

Kingfisher <i>Alcedo atthis</i>	No suitably open steep streamside cliffs for nesting, and no evidence of birds being present. Potentially use the site, particularly when nearby rivers in winter flood. Unlikely to breed on site.
Nightjar <i>Caprimulgus europaeus</i>	Typically, a heathland and clear fell species. Unlikely to nest in grazed grassland habitats due to unsuitability of relevant cover, roosting locations, vulnerability to disturbance and vulnerability to predators. Typically avoids stands of tall vegetation such as rough grasslands, scrub and tree cover.

8.4.3.2 None-schedule 1 birds - breeding birds

8.4.3.2.1 Impacts related to breeding birds are essentially related to the temporary loss of habitat which is utilised by breeding species. Related to this is the risk that birds could be nesting within impacted habitats at the time that construction work is programmed to start. Of relevance to this project are small passerine species, particularly those associated with the trees.

8.4.3.2.2 An assemblage of breeding birds of UKBAP and conservation priority breed within the adjacent woodland/forests and have potential to use the site directly for breeding or foraging including common redstart *Phoenicurus phoenicurus*, spotted flycatcher *Muscicapa striata*, marsh tit, willow tit *Poecile montanus*, pied flycatcher *Ficedula hypoleuca*, song thrush, woodcock *Scolopax rusticola*, dipper *Cinclus cinclus* and nightjar *Caprimulgus europaeus*. Alternative opportunities for these species are abundant within the surrounding landscape and it is considered with appropriate mitigation the site will provide increased opportunities post development.

8.4.3.3 None-schedule 1 birds - wintering birds

8.4.3.3.1 The Application Site is not considered to be valuable to wintering birds like wildfowl and waders. The Application Site is too enclosed by surrounding valley sides and plantation woodland. The only species likely to winter in this habitat from this group are woodcock. Alternative tree cover is abundant within the landscape, including alternative habitat corridors. A new lake has the potential to provide new opportunities for a range of wintering species.

8.4.4 **Wold Ecology does not recommend any further surveys for birds.**

8.4.5 Biodiversity Gains and Recommendations

8.4.5.1 It is concluded that the Application Site is a good habitat for riparian and woodland bird species with various designations. There is nesting potential for a range of birds including common redstart, spotted flycatcher, willow warbler, blackcap, grey wagtail and dipper. Several simple management prescriptions can improve the site for breeding bird species.

8.4.5.2 Any trees, shrubs, scrub, hedgerows and tall vegetation to be removed should be cleared outside of the bird nesting season (i.e. clearance should be undertaken between mid-September and early February inclusive) or be carefully checked* by an ecologist to confirm no active nests are present - prior to removal during the summer period. If nesting birds are found during the watching brief, works will need to stop until the young have fledged. Since a number of nests are active, work

will need to wait until fledging has occurred, then trees should be removed immediately to avoid other nests being created.

*Thick and overgrown hedgerows are often difficult to inspect fully and removal of a hedge during the spring/summer period is not recommended.

- 8.4.5.3 In order to increase nesting opportunities for birds, it is recommended that Schwegler bird boxes are erected throughout the site. Local Authority guidance recommends that 25% of houses within a development should contain a bird box. A summary of recommended bird boxes is listed below:

Name	Description	Quantity
Schwegler Nest Box 1B	Entrance hole 32 mm.	1
Schwegler Nest Box 1B	Entrance hole 26 mm.	1
Schwegler Sparrow Terrace 1SP	Sparrow terrace	1
Schwegler Nest Box 2GR	Oval entrance hole.	1
Starling box 3S	Oval entrance hole.	1
Schwegler swift box #25	Brick building box	2

- 8.4.5.4 Boxes should be placed so that the entrance does not face the prevailing wind, rain and strong sunlight. The sector from north to south east should be used, with south facing boxes positioned in more shaded areas. Boxes should be positioned away from the damp side of the tree trunk, usually told by algae, lichen and moss growth. Boxes should also be angled downwards to stop rain blowing into them.

- 8.4.5.5 Many species will use boxes at a wide variety of heights however to give the box protection in areas with a lot of human or mammalian predator activity they should be placed approximately 3-4 metres above ground level. A clear flight path should be available to and from the nest box.

- 8.4.5.6 Boxes should be placed at a density of approximately 10 per hectare within woodland like that on the site. This will help ensure that competition is not too great for more timid species such as marsh tits and coal tits. Metal plates should be fitted to the front of the boxes to stop grey squirrels and brown rats enlarging the entrance holes and predated the nestlings and eggs.

- 8.4.5.7 Boxes should be attached to trees using wire where possible, it is important that nails are not used as they damage the tree, get pushed out as the tree grows and can damage chainsaw blades and cause injury if the tree is felled.

8.5 Badgers

8.5.1 Legislation

- 8.5.1.1 Badgers and their setts are protected under the Protection of Badgers Act 1992, which makes it illegal to wilfully kill, injure or take badgers or to interfere with a badger sett, obstructing access to or any entrance of a sett, causing a dog to enter a sett, disturbing a badger when it is occupying a sett, to dig for a badger, to cruelly ill-treat a badger or to possess or control a live badger. Interference with a badger sett is an offence under Section 3 of the Act. This includes recklessly damaging or obstructing a sett whilst clearing land for development.

8.5.1.2 Due to the sensitive nature of publishing badger information in the public domain, details of the badger survey within this report is restricted.

8.5.2 Field Survey Methodology

8.5.2.1 All features of potential value to badgers are surveyed; including areas of woodland (including plantation), small copses, hedgerows, embankments, and rock outcrops. Well-worn animal paths and footpaths were inspected for badger footprints and links to setts.

8.5.2.2 The surveyor observations included any areas where there were noticeable changes in the topography providing sloping ground into which the badgers could excavate setts. The following field signs will indicate the presence of badgers:

- Badger setts and associated soil excavation
- Badger latrines, dung pits and foraging activity
- Badger prints, hairs and paths
- Evidence of badger

8.5.3 Field Survey Results.

8.5.3.1 No main setts, annexe setts, subsidiary setts or outlier setts were located within 50 metres of the Application Site boundaries or within the Application Site. Badgers have a preference for excavating setts on well drained calcareous grits and upper chalks rather than middle chalks and clays, although exceptions to this rule occur where no similar geology is present. Badgers often show a preference to sett excavation in woodland and scrub. Suitable habitat outside of the Application Site was also extensively searched where accessible.

8.5.3.2 **No further surveys or mitigation are required for badgers.**

8.6 Reptiles

8.6.1 Legislation

8.6.1.1 The legislation relating to the protection of the more common reptiles (adder *Vipera berus*, grass snake *Natrix helvetica*, common lizard *Zootoca vivipara* and slowworm *Anguis fragilis*) in Britain is contained mainly within the Wildlife and Countryside Act (1981) as amended by the Countryside and Rights of Way Act (2000). Their inclusion on Schedule 5 gives 'partial protection' (i.e. only parts of section 9 apply). Under the Act it is an offence to;

- Intentionally (or recklessly) kill or injure commoner reptile species.

8.6.1.2 The less common reptile species such as sand lizard *Lacerta agilis* and smooth snake *Coronella austriaca* have a higher level of protection under the Wildlife and Countryside Act (1981). However, these species will not be present within the Application Site, owing to their restricted southerly British distribution and the lack of suitable habitat.

8.6.1.3 Since its original enactment, the Wildlife and Countryside Act has been subject to many changes (notably via Schedule 12 of the Countryside and Rights of Way Act 2000) and is further protected under the Conservation of Habitats and Species Regulations 2017. These have in particular affected penalties and enforcement. Offences under section 9 of the Act are now 'arrestable'. Enforcement is usually

by the Police and less frequently by Natural England. However, section 25(2) of Wildlife and Countryside Act also states that a local authority may institute proceedings. Prosecutions can result in a level five fine (currently £5000) for each offence (and the Act is specific that killing/injuring of each individual animal can constitute a separate offence), the forfeiture of any equipment, etc., used to perpetrate that offence and (under the Countryside and Rights of Way Act 2000) up to six months imprisonment.

8.6.2 Field Survey Methodology

8.6.2.1 No direct observations or field signs of reptiles was recorded on site. A full walkover was undertaken to assess the sites potential to support reptiles.

8.6.3 Field Survey Results

8.6.3.1 The desktop study identified adder, common lizard, slow worm as the only reptile species which is found within the wider area. Reptiles are moderately localised in North Yorkshire, although are quite common within the forest area.

8.6.3.2 The Application Site is considered to have reduced value for reptiles for the following reasons:

- Heavily grazed reducing areas of shelter, making reptiles prone to trampling and to predation, safe basking habitat limited.
- Streamside trees cause extensive shading unsuitable for basking across much of the site.
- High densities of pheasants likely to predate reptiles and reduce the likelihood of viable colonies persisting.

8.6.3.3 Whilst the Application Site is largely unsuitable for reptiles, large populations occur within the surrounding forests. Forests are linked to the Application Site by hedge lines and watercourses and it is possible that dispersing animals, particularly juveniles, may occasionally disperse through the Application Site.

8.6.4 **Wold Ecology recommends that the proposed development works are undertaken in conjunction with the following reptile method statement.**

8.6.5 Method Statement

8.6.5.1 Due to populations of adder, common lizard and slow worm in close proximity to the Application Site, all works must be undertaken with care. This method statement (MS) has been designed to ensure the avoidance of disturbance, killing or injuring reptiles by taking all reasonable steps to ensure works do not impact upon reptiles or their associated habitat. This will be achieved by adhering to a site-specific working method statement, which is aimed at reducing the potential impact upon reptiles and their habitat during construction processes.

8.6.5.2 This Method Statement will ensure that:

- Reasonable steps are taken to ensure that the risk of reptiles being killed or injured is minimal.
- Reptiles are not to be significantly disturbed by the works.

8.6.5.3 To reduce the risk of negatively impacting upon reptiles that could be using the Application Site and development area, the following must be implemented:

- A tool box talk will be given to all contractors involved in the development before works proceed. This will provide background information on reptiles in the area, where reptiles are likely to be found and what to do if reptiles are unexpectedly discovered during works. Staff will be shown photos of reptiles to ensure they are aware of the possible presence of reptiles on site, what to look out for and their level of protection. The method statement will remain on site during the building works.
- All works in sensitive areas will be supervised by a suitably qualified and experienced ecologist, this includes the roots balls and mature log piles along the woodland edge.
- Any areas containing tall vegetation will be directionally strimmed in two stages to allow any reptiles present to move out of the working area naturally. The amenity grassland will continue to be managed as it is leading up to and during the development phase to discourage reptiles moving into more favourable rank grassland.
- These areas of tall vegetation will be strimmed initially to a height of 150mm. The direction of strimming will be selected to encourage the movement of any reptiles present into habitats which will not be affected. After a resting period of 2-7 days the remainder of the vegetation can be removed.
- To reduce the likelihood of reptiles being present or impacted upon within the construction period, cutting would be undertaken between the hours of 12:00 and 15:00 only.
- All vegetation will be removed from the area, or be placed into secure skips to prevent potential areas of refuge being created for reptiles to shelter in.
- Whilst strimming is taking place, scrub and trees to be removed will have the roots left intact. Debris piles etc. which also provide potential hibernacula will be left in-situ.
- Suitable refugia, for example roots left in place and logs will be dismantled carefully by hand or excavated (roots), under the supervision of suitably qualified and experienced ecologist.
- All building materials, vehicles and tools will be stored on the hard standing or gravel adjacent to the buildings. This will reduce the risk of providing temporary refugia for reptiles throughout the construction phase. Reptiles may seek refuge beneath and within building material when they occur on soft substrates.
- Pipe lines and associated infrastructure should be completed within a day and not be left for extended time periods, ensuring that no holes, gaps or openings are present within the ground which reptiles could enter and become sealed in during the completion of the works.

8.6.5.4 Sub optimal and non-viable habitat which comprises the development area will be managed in accordance with its current management operations (i.e. mown/grazed) for the duration of the development, to ensure that (where vegetation is present) the sward length is kept short, and therefore less suitable for reptiles.

8.6.5.5 As reptiles hibernate over the winter, ground works on site in areas suitable for reptile hibernation i.e. root balls, should be undertaken when the species are active, prior to the first frosts (typically in early October) or after evening temperatures have risen in spring to over 5°C (typically in early March).

8.7 Hedgehog

8.7.1 Legislation

8.7.1.1 Although the Hedgehog *Erinaceus europaeus* only receives partial protection under the Wildlife and Countryside Act 1981 (as amended), its numbers have declined dramatically over the past two decades, resulting in the suggested proposal of upgrade to a higher level of protected status. The British population has declined by 25% over the past 10 years. The reasons for the decline are thought to be complex but include the loss of hedgerows and permanent grasslands as well as agricultural intensification.

8.7.2 Field Survey Methodology

8.7.2.1 All features of potential value to hedgehogs are surveyed; including areas of thick vegetation, outbuildings, lawns, grassland, scrub, woodland, and hedge bases. Evidence of breeding nests, hibernation nests and loafing nests were searched for in areas of suitable cover.

8.7.2.2 Well-worn animal paths, pool edges and footpaths were inspected for hedgehog footprints. Open areas were inspected for hedgehog droppings, particularly amenity grassland. Additionally, the surrounding road system was surveyed for road casualties.

