

6 UPDATED ECOLOGICAL IMPACT ASSESSMENT



Ecological Consultants
Environmental and Rural Chartered Surveyors

Ecological Impact Assessment (EclA)

Bourble's Lane, Pilling



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ACCURACY OF REPORT

This report has been compiled based on the methodology as detailed and the professional experience of the surveyor. Whilst the report reflects the situation found as accurately as possible, all of the protected species this survey covers are wild and can move freely from site to site. Their presence or absence detailed in this report does not entirely preclude the possibility of a different past, current or future use of the site surveyed.

We would ask all clients acting upon the contents of this report to show due diligence when undertaking work on their site and/or in their interaction with protected species. If protected species are found during a work programme, and continuing the work programme could result in their disturbance, injury or death, either directly or indirectly an offence may be committed.

If in doubt, stop work and seek further professional advice.

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1. EXECUTIVE SUMMARY

1.1.1 Envirotech NW Ltd were commissioned in April 2016 by CFM Consultants to carry out an ecological appraisal of land off Bourble's Lane, Pilling. It is proposed there is gravel and sand extraction followed by restoration and construction of ponds/ lakes and creation of a small lodge development.

1.1.2 A data search and desk study of the site and an area within 2km of the site were undertaken to establish the presence of protected species and notable habitats.

1.1.3 The site was then visited on three occasions by three licenced ecologists in 2019, one early April, then late April, and finally in late May. A full botanical survey of the site was initially undertaken and this was followed by surveys to establish the presence or absence of notable species at the site or in proximity such that they may be affected by the proposed development.

1.1.4 Additional assessments for overwintering birds were undertaken on 22nd January and 2nd February 2021.

1.1.5 The extent of proposed site works was increased and additional surveys were undertaken on 6th May, 27th October, 24th November and 14th December 2022 and 16th January, 15th February and 7th March and 20th April 2023 covering the spring nesting, amphibian and overwintering bird season. Bat activity surveys were undertaken on 1st May and 19th June 2023.

1.1.6 The plant species assemblages recorded at the site are all common in the local area and are considered to be of low ecological value. The sites floral diversity and ecological value could easily be improved.

1.1.7 The hedgerows around the site perimeter were not considered important under the Hedgerow Regulations (1997).

1.1.8 The high stocking rates of both carp and mallard in and on the ponds have resulted in the water bodies being of low ecological value.

1.1.9 Low numbers of common bat species were recorded foraging over the site. No bats were recorded roosting on or near site.

1.1.10 Birds are likely to utilise any of the dense vegetation on site for nesting between March and September. Any vegetation clearance should therefore be undertaken outside of this period or following checks for nesting activity.

1.1.11 Use of the site by overwintering birds is limited due to the site being used as a commercial shoot and for the commercial rearing of wildfowl. Whooper Swan were recorded outside the site boundary but within the zone of influence in numbers greater than 1% of the local recorded population for the designated SPA adjacent.

1.1.12 There occasional use of the arable areas of the site by ground nesting birds.

2. INTRODUCTION

2.1 Background

2.1.1 Envirotech NW Ltd were commissioned to carry out an Ecological Impact Assessment (EIA) of land off Bourble's Lane, Pilling, central grid reference SD 377 476 (Figure 1). A site investigation was undertaken and a report compiled which includes recommendations for any future actions and or mitigation required.

2.1.2 The survey was requested in connection with the proposed alteration of use of the site, with gravel and sand extraction followed by land restoration and the creation of ponds/ lakes and a small lodge development.

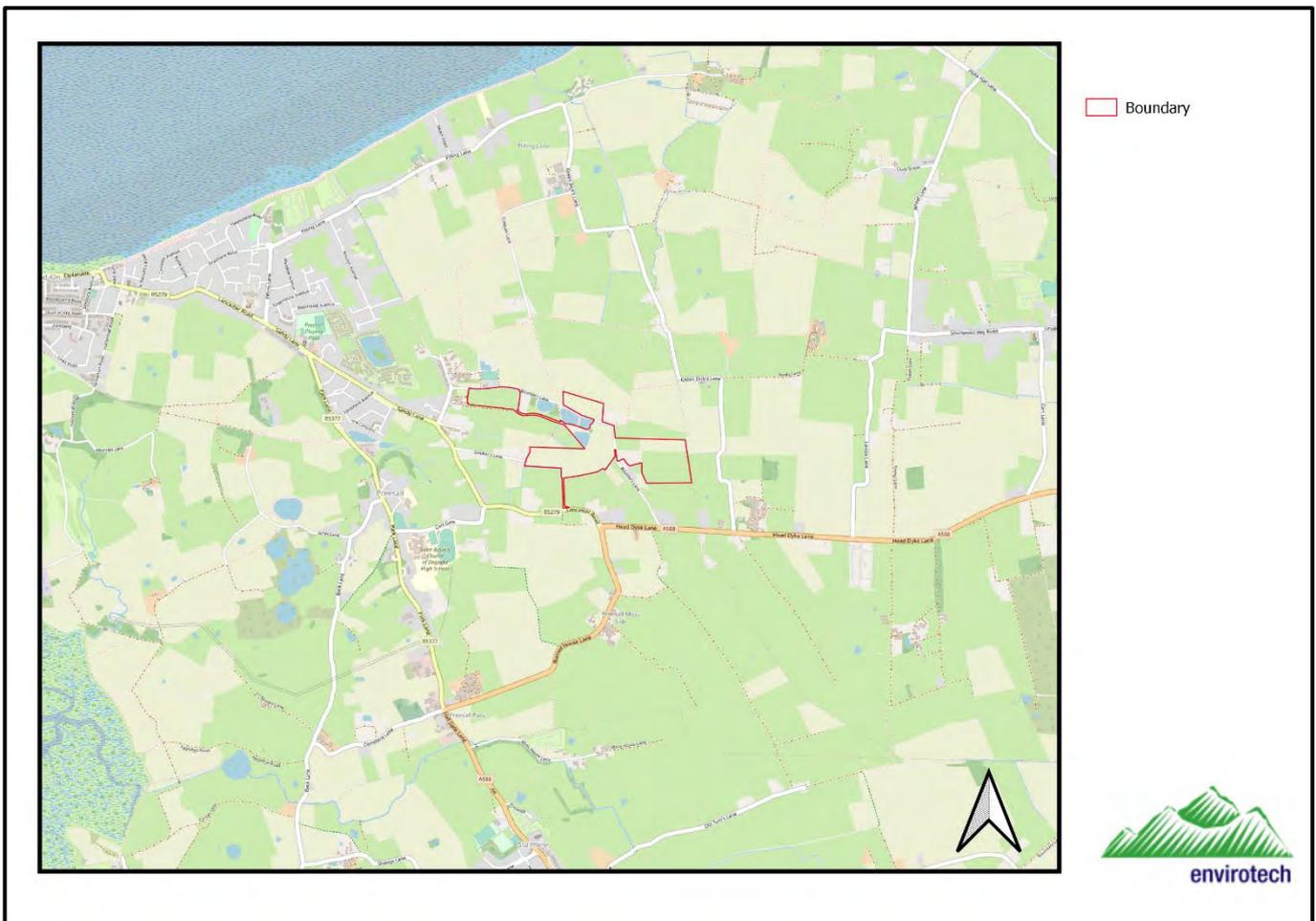


Figure 1 Site location at SD 377 476 outlined red.

2.2 Objectives

2.2.1 The main objectives of the study were:

- The completion of a Phase 1 Habitat Survey including the preparation of a vegetation and habitat map of the site and the immediate surrounding area.
- The survey and assessment of all habitats for statutorily protected species.
- An evaluation of the ecological significance of the site.
- The identification of any potential development constraints and the specification of the scope of mitigation and enhancement required in accordance with wildlife legislation, planning policy and other relevant guidance, and;
- The identification of any further surveys or precautionary assessments that may be required prior to the commencement of any development activities.

3. METHODOLOGY AND SOURCES OF INFORMATION

3.1 *Data Search*

3.1.1 The Biological Records center for Lancashire “LERN” was searched for notable and protected species within 2km of the site.

3.1.2 The Fylde Bird Club records were searched for birds associated with the adjacent estuary (Special Protection Area) within 1km of the site.

3.1.3 The National Biodiversity Network (NBN) was searched for birds associated with the adjacent estuary (Special Protection Area) within 1km of the site. None of the records searched were marked CC-BY-NC. The British Trust for Ornithology (BTO), Royal Society for Protection of Birds (RSPB) and Natural England (NE) all provide records which are marked for public use.

3.1.4 Incidental records/ sightings recorded by local interest groups on social media were reviewed.

3.1.5 The Envirotech dataset, and the Multi-Agency Geographic Information for the Countryside (MAGIC) were searched to establish the presence of any records of statutorily protected, notable or rare species, and any designated sites of international, national, regional or local importance within a 2km radius of the site boundary.

3.1.6 The Envirotech dataset is compiled from extensive field surveys from the period 2004-present, as well as records obtained from third parties during this time.

3.1.7 Google Earth and Google Street View were consulted to establish the presence of any features of ecological importance within the local area.

3.2 *Vegetation and Habitats*

3.2.1 A vegetation and habitat map was produced for the site and the immediate surrounding area. The mapping is based on the Joint Nature Conservation Committee Phase 1 Habitat Survey methodology (JNCC 2003).

3.2.2 Searches were made for uncommon, rare and statutorily protected plant species, those species listed as protected in the Wildlife and Countryside Act (1981) and indicators of important and uncommon plant communities. All plant nomenclature follows Stace (2019).

3.2.3 Searches were carried out for the presence of invasive species, including those listed on Schedule 9 of the Wildlife and Countryside Act (1981), namely Japanese knotweed (*Fallopia japonica*), Himalayan balsam (*Impatiens glandulifera*) and giant hogweed (*Heracleum mantegazzianum*) on terrestrial habitat and aquatic species such as floating pennywort (*Hydrocotyle ranunculoides*), water hyacinth (*Eichhornia crassipes*) and New Zealand pygmyweed (*Crassula helmsii*).

3.2.4 The survey was also informed by questioning the landowner/site agent to ascertain the recent history of the site.

3.3 Timing and Personnel

3.3.1 Surveys of the site have been undertaken over several years. Many of the surveys undertaken were for multiple species and reference to specific dates and weather conditions are provided with each species group.

3.3.2 Surveys of the site have been undertaken by

- (AG) Mr Andrew Gardner BSc (Hons), MSc, MRICS, MIEEnvSc
Natural England Bat Class Licence (Level 2)
Natural England Bat Low Impact Class Licence
Natural England Barn Owl Licence
Natural England Great Crested Newt Licence (Level 1)
Natural England Badger Class Licence
- (MT) Mr Matthew Thomas BSc (Hons), Grad CIEEM
Natural England Bat Class Licence (Level 2)
Natural England Barn Owl Licence
Natural England Great Crested Newt Licence (Level 1)
Natural England Natterjack Toad Licence
- (JS) Mr Jack Sykes BSc (Hons), MCIEEM
Natural England Bat Class Licence (Level 2)
Natural England Barn Owl Licence
Natural England Great Crested Newt Licence (Level 1)
- (EP) Miss Emily Peacock BA (Hons)
Natural England Bat Class Licence Agent (Level 1)
- (AC) Miss Amy Cooke Bsc (Hons)
Natural England Bat Class Licence Agent (Level 1)

, (Dawn) and (Sunset).

Date	Survey Undertaken	Surveyor
31 st January 2019	Overwintering bird surveys, Badger, Brown Hare, Otter	JS
4 th March 2019		
25 th April 2019	Bat transect surveys	MT, JS
23 rd May 2019		
22 nd January 2021	Overwintering bird surveys, Badger, Brown Hare, Otter	JS
2 nd February 2021		
6 th May 2022	Breeding bird surveys, Water vole, Amphibian, Badger, Brown Hare, Invertebrates, Otter, Reptiles	AG
27 th October 2022 24 th November 2022 14 th December 2022 16 th January 2023 15 th February 2023 7 th March 2023	Overwintering bird surveys, Badger, Brown Hare, Otter	AG

20 th April 2023	Vegetation, Breeding bird surveys, Great crested Newt, Water vole, Otter, Amphibian, Badger, Brown Hare, Invertebrates, Reptiles	AG
6 th May 2022	Vegetation, Great crested Newt, Water vole, Otter, Amphibian, Badger, Brown Hare, Invertebrates, Reptiles	
7 th March 2023	Breeding bird surveys, Water vole, Amphibian, Badger, Brown Hare, Invertebrates, Otter, Reptiles	AG
1 st May 2023	Bat transect surveys, Water vole, Amphibian, Badger, Brown Hare, Otter, Reptiles	AG
6 th May 2023	Water vole, Amphibian, Badger, Brown Hare, Invertebrates, Otter, Reptiles	AG
30 th May 2023	Breeding bird surveys, Water vole, Amphibian, Badger, Brown Hare, Invertebrates, Otter, Reptiles	AG, AC
19 th June 2023	Bat transect surveys, Water vole, Amphibian, Badger, Brown Hare, Otter, Reptiles	AG
28 th September 2023 12 th October 2023 26 th October 2023 9 th November 2023 8 th December 2023 20 th December 2023 4 th January 2024 18 th January 2024 1 st February 2024 13 th February 2024 29 th February 2024 14 th March 2024	Overwintering bird surveys, Badger, Brown Hare, Otter	AG and AC
27 th March 2024 23 rd April 2024 8 th May 2024	Breeding bird surveys, Water vole, Amphibian, Badger, Brown Hare, Invertebrates, Otter, Reptiles	AC
9 th May 2024	Bat transect surveys, Water vole, Amphibian, Badger, Brown Hare, Otter, Reptiles	AG
21 st May 2024 4 th June 2024	Breeding bird surveys, Water vole, Amphibian, Badger, Brown Hare, Invertebrates, Otter, Reptiles	AC
14 th August 2024 18 th September 2024	Bat transect surveys, Water vole, Amphibian, Badger, Brown Hare, Otter, Reptiles	AC
25 th September 2024	Water vole, Badger, Brown Hare, Otter, Reptiles	AC

4. SPECIES SURVEY METHODOLOGY

4.1 Amphibian

4.1.1 Great crested newts (*Triturus cristatus*) are listed on Annexes II and IV of the EC Habitats Directive and Appendix II of the Bern Convention. It is protected under Schedule 2 of the Conservation (Natural Habitats) Regulations (2019) as amended and Schedule 5 of the Wildlife & Countryside Act (1981).

4.1.2 Water-bodies located within or adjacent (within 500m) of the study area were identified and where access was possible were assessed for their potential to support great crested newts.

4.1.3 Water samples were collected from each of the ponds and sent away for eDNA analysis in accordance with Natural England protocols to SureScreen Scientific.

4.1.4 Where access to ponds was not possible, samples were taken of slow flowing drainage ditches. This should pick up great crested newt movement across the landscape and from adjacent ponds not directly accessed.

4.1.5 The level of survey was considered sufficient to confirm presence/ absence of this species.

4.1.6 In addition to the eDNA testing observations were made for the Biodiversity Action Plan (BAP) species Common Toad (*Bufo bufo*), along with other more common species of amphibian.

4.1.7 Several visits were made to the site between January and June between 2019 and 2024. On each visit the ponds and ditch edges were walked at a slow and steady pace, making observations for amphibians. The number of frog spawn clumps, toad spawn strings, frogs and toads and tadpoles were observed and recorded. Other species observed (e.g. newts) were also recorded. Spawn and tadpoles would be visible at any time of day. Toads would be less likely to be seen in the daytime, but observations were made at dusk during some of the late winter bird surveys and early spring and summer bat surveys by torchlight. Dead frogs and toads on the local roads were also recorded if observed.

4.1.8 Assessments were made of the quality of the habitats on site for use by amphibians. Where possible any potential refugia were searched.

4.2 Badger

4.2.1 Badgers (*Meles meles*) and their setts are protected under the Protection of Badgers Act (1992). This legislation arises from animal welfare issues (rather than on the basis of nature conservation grounds) and protects badgers from being killed, injured or disturbed whilst occupying a sett.

4.2.2 A disturbance to badgers in their setts may occur as a result of construction operations. Natural England recommends that the use of heavy machinery in proximity of a sett entrance should be avoided, with a 'disturbance free-zone' being established.

4.2.3 The degree of disturbance attributed to construction activity is a function of the background level of activity badgers are accustomed to and that which will be attributed to a proposed activity. The "disturbance free zone" is therefore site specific.

4.2.4 The survey for badgers comprised an assessment of all suitable habitat within and outside the study area boundary (where this was possible) to a distance of 30m for indications of use by badgers.

4.2.5 Signs of badgers which were searched for included:

- Setts - 'D' shaped entrances at least 25cms wide and wider than they are high with large spoil mounds
- Discarded bedding at sett entrances (this includes grass and leaves)
- Scratching posts on shrubs and trees close to a sett entrance
- The presence of badger hairs which are coarse, up to 100mm long with a long black section and a white tip
- Dung pit latrines and footprints
- Habitual runs through vegetation and beneath fences
- Hedgehog carcasses

4.3 Bats

4.3.1 All British bat species are fully protected under Schedule 5 of the Wildlife and Countryside Act (1981), and are included on Schedule 2 of the Conservation (Natural Habitats) Regulations (2019) as amended, as European Protected Species. Taken together, these pieces of legislation make it an offence to:

- Intentionally or recklessly kill, injure or capture bats;
- Deliberately or recklessly disturb bats (whether in a roost or not);
- Damage, destroy or obstruct access to bat roosts.

4.3.2 The Bat Conservation Trust (Hundt (2012) and Collins, J. (ed) (2016) issued guidelines on bat survey methodology, a key feature of their recommendation is for the undertaking of a pre-survey assessment - an initial desk-study and a walkover assessment of the survey area and its surrounding area to identify the relative value of the habitats present for bats and likely commuting routes. This is to be followed by a survey program that is appropriate to the likely level of bat activity within the survey area to be determined by and based on the experience of the surveyor.

4.3.3 The potential value of the survey area for foraging bats was assessed through consideration of two main factors: professional knowledge of bat ecology and foraging behavior in combination with the geographical location, topography and habitats present within the survey area and surrounds. This resulted in the production of a map showing habitat quality both on and adjacent to the site.

4.3.4 As a result of the low potential suitability of the habitat on the site and along its boundaries for foraging bats no bat activity surveys were deemed necessary but two were undertaken in 2019 as surveyors were on site for other surveys. Two surveys were undertaken in 2023 and three in 2024. The surveys were based upon standard guidelines Hundt (2012), Collins, J. (ed) (2016) and NCC (1987) and Mitchell-Jones (2004) and were undertaken in suitable weather conditions by suitably qualified and experienced personnel.

4.3.5 The activity surveys were walked transects of the site for a period of 1.5 hours, undertaken by licenced surveyors in suitable weather conditions. The surveyors were using Echo Meter Touch Pros.

4.3.6 Anabats were deployed in two locations for a period of at least five days on each deployment in each season, Spring, Summer and Autumn in 2024. Analysis was undertaken using KALEIDOSCOPE 4.0.1 and Bats of Europe 3.1.3 S/A:+1. Calls were not then manually filtered.

4.3.7 All trees on the site were assessed in accordance with Collins ed. (2016) and assigned a risk category.

4.4 Birds

4.4.1 All breeding birds, other than pest species, are protected under the Wildlife and Countryside Act of 1981 when building a nest, rearing young or sitting on eggs. Some bird species, such as barn owl (*Tyto alba*), are protected when near an active nest site. Several birds are listed as UK and or County BAP species.

4.4.2 Bird species and behavior was noted during the other field surveys. All areas are covered equally, in order to avoid the subjective survey of better quality 'bird habitat'. All birds displaying breeding behavior were recorded. The site is not considered to offer significant breeding bird interest.

4.4.3 Overwintering birds are a cited interest for the adjacent Biological Heritage Site, in particular Pinkfooted geese and Whooper swan are known to feed on adjacent fields. The site and adjacent fields may provide functionally linked land (FLL) for birds associated with coastal Natura 2000 sites.

4.4.4 In this respect three visits were made to the site over the overwintering period 2018/19. These were for two hours in duration and split, sunrise, sunset and mid-day. Two surveys were undertaken in the overwintering period 20/21 and six surveys were undertaken in the overwintering period 22/23. In addition fortnightly surveys were undertaken between September 2023 and March 2024.

4.4.5 Geese, Swans and other waterfowl and waders on or near the site were recorded.

4.5 Brown Hare

4.5.1 The brown hare (*Lepus europaeus*) is a UK BAP species.

4.5.2 The survey method involved walking boundaries and surveying with binoculars. The survey was conducted at a suitable distance to ensure that the hares were not disturbed. Generally, surveys were undertaken throughout the early afternoon and evening when hares are thought to be most active and feeding.

4.5.3 Where present the number of brown hares in each field or hedgerow was recorded, together with the nature and use of the field, climatic conditions and time of day. The presence of forms and droppings where present were also recorded.

4.6 Invertebrates

4.6.1 A general assessment was made of the study area's suitability for supporting invertebrates during the phase 1 survey. The study area's lack of habitat diversity, species-poor composition and uniformity of vegetation structure (i.e., lack of variation in height and microtopography) resulted in our belief that a low diversity of invertebrates would be likely to occur across the site.