8.7.2.3 The following field signs will indicate the presence of hedgehogs:

- Nests within dense vegetation
- Hedgehog droppings and prints
- Road casualties.

8.7.3 Field Survey Results.

8.7.3.1 No active or unused hedgehog nests were found within the woodland or hedge base within the Application Site. Most of the Application Site is too open to support nesting behaviour, although the woodland base offer suitable habitat.

8.7.4 Biodiversity Gains and Recommendations

8.7.4.1 Care must be taken whilst carrying out vegetation clearance, or strimming. A thorough check of the vegetation prior to removal will help ensure that no hedgehogs are injured or killed during development works. Sleeping hedgehogs frequently suffer severe injuries from strimmers.

8.7.4.2 Avoid setting fire to piles of vegetation unless they have been turned, checked or moved immediately prior to burning. Hedgehogs often get killed or injured in fires during vegetation removal and during early November.

8.7.4.3 Encouraging thick hedgerow bases and areas of rough grassland will offer good hedgehog habitat within the study area. Hedgehogs favour lawned grassland in close proximity to rough grassland for foraging where they can access soil invertebrates on evenings.

8.7.4.4 A number of hedgehog houses should be positioned around the site within woodland edges and rough grassland. These will provide important breeding and

hibernation sites for hedgehogs within the local area. Boxes should be sited out of direct sunlight with the entrance facing away from prevailing winds, in or under thick vegetation. The boxes should be situated away from busy roads or areas of high disturbance.

8.8 Water vole

8.8.1 Legislation

8.8.1.1 The water vole is fully protected under section 9 of Schedule 5 of the Wildlife and Countryside Act 1981 (updated 6th April 2008). Legal protection makes it an offence to:

- Intentionally kill, injure or take (capture) a water vole
- Possess or control a live or dead water vole, or any part of a water vole
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place which water voles use for shelter or protection or disturb water voles while they are using such a place
- Sell, offer for sale or advertise for live or dead water voles.

8.8.1.2 It is clearly not the intention of the law to prevent all development, management or maintenance works in areas used by water voles. However, legal protection does require that due attention is paid to the presence of water voles and appropriate actions are taken to avoid committing offences.

8.8.1.3 The water vole is found throughout Britain but is confined mainly to lowland areas near water. Once common and widespread, this species has suffered a significant decline in numbers and distribution. A national survey in 1989-90 failed to find signs of voles in 67% of sites where they were previously recorded, and it is estimated that this will rise to 94% by the turn of the century. A recent population estimate based on the number of latrines found suggested a total GB pre-breeding population of 1,200,000 animals.

8.8.2 Field Survey Methodology

8.8.2.1 Water voles prefer slow-moving watercourses less than 3m wide and around 1m deep, with lush bank side vegetation and no extreme water level fluctuations. Canals, water meadows and ponds are also used. In urban situations, sub-optimal areas are often inhabited, where the lack of predators can compensate for reduced bank side cover.

8.8.2.2 All aquatic habitats within and adjacent to the Application Site were assessed. This typically includes streams, ditches, rivers, ponds, and rush-pasture/marsh habitats; particularly when attached to other habitat corridors in the case of the latter two habitats.

8.8.2.3 A visual search for the presence of water voles and their signs was undertaken within any suitable habitat within or adjacent to the Application Site. Specifically, the visual survey involved:

- Actual sightings.
- Evidence of burrow entrance holes.
- Cropped "gardens" around tunnel entrances.
- Survey for latrines, droppings, feeding stations and footprints.

- Runways through vegetation and paths along the water's edge
- Dead animals or parts of dead animals

8.8.2.4 An assessment of habitat suitability for each watercourse was carried out for water voles following the methodology in the IEEM 'In Practice' (September 2009), rating each watercourse on a scale of 1 to 8 with 1 & 2 unsuitable, 3, 4 & 5 sub-optimal and 6, 7 and 8 optimal habitats for water vole.

8.8.2.5 As well as water voles, American mink *Neovison vison* were also looked for; this species has had detrimental impacts on water voles throughout Britain and Europe where it has become established in the wild. Suitable site mitigation measures for water voles require the knowledge of mink population densities within the local area.

8.8.3 Field Survey Results.

8.8.3.1 The table below summarises the watercourses suitability for water vole.

Habitat suitability feature	Score 1 if present
Waterbody	Highdales Beck and tributary
Well-developed (>60%) bankside and emergent vegetation to provide cover	-
Year-round availability of food sources	-
Suitable refuge areas above extremes in water levels	-
Steep banks suitable for burrowing	1
Permanent open water	1
Presence of berm (ledge at water level)	-
Lack of disturbance through poaching, grazing and/or recent management	-
Nest building opportunities in vegetation above water level	-
Habitat suitability assessment score	2

8.8.3.2 Highdales Beck and tributary received a water vole habitat suitability score of 2, which is classified as unsuitable water vole habitat (in accordance with IEEM).

8.8.3.3 There were no sightings or evidence to suggest that water vole is present on the sections of Highdales Beck within 100 metres of the proposed development area. However, some sections of these watercourse were inaccessible at the time of survey. Most of the section of watercourse within the Application Site is either heavily shaded or over grazed providing relatively few opportunities for water voles. It is considered unlikely that they will occur within the Application Site.

8.8.4 **Wold Ecology does not recommend any further surveys for water voles.**

8.9 Otter Survey

8.9.1 Legislation

8.9.1.1 Otters are strictly protected by the Wildlife and Countryside Act 1981 (as amended) and by the EC Habitats Directive, (transposed into domestic law through the Conservation of Habitats and Species Regulations 2017. Under the Habitats Regulations, otters are classed as a European protected species and therefore given the highest level of protection.

8.9.1.2 Legal protection makes it an offence to:

- Deliberately capture and otter
- Deliberately disturb an otter either at its resting place or away from it.
- To intentionally kill or injure and otter
- To damage or destroy a breeding site or resting place (i.e. an otter holt).

8.9.1.3 It is not the intention of the law to prevent all activity in areas used by otters. However, legal protection does require that due attention is paid to the presence of otters and that appropriate actions are taken to safeguard the places they use for shelter, protection and/or breeding.

8.9.2 Field Survey Methodology

8.9.2.1 This involved walking the banks of all waterbodies in and adjacent to the Application Site, to identify field signs. Regarding resting sites, these were considered on the basis of being sites that are typical of the places known to be used by otters for lying-up and show evidence of use. Three categories were used to describe resting sites:

- **Actual resting sites** were where there were signs that the site was well used by otters including a well trampled entrance, otter spraints and footprints
- **Possible resting sites** were where the site was typical of an otter resting site with obvious evidence that it was being used by a mammal but no signs that otters were using the site
- **Potential resting sites** were areas that are typical of an otter resting site but with no signs of use.

8.9.2.2 Otter signs were looked for in a systematic manner, checking prominent habitat features such as islands, headlands, and inlets. Within these areas suitable features including rocks, logs, tussocks, swan nests etc. were looked at for signs of spraints and bare wet ground for footprints. Specifically, the visual survey involved:

- Actual sightings
- Evidence of holts
- Evidence of "Couches" resting places
- Survey for spraints, feeding remains, trails and footprints

8.9.3 Field Survey Results.

8.9.3.1 No evidence of otters was noted on Highdales Beck, although it would be expected that transient animals would occasionally travel up the section of watercourse to access new areas or to forage. It is likely otters would adapt to any proposed development on site and may use the site more frequently depending on how the proposed lake develops. No active holts were noted on site.

8.9.3.4 **Wold Ecology does not recommend any further surveys for otters.**

8.10 White-clawed Crayfish

8.10.1 Legislation

8.10.1.1 White-clawed crayfish is widespread in clean, calcareous streams, rivers and lakes in England and Wales. This species is listed in Appendix III of the Bern Convention and Annexes II and V of the EC Habitats Directive. It is classed as *Globally Threatened* by IUCN/WCMC. It is protected under Schedule 5 of the WCA in respect of taking from the wild and sale and is proposed for addition to Schedule 5 of the Wildlife (Northern Ireland) Order 1985.

8.10.1.2 International status: The white-clawed crayfish is listed under Appendix III of the Bern convention, and annexes II and V of the Habitats Directive. It is classed as globally threatened by the IUCN red data book. Formerly widespread across Europe, populations are now confined to a diminishing number of areas.

8.10.1.3 UK status: This is the only crayfish native to the UK. It used to be commonly found in clean calcareous streams, but numbers are now significantly reduced, with a 25–49% decline in numbers and range in the last 25 years. It has been identified by the UK Steering Group for Biodiversity as a Priority Species and is listed under Schedule 5 of the Wildlife and Countryside Act 1981 in respect of taking from the wild and sale. The native UK crayfish is threatened by crayfish plague and competition from non-native crayfish species.

8.10.1.4 White-clawed crayfish are protected under Schedule 5 of the WCA in respect of taking from the wild and sale and is proposed for addition to Schedule 5 of the Wildlife (Northern Ireland) Order 1985. The freshwater white-clawed crayfish has been targeted as a priority for conservation under the UK Biodiversity Action Plan (UK BAP). The Species Action Plan aims to maintain the current distribution of the species through a combination of restricting the spread of non-native crayfish and crayfish plague, as well as providing suitable habitat features. It is an offence under Schedule 9 of the Wildlife and Countryside Act to release the three introduced species of crayfish into the wild.

8.10.2 Field Survey Methodology.

8.10.2.1 White clawed crayfish are typically found in water between 0.75 and 1.25m deep but can occur in very shallow streams with as little as 50mm and in deeper, slow flowing rivers. They are typically found under rocks and submerged logs or among tree roots and in river-banks. White clawed crayfish are omnivorous but primarily carnivorous, eating macro invertebrates and carrion when available. They will also eat worms, insect larvae, snails, small fish, macrophytes, algae and calcified plants.

8.10.2.2 Often when records of white-clawed crayfish exist in a watercourse, they are not uniformly spread along the channel. The population can be highly localised, occupying only favourable sections of a river. The crayfish may also be localised within a channel cross section. For example, the animals may be found mainly in the margins and may be sparse or even absent in the mid-channel (Peay 2000). This makes crayfish prone to localised population extinctions if one of the colonies is destroyed.

8.10.2.3 Highdales Beck was assessed for its potential to hold white-clawed crayfish during the field survey.

8.10.3 Field Survey Results.

8.10.3.1 The section of Highdales Beck within the Application Site contains the following features that increase the likelihood of white clawed crayfish being present within the watercourse:

- Good quality clear, well oxygenated water
- Submerged tree roots
- Boulders, overhangs, and cavities within the base of the watercourse which offer suitable refugia
- Debris dams
- Boulder riffles
- Submerged tree roots and
- Lies in close proximity to known populations on the River Derwent.

8.10.3.2 **In order to comply with the requirements of the latest Natural England guidance (EN 2000), a presence or absence survey, must be undertaken. Crayfish surveys are best carried out during the period July to October, the peak time of activity and minimal disturbance. This can be achieved by eDNA water sampling.**

Crayfish Cycle	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Activity and Growth	Yellow	Yellow	Yellow	Green	Red	Red	Red	Red	Red	Red	Green	Green
Mating											Green	Green
Females with eggs	Red	Red	Red	Red	Red	Green	Yellow			Yellow	Green	Grey
Surveying	Green	Green	Green				Red	Red	Red	Red	Green	Green

(Modified from Peay 2000)

Activity Key

Maximum	Red
Medium	Green
Minimum	Yellow
Insignificant	

8.11 Fish

8.11.1 Records of brown trout/sea trout *Salmo trutta*, bullhead *Cottus gobio*, European eel *Anguilla Anguilla* and grayling *Thymallus thymallus*, and occur on the local river catchments and within 2km of the Application Site.

8.11.2 Brown Trout

8.11.2.1 Brown trout is a UK BAP priority species and listed on the IUCN Red List as a species of least concern (Freyhoff, 2011b). The species requires loose gravel habitat for breeding (substrate size 5 – 50mm) and fast flowing, well oxygenated water. Such habitat characteristics are available within stretches of Highdales Beck on site. Brown trout predominantly spawn from October through to November (Freyhoff, 2011b), with some variability outside of this timeframe. On chalk fed streams where the temperature can be up to 10 degrees through the winter and where they are close to the spring line, spawning can occur from November through to March. This variation is based on base flow through this period and big flows encourages

spawning earlier in winter, but the fish will wait until March in drought conditions. Eggs typically take 1 month to hatch under optimum thermal conditions (e.g. 7.8 °C). However, where temperatures may fall below the optima, hatching can be delayed and may not occur until late May in some circumstances (Freyhoff, 2011b; Reyalis-Doyelle et al. 2016).