4.6.2 The presence of invertebrates was noted during the other surveys which were undertaken. The extent of sampling was limited in that it could be confirmed that no priority or BAP species would be likely to be affected by the proposal.

4.7 Otter

4.7.1 Otters (*Lutra lutra*) are given protection by Annexes II & IV of the Habitats Directive and by Schedule 5 of the Wildlife and Countryside Act (1981) as amended and Schedule 2 of the Conservation (Natural Habitats) Regulations (2019) as amended

This protection means that it is an offence to deliberately or recklessly:

- Kill or injure otters;
- Destroy, damage or obstruct their dens, and
- Disturb them whilst in the den.

4.7.2 Watercourses were assessed for their suitability and for the presence of otters within 10m of the banks. The banks and scrub vegetation were carefully searched for spraints, feeding remains, runs, prints and couches/holts.

4.8 Reptiles

4.8.1 All native reptiles are protected in Britain under the Wildlife and Countryside Act of 1981. It is an offence to intentionally kill, injure, sell or advertise to sell any of the six native species.

4.8.2 The survey for these species was based on assessing the habitat type and suitability of the site. This comprised an assessment of satellite imagery for the site and surrounding area as well as comparison of the results from the records searches with habitat types. The general habitat at the site was evaluated in terms of its suitability to reptiles for foraging or breeding.

4.8.3 Reptile surveys comprising visual encounter surveys were undertaken. Habitat at the site was not considered sufficiently suitable for a full presence/ absence survey to be warranted.

4.9 Water Vole

4.9.1 Water voles (*Arvicola amphibious*) and their habitat are fully protected under Schedule 5 of the Wildlife and Countryside Act (1981). This provides protection from killing or taking by certain prohibited methods and their breeding and resting places are fully protected from destruction or obstruction, it is also an offence to disturb them in these places.

4.9.2 There are small ditches and ponds on the site. These watercourses were surveyed and assessed for evidence of the presence of water vole.

4.9.3 This involved intensive searches by wading upstream where possible, and observing from the banks where not; looking for burrows and other signs including footprints, droppings and chewed vegetation. This was undertaken up to 5m from the water courses.

4.10 Survey limitations

4.10.1 No significant survey limitations were encountered.

4.11 Significance Criteria

4.11.1 The assessment methodology used in this chapter is based on the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment (2022). The methodology is described in further detail below.

4.11.2 In order to assess the significance of effect, valued ecological resources / receptors (VERs) that could potentially be affected by Development have been identified and described using a range of parameters (e.g. extent, magnitude and duration). The significance of effect has then been assessed by considering the impact on the integrity of an ecological feature, where integrity is defined as *“the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat and / or the levels of populations of the species for which it was classified”*

4.11.3 The CIEEM Guidelines for Ecological Impact Assessment (CIEEM, 2022) identify various characteristics that can be used to identify ecological resources or features likely to be important in terms of biodiversity. These include:

- Animal or plant species that are rare or uncommon, either internationally, nationally or more locally;
- Ecosystems and their component parts, which provide the habitats required by the above species, populations and / or assemblages;
- Endemic species or locally distinct sub-populations of a species;
- Habitat diversity, connectivity and or / synergistic associations (e.g. networks of hedgerows and areas of species-rich pasture that provide important feeding habitat for a rare species such as greater horseshoe bat);
- Notably large populations of animals or concentrations of animals considered uncommon or threatened in a wider context; plant communities (and their associated animals) that are considered to be typical valued natural / semi-natural vegetation types - these will include examples of natural species-poor communities; species on the edge on their range, particularly where their distribution is changing as a result of global trends and climate change; and

- Species-rich assemblages of plants and animals; and typical faunal assemblages that are characteristic of homogenous habitats.

4.11.4 The following geographic frame of reference has been used to determine the value of ecological receptors:

- International;
- UK / National;
- Regional (Northern England);
- County (Lancashire);
- Borough/ District (Wyre); and
- Local (Parish/Neighborhood).

4.11.5 Those sites, habitats and/or species classified at Local level and above are considered to be sufficiently valuable for a significant effect upon them to be material in decision-making. The sensitivity of receptors is assessed in accordance with Table 1.

Sensitivity / value	Description
Very high	<p>Receptor has very limited or no capacity to accommodate physical or chemical changes or influences.</p> <p>Receptor possesses fundamental characteristics which contribute significantly to the distinctiveness, rarity and character of the resource, is of very high importance and rarity that is international in scale (e.g. designated sites such as SACs, SPAs, Ramsar Sites, World Heritage Sites, Geological Conservation Review Sites, and Habitats Directive Annex II species), and has very limited potential for substitution / replacement.</p>
High	<p>Receptor has a limited capacity to accommodate physical or chemical changes or influences.</p> <p>Receptor possesses key characteristics which contribute significantly to the distinctiveness, rarity and character of the resource, is of high importance and rarity that is national in scale (e.g. designated sites such as SSSIs, NNRs, UK Biodiversity Action Plan (BAP) habitats and species, Areas of Outstanding Natural Beauty, Heritage Coasts, Scheduled Monuments, Grade I and II* Listed Buildings, Conservation Areas, etc.), and has limited potential for substitution / replacement.</p>
Medium	<p>Receptor has a limited capacity to accommodate physical or chemical changes or influences.</p> <p>Receptor possesses key characteristics which contribute to the distinctiveness and character of the resource, is of medium importance and rarity that is regional in scale (e.g. designated sites such as County Wildlife Sites (CWSs), Regionally Important Geological Sites, Grade II Listed Buildings, Local BAP, etc.), and has limited potential for substitution / replacement.</p>

Low	Receptor has a moderate capacity to accommodate physical or chemical changes or influences. Receptor possess characteristics which are locally distinctive only, are of low to medium importance and rarity that is local in scale (e.g. designated sites such as Local Nature Reserves), and potentially can be substituted / replaced.
Very low	Receptor is generally tolerant of and can accommodate physical or chemical changes or influences. Receptor characteristics do not make a significant contribution to local character or distinctiveness, and are of very low importance and rarity, are not designated, and are easily substituted / replaced.

Table 1 *Sensitivity of Receptors*

4.11.6 The likelihood that a change / activity will occur as predicted has a degree of confidence assigned. The categories of confidence used are

- Certain / Near-Certain Probability estimated at 95% chance or higher;
- Probable Probability estimated below 95% but above 50%;
- Unlikely Probability estimated below 50% but above 5%; and
- Extremely Unlikely Probability estimated at less than 5%.

4.11.7 When describing impacts on an ecosystem, structure or function, reference is made to the following parameters.

- Beneficial or Adverse - Whether the impact has a positive or negative affect
- Extent - The area of which the impact occurs
- Magnitude- The size or amount of an impact
- Duration- The time for which the impact is predicted to last prior to recovery or replacement of the resource or feature
- Reversibility - Whether the impact is permanent (i.e. irreversible) or temporary (i.e. reversible)
- Timing and Frequency - How often the impact occurs (e.g. repeated noise from piling work) and when it occurs (e.g. vegetation clearance undertaken outside of the bird breeding season).

4.11.8 The Magnitude of impact is assessed in accordance with Table 2

Magnitude	Description
Very High	Loss of resource and/or integrity of the resource; severe damage to key characteristics, features or elements (Adverse). Permanent / irreplaceable change, which is certain to occur. Large scale improvement of resource or attribute quality; extensive restoration or enhancement (Beneficial).
High	Loss of resource, but not affecting integrity of the resource; partial loss of or damage to key characteristics, features or elements (Adverse). Permanent / irreplaceable change, which is likely to occur. Improvement to, or addition of, key characteristics, features or elements of the resource; improvement of attribute quality (Beneficial).

Medium	Minor loss of, or alteration to, one (maybe more) key characteristics, features or elements; measurable change in attributes, quality or vulnerability (Adverse). Long-term though reversible change, which is likely to occur. Minor improvement to, or addition of, one (maybe more) key characteristics, features or elements of the resource; minor improvement to attribute quality (Beneficial).
Low	Very minor loss of, or alteration to, one (maybe more) key characteristics, features or elements; noticeable change in attributes, quality or vulnerability (Adverse). Short- to medium-term though reversible change, which could possibly occur. Very minor improvement to, or addition of, one (maybe more) key characteristic, feature or element; very minor improvement to attribute quality (Beneficial).
Very Low	Temporary or intermittent very minor loss of, or alteration to, one (maybe more) characteristic, feature or element; possible change in attributes, quality or vulnerability (Adverse). Short-term, intermittent and reversible change, which is unlikely to occur. Possible very minor improvement to, or addition of, one (maybe more) characteristic, feature or element; possible improvement to attribute quality (Beneficial).

Table 2- Magnitude of Impact

4.11.9 Once an impact is considered to be significant then the scale of impact is assessed on a geographical scale (i.e. international, national, regional, county etc.). For example the impact may not be significant at a county scale, but is significant at a more local scale.

4.11.10 CIEEM (2022) states an impact may be considered significant at any geographical level detailed at 4.10.4. Impact significance is detailed by cross referencing Receptor sensitivity with magnitude of effect. Table 3

Receptor Sensitivity (inclusive of value)	Magnitude of Effect				
	Very High	High	Medium	Low	Very Low
Very High	Major	Major	Moderate	Moderate	Minor
High	Major	Moderate	Moderate	Minor	Negligible
Medium	Moderate	Moderate	Minor	Minor	Negligible
Low	Minor	Minor	Minor	Negligible	Negligible
Very Low	Minor	Negligible	Negligible	Negligible	Negligible

Table 3- Magnitude of Impact

Determination of Appropriate Mitigation

4.11.11 For the purposes of this assessment, impacts on VERs are assessed without mitigation in place.

4.11.12 Mitigation or compensation is given for significant impacts on features of nature conservation importance. In line with current CIEEM (2022) guidelines the mitigation proposals for the proposed development for the scheme should aim to:

- Avoid negative ecological impacts - especially those that could be significant;
- Reduce negative impacts that cannot be avoided; and
- Compensate for any remaining significant ecological impacts.

4.11.13 Priority is given to the avoidance of impacts, where possible, through scheme design and / or regulation of the project through aspects such as timing, storage of materials etc. Where this is not possible opportunities are sought to reduce the impacts as much as is feasible. If significant impacts cannot be avoided through mitigation, then compensation that is considered appropriate to offset the negative impacts of the proposed development should be outlined. Where it is known to exist, evidence is supplied for the effectiveness of proposed mitigation or compensation.

Residual Impact Assessment

4.11.14 Residual impacts are those that remain after the implementation of mitigation measures. The assessment of the significance of any residual impacts follows the methodology set out above. For the purposes of this assessment, effects on ecological receptors are assessed without mitigation and then with mitigation to determine the residual effect. Those residual impacts of moderate or major significance are the resultant likely significant environmental effects.

Cumulative Impact Assessment

4.11.15 The same methodology to that detailed above has been used to assess the potential for impact interactions and cumulative ecology impacts of the Development with committed developments in the area. This assessment is essentially a receptor-based assessment. Other schemes in the surrounding area that are likely to either impact a receptor that has been affected by the Development 'alone', or reduce the usefulness of a particular mitigation measure will be considered. The temporal and spatial parameters of this assessment will help determine which schemes are likely to be included within the cumulative impact assessment.

5. RESULTS

5.1 Data Search

5.1.1 There are no records of protected or notable species for the site. There are however records of protected or notable species within 2km (Figure 2). These are discussed in the relevant sections below.

5.1.2 There are records shown on Figure 2 to the South boundary of the site, these are the intersection of a 1km grid square, the records plotted here are not provided at higher resolution than 1km and relate to, Linnet (*Linaria cannabina*), Lapwing (*Vanellus vanellus*) and Corn bunting (*Emberiza calandra*).

5.1.3 Local residents report Pinkfooted Geese (*Anser brachyrhynchus*) and Whooper Swan (*Cygnus cygnus*) occurring in and around the site as well as Brown Hare (*Lepus europaeus*).

5.1.4 The nearest non-statutory site is partly within the site boundary to the North and East and includes a large area of the surrounding landscape, Figure 3. Pilling Moss - Head Dyke is a Biological Heritage Site (BHS) designated for its importance for overwintering wildfowl, namely pink footed geese and whooper swans. This correlates with the observations of local residents reported on social media.

5.1.5 The site lies partly within a mapped priority habitat, Coastal and Grazing Flood Plain Marsh (Figure 4).

5.1.6 The nearest statutory protected site is Morecambe Bay Ramsar and Special Area of Conservation (SAC), Lune Estuary and Wyre Estuary Site of Special Scientific Interest (SSSI), Morecambe Bay and Duddon Estuary Special Protection Area (SPA) and Wyre Lune Marine Conservation Zone (MCZ) the nearest of these sites being 1300m to the North and West (Figure 5).

5.1.7 The site lies within mapped habitat used by feeding and roosting Pinkfooted Geese and feeding Whooper Swan. In this regard the site and surrounding land is considered to be potential Functionally Linked Land (FLL) to the Natura 2000 sites, Morecambe Bay Ramsar and Morecambe Bay and Duddon Estuary SPA, 1300m to the North and West. Species using FLL may also be associated with Morecambe Bay SSSI but the designation of FLL is not applied to SSSI sites.

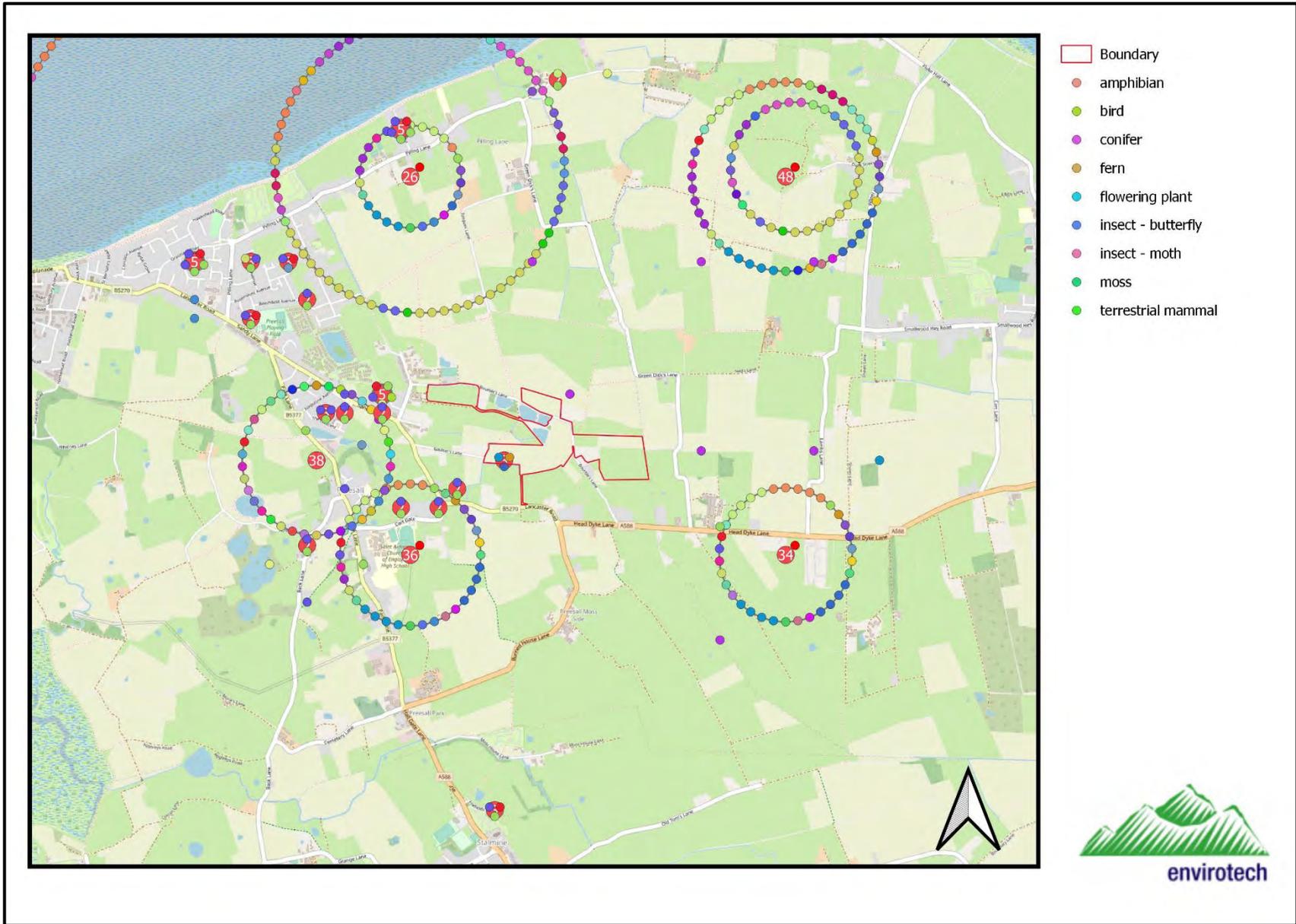


Figure 2 Notable species records.

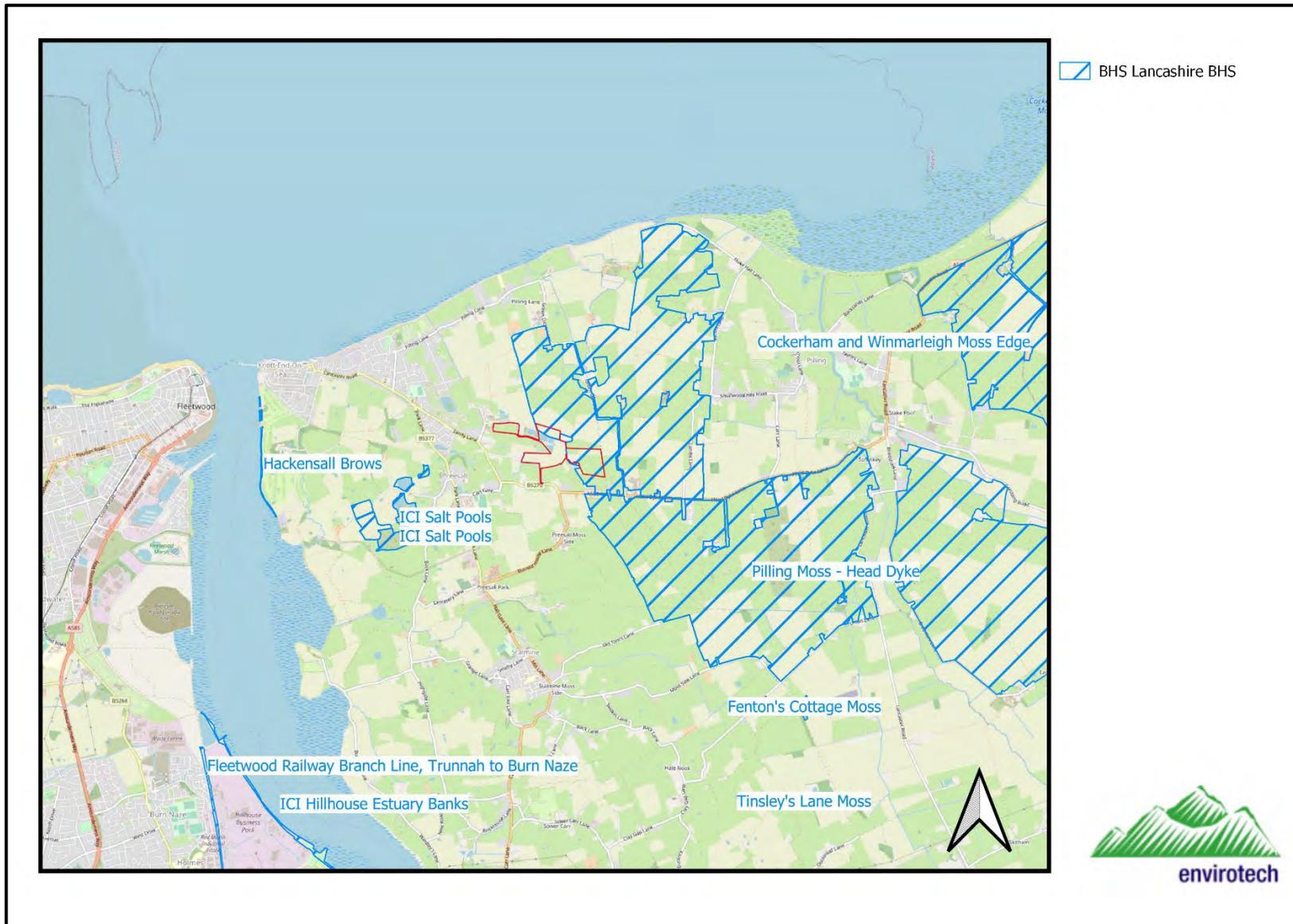


Figure 3 Non-statutory sites.