- 8.11.2.2 Highdales Beck has suitable habitat characteristics for brown trout, although is fragmented from the main River Derwent channel by a culvert, it is unknown what populations of trout occur within Highdales beck. The creation of a lake would have to address issues with silt and water quality reducing the habitat value for brown trout.
- 8.11.3 European bullhead
 - 8.11.3.1 European bullhead is listed as 'Least threatened' under the IUCN Red List of Threatened Species and is found in clean and well-oxygenated habitats in the UK and much of Europe. Bullhead utilise loose pebble substrate (Freyhoff, 2011a), constructing nests and laying eggs adjacent to and under large pebbles and rocks, often using tree roots and debris when the former is unavailable (Natural England, 2003). The species typically breeds in the spring from February to June, with larvae hatching within 30 days (Maitland and Campbell, 1992), although water temperature may affect this timeframe (Natural England, 2003). Notably Bullhead densities are typically higher within lowland streams (Natural England, 2003, with females in lowland systems often laying up to four batches of eggs (Fox, 1978). Upland females, on the other hand, typically produce only a single batch (Fox, 1978).
 - 8.11.3.2 It is unknown whether bullhead occur within this section of Highdales Beck. Habitats quality is good and offers enough suitable breeding habitat to sustain a viable population. It is unknown how much of a barrier the culvert downstream is on this population. The creation of a lake would have to address issues with silt and water quality reducing the habitat value for bulhead.
- 8.11.4 European eel
 - 8.11.4.1 The European Eel is included on Section 41 (England) of the NERC Act and is also a UKBAP species. It is also listed as critically endangered on the IUCN Red List. The European Eel is largely nocturnal, resting under stones or burrowing into mud during the day, emerging at dusk in search of food. Eels are a catadromous fish, meaning that they migrate from freshwater to the sea to spawn. Unlike most species of migratory fish, the Eel begins its life in the ocean, but spend the majority of its life in freshwater, returning to the ocean to spawn and die. After between five and 20 years in freshwater, the Eels reach sexual maturity when their eyes increase in size, their flanks turn from a brownish-yellow to silver and their underside becomes white, following which they begin their migration to their breeding grounds. This phase of their life is remarkably short, thought to be no more than six months, during which time a 'silver eel' will swim between 4,000 km and 8,000km across the Atlantic Ocean.
 - 8.11.4.2 Eels are more of a generalist species than the other species recorded within this area and would likely survive within a new lake. It is possible that existing populations occur within this section of Highdales Beck and the culvert downstream is not considered to be a significant barrier to this species. European eels can survive in a

variety of water types and are not considered to be at risk from the proposed lake creation.

8.11.5 Grayling

8.11.5.1 The European grayling is listed as an Annex V species in the Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive). This means that their exploitation must be compatible with maintaining grayling populations at a favourable conservation status. As a general rule, riverine grayling prefers a good sequence of pool, riffle / glide and run; diverse habitat that can fulfil their lifecycle requirements. Good connectivity of these habitats is a prerequisite for healthy self-sustaining populations. The physical size of the substrate is of importance even though grayling do not create a large redd. Spawning occurs in spring between March and mid-May (dependent upon geographical location - with more southerly populations spawning earlier). Spawning commences when river temperatures are between 3-11°C, up to a maximum of 14°C. For spawning and successful egg development, grayling require good clean, well oxygenated and silt-free gravel in the 2-8cm range, with a depth of c. 5cm or more. Adult grayling (25-55cm fork length) generally occupy the Main channel of the river, preferring water depths of 75-165cm; shallower depths are preferred during summer, and deeper water in winter. Adults prefer substrates comprising cobble, gravel and boulders, typically much larger than that preferred by fry and juveniles. Adults also prefer higher water velocities, usually in the range 0.2-0.5m/s.

8.11.5.2 Wold Ecology consider it unlikely that grayling would occur in such a small, narrow fast flowing stream. This habitat does not support ample breeding opportunities and importantly is fragmented from suitable larger channels by a large culvert.

8.11.6 Recommendations

8.11.6.1 The proposed works will result in a loss of a section of Highdales Beck which has the potential to support bullheads and brown trout. Bullheads rarely occur in still waters, usually due to siltation and water quality. It is likely bullheads would be lost from the immediate section to be redeveloped although an abundance of habitat would remain for the population within the wider catchment. If populations occur upstream of the proposed lake, they will likely become fragmented, although the culvert beneath the site access road downstream already acts as a significant barrier to upstream dispersal of bullhead. Any populations upstream are likely already fragmented from the wider population.

8.11.6.2 The spawn and spawning grounds of freshwater fishes are protected by law and therefore any changes to a watercourse that may lead to negative impacts on these should be avoided. Considering the information presented on brown trout and bullhead, it is recommended that any works on the watercourse are avoided until after June, allowing both species to have completed breeding and for the larvae to hatch.

The table below demonstrates timetable for work on Highdales Beck and tributary in relation to the breeding phenology of:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
B. Trout												
Bullhead												
E. Eel	Does not breed in freshwater											
Grayling	Habitat unsuitable for breeding											
	Spawning/eggs likely present; work should not take place on the watercourse.											
	Spawning/eggs likely present if breeding is protracted; work should not take place on the watercourse.											
	No breeding activity is likely; work on watercourse can take place.											

8.11.7 Consideration to the future impacts of watercourse management, including flow alteration and sedimentation should be considered and approved by the Environment Agency. Sedimentation is known to be a factor influencing the breeding success of both species, reducing habitat value (Natural England 2003; Conallin, 2004). Sedimentation can lead to increased fine silt/sand deposition, reducing the suitability of breeding sites for both species (Acornley and Sear, 1999; Natural England 2003; Conallin, 2004). It can also cause gill irritation/trauma and alter blood physiology in fish particularly salmonids like brown trout (Berg 1982; Schleiger 2000).

8.11.8 The following mitigation will be implemented to reduce the impact of the works on fish:

- The river channel will at no point be completely blocked, allowing migrating and moving fish to travel adjacent to the works.
- Works will not occur for 24 hours a day, allowing at least 12 hours of no disturbance.
- During construction work, silt will be managed using temporary silt management solutions such as silt mats or silt wattle (Frog Environmental, 2018).
- Post construction silt inflow in the Highdales Beck may be managed using a silt trap and/or wattle (Frog Environmental, 2018).

9.0 HABITATS APPRAISAL

9.1 Biodiversity Action Plans (BAP) Habitats of Principal Importance for the Conservation of Biological Diversity

9.1.1 In 1995, 'Biodiversity: The UK Steering Group Report' was published, which aimed to conserve and enhance biological diversity within the UK, including action plans for 38 key habitats and for 402 of our most threatened species. These plans describe the status of each habitat and species, outline the threats they face, set targets and objectives for their management, and propose actions necessary to achieve recovery. The Biodiversity Action Plans (BAP) have recently been updated, new ones added, and others removed, so there are numerous habitats that have been listed as priorities for conservation action. A list of these UK BAP species and habitats can be found at <http://jncc.defra.gov.uk/page-5706>

9.1.2 In addition, there are approximately 150 Local Biodiversity Action Plans (LBAP), normally at county level. These plans usually include actions to address the needs of the UK priority habitats and species in the local area, together with a range of other plans for habitats and species that are of local importance or interest.

9.1.3 The following UKBAP Habitats are recorded on site:

UK BAP broad habitat.	UK BAP priority habitat.	Habitat present within the Application Site.
Rivers and Streams	Rivers	Likely
Standing Open Waters and Canals	Oligotrophic and Dystrophic Lakes	N
	Ponds	N
	Mesotrophic Lakes	N
	Eutrophic Standing Waters	N
	Aquifer Fed Naturally Fluctuating Water Bodies	N
Arable and Horticultural	Arable Field Margins	N
Boundary and Linear Features	Hedgerows	N
Broadleaved, Mixed and Yew Woodland	Traditional Orchards	Y
	Wood-Pasture and Parkland	N
	Upland Oakwood	N
	Lowland Beech and Yew Woodland	N
	Upland Mixed Ashwoods	N
	Wet Woodland	N
	Lowland Mixed Deciduous Woodland	N
	Upland Birchwoods	N
Coniferous Woodland	Native Pine Woodlands	N
Acid Grassland	Lowland Dry Acid Grassland	N
Calcareous Grassland	Lowland Calcareous Grassland	N
	Upland Calcareous Grassland	N
Neutral Grassland	Lowland Meadows	N
	Upland Hay Meadows	N
Improved Grassland	Coastal and Floodplain Grazing Marsh	N
Dwarf Shrub Heath	Lowland Heathland	N
	Upland Heathland	N
Fen, Marsh and Swamp	Upland Flushes, Fens and Swamps	N
	Purple Moor Grass and Rush Pastures	N

	Lowland Fens	N
	Reedbeds	N
Bogs	Lowland Raised Bog	N
	Blanket Bog	N
Montane Habitats	Mountain Heaths and Willow Scrub	N
Inland Rock	Inland Rock Outcrop and Scree Habitats	N
	Calaminarian Grasslands	N
	Open Mosaic Habitats on Previously Developed Land	N
	Limestone Pavements	N
Supralittoral Rock	Maritime Cliff and Slopes	N
Supralittoral Sediment	Coastal Vegetated Shingle	N
	Machair	N
	Coastal Sand Dunes	N
Marine Habitats		N

9.2 Hedgerows

9.2.1 Legislation

9.2.1.1 **Permission should be granted from the planning authority prior to removing a hedge and new hedgerows should be planted to compensate for the hedge removal – if applicable.**

9.2.2 UKBAP Habitat criterion

9.2.2.1 A hedgerow is defined as any boundary line of trees or shrubs over 20m long and less than 5m wide, and where any gaps between the trees or shrub species are less than 20m wide (Bickmore, 2002). Any bank, wall, ditch or tree within 2m of the centre of the hedgerow is considered to be part of the hedgerow habitat, as is the herbaceous vegetation within 2m of the centre of the hedgerow. All hedgerows consisting predominantly (i.e. 80% or more cover) of at least one woody UK native species are covered by this priority habitat, where each UK country can define the list of woody species native to their respective country. Climbers such as honeysuckle and bramble are recognised as integral to many hedgerows, however they require other woody plants to be present to form a distinct woody boundary feature, as such they are not included in the definition of woody species. The definition is limited to boundary lines of trees or shrubs and excludes banks or walls without woody shrubs on top of them.

9.2.2.2 Based on an analysis of Countryside Survey data, using the threshold of at least 80% cover of any UK native woody species, it is estimated that 84% of countryside hedgerows in GB would be included. Hedgerows are a primary habitat or at least 47 species of conservation concern in the UK, including 13 that are globally threatened or rapidly declining, more than for most other key habitats. They are especially important for butterflies and moths, farmland birds, bats and dormice (where locally present).

9.2.2.3 Since 1945 there has been a continual decline in both the quantity and quality of the UK's native hedgerows either through removal or poor management practices. The Environment Act 1995 introduced an enabling power to protect important hedgerows in Britain. Land managers are required to consult local authorities before

hedgerows can be removed. Article 10 of the EC Habitats Directive requires member states to encourage the management of linear features such as hedgerows in their planning and development policies and with a view to improving the ecological coherence of the Natura 2000 network. This is supported by the Habitats and Species Regulations 2017, which recognises the importance of these features for the migration, dispersal, and genetic exchange of wild species. NPPF further encourages the development of policies for the management of hedgerows.

9.2.2.4 UKBAP targets for hedgerows are:

- Maintain the net extent of hedgerows across the UK
- Maintain the overall number of individual, isolated hedgerow trees and the net number of isolated veteran trees;
- Ensure that hedgerows remain, on average, at least as rich in native woody species
- Achieve favourable condition of 348,000 km (50%) by 2015
- Reverse the unfavourable condition of over-managed hedgerows across the UK by reducing the proportion of land managers who trim most of their hedges annually
- Halt further decline in the condition of herbaceous hedgerow flora in Great Britain by 2010 (and improve their condition by 2015)
- Improve the condition of the hedgerow tree population by increasing numbers of young trees (1-4 years) in Great Britain to 80,000 by 2015 and
- Achieve a net increase in the length of hedgerows of an average of 800 km per year in Great Britain to 2015.

9.2.2.5 The criteria for an important hedgerow are one or more of the following:

- Marks a pre-1850 parish or township boundary.
- Incorporates an archaeological feature.
- Is part of, or associated with, an archaeological site.
- Marks the boundary of, or is associated with, a pre-1600 estate or manor.
- Forms an integral part of a pre-parliamentary enclosure field system.
- Contains certain categories of species of bird, animals or plants listed in the Wildlife and Countryside Act or Joint Nature Conservation Committee (JNCC) publications and includes:
 - (a) at least seven woody species, on average, in a 30m length.
 - (b) at least six woody species, on average, in a 30m length and has at least three associated features.
 - (c) at least six woody species, on average, in a 30m length including a black-poplar tree, or a large-leaved lime, or small-leaved lime, or wild service-tree.
 - (d) at least five woody species, on average in a 30m length and has at least four associated features.

9.2.2.6 Runs alongside a bridleway, footpath, road used as a public path, or a byway open to all traffic and includes at least four woody species, on average, in a 30m length and has at least two of the associated features listed at (i) or (v) below. The associated features are:

- (i) a bank or wall supporting the hedgerow.
- (ii) less than 10% gaps.
- (iii) on average, at least one tree per 50m.
- (iv) at least three species from a list of 57 woodland plants.

- (v) a ditch.
- (vi) a number of connections with other hedgerows, ponds or woodland.
- (vii) a parallel hedge within 15m.

9.2.2.7 Based on the criteria above, Wold Ecology does not consider the hedgerows within and adjacent to the Application Site to be important UKBAP habitat. They contain deadwood but have been over managed, have a small size and poor structure for wildlife.