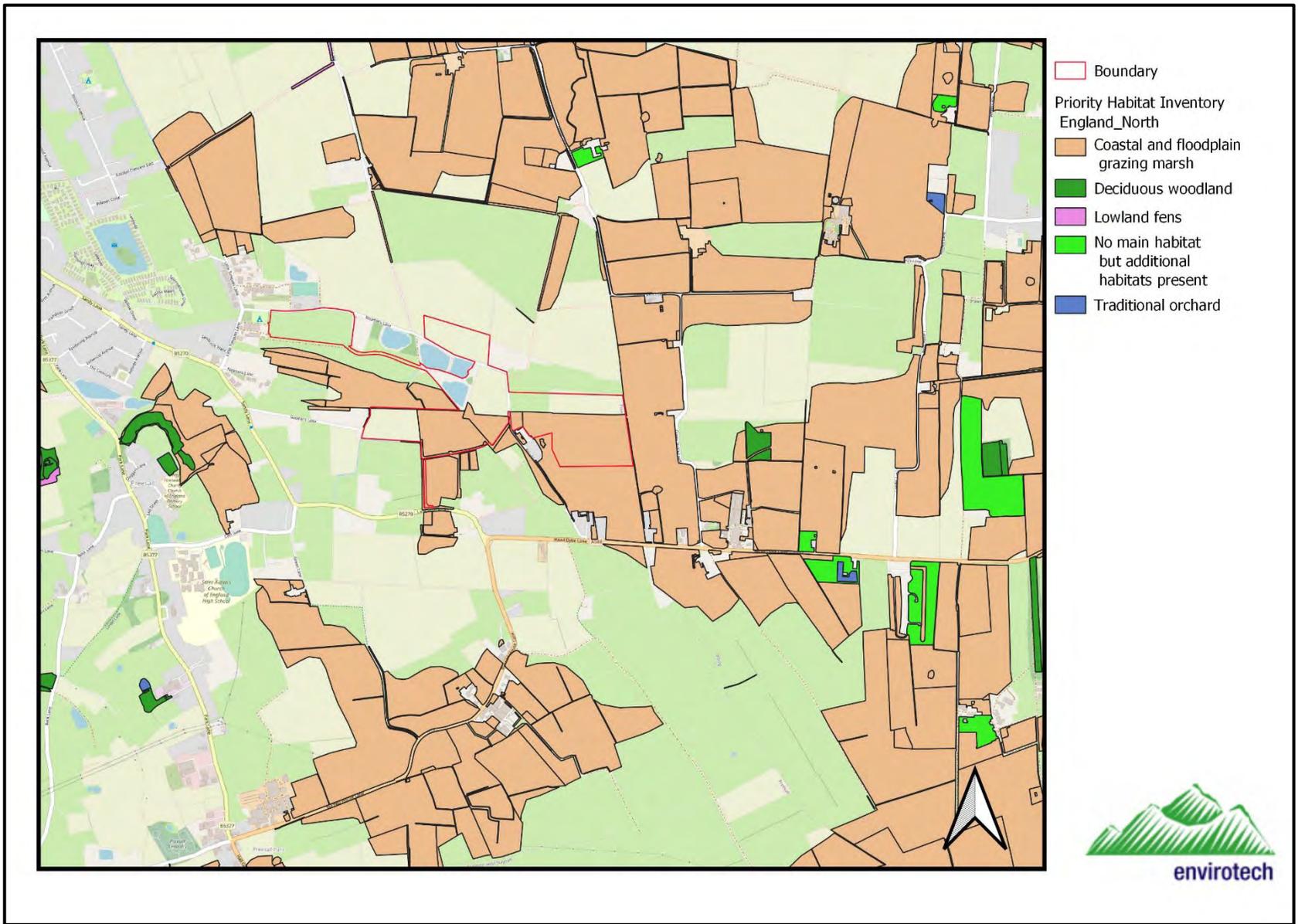


Figure 4 *Priority Habitats*

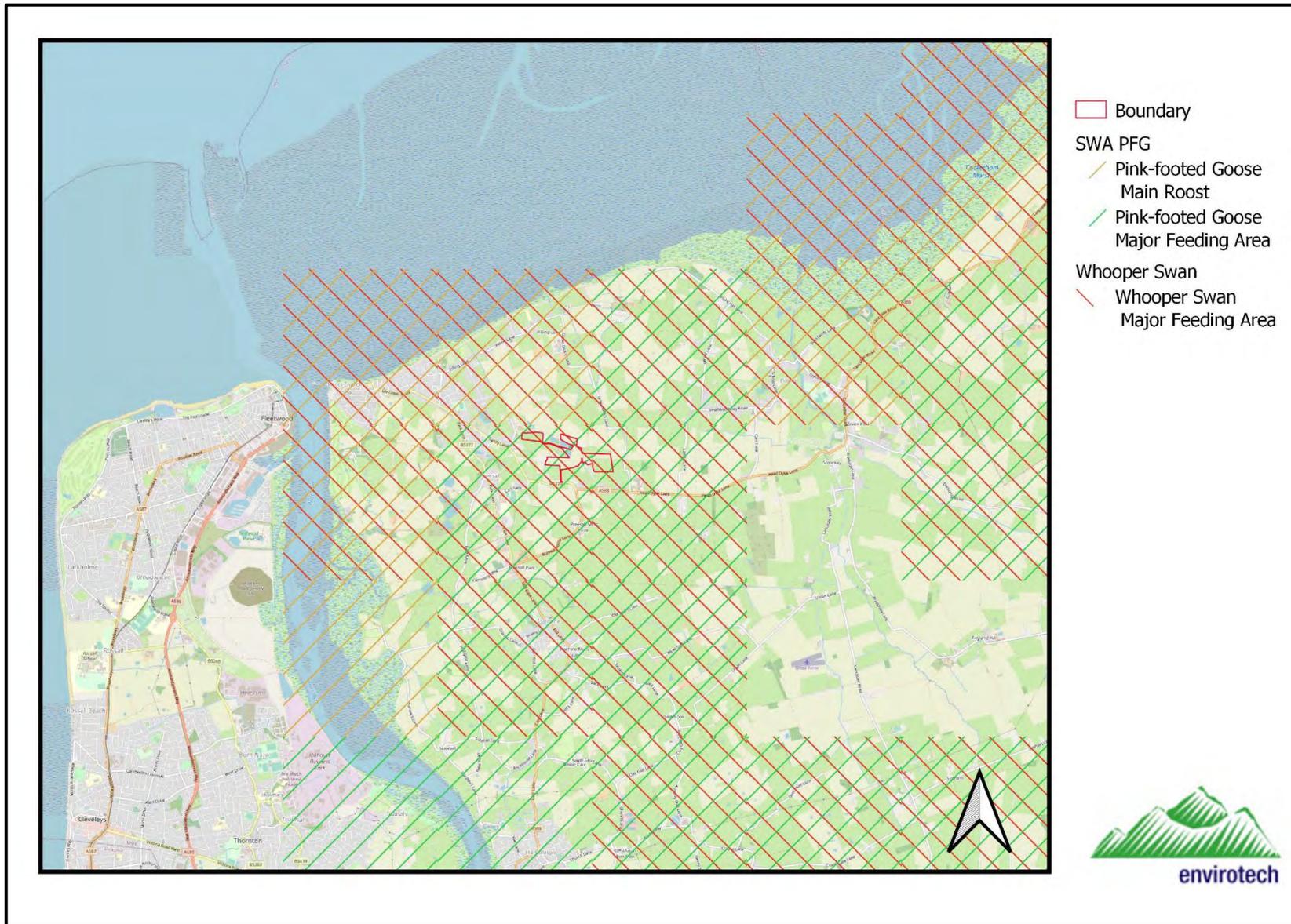


Figure 6 *Functionally Linked Land*

6. PHASE 1 SURVEY RESULTS

6.1 *Habitat Results*

6.1.1 A drone was overflown on the 7th March 2023. This produced a number of images which were stitched together to form an orthomosaic map and provided upto date imagery of the site from which phase 1 habitat mapping has been based. Figure 7 shows the hi-resolution imagery without the phase 1 mapping overlay. Figure 8 shows a part of the site at reduced scale, and the detail/ small scale of each habitat type revealed which can be mapped by the drone imagery.

6.1.2 The site comprises a complex of three lakes used for carp fishing and duck shooting, with arable fields and an area fenced and used for rearing wildfowl. Fields to the South and East are used for grazing livestock, including horses.

6.1.3 See Figure 9 for the Phase 1 Habitat Plan and Table 1 for the descriptive Target Notes.

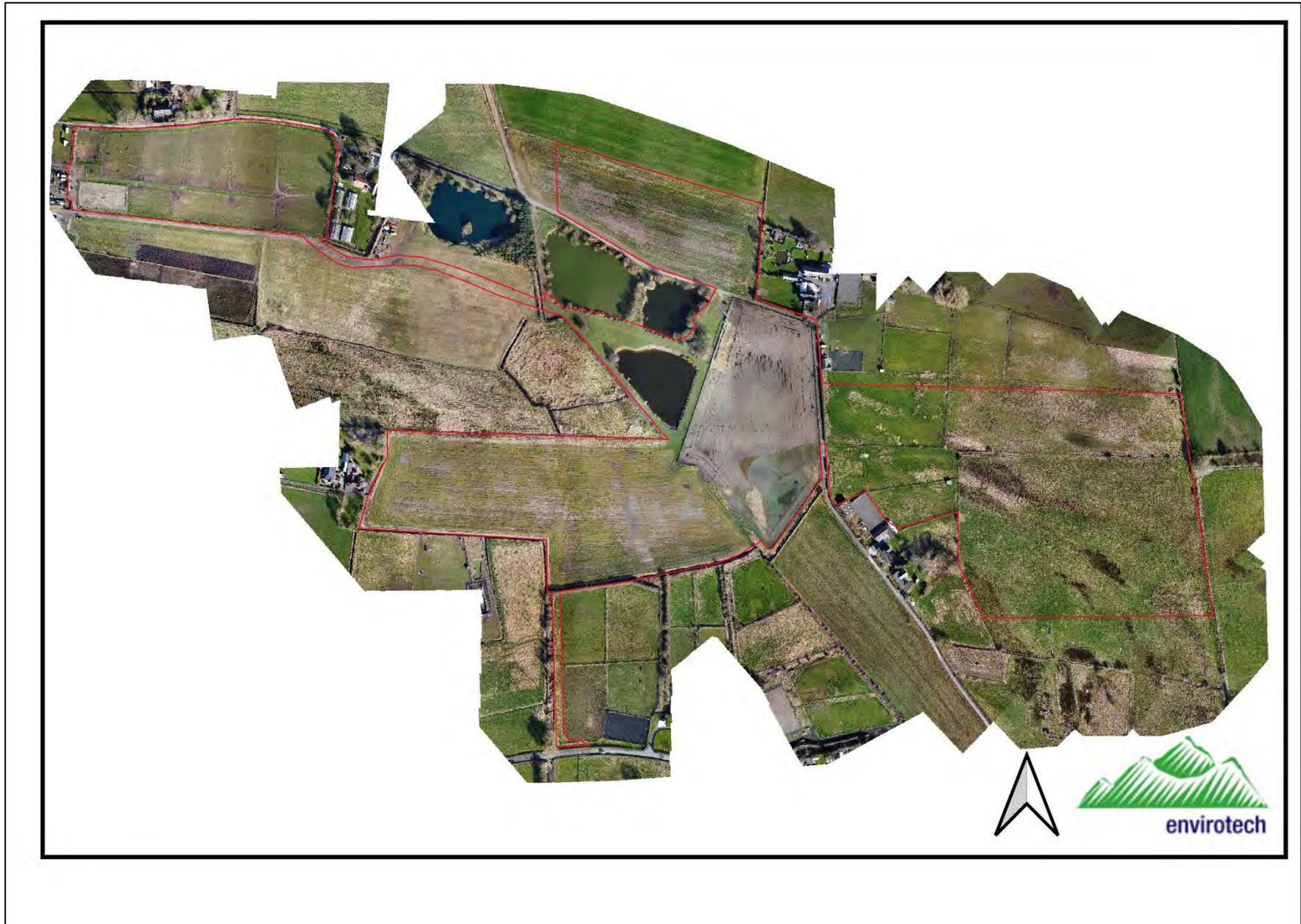


Figure 7 - Orthomosaic map

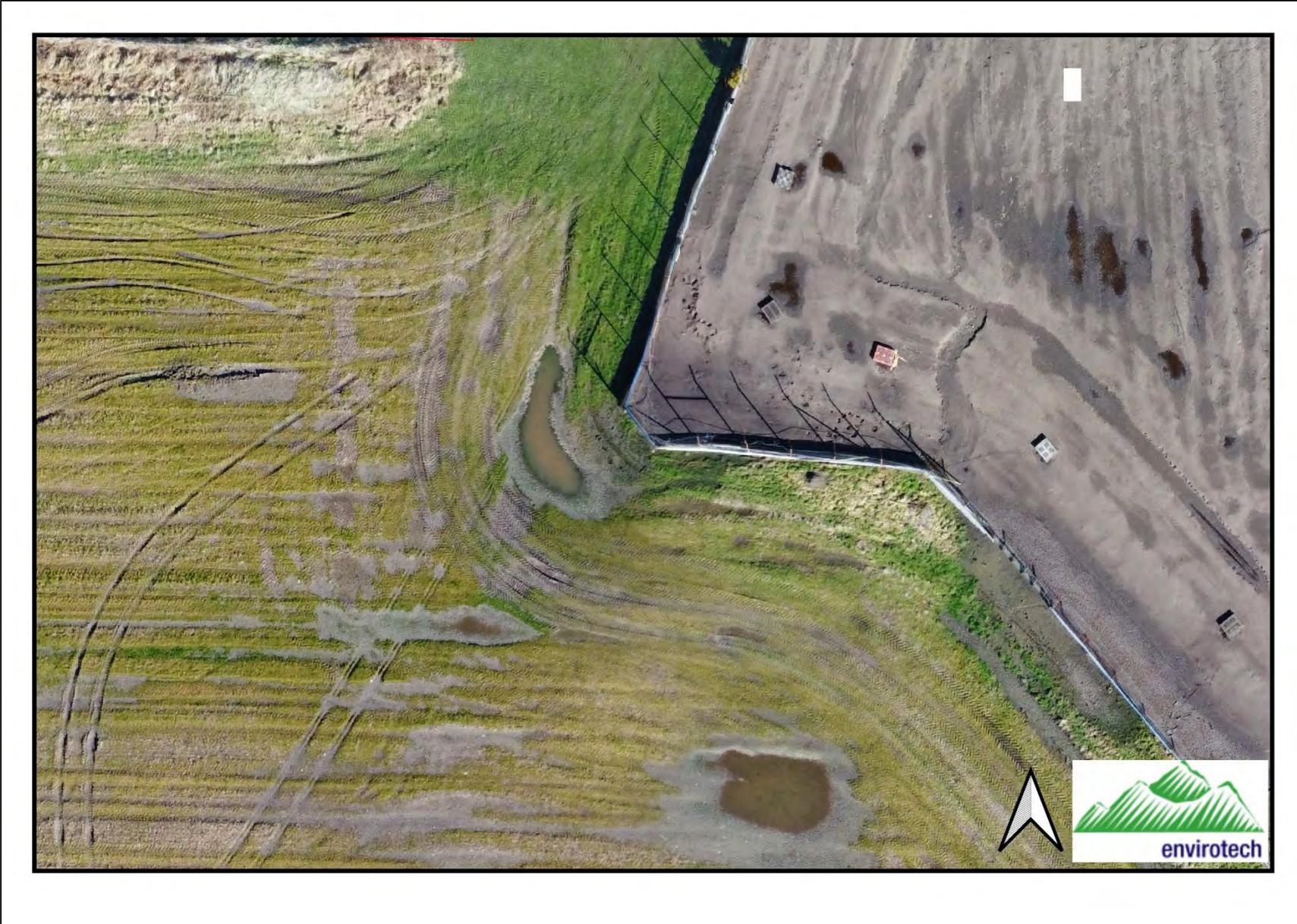


Figure 8 - Orthomosaic map close up

Target Note	Description	Comment
TN1	Amenity grassland	<p>The banks of the lakes in this area are either mown or short grazed by wildfowl kept on site. Annual Meadow Grass (<i>Poa annua</i>) is abundant along with Daisy (<i>Bellis perennis</i>), Ribwort Plantain (<i>Plantago lanceolata</i>) and Dandelion (<i>Taraxacum officinale</i>).</p> <p>Boundary areas are more diverse as they interface with the lakeshore and hedgelines but these areas are very small. Species recorded to the boundary include Cow parsley (<i>Anthriscus sylvestris</i>), Soft rush (<i>Juncus effuses</i>), Pineapple mayweed (<i>Matricaria discoidea</i>), Nettle (<i>Urtica dioica</i>), Rosebay willow herb (<i>Epilobium angustifolium</i>), Garlic mustard (<i>Alliaria petiolata</i>), Red dead nettle (<i>Lamium purpureum</i>), Cocksfoot (<i>Dactylis glomerata</i>), Bramble (<i>Rubus fruticosus</i> agg.), Perennial ryegrass (<i>Lolium perenne</i>), Ribwort plantain, Greater plantain (<i>P. major</i>), Reed canary grass (<i>Phalaris arundinacea</i>), Horsetail (<i>Equisetum</i> sp.), Creeping buttercup (<i>Ranunculus repens</i>), Broadleaved dock (<i>Rumex obtusifolius</i>), Silverweed (<i>Argentina anserina</i>), Spear thistle (<i>Cirsium arvense</i>), Dandelion, Sow thistle (<i>Sonchus</i> sp.), Yorkshire fog (<i>Holcus lanatus</i>), Cleavers (<i>Galium aparine</i>), Common reed (<i>Phragmites australis</i>), Hogweed (<i>Heracleum sphondylium</i>), Ground elder (<i>Aegopodium podagraria</i>), Chickweed (<i>Stellaria media</i>), Ragwort (<i>Jacobaea vulgaris</i>) and Forget-me-not (<i>Myosotis scorpioides</i>).</p> <p>Yellow flag (<i>Iris pseudacorus</i>) occurs to the lakeshores occasionally.</p>
TN2	Scrub - dense/continuous	The scrub areas of the site are dominated by willow (<i>Salix</i> sp.) which grows around much of the lake shores.
TN3	Broadleaved trees	A small stand of broadleaved trees is present to the sides of the lakes. Species present in these stands are alder (<i>Alnus</i> sp.), sycamore (<i>Acer pseudoplatanus</i>), Apple (<i>Malus</i> sp.), Cherry (<i>Prunus</i> Sp.) and Elderberry (<i>Sambucus nigra</i>). There is an understorey of snowberry (<i>Symphoricarpos albus</i>) with Bluebell (<i>Hyacinthoides non-scripta</i>) and Garlic mustard.
TN4	Cultivated/disturbed land - arable	A fenced compound. This area is used for rearing wildfowl. Over winter this compound comprises bare ground with a very high density of Mallard (<i>Anas platyrhynchos</i>) present. In past years, an arable crop has been planted in the spring. Areas of standing water are present in winter due to overflowing drinkers.

TN5	Cultivated/disturbed land - arable	An arable field which appears to be sown with spring wheat. This is fenced from adjacent fields but open to the access road to the West. The land is fallow overwinter.
TN6	Cultivated/disturbed land - arable	An arable field which appears to be sown with spring wheat. The land is fallow overwinter, a small splash formed towards the East boundary.
TN7	Other tall herb/fern - ruderal	A strip of uncultivated land alongside the arable field boundary to the North. Species present are similar as BTN1, except with the addition of Woundwort (<i>Stachys sp.</i>).
TN8	Poor semi-improved grassland	Fields grazed short grazed by horses. Soils appear thin, likely nutrient poor. Ragwort (<i>Senecio jacobaea</i>), Dandelion (<i>Taraxacum officinale</i>), Mouse ear (<i>Cerastium fontanum</i>), Silverweed (<i>Potentilla anserina</i>), Ribwort Plantain, Sweet Vernal Grass (<i>Anthoxanthum odoratum</i>), Germander Speedwell (<i>Veronica chamaedrys</i>), White clover (<i>Trifolium repens</i>) and Creeping Buttercup (<i>Ranunculus repens</i>). Diversity of forbs locally in excess of 6 per m ² only in localized areas.
TN9	Marshy Grassland	An open grazed field. Yorkshire Fog, Annual Meadow Grass, Timothy-grass (<i>Phleum pratense</i>), White clover and Mouse ear. Rush beds with Soft Rush (<i>Juncus effusus</i>), Common Sorrel (<i>Rumex acetosa</i>), Horsetail (<i>Equisetum arvense</i>), Meadow Buttercup (<i>Ranunculus acris</i>) and Reed canary grass (<i>Phalaris arundinacea</i>).
TN10	Improved grassland	Fields grazed short grazed by horses. Extensive Dandelion, Mouse ear, Annual Meadow grass, White clover and Ribwort Plantain. Field to South higher component of Perennial Ryegrass.
TN11	Other habitat	Farmsteads and private houses are present around the periphery of the site along with bare ground associated with Manège rings for horses.
TN12	Bare ground	Bare ground associated with an access track
TN13	Poor semi-improved grassland	Recently disturbed ground, now revegetating. Course grass species dominate with Yorkshire Fog, Nettle, Perennial Ryegrass. Cocksfoot dominant to field boundary on earth bank.
TN14	Lakes	Man made lakes used for both carp fishing and duck shooting with both at very high stocking densities. Fish are visible and active on all three lakes, up to 80 mallard (<i>Anas platyrhynchos</i>) and other fowl may be present on each of the ponds at any one time. Water quality within the ponds appears to be poor, highly eutrophic, with a thick algal bloom in summer.