9.2.3 Biodiversity Gains and Recommendations

9.2.3.1 If applicable, hedges should be cleared outside of the bird nesting season (i.e. clearance should be undertaken between mid-September and early February inclusive) or be carefully checked* by an ecologist to confirm no active nests are present - prior to removal during the summer period. If nesting birds are found during the watching brief, works will need to stop until the young have fledged.

*Thick and overgrown hedgerows are often difficult to inspect fully and removal of a hedge during the spring/summer period is not recommended.

9.2.3.2 During the construction period, it is important that a root protection exclusion zone is in place adjacent to any hedgerow. This must be at least 5m from the centre of the hedge and must be kept free of plant and storage of building supplies.

9.2.3.3 The hedgerows bounding the site should ideally be maintained to a minimum height of at least 2m and kept free of fertilisers, pesticides and development on land within 3m of the hedge centre. The long-term management of these hedges will add to their biodiversity value; the hedge should be cut only once every three calendar years and should not be cut between the beginning of February and mid-September to ensure breeding birds are not disturbed. Hedge cutting should occur outside of the bird nesting season (i.e. clearance should be undertaken between mid-September and early February inclusive). Cutting the hedge in January will provide maximum quantities of food for birds over winter.

9.2.3.4 The hedgerows should be trimmed every three years at the end of winter, avoiding periods of hard frost. This is to maintain the current shape and condition of the hedgerows. Hedgerows less than 2m in height should be lightly trimmed along the sides annually until a desired height of at least 2.5m is reached.

9.2.3.5 A minimum 3m grass margin adjacent to the hedges adjacent within the Application Site should be encouraged and allowed to provide rough grassland dispersal routes and habitat for small mammals. The grassland should be cut during late summer (August/September) with all cuttings should be removed from the site to stop soil enrichment and the smothering of less competitive species of herb. The grassland should be cut every 2-3 years, as part of the management program on a 2-3-year rotation, to avoid scrub encroachment. The grassland margins should be topped at 12cm to encourage tussocks.

9.3 Lowland Mixed Deciduous Woodland

9.3.1 Lowland mixed deciduous woodland includes woodland growing on the full range of soil conditions, from very acidic to base-rich, and takes in most semi-natural woodland in southern and eastern England, and in parts of lowland Wales and Scotland. It thus complements the ranges of upland oak and upland ash types. It

occurs largely within enclosed landscapes, usually on sites with well-defined boundaries, at relatively low altitudes, although altitude is not a defining feature. Many are ancient woods and they include the classic examples of ancient woodland studied by Rackham (1980) and Peterken (1981) in East Anglia and the East Midlands. The woods tend to be small, less than 20ha. Often there is evidence of past coppicing, particularly on moderately acid to base-rich soils; on very acid sands the type may be represented by former wood-pastures of oak and birch.

- 9.3.2 There is great variety in the species composition of the canopy layer and the ground flora, and this is reflected in the range of associated NVC and Stand Types. *Quercus robur* is generally the commoner oak (although *Quercus petraea* may be abundant locally) and may occur with virtually all combinations of other locally native tree species.
- 9.3.3 In terms of the National Vegetation Classification the bulk of this type falls into W8 (mainly sub-communities a - c in ancient or recent woods; in the lowlands W8d mostly occurs in secondary woodland) and W10 (sub-communities a to d) with lesser amounts of W16 (mainly W16a). Locally, it may form a mosaic with other types, including patches of beech woodland, small wet areas, and types more commonly found in western Britain. Rides and edges may grade into grassland and scrub types.
- 9.3.4 The canopy variations as represented by the Stand Type system include most of the field maple (2), lime (4, 5), suckering elm (10) and hornbeam (9) Stand Groups, and substantial proportions of the wych elm (1), ash (3) and oak (6) Stand Groups. More rarely, birch (12) and some alder stands (7C) may also occur. These may require separate management treatments.
- 9.3.5 There are no precise data on the total extent of lowland mixed deciduous woodland in the UK, but in the late 1980s the Nature Conservancy Council estimated the total extent of this type to be about 250,000ha. There is however no doubt that the area of this priority type on ancient woodland sites has declined in area by clearance, overgrazing and replanting with non-native species, by about 30–40% over the last 50 years.
- 9.3.6 Based on the criteria above, Wold Ecology does not consider the woodland within Application Site to be important UKBAP habitat. The woodland within the Application Site is relatively young and has arisen since site clearance within the past 50 years. However, it evidently occurs on an old seedbank, with ground flora suggestive of ancient woodland. This habitat type is relatively common within the surrounding locality, with better examples further south down the valley.
- 9.3.7 Currently, this habitat appears to be damaged with basal vegetation suppressed by high densities of pheasants eating ground flora and trampling. This reduces its overall ecological value and it lacks complex ancient woodland communities, which are regularly found elsewhere in the wider landscape.
- 9.3.8 No further surveys are recommended.

9.4 Traditional Orchards

- 9.4.1 Habitat structure rather than vegetation type, topography or soils, is the defining feature of the habitat.
- 9.4.2 Traditional orchards are structurally and ecologically similar to wood-pasture and parkland, with open-grown trees set in herbaceous vegetation, but are generally distinguished from these priority habitat complexes by the following characteristics: the species composition of the trees, these being primarily in the family Rosaceae; the usually denser arrangement of the trees; the small scale of individual habitat patches; the wider dispersion and greater frequency of occurrence of habitat patches in the countryside. Traditional orchards include plantings for nuts, principally hazel nuts, but also walnuts. Management of the trees is the other main feature distinguishing traditional orchards and wood-pasture and parkland. Trees in traditional orchards are, or were, grown for fruit and nut production, usually achieved through activities such as grafting and pruning; whereas timber has been the main product from trees in wood-pastures and parkland, mostly derived from pollarding or selective felling. Grazing or cutting of herbaceous vegetation are integral to orchard management, as they are in wood-pastures and parkland. The presence of scrub, mostly in the form of hedgerows on the site boundaries, or sometimes, especially in unmanaged orchards, among the orchard trees, is analogous to the frequent occurrence of scrub in wood-pastures and parkland and plays a similar ecological role (see under biodiversity characteristics described below). Ponds and other wetland features are often present; being used now, or in the past, for watering livestock.
- 9.4.3 Orchards are hotspots for biodiversity in the countryside, supporting a wide range of wildlife and containing UK BAP priority habitats and species, as well as an array of Nationally Rare and Nationally Scarce species. The wildlife of orchard sites depends on the mosaic of habitats they encompass, including fruit trees, scrub, hedgerows, hedgerow trees, non-fruit trees within the orchard, the orchard floor habitats, fallen dead wood and associated features such as ponds and streams. A feature of the biodiversity of traditional orchards is the great variety of fruit cultivars that they contain. For example, Luckwill and Pollard (1963) list 101 varieties of perry pear distributed across the parishes of Gloucestershire. This agricultural biological diversity is not an explicit part of the current UK BAP, although the UK Government is a signatory to the Global Strategy for Plant Conservation (2001). The Government response (Cheffings and others 2004) includes a target for conserving crop diversity.
- 9.4.4 Traditional orchards are defined for priority habitat purposes as orchards managed in a low intensity way, in contrast with orchards managed intensively for fruit production by the input of chemicals such as pesticides and inorganic fertilisers, frequent mowing of the orchard floor rather than grazing or cutting for hay, and planting of short-lived, high-density, dwarf or bush fruit trees.
- 9.4.5 Spacing of trees in traditional orchards can vary quite widely (from ≈ 3 m in some plum orchards and traditional cobnut plats, to over 20m in some large perry pear and cherry orchards). There is some overlap of density of planting with intensive orchards, but these orchards often have densities at least twice as high as the most closely-spaced traditional orchard.

- 9.4.6 Like wood-pastures and parklands, traditional orchards can occur on a wide range of soil types, from slightly acid, relatively infertile soils to fertile river floodplain soils and lime-rich soils. Orchards can be found on slopes ranging from steep to level, and with any aspect. Generally, sites do not have badly impeded drainage, although locally, within sites, there may be wetter areas. Orchards are found in the lowland landscape in the UK, defined as the land below the altitudinal limit of enclosure (i.e. below the ‘moor wall’).
- 9.4.7 Traditional orchards can easily be distinguished from other wooded habitats based on the preponderance of domestic fruit and nut species: apple, plum, pear, damson, cherry, walnut and cobnut. Only in a very few cases will there be a significant number of other tree species in a traditional orchard, unless the orchard is becoming woodland through neglect. An arbitrary distinction of requiring, say, 50% of trees to be domestic fruit or nut species in an orchard, is rarely likely to be invoked for distinguishing orchards from wood pasture/ parkland.
- 9.4.8 Traditional orchards contrast with orchards managed intensively for fruit production, where there are inputs of chemicals such as pesticides and inorganic fertilisers, frequent mowing of the orchard floor rather than grazing or cutting for hay, and planting of short-lived, high density, dwarf or bush fruit trees (stems generally 75cm or less).
- 9.4.9 A small section of this habitat will be lost as part of the proposed works. The soft landscaping scheme should include the planting of apple trees; the table below identifies the apple varieties that are suitable for the north of England. This list is not exhaustive and further species can be added, subject to client’s requests and availability (Source – Northern Fruit Group). All apple trees should be planted in pairs.

Cultivar	Type	Comments
Fillingham Pippin	D	This apple was raised from seed or cuttings from America by Mr Fillingham of Swanland. It's a good crisp, sharp eater and unusually, it can be propagated from cuttings. Circa 1835.
Hornsea Herring	C	At one time in Hornsea, it was a condition for some tenants that a Hornsea Herring had to be planted and tended. The apple originates from circa 1855.
Balsam	B	A Yorkshire variety, also known as Green Balsam. Recorded in 1831, this cooking apple could be found in most gardens and was ‘peculiar to the northern parts of Yorkshire’ where it was known as ‘the farmer’s wife’s apple’.
Hunthouse	C	Legend has it that Hunthouse or Hunt House was taken by Captain Cook when he sailed out from Whitby. It helped to prevent scurvy amongst his crew and dates back to pre-1800.
Ribston Pippin	D	Also known as the Glory of York, this is the most famous Yorkshire variety. It's a strong-tasting 'aromatic' traditional apple. If you like a classic English dessert apple, then this is one to try.
Bloody Ploughman	D	Named in 1883, its name is reputedly taken from a ploughman caught stealing apples on the Megginch estate and shot for it by the gamekeeper. On finding the apples, the ploughman’s wife threw them on to a rubbish heap and one of the seedlings that emerged was rescued and subsequently

		named.
Yorkshire Beauty	C	Also known as Greenup's Pippin, it was introduced in the late 1700s and came from the garden of a shoemaker in Keswick. It is a big angular apple which has a rosy flush.
Bramley Seedling	C	Very popular and highly regarded as the 'world's best cooking apple', it dates back to 1809. The original tree is still thriving in Nottinghamshire.
Cockpit Improved	B	This dual purpose apple dates back to 1902 and is sweeter than the original Cockpit variety.

D = Dessert; C = Culinary; B = Both.

9.4.10 It is imperative to the success of each tree that it is kept weed free and watered after planting. All trees will be protected by a 0.6m tube and stake. This will be removed and replaced with a stake and tie, after approximately 5 years.

9.4.11 The table below summarises the various rootstock to which the cultivar can be grafted too.

Rootstock	Height in metres	Age of first fruiting (yrs)	Comments
'M27'	1.5m (5 ft)	2-3	Very dwarfing and require good growing conditions to maintain high yields.
'M9'	2.5m (8 – 10 ft)	3-4	Doesn't produce strong roots and will need staking permanently. Not recommended for the north of England.
'M26'	3m (10 – 12 ft)	3-4	Doesn't require staking unless in really exposed areas. It will withstand moderate competition from weeds and grass
'MM106'	4.5m (15 – 17 ft)	4-5	The most widely planted rootstock for apples in commercial orchards.
'MM111'	6m (20+ ft)	6-7	Crown can spread to 4.5m (16 ft) and may require a professional to assist with pruning.

9.4.12 It is recommended that M26 or MM106 are planted on site. M26 and MM106 are compact yet robust trees that will thrive in the conditions and meet the compact demands of the land parcel. The height of the trees will also allow a clear walking tunnel beneath.

9.5 Rivers and Streams

9.5.1 This habitat type includes a very wide range of types, encompassing all natural and near-natural running waters in the UK (i.e. with features and processes that resemble those in 'natural' systems). These range from torrential mountain streams to meandering lowland rivers.

9.5.2 Numerous factors influence the ecological characteristics of a watercourse, for example geology, topography, substrate, gradient, flow rate, altitude, channel profile, climate, catchment features (soil, land use, vegetation, etc.). Human activities add to this complexity. In addition, most river systems change greatly in character as they flow from source to sea or lake. Although various classifications and typologies for rivers exist, none is considered adequate for identifying a discrete but comprehensive series of specific priority types against the criteria. Consequently, a broad 'rivers' priority habitat has been adopted by the UK BAP, which includes the existing priority habitat, chalk rivers. Work to refine the criteria to identify the priority habitat was carried out by a partnership group, including representatives from the conservation and environment agencies, and Buglife, which proposed the following criteria. These were agreed by the UK BAP Biodiversity Reporting and Information Group (BRIG) on 19 July 2010.