H1	Intact hedge - species poor	A flail mown species poor hedge of predominantly hawthorn but with Gorse (<i>Ulex europaeus</i>). Bluebell recorded to base. This hedge is of recent planting, less than 20years, with spiral ring guards still presence to its base.
H2	Intact hedge - species poor	A taller hedge than H1, species poor hedge of predominantly hawthorn but with Gorse. Bluebell recorded to base.
H3	Intact hedge - species poor	A tall species poor hedge with Hawthorn and occasional Willow. Ditch to its base.
H4	Intact hedge - species poor	A tall species poor hedge with Hawthorn and Elderberry (<i>Sambucus nigra</i>). Ditch to its base.
H5	Intact hedge - species poor	A flail mown species poor hedge with Hawthorn, Elderberry and occasional Horse Chestnut (<i>Aesculus hippocastanum</i>). Garlic mustard and Bluebell recorded to its base.
H6	Intact hedge - species poor	A short species poor hedge with Hawthorn and occasional Crack Willow (<i>Salix fragilis</i>)
D1	Ditch	A ditch with steep sides, limited in channel vegetation, Brooklime (<i>Veronica beccabunga</i>) occasional, standing water all year. Occasional Common Reed (<i>Phragmites australis</i>) and Pendulous Sedge (<i>Carex pendula</i>) to banks but open to the arable fields adjacent and very narrow strip of uncultivated land to the bank top. Yorkshire Fog (<i>Holcus lanatus</i>), Annual Meadow Grass, Nettle, Rosebay Willow herb and Meadowsweet (<i>Filipendula ulmaria</i>).
D2	Ditch	A shallow ditch, partly dry in spring. Likely fully dry in summer. In channel vegetation includes Common Reed with banks dominated by course grass species, Yorkshire Fog and False oat grass (<i>Arrhenatherum elatius</i>)

Table 4 Details of Botanical and Faunal Target Notes.

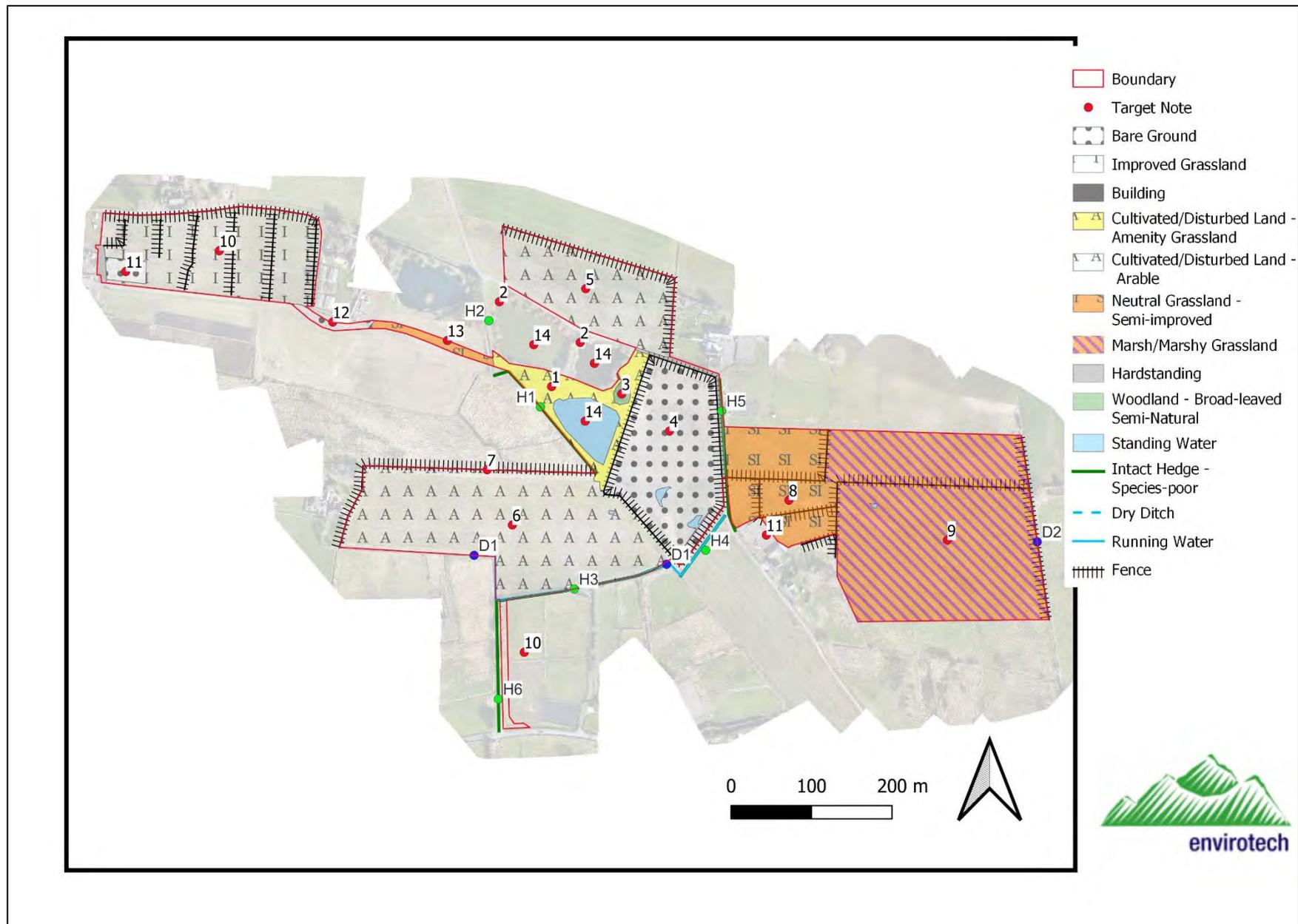


Figure 9 - Phase 1 habitat map



TN1

The banks of the lakes comprise short amenity grassland



TN2/TN3

There are small stands of trees and scrub around the lakes. Bluebell visible to lower right of bottom image



TN4

A compound used to overwinter ducks is devoid of vegetation



TN5

There are gravel tracks around the site, the arable field to the East is open to a track



TN6 and TN7

There is a wide strip of ruderal along the boundary of the arable field at the South of the site otherwise it is open and exposed



TN8 short grazed grassland. Species diversity to localised areas in excess of 6 species per m²



TN9 Marshy grassland, dense patches of soft rush occur across the field



TN10 Improved grassland used by grazing horses to South and North of Site



TN11- Stable buildings are well sealed



TN13- Recently re-seeded grassland short mown, species poor but Perennial Ryegrass not dominant



TN14- Man made lakes/ ponds with heavy wildfowl populations and stocked with fish



H1- Species poor, flail mown. Occasional bluebell to base



H3- Tall hawthorn hedge with limited ground flora



H5- Roadside hedges are species poor. Bluebell was occasional



D1- A wide ditch with slow flow to the edge of arable fields



D2- Shallow and likely dry in summer

Table 2. Photographs of target noted and other notable features on the site.

6.2 Vegetation

6.2.1 Details of the plant species found on site are included in the target notes.

6.2.2 Improved and amenity grassland is typically species poor and dominated by common and widespread species, it has a low ecological value.

6.2.3 Neutral and marshy grassland forms the majority of the site to the East. Species diversity within these fields is higher than other grassland areas of the site but is strongly influenced by existing land management with heavy grazing noted to the horse paddocks and mowing/ spraying of rushes noted in the marshy grassland fields. This habitat is less common locally, the fields in the area generally being of improved grassland. This would be of borough value.

6.2.4 Trees within the site boundary comprise semi-mature sycamore, willow, alder and apple. There are no ancient or veteran trees on site and no trees that were considered to be of notable value to wildlife.

6.2.5 There is no evidence of Japanese knotweed, giant hogweed or Himalayan balsam on the site. No other invasive or notable weed species listed on Schedule 9 (Section 14) of the Wildlife and Countryside Act (1981) (as amended) was identified within the site or adjacent land.

6.2.6 In considering priority habitat at the site, the Southern and Eastern fields are mapped as priority habitat "Coastal and floodplain grazing marsh". Coastal and floodplain grazing marsh is a Habitat of Principal Importance (HPI) as listed under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006, and formerly on the UK Biodiversity Action Plan. It is described as periodically inundated pasture, or meadow with ditches to maintain the water levels containing standing brackish or fresh water. These ditches are especially rich in plants and invertebrates. Almost all high-quality areas are grazed, but some are cut for hay or silage.

6.2.7 None of the fields on site would meet the criteria of being "periodically inundated". Ditches are present on site but were found to have a moderate flow rather than standing water. None of the site therefore displays characteristics of coastal and floodplain grazing marsh and none of the site should be classified as this priority habitat type.

6.2.8 Purple moor grass and rush pasture is also a (HPI). This habitat has a broad, non-specific definition: "vegetation, which has a distinct character, consists of various species-rich types of fen meadow and rush pasture. Purple moor-grass *Molinia caerulea*, and rushes, especially sharp-flowered rush *Juncus acutiflorus*, are usually abundant. Just as the best examples of lowland heath contain a wide range of plant communities, so the same is true for this habitat" (JNCC 2008).

6.2.9 Although the species purple moor grass is usually abundant within this HPI, it is possible to characterise the habitat where it is absent. At this site, no purple moor grass or sharp-flowered rush (also an indicator of the purple moor grass and rush pastures HPI) was found to be present. Soft rush was locally abundant.

6.2.10 The soft rush patches were considered to be of low botanical value and no more important than the surrounding areas of marshy grassland of low interest, largely comprising modified grassland types.

6.2.11 None of the other indicator plant species listed in the BAP description were present. Of note Marsh Bedstraw (*Galium palustre*) was absent and is an indicator species for NVC M23 mire community.

6.2.12 In NVC terms the marshy grassland area of the site would fall under the species poor MG10 (Holcus lanatus - Juncus effusus rush-pasture) which is not a BAP habitat rather than Species-rich M23 mire community -Soft Rush Juncus effusus / Sharp-flowered Rush Juncus acutiflorus which is more typical of the purple moor grass and rush pasture habitat.

6.2.13 We can therefore conclude the marshy grassland on site does not constitute a priority habitat type.

6.2.14 The intact hedges bounding the site are species poor, but may provide habitat for small birds and may also provide some cover from the weather in what is otherwise very open landscape. None of the hedges were found to contain more than 4 woody species per 30m average length and no protected species records occur in them. Hedge 1, 2 and 3 were found to contain small numbers of Bluebell (*Hyacinthoides non-scripta*). Hedge 1 is less than 20years old, spiral ring guards are still present around hedge plants. Hedge 2 does not bound land which is protected or common land or land used for agriculture or forestry. Hedge 5 part, using the "node to node" approach, part borders the curtilage of a dwelling. These hedges therefore fail a criteria which must be passed to be classified as important under the Hedgerow Regulation due to the presence of bluebell.