9.5.3 Features qualifying BAP priority river habitat

9.5.3.1 River water bodies will qualify as BAP priority habitat either because they are considered to be near-natural, or because they fulfil one or more specific criteria relating to BAP priority species or to particular habitat types. BAP actions and targets will be part of local biodiversity strategies. Where a stretch of river is near-natural, the aim will be to maintain this quality and, where possible, to increase the naturalness of other parts of the river system. There are various ways of defining what is meant by 'near-natural' but, to increase consistency, only the relatively few river water bodies defined as being at 'high status' under the WFD are included in this category. Where a river qualifies on grounds other than naturalness, improvements in habitat quality may also form part of the objectives for maintaining the interest of its BAP features. As a significant proportion of the running water resource in the UK is likely to qualify, achievable priorities will need to be set for action, to improve the extent, habitat connectivity or quality of BAP priority rivers.

9.5.3.2 The list of qualifying criteria is as follows.

- 1. Riverine water bodies of high hydromorphological/ecological status.** The Environment Agency, the Northern Ireland Environment Agency and the Scottish Environmental Protection Agency have developed criteria and rules to identify such water bodies (http://www.wfduk.org/tag_guidance/article_4/high_status).
- 2. Headwaters.** To qualify as a priority habitat for 'Rivers' under the criterion of 'headwaters' a stream must be:
 - A watercourse within 2.5 km of its furthest source as marked with a blue line on Ordnance Survey (OS) maps at a scale of 1:50,000. Note that each tributary of a river will have its own headwater, so there will be more than one (sometimes many more) per catchment. Headwaters which have been significantly altered from their natural state are however not included.
- 3. Occurrence of the EC Habitat Directive Annex I habitat (H3260 Water courses of plain to montane levels with the *Ranunculus fluitantis* and**

***Callitricho-Batrachion* vegetation**). The definition will include (but not be confined to) all river SACs designated for the feature.

4. **Chalk Rivers** as given in the existing BAP definition.
5. **Active shingle rivers**. Data for this can come from River Habitat Surveys (Environment Agency 2003) or indicator species of invertebrate (see criterion 7).
6. **A/SSSIs (Areas/Sites of Special Scientific Interest)** designated for river species, riverine features or fluvial geomorphology.
7. **Species** including:
 - i. Annex II Habitats Directive species
 - ii. BAP priority species
 - iii. Invertebrate species which are strongly indicative of river shingle

- 9.5.3.3 Wold Ecology concludes that Highdales Beck is likely meet the UKBAP habitat criteria - presence of bullhead.
- 9.5.3.4 Changing the local watercourse from a lotic (flowing) to a lentic (still water) system will undoubtedly change the biodiversity of this section of Highdales Beck, with the potential to reduce populations or lose certain species, whilst gaining others. This involves the loss of habitat for key species of invertebrates including stoneflies, caddis flies, mayflies, crustaceans and molluscs and may include the loss of species of fish unique to running water. Still waters lack high enough levels of oxygen or clear gravel bases (with siltation usually a by-product of a lack of strong water flow) to support the running water communities found in small streams, and generally have higher temperatures further reducing suitability.
- 9.5.3.5 A still water will however provide opportunities for more generalist species, and may provide landscaping possibilities to create important marginal habitats of increased value to species like small-pearl bordered fritillary, dragonflies, reed bunting, common snipe, nightjar, reptiles and amphibians.
- 9.5.3.6 It is considered likely that the section of Highdales Beck to the north of the Application Site is already fragmented for aquatic species which cannot fly or crawl long distances, consequently the proposed lake is unlikely to lead to any additional fragmentation than what is already present. This is due to a raised culvert pipe running beneath the access road to the buildings. Additionally, sections of Highdales Beck further south are culverted below a road leading to further fragmentation. This may have both positive and negative impacts of the species within the wider watercourse. For example, a reduction in genetic diversity may negatively influence species present, but also a means for blocking invasive species like signal crayfish.
- 9.5.3.7 The creation of a lack may reduce water quality downstream, large numbers of wildfowl or fish will increase water nitrogen and phosphate levels which could then influence the water quality of the wider catchment. Although as this area is currently used by cattle which have access to the stream and likely currently influence water quality. Water quality and ways in increasing it and mitigating changes in land use should be considered.

9.6 Working adjacent to watercourses

9.6.1 Legislation

9.6.1.1 Under the Water Resources Act 1991 and associated byelaws, works in, over, under or adjacent to 'main rivers' require the consent of the Environment Agency. This is to ensure that they neither interfere with the Agency's work nor adversely affect the environment, fisheries, wildlife and flood defence in the locality. The Environment Agency functions under the responsibilities of the Environment Act 1995. The EC Habitats Directive protects Special Areas of Conservation (SAC) and Special Protection Areas (SPA) and special consents are required from Natural England or the Countryside Council for Wales (in Wales only).

9.6.1.2 Construction and maintenance activities in or near water have the potential to cause serious pollution or impact on the bed and banks of a watercourse and on the quality and quantity of the water. Some activities with the potential for affecting watercourses or groundwater may require either consent in England and Wales under the Water Resources Act 1991 or an authorisation in Scotland under the Water Environment (Controlled Activities) (Scotland) Regulations 2005.

9.6.1.3 Types of activity that may impact upon the bed and banks of a watercourse or of a wetland include:

- repairs, maintenance or improvements to any structure in, over or above main river (as defined in the Water Resources Act 1991)
- erection or construction of any structure, either permanent or temporary, in, over or above main river
- diversion of flows
- works within the river channel or a lake/loch
- works within 10 metres of a main river watercourse or flood defence (in England, Northern Ireland and Wales).

9.6.1.4 Potential discharge of foul water into the adjacent watercourses should be addressed by the contractor.

9.6.2 Method statement

9.6.2.1 Run off from site roads and river crossings can contain high levels of silt. Reducing the pollution risk can be achieved by:

- brushing or scraping roads to reduce dust and mud deposits
- putting small dams in artificial roadside ditches to retain silt
- using existing permanent bridges or pipe crossings for river crossing
- if necessary, building temporary bridges - but not fording rivers and
- working from the bank where possible – not in the river

9.6.2.2 Fresh concrete and cement are very alkaline and corrosive and can cause serious pollution. Concrete and cement mixing and washing areas should:

- be sited at least 30 metres from any watercourse or surface water drain to minimise the risk of run off entering a watercourse
- have settlement and re-circulation systems for water reuse, to minimise the risk of pollution and reduce water usage
- have a contained area for washing out and cleaning of concrete batching plant or ready-mix lorries

- wash waters from concrete and cement works should never be discharged in to the water environment.

9.6.2.3 Ensure machinery is properly maintained, check for oil leaks before use. There are risks of pollution from fuel, oils and silt associated with use of machinery which could result in prosecution. Particular attention should be paid to using chainsaws in or near the water's edge as chain oil sprayed during operation easily contaminates the water. Follow the correct procedures and if possible, use biodegradable oil to reduce this risk

9.6.2.4 Ensure fuel, oil and chemical storage on site is secure. Site the storage on an impervious base within a secondary containment system such as a bund. The base and bund walls should be impermeable to the material stored and able to contain at least 110% of the volume stored. Site the storage area above any flood water level and where possible away from high-risk locations (such as within 10 metres of a watercourse or 50 metres of a well, borehole or spring), to minimise the risk of a spill entering the water environment. Biodegradable chainsaw chain bar lubricant and biodegradable hydraulic oil in plant should be used when working in or near watercourses. The Environment Agency and its contractors use biodegradable oils for their own operations. Biodegradable oils are less toxic than most of the synthetic oil but should still be stored and used to the same standards as other oils.

9.6.2.4 Keep a spill kit with sand, earth or commercial products that are approved for your stored materials, close to your storage area. Train staff on how to use these correctly.

9.6.2.5 In no circumstance should burning take place in the water course channel or close to the bank edge and ash must not blow or wash into the watercourse as it is harmful to water life

9.6.2.6 Be sure to stack or remove any material well away from the river to avoid it being washed into the water again during the next flood.

9.6.2.7 Accident Plan

Condition	Likelihood	Consequences	Response
Machinery breakdown	Low to medium.	Potential damage to habitat due to spilled fuel or oil.	Call out of hirer to effect repairs. Competent operators will minimise the likelihood of mal-operation leading to a breakdown. Incident commander will be briefed about the environmental hazard.
Machinery fire	Low, since machinery will be maintained.	Potential damage to habitat due to spilled fuel or oil	Call out of fire brigade. Incident commander will be briefed about the environmental hazard.

Toppling of machinery	Low, since competent operators will be used	Damage to equipment. Personal injury. Damage to habitat, if near the watercourse	Pre-emptive: Machinery will be used as far away as possible from the bank, consistent with safe excavation of the final breakthrough from the meanders to the exiting watercourse. Personal injury: first aid kit available on site; ambulance call.
Vandalism	Low to medium Equipment will be in a field,	Minimal. With machines parked away from the watercourse when in use, and damage would be limited to the parking place.	Pre-emptive: As a matter of course, machinery will be parked away from the watercourse at the end of each working day. Machines will be locked when not in use

9.6.2.8 Silt

9.6.2.8.1 Silt causes lasting damage to river life such as fish, insects and plants and can also build up to cause flooding. Water containing silt should never be pumped or allowed to flow directly into a river, stream or surface water drain. Silty water can arise from dewatering excavations, exposed ground, stockpiles, plant and wheel washing, site roads and disturbance of the river bed. Where possible, silty water should be disposed of to the foul sewer with the prior agreement of the sewerage undertaker (see Section 1b). Discharges to streams, watercourses or soakaways must have Agency approval which should be obtained well in advance. Suitable treatment will be required, such as the use of a lagoon, tank or grassed area to settle solids. For fine silts, flocculants may be required to aid settlement, although these should be used with care because of their potential for pollution.

9.6.2.8.2 **A silt management plan should be produced by the contractor/engineers and should be approved by the Environment Agency.**

9.7 Trees

9.7.1 Any trees to be retained should be protected by barriers erected following guidelines given in BS5837:2012 "Trees in Relation to Construction". English Nature (2000) recommends that 'an exclusion zone of 15 times the diameter of the tree at breast height is created'. This will protect the roots from compaction and physical damage whilst protecting the tree from fertilizers and chemical applications. The latter can have a detrimental effect on the tree's relationship with lichens and mycorrhizal fungi. Root protection zones should be free of plant, storage of building sundries and excavation works should be limited where possible; this will help preserve the life of the trees.

9.8 Management planning

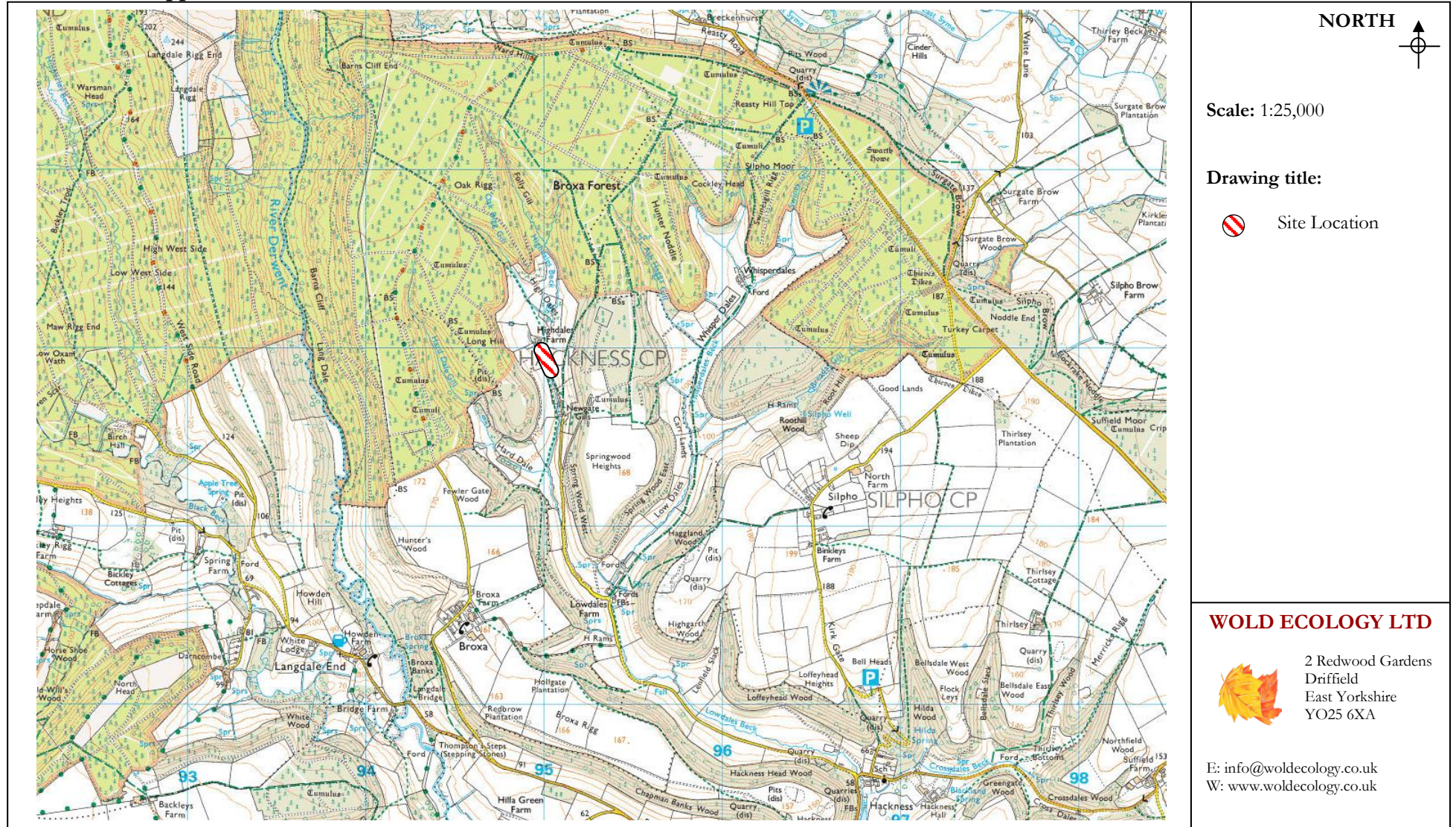
- 9.8.1 Management planning is an important tool in safeguarding countryside sites for future generations although, as yet, there are no statutory obligations for the production of management plans. The LA21 and BAP promote sustainable management of habitats, species and land, with management planning playing a major role in achieving this.
- 9.8.2 With few natural wildlife habitats remaining in Britain today and the vast majority of nature conservation sites being semi-natural, these habitats require continual management if their complex and fragile conservation value is to be preserved for generations to come.
- 9.8.3 The role of a management plan can be diverse and complex, but also flexible to meet the needs of the site managers. The basic role of a management plan is to help ensure the long-term conservation of habitats and related flora and fauna. Lambert et al (1990, p3) highlight that “habitats usually need to be managed if their conservation value is to be maintained” and Clarke and Mount (1998, page i) state that “management planning is all about the good stewardship of land”. These two statements can only be continually achieved to an adequate standard through the formalised production of a management plan.
- 9.8.4 It is recommended that a detailed Ecological Construction Method Statement and a Wildlife Enhancement Plan is produced in order to protect, maintain and enhance the sites ecological value.

- Andrews, H., *et al*, (2013). *Bat Tree Habitat Key*. AEcol, Bridgewater.
- Arntzen, J.W. & Teunis, S.F.M (1993). *A six-year study on the population dynamics of the crested newt (Triturus cristatus) following the colonisation of a newly created pond*. Herpetological Journal 3: 99-110.
- Baker, J., Beebee, T., Buckley, J., Gent, T. and Orchard, D. (2011). *Amphibian Habitat Management Handbook*. Amphibian and Reptile Conservation, Bournemouth.
- Beebee, T., & Griffiths, R., (2000), *Amphibians and Reptiles*, Harper Collins.
- Chinery, M., (2007), *Insects of Britain and Western Europe*, A & C Black.
- Chinery, M., (2011), *Britain's Plant Galls*, Wild Guides.
- Cramp, S. and Simmons, K.E.L., (1980), *The Handbook of the Birds of Europe the Middle East and North Africa, The Birds of the Western Palaearctic*. (eds.), 1, 2, 3, 4, 5, 6, 7, 8, 9, Oxford University Press.
- Dietz, C., Helversen, O.V., & Nill, D., (2009), *Bats of Britain, Europe & Northwest Africa*. A & C Black.
- Entwhistle, A.C., Harris, S., Hutson, A.M., Racey, P.A., Walsh, A., (2001). *Habitat Management for Bats - A guide for land managers, land owners and their advisors*. JNCC.
- Ferguson-Lees, J., Castell, R., & Leech, D., (2011) *A Field Guide to Monitoring Nests*, BTO.
- Gent, T., & Gibson, S., (2003), *Herpetofauna Workers' Manual*. Pelagic publishing.
- Gilbert G., Gibbons D.W. & Evans J. (1998) *Bird Monitoring Methods: A manual of techniques for key species*, RSPB, Sandy.
- Gregory R., D., Wilkinson N., I., Noble D., G., Robinson J., A., Brown A., F., Hughes J., Procter D., A, Gibbons D., W. and Galbraith C., A.,(2002), *The population status of birds in the United Kingdom, Channel Islands and Isle of Man: an analysis of conservation concern 2002–2007*. British Birds 95: 410–450.
- Greenhalgh, M., & Ovenden, D., (2007), *Freshwater Life; Britain and Northern Europe*. Harper Collins.
- Habitats Directive*. (1994) European Commission.
- Harris, S., & Yalden, D.W., (2008), *Mammals of the British Isles, Handbook, 4th Edition*. The Mammal Society.
- Jehle, R., Thiesmeier, B., & Foster, J., (2011), *The Crested Newt a dwindling pond-dweller*, Laurenti-Verlag (Germany).
- JNCC, (2010), *Handbook for Phase 1 habitat survey - a technique for environmental audit*.

- Johnson, O., & More, D., (2004), *Collins Tree Guide*, Harper Collins.
- Langton, T, Beckett, C, & Foster, J, (2001), *Great Crested Newt Conservation Handbook*.Froglife.
- Lever, C., (2009), *The Naturalized Animals of Britain and Ireland*, New Holland Publishers (UK) Ltd.
- Macdonald, D., & Barrett, P., (1993), *Mammals; Britain and Europe*, Harper Collins.
- Mitchell-Jones A.J. (2004). *Bat Mitigation Guidelines*, English Nature, Peterborough.
- Mather, J., (1986). *The Birds of Yorkshire*. Christopher Helm Publishers Ltd.
- Natural Area Profile*. English Nature, 1997.
- Protection of Badgers Act*. 1992.
- Roper, T.J., *Badger*, New Naturalist, Harper Collins.
- Streeter, D., Hart-Davies, C., Hardcastle, A., Cole, F., & Harper, L., (2009), *Collins Flower Guide*, Harper Collins.
- Svensson, L., (2009) *Collins Bird Guide: The most complete guide to the birds of Britain and Europe*, 2nd Ed., Harper Collins.
- The Wildlife and Countryside Act*, HMSO. Anon, 1981.
- Tranche 2 Action Plans: Terrestrial and Freshwater Habitats*. UK Biodiversity Group, 1998. Crown Copyright.
- Wembridge, D., (2012), *Urban Mammals a concise guide*, Whittet Books Ltd.
- Williams, J., (2010), *The Otter*, Merlin Unwin Books.
- http://www.english-nature.org.uk/citation/citation_photo/1003238.pdf. 1984
- <http://www.ukbap.org.uk/UKPlans.aspx?ID=7>
- <http://www.natureonthemap.org.uk/identify.aspx>

11.0 APPENDICES

11.1 Appendix 1



11.2 Appendix 2



NORTH

Not to Scale
 Drawing title:
Phase 1 Habitat Map

WOLD ECOLOGY LTD

2 Redwood Gardens
 Driffield
 East Yorkshire
 YO25 6XA

E: info@woldecology.co.uk
 W: www.woldecology.co.uk

11.3 Appendix 3–Summary of desktop study

Organisation.	Response Summary.	Date.
Natural England.	Local designations.	April 2020
Natural England.	UKBAP species and habitats within 2 km of the Application Site.	April 2020
North and East Yorkshire Ecological Data Centre.	Species lists within 2 km of the Application Site.	April 2020
www.magic.gov.uk	European Protected species licenses within 2km of the Application Site.	April 2020
Wold Ecology network.	Species lists within 5 km of the Application Site.	2006 – to present day.

11.4 Appendix 4 - Protected Species Legislation

The following provides background to the current legislation in England - for full details reference should be made to the relevant legislation. A number of wild animals are classified as Protected Species as they are protected by various pieces of legislation. The most commonly encountered Protected Species of animal are listed in the table below. This table summarises which sections of legislation each species is protected by and the legislative text is provided on the following pages.

Legislation	Schedule 5 Wildlife and Countryside Act 1981 (As amended) Part 1							EPS	PBA
	S1 (1)	S1 (4 & 5)	S9 (1)	S9 (2)	S9 (4)(a)	S9 (4)(b)	S9 (5)		
Adder <i>Vipera berus</i>			√*				√		
Common lizard <i>Zootoca vivipara</i>			√*				√		
Grass snake <i>Natrix helvetica</i>			√*				√		
Slow worm <i>Anguis fragilis</i>			√*				√		
Smooth snake <i>Coronella austriaca</i>			√	√	√	√	√	√	
Sand lizard <i>Lacerta agilis</i>			√	√	√	√	√	√	
Great Crested Newt <i>Triturus cristatus</i>			√	√	√	√	√	√	
Natterjack Toad <i>Epidalea calanita</i>			√	√	√	√	√	√	
All UK bats Chiroptera			√	√	√	√	√	√	
Water vole <i>Arvicola amphibious</i>			√	√	√	√	√		
Otter <i>Lutra lutra</i>			√	√	√	√	√	√	
Dormouse <i>Muscardinus avellanarius</i>			√	√	√	√	√	√	
Badger <i>Meles meles</i>									√
Red Squirrel <i>Sciurus vulgaris</i>			√	√	√	√	√		
Pine Marten			√	√	√	√	√		

<i>Martes martes</i>									
Scottish Wildcat <i>Felis silvestris</i>			✓	✓	✓	✓	✓	✓	
White-clawed crayfish <i>Austropotamobius pallipes</i>			✓				✓		
All Nesting birds	✓								
Specific Nesting birds i.e. Barn Owl, Black Redstart	✓	✓							

S = Section

() = Paragraph

EPS = European Protected Species i.e. listed under Regulation 40 of the Conservation (Natural Habitats &c.) Regulations 2017

PBA = Protection of Badgers Act 1992

* = Only part of this section

Legislative Text

Wildlife and Countryside Act 1981 (as amended)

Since its original enactment, the Wildlife and Countryside Act has been subject to many changes (notably via Schedule 12 of the Countryside and Rights of Way Act 2000). These have in particular affected penalties and enforcement. Offences under section 9 of the Act are now 'arrestable'. Enforcement is usually by the Police and less frequently by Natural England. However, section 25(2) of Wildlife and Countryside Act also states that a local authority may institute proceedings. Prosecutions can result in a level five fine (currently £5000) for each offence (and the Act is specific that killing/injuring of each individual animal can constitute a separate offence), the forfeiture of any equipment, etc., used to perpetrate that offence and (under the Countryside and Rights of Way Act 2000) up to six months' imprisonment.

The Wildlife and Countryside Act 1981 (as amended), transposes into domestic law the Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention). It is an offence under the various sections of Part 1 of the Act to -

S.1(1) intentionally kill, injure, or take any wild bird or their eggs or nests.

S.1(4) intentionally or recklessly kill, injure, or take any wild bird listed on Schedule 1 of the Act, or their eggs or nests (special penalties apply if convicted) (For a full list of Schedule 1 bird species see the full text of the Wildlife and Countryside Act 1981 [as amended])

S.1(5) (a) disturb any wild bird listed on Schedule 1 while it is building a nest or is in, on or near a nest containing eggs or young; or

(b) disturb dependent young of such a bird

S.9(1) intentionally or recklessly kill, injure or take any wild animal included in Schedule 5 (certain reptiles are only protected from killing and injuring);

S.9(2) be in possession or control of any live or dead wild animal included in Schedule 5 or any part or derivative;

S.9(4)(a) intentionally or recklessly damage or destroy, or obstruct access to, any structure or place used by a Schedule 5 animal for shelter or protection;

S.9(4) (b) disturb any such animal while it is occupying such a structure or place which it uses for that purpose

S.9(5) (a) sell, offer for sale, possess or transport any live or dead wild animal included in Schedule 5 for the purpose of sale or any part or derivative;

S.9 (5) (b) advertise for buying or selling such things.

European Protected Species (EPS)

EPS and their breeding sites or resting places are protected under Regulation 41 of the Conservation of Habitats & Species Regulations, 2017. These Regulations transpose Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive) into national law.

A person who—

- (a) deliberately captures, injures or kills any wild animal of a European protected species,
- (b) deliberately disturbs wild animals of any such species,
- (c) deliberately takes or destroys the eggs of such an animal, or
- (d) damages or destroys a breeding site or resting place of such an animal, is guilty of an offence.

For the purposes of paragraph (b), 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.

(However, please note that the existing offences under the Wildlife and Countryside Act, which cover obstruction of places used for shelter or protection (for example, a bat roost), disturbance and sale, still apply to EPS.)

These actions can be made lawful through the granting of licenses by the appropriate authorities, e.g. Natural England. Licenses may be granted for a number of purposes (such as science and education, conservation, preserving public health and safety), but only after the appropriate authority is satisfied that there are no satisfactory alternatives and that such actions will have no detrimental effect on the wild population of the species concerned.

Protection of Badgers Act 1992 (PBA)

The main legislation protecting badgers is the Protection of Badgers Act 1992. This Act consolidates all previous legislation including the Badgers Act 1973 (as amended) and the Badgers (Further Protection) Act 1991. Under the 1992 Act it is an offence to:

- destroy a sett
- interfere with a badger sett by damaging a sett or any part thereof
- obstruct access to a sett
- disturb a badger while occupying a sett
- wilfully kill, injure, take or attempt to kill, injure or take a badger;
- dig for a badger
- possess a dead badger or any part of a badger
- cruelly ill-treat a badger
- use badger tongs in the course of killing, taking or attempting to kill a badger

- sell or offer for sale or control any live badger
- mark, tag or ring a badger
- cause a dog to enter a sett

The 1992 Act defines a badger sett as: “any structure or place which displays signs indicating current use by a badger”. Since development operations may take place over a protracted period, Natural England recommends that licences be sought for developments that may affect seasonally-used setts as well as main setts. Natural England considers a good guide to be that if a sett has shown signs of occupation within the past twelve months it is considered active.

The Protection of Badgers Act 1992 allows for licences to be issued for a number of purposes, including development under the Town and Country Planning Act 1990 and to prevent serious damage to property. Licences to interfere with badger setts or disturb badgers for development are issued by the Government’s statutory nature conservation agencies, e.g. Natural England.

11.5 Appendix 5 - Staff Profiles

Field Surveyor Profile – Chris Toohie M Sc., MCIEEM.

Job title: Director.

Career Summary.

- Chris has worked in the environmental sector for all of his working life. He is an experienced and competent site manager with well-developed organisational skills and a proven ability to deal with a variety of situations in pressurised and challenging environments. As the former site manager of Millington Wood SSSI, Beverley Parks Millennium Orchard Local Nature Reserve and three reserves on the Flamborough Head Heritage Coast/SSSI, Chris has gained an understanding of the functioning of local government and the skills to operate within such structures and multicultural environments. Chris completed over 14 years within local authority countryside services.
- Chris is currently heavily involved in local projects and has volunteered his time and resources to benefit local conservation projects that include The Wolds Barn Owl Study Group, Ryedale Folk Museum Cornflower Project, BTO, Lower Derwent Valley, North Cliff Marsh Flamborough and apple conservation. As a trustee of Driffield’s Millennium Green, Chris has allocated his own time and financial resources to enhance the ecological value of the site.
- Chris is an excellent communicator and his enthusiasm for his work has enabled the successful deliverance of numerous conservation schemes. Chris has been instrumental in raising over £100,000 for environmental and community projects since 2005. These have included grants from Natural England, landfill tax credits and Heritage Lottery funding.

Project Experience in last 5 years.

- Chris has undertaken over 850 bat activity surveys since 2006 including writing and implementing over 110 Natural England bat development licenses.

- Chris is one of 186 (February 2020) Natural England Registered Ecological Consultants able to hold a Low Impact Bat Class Licence (BLICL). Chris is the only Natural England Registered Ecological Consultant in East Yorkshire/Hull/Lincolnshire and one of a small number of Registered Consultants in North Yorkshire. The BLICL can reduce time and costs in the long term if roosting bats are found.
- Phase 1 ecology surveys and Preliminary Ecological Appraisals have included National Nature Reserves, SSSI's, local wildlife sites and urban sites; specifically, Chris has undertaken ecological surveys at Raincliffe Wood SSSI, sections of Hadrian's Wall and numerous English Heritage Castles.
- Contracts have included Natural England, English Heritage, East Riding of Yorkshire Council, Scarborough Borough Council, NPS London, Hull City Council, Gateway, Riverside Housing, IMS Windpower, Kier London Ltd, NHS, Castle Howard Estates, Cemex, Stroma, Bolton Abbey Estates and Pell Frischman.

Field Surveyor Profile – Daniel Lombard B Sc. (Hons), MCIEEM.

Job title: Ecologist.

Career Summary.

- Daniel has spent all his working life in the environmental sector. He is an experienced and competent field ecologist with proven skills in species identification across a range of biota and an in-depth appreciation of many aspects of biodiversity, ecology and biology.
- Upon leaving University Daniel volunteered with a range of conservation organisations including The Wildlife Trust, North York Moors National Park, BTO and RSPB.
- He briefly operated as a freelance ecologist before starting full time at Wold Ecology.
- Daniel is currently involved in a number of local projects in which he has volunteered his time and resources. He is a member of Filey Bird Observatory and acts as the recorder for both Dragonflies and Butterflies within the group.
- He acts as an ecologist giving free advice to the Yorkshire branch of Butterfly Conservation including habitat management plans and field surveys. He also contributes to the BTO bird ringing scheme, helping in the scientific study birds.
- Daniel also contributes to national invertebrate, bird, fungi and mammal recording schemes.

Project Experience in last 5 years.

- Daniel has undertaken over 350 bat activity surveys since 2010 including dawn and dusk surveys at a range of sites across England.
- Daniel specialises in reptile, amphibian, bird and mammal surveys and has undertaken a wide range of surveys for species including otter, water vole, badger, adder, grass snake, common lizard, slow worm and great crested newt. This includes writing and contributing towards mitigation strategies and habitat enhancements where appropriate. He has also contributed to white clawed crayfish surveys.
- Daniel has undertaken a large number of Phase 1 ecology surveys and Preliminary Ecological Appraisals and EIA assessments.

- Daniel has undertaken and helped supervise a seabird surveys on the North Yorkshire coastline at an internationally important seabird colony on the behalf of Natural England and the Environment Agency. This has involved leasing with a variety of conflicting stakeholders to mitigate against potential adverse impacts to the colony.

11.6 Appendix 6 – Identification of Legal and Planning Policy Issues in England

Scope of Assessment

The first step is to identify any biodiversity features found on the site that are subject to legal or policy controls, as follows:

Designated Sites

The location of the site is compared to the distribution of sites with a statutory or non-statutory nature conservation designation using information derived from the desk study. Consideration is given to designated sites that could be affected directly or indirectly by the proposed development.

Habitats outside Designated Sites

The habitats known to occur on the site are compared to those which receive some protection, in law or policy, outside of designated sites i.e. hedgerows, uncultivated land and semi-natural areas, habitats listed as Priorities in the UKBAP, habitats listed as Habitats of Principal Importance for the Conservation of Biodiversity by the Secretary of State and habitats listed as requiring action in the Local Biodiversity Action Plan.

Ancient Woodland

The ancient woodland inventory is checked to determine whether any known ancient woodland occurs either on the site or nearby.

Protected Species

The species known to occur on the site as a result of the desk study and Phase 1 habitat survey are compared with those listed in nature conservation legislation i.e. the Wildlife and Countryside Act 1981, as amended, and the Habitats and Species Regulations 2017, as amended.

In addition, the species known to occur on the site as a result of the desk study and Phase 1 habitat survey are compared with those listed in animal welfare legislation, i.e. the Badgers Act 1992 and the Wild Mammals (Protection) Act 1996.

Biodiversity Action Plan Priority Species

The species known to occur on the site are compared with those listed as Priorities in the UKBAP, Species of Principal Importance for the Conservation of Biodiversity by the Secretary of State or requiring action in the Local Biodiversity Action Plan.

Other Species of Conservation Concern

The species known to occur on the site are compared with other nature conservation listings, such as red data books.

Invasive Plant Species

The species of plant present on the site are compared with those listed by government agencies as invasive non-natives, with particular attention given to those listed in the Wildlife and Countryside Act.

Review of Legislation and Policy

If any of the above are found to occur on or near the site and are likely to be affected by the development in any way, the relevant legislation and planning policy (including national, regional, county and borough policies) are examined to determine whether the proposed development is compliant.

Ecological Enhancement

Planning policy generally requires new developments to be enhanced for biodiversity. The existing proposals are considered to determine whether biodiversity enhancements are offered and whether they are adequate to meet the policy requirements. Again, national, regional, county and borough policies are considered.

Identification of Potential Further Ecological Issues

Further ecological issues are those which cannot be resolved during the desk study, extended phase 1 habitat survey and preliminary ecological appraisal for any reason, including the following:

- The development is near a designated site and consultation with the relevant regulator is required to determine whether further assessment is required;
- Suitable habitat is present on or near the site for a protected species/species of conservation concern and specialist survey techniques are required for their detection;
- Suitable habitat is present on or near the site for a protected species/species of conservation concern and the extended phase 1 habitat survey and preliminary ecological appraisal was not undertaken at a suitable time of year for their detection;
- A protected species/species of conservation concern was found on or near the site but further information on population size or distribution is required to resolve any legal and planning policy issues (such as obtaining licences).

Discussion of issues raised by 3rd parties, e.g. reports of protected species from the site by local people, may also be discussed under this heading.

The desk study is used as a guide to the protected species/species of conservation in the local area, however, the list is not taken to be exhaustive and it is borne in mind that some species may no longer occur in the locality.

No attempt is made to evaluate the importance of the site for species not yet confirmed to be on or near the site, nor to discuss the implications for the development if the species were to be found on the site.

No attempt is made to evaluate the importance of the site for species not yet confirmed to be on or near the site, nor to discuss the implications for the development if the species were to be found on the site.

11.7 Appendix 7 - HSI Scoring.

11.8.1 The HSI for great crested newts is a measure of habitat suitability but is not a substitute for newt surveys. In general, ponds with high HSI scores are more likely to support great crested newts than those with low scores (The Herpetological Conservation Trust, 2008).

11.8.2 The HSI is a geometric mean of ten suitability indices (SI):

$$\text{HSI} = (\text{SI1} \times \text{SI2} \times \text{SI3} \times \text{SI4} \times \text{SI5} \times \text{SI6} \times \text{SI7} \times \text{SI8} \times \text{SI9} \times \text{SI10})^{1/10}$$

- The ten suitability indices are scored for a pond, in the field and from map work.
- The ten field scores are then converted to SI scores, on a scale from 0.01 to 1 (0.01 instead of 0, because multiplying by 0 reduces all other SI scores to 0).
- The ten SI scores are then multiplied together.
- The tenth root of this number is then calculated $(X)^{1/10}$

11.8.3 The field scores were collected by Chris Toohie/Dan Lombard. Some of the field scores are categorical, some are numerical. The numerical field scores are converted to SI scores by reading off the values from graphs produced by Oldham *et al.* (2000). Full details of the HSI rationale and guidance can be obtained from the Herpetological Conservation Trust.

11.8.4 HSI Results

Geographical location – SI 1

All ponds are located in Zone A

Pond 1 = 1.0

Pond 2 = 1.0

Pond area – SI 2

The approximate size of the pond is shown in brackets.

Pond 1 (250m²) = 0.5

Pond 2 (800m²) = 1.0

Pond drying – SI 3

Pond 1 (Sometimes Dries) = 0.5

Pond 2 (Sometimes Dries) = 0.5

Water quality – SI 4

Pond 1 (Good) = 1.0

Pond 2 (Good) = 1.0

Shade – SI 5

Pond 1 (80%) = 1.0

Pond 2 (60%) = 1.0

Fowl – SI 6

Pond 1 (Absent) = 1.0

Pond 2 (Absent) = 1.0

Fish – SI 7

Pond 1 (Absent) = 1.0

Pond 2 (Absent) = 1.0

Ponds within 1 km – **SI 8**
 Pond 1 (4) = 0.7
 Pond 2 (4) = 0.7

Terrestrial habitat – **SI 9**
 Pond 1 (Good) = 1.0
 Pond 2 (Good) = 1.0

Macrophytes – **SI 10**
 Pond 1 (30%) = 0.6
 Pond 2 (60%) = 0.9

Summary of HSI scoring.											
SI	1	2	3	4	5	6	7	8	9	10	Total
Pond 1	1.0	0.5	0.5	1.0	1.0	1.0	1.0	0.7	1.0	0.6	0.105
Pond 2	1.0	1.0	0.5	1.0	1.0	1.0	1.0	0.7	1.0	0.9	0.315

11.8.5 Each SI score is multiplied together to give a total. The tenth root of this number is then calculated, consequently, the calculated HSI for a pond should score between 0 and 1.



Folio No: E7090
 Report No: 1
 Purchase Order: Chris Toohie
 Client: WOLD ECOLOGY
 Contact: Chris Toohie

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: 30/04/2020
Date Reported: 05/05/2020
Matters Affecting Results: None

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
0777	Highdales P1, Highdales Farm, Hackness	E 94817 93139	Pass	Pass	Pass	Negative	0

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

Reported by: Sarah Evans

Approved by: Sarah Evans



Forensic Scientists and Consultant Engineers
 SureScreen Scientifics Ltd, Morley Retreat, Church Lane, Morley, Derbyshire, DE7 6DE
 UK Tel: +44 (0)1332 292003 Email: scientifics@surescreen.com
 Company Registration No. 08950940

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.



Forensic Scientists and Consultant Engineers
SureScreen Scientifics Ltd, Morley Retreat, Church Lane, Morley, Derbyshire, DE7 6DE
UK Tel: +44 (0)1332 292003 Email: scientifics@surescreen.com
Company Registration No. 08950940

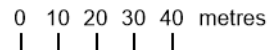
Page 2 of 2



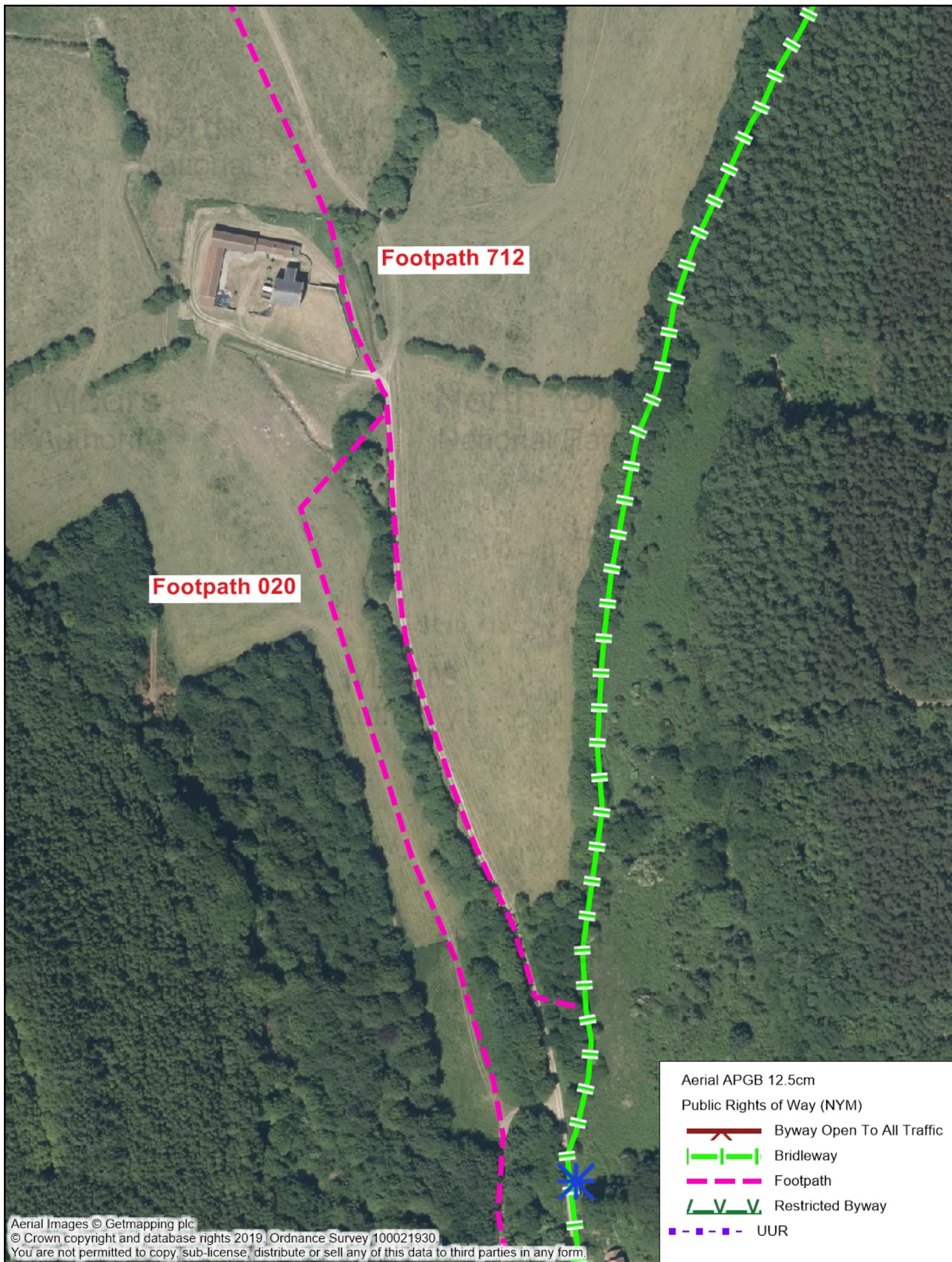
North York Moors National Park Authority
The Old Vicarage
Bondgate
Helmsley YO62 5BP
01439 772700

Rights of Way Location Plan -Newgate Farm

Printed: 05 November 2019
By: David Smith



Scale: 1:2000





WOLD ECOLOGY LTD.

2 Redwood Gardens, Drifffield
East Riding of Yorkshire. YO25 6XA
www.woldecology.co.uk

NYMNPA

01/12/2020

Your Ref : 06-Highdales
Enquiries : Chris Toohie

Date : 08 July 2020

c/o Ric Blenkharn
Newgate Estate,
Highdales Beck,
Hackness.

Dear Ric,

With reference to the site at Newgate Farm and adjacent Highdales Beck, I can confirm that Wold Ecology have undertaken white-clawed crayfish *Austropotamobius pallipes* eDNA sampling.

White-clawed crayfish is widespread in clean, calcareous streams, rivers and lakes in England and Wales. This species is listed in Appendix III of the Bern Convention and Annexes II and V of the EC Habitats Directive. It is classed as *Globally Threatened* by IUCN/WCMC. It is protected under Schedule 5 of the WCA in respect of taking from the wild and sale and is proposed for addition to Schedule 5 of the Wildlife (Northern Ireland) Order 1985.

International status: The white-clawed crayfish is listed under Appendix III of the Bern convention, and annexes II and V of the Habitats Directive. It is classed as globally threatened by the IUCN red data book. Formerly widespread across Europe, populations are now confined to a diminishing number of areas.

UK status: This is the only crayfish native to the UK. It used to be commonly found in clean calcareous streams, but numbers are now significantly reduced, with a 25–49% decline in numbers and range in the last 25 years. It has been identified by the UK Steering Group for Biodiversity as a Priority Species and is listed under Schedule 5 of the Wildlife and Countryside Act 1981 in respect of taking from the wild and sale. The native UK crayfish is threatened by crayfish plague and competition from non-native crayfish species.

White-clawed crayfish are protected under Schedule 5 of the WCA in respect of taking from the wild and sale and is proposed for addition to Schedule 5 of the Wildlife (Northern Ireland) Order 1985. The freshwater white-clawed crayfish has been targeted as a priority for conservation under the UK Biodiversity Action Plan (UK BAP). The Species Action Plan aims to maintain the current distribution of the species through a combination of restricting the spread of non-native crayfish and crayfish plague, as well as providing suitable habitat features. It is an offence under Schedule 9 of the Wildlife and Countryside Act to release the three introduced species of crayfish into the wild.

A section of Highdales Beck and tributary runs through and adjacent to the Application Site and will be impacted upon by the proposed development. Consequently, eDNA samples were taken from this habitat, with samples taken along a 500m stretch of the watercourses.

Twenty samples were taken on 19th June 2020; this was within the correct time period of between April to October. The samples were taken by Chris Toohie and Daniel Lombard:

The samples were sent to Surescreen Scientifics for analysis on 23rd June 2020.

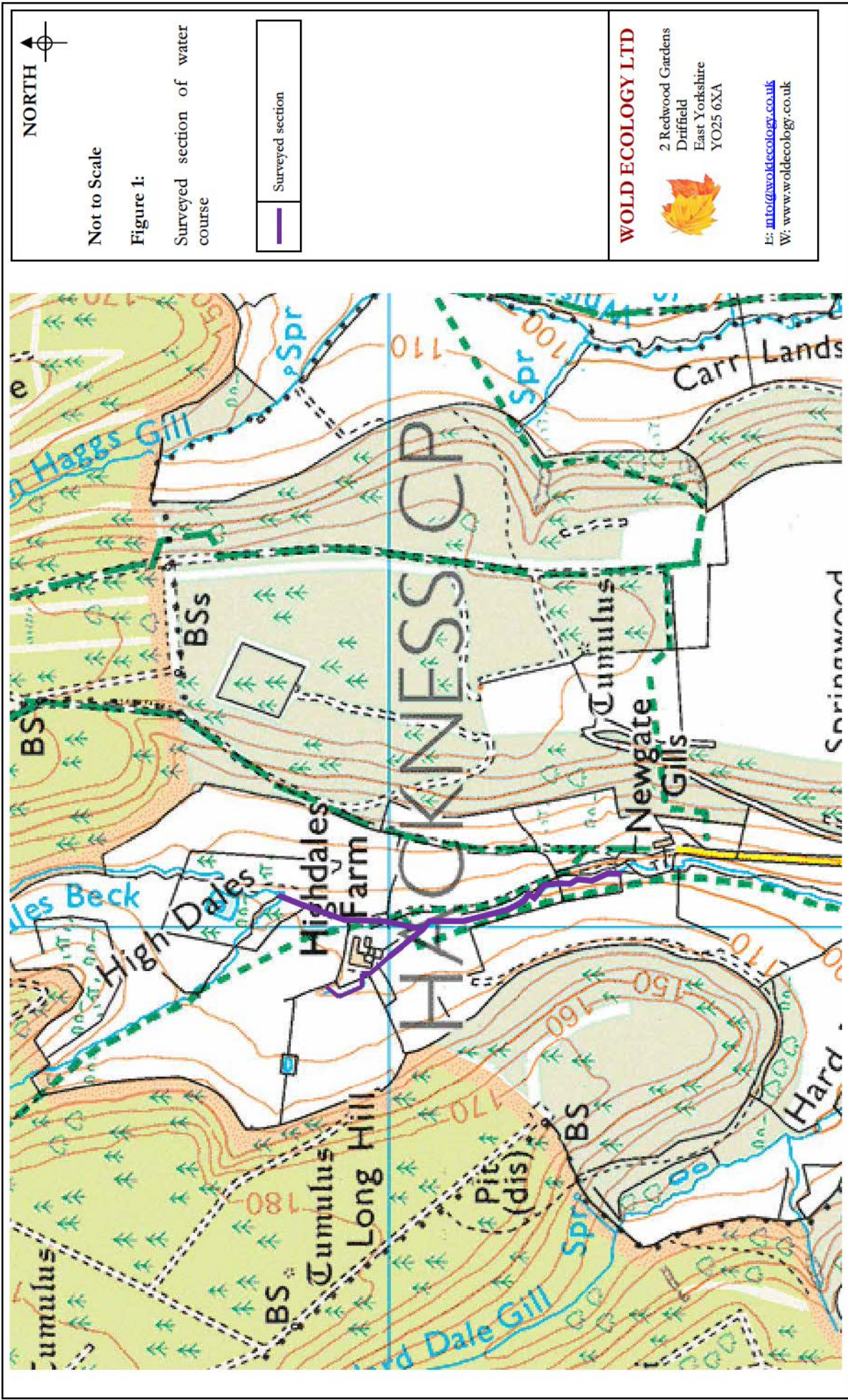
The results of eDNA analysis did not detect the presence of any white-clawed crayfish in Highdales Beck and tributary. In addition, field surveys for other aquatic invertebrates and fish during the preliminary ecological appraisal failed to record any crayfish species within the watercourses. Wold Ecology conclude that white-clawed crayfish are unlikely to be found within the section of watercourse to be impacted upon by the proposed development.

No further white clawed crayfish, mitigation, surveys or licenses are recommended in relation to the Highdales Farm Application Site.

Yours sincerely

Chris J. Toohie

Chris Toohie M Sc. MCIEEM





Folio No: E7942
 Report No: 1
 Purchase Order: Chris Toohie
 Client: WOLD ECOLOGY
 Contact: Chris Toohie

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA SAMPLES FOR THE DETECTION OF CRAYFISH SPECIES AND CRAYFISH PLAGUE

SUMMARY

All organisms continuously release small amounts of environmental DNA (eDNA) into their habitat. By collecting and analysing this eDNA from water samples from lakes, ponds or rivers we can detect the presence or absence of crayfish species including: the white-clawed crayfish (*Austropotamobius pallipes*), signal crayfish (*Pacifastacus leniusculus*), the marbled crayfish (*Procambarus virginalis*) and the crayfish plague (*Aphanomyces astaci*).

RESULTS

Date sample received at Laboratory: 23/06/2020
Date Reported: 06/07/2020
Matters Affecting Results: None

Lab Sample ID.	Site Name	O/S Reference	Species	Result	SIC	DC	IC	Positive Replicates
C0182	Highdales Beck, Newgate Farm, Hackness	SE 94990 92969	White-Clawed Crayfish	Negative	Pass	Pass	Pass	0

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

Reported by: Sarah Evans

Approved by: Chris Troth

METHODOLOGY

The analysis is conducted in two phases. The sample first goes through an extraction process where the filter is incubated in order to obtain any DNA within the sample. The extracted sample is then tested via real time PCR (also called q-PCR) for each of the selected target species. This process uses species-specific molecular markers (known as primers) to amplify a select part of the DNA, allowing it to be detected and measured in 'real time' as the analytical process develops. qPCR combines amplification and detection of target DNA into a single step. With qPCR, fluorescent dyes specific to the target sequence are used to label targeted PCR products during thermal cycling. The accumulation of fluorescent signals during this reaction is measured for fast and objective data analysis. The primers used in this process are specific to a part of mitochondrial DNA only found in each individual species. Separate primers are used for each of the species: white-clawed crayfish, signal crayfish and crayfish plague, ensuring no DNA from any other species present in the water is amplified.

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. These methods have been extensively tested since 2015 in a number of different environments, habitats, conditions and ecological situations in order to successfully enable the full application of eDNA for the detection of crayfish species and the crayfish plague.

RESULTS INTERPRETATION

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 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 eDNA [Positive/Negative/Inconclusive]

Positive: DNA was identified within the sample, indicative of species 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 species 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 species presence.

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

Inconclusive: Controls indicate inhibition or degradation of the sample, resulting in the inability to provide conclusive evidence for species presence or absence.