6.2.15 All hedgerows are an HPI.

6.2.16 The arable land is typically species poor. Large areas of it are bare ground over winter and or used for rearing wildfowl. There are very narrow field margins which contain common species associated with disturbed ground. The Arable field margins HPI is therefore not present.

6.2.17 There are several ponds on the site all of which appear to have poor water quality. Species of Principal Importance such as Common Toad (*Bufo bufo*) and Great Crested Newt (*Triturus cristatus*) are absent. Ponds on site therefore do not constitute HPI.

6.3 Amphibian

6.3.1 There are six records of three species of amphibian within 2km of the site. Two of the records are for great crested newts.

6.3.2 The closest great crested newt records are over 1km from the site.

6.3.3 10 Lakes/ ponds or standing waterbodies were identified within 500m of the site boundary from ordnance survey mapping, google earth and where access was possible, ground survey. Figure 10 shows the location of lakes/ ponds or standing waterbodies and 100m, 250m and 500m buffers to the site boundary.

6.3.4 Each lakes/ pond or standing waterbody was assessed in relation to its potential to support Great crested newts or other amphibian species. Observations were made for tadpoles, efts and spawn/ eggs. Details of each pond are shown on Table 3 with photographs in Table 4. eDNA testing was undertaken on 6th May 2022 by a licensed ecologist, the results are appended and shown in Table 3.

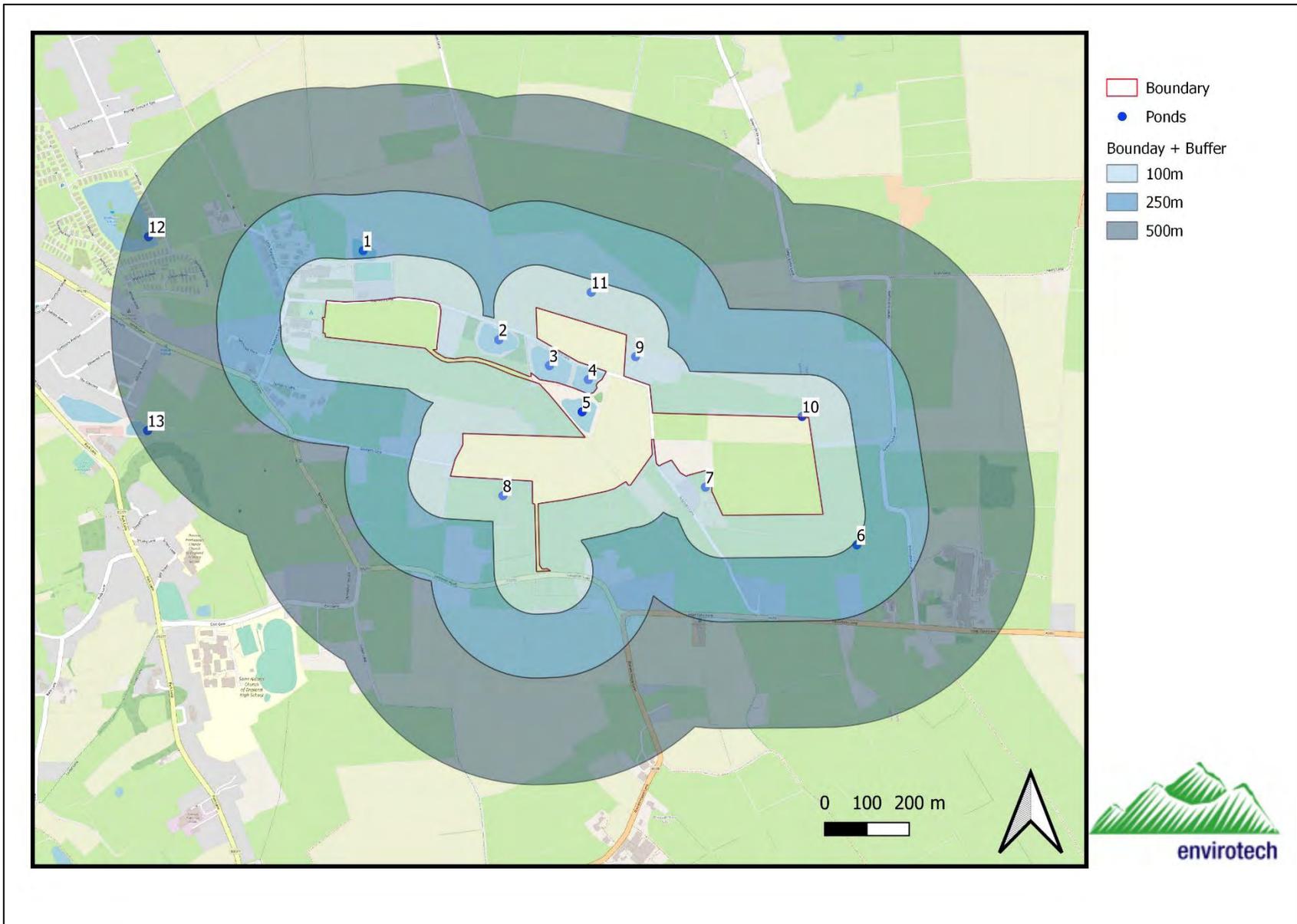


Figure 10 - Ponds/ lakes and 100m, 250m and 500m buffers to site boundary

Pond Number	Notes	eDNA Tested	eDNA result
1	A large lake surrounded by mown amenity grassland. Shallow sloping sides fringed by Common Reed (<i>Phragmites australis</i>). No spawn or tadpoles/ efts noted	Yes	Negative
2	A large lake, stocked with fish, surrounded by scrub. Large wildfowl population. Steep sloping sides. Water appears "blue" possibly due to dissolved minerals. No spawn or tadpoles/ efts noted	Yes	Negative
3	A large lake, stocked with fish, surrounded by scrub. Large wildfowl population. Steep sloping sides. Lake 3, 4 and 5 hydrologically linked. No spawn or tadpoles/ efts noted	Yes	Negative
4			
5			
6	A small, shallow pond. Heavily shaded with limited macrophyte growth. Likely ephemeral in nature. No spawn or tadpoles/ efts noted	Yes	Negative
7	A small, shallow pond. Heavily shaded with limited macrophyte growth. Likely ephemeral in nature to the edge of a garden. No spawn or tadpoles/ efts noted	Yes	Negative
8	A small pond within a compound used for keeping ducks and geese. Vertical sides. Appears eutrophic in nature. Close inspection not possible/ access restricted. High captive wildfowl population and eutrophic water highly prejudicial to use by amphibians. Ditch flows past the pond in field boundary, ditch DNA tested as access to pond not possible	Yes	Negative
9	A small pond within a garden. Vertical sides. Close inspection not possible/ access restricted. Vertical pond sides highly prejudicial to use by amphibians.	No	-
10	A small depression within the field shown as a pond on ordnance survey maps, soft rush dominant. No standing water noted	No	-
11	A small depression within the field shown as a pond on ordnance survey maps. No standing water noted	No	-
12	Larger ponds, likely stocked with fish. Isolated from site by distance and roads	No	-
13			

Table 3- Lakes/ ponds or standing waterbodies



Lake 1 fringed with common reed



Lake 2 had a noticeable tint to its water when sampled



Lake 3, 4 and 5 are closely linked

Fish were clearly visible in all the lakes on the site.

Up to 80 fowl were counted on one of the lakes, outside of the shooting season



Pond 6 is very shallow and heavily shaded. It may be ephemeral in nature



Pond 7 is shallow and shaded. It may be ephemeral in nature



Pond 8 is within a compound used for raising wildfowl



A ditch flows past Pond 8 and was sampled for GCN eDNA



Pond 9 is within a garden and has vertical sides

	<p>Pond 10 was found to be completely dry</p>
<p>Table 4- Ponds</p>	

6.3.5 Given the stocking densities of both fowl and fish in the ponds on site, it is considered highly unlikely that any amphibian species could breed successfully at the site in Lakes 2, 3, 4 and 5.

6.3.6 It is possible there may be breeding by amphibians in Lake 1 offsite. Reduced wildfowl numbers on this pond make it a more suitable breeding site.

6.3.7 Breeding by amphibians in Ponds 6 and 7 offsite is possible but these appear ephemeral in nature and as such are of low suitability.

6.3.8 Breeding by amphibians in Ponds 8 and 9 offsite is possible but these ponds appear artificial in nature and suitability is likely to be low.

6.3.9 Pond 10 and 11 are dry. Pond 12 and 13 are too remote from site and isolated from it for impacts to be likely.

6.3.10 Ditches on the site have a noticeable flow but may be marginally suitable for use by breeding amphibians. eDNA testing of the main ditch, adjacent Pond 8, was negative for Great crested newts.

6.3.11 No amphibians were observed on site during the surveys in any of the Lakes/ponds or standing waterbodies.

6.3.12 It is generally considered that any water body which contains fish will have a low suitability to Great crested newts. When fish are at artificially elevated levels due to stocking, the potential for use of a water body by Great crested newts is even lower.

6.3.13 An extract below is taken from the "Amphibian Habitat Management Handbook" by Baker et al. (2011). This explains how ponds which may have frogs and toads need not necessarily indicate the presence of Great crested newts when fish are present.

“Native amphibians differ in their abilities to co-exist with fish. At one extreme the common toad is either distasteful or toxic to many predators, including fish.

This defence mechanism is present at all stages of the toad’s life cycle. Not only are common toads able to survive in ponds with fish, but fish may even be beneficial. Although common toad tadpoles are distasteful to fish, they are consumed by predatory invertebrates. Fish may reduce invertebrate numbers, lowering the impact of invertebrate predation on toad tadpoles. Common toads can breed successfully, even in well stocked angling ponds.

At the other extreme, the great crested newt is the least able to co-exist with fish. Great crested newt larvae spend time high up in the water column rather than hidden on the pond bottom and it seems that this behaviour makes them particularly prone to fish predation.

The remaining widespread amphibian species are intermediate in their abilities to survive with fish. Although their larvae are consumed by fish, these species frequently breed successfully in ponds with fish. The nature of co-existence is not fully understood but the survival of amphibian larvae may depend on physical refuges from predation such as may be provided by aquatic vegetation.

Due to the sensitivity of great crested newts to fish predation, and because fish are predators of other amphibian species, fish should not be stocked in amphibian ponds.”

6.3.14 Common toad (*Bufo bufo*) are species of principal importance, whilst these are not known to occur in the ponds and ditches on site, the potential presence of this or other species, which are less prone to fish predation than great crested newt, should be considered. As such precautionary mitigation would be appropriate in respect of construction and restoration activities but this species group is unlikely to be of more than local importance.

6.4 Badger

6.4.1 There are no records of badgers within 2km of the site. Records of badgers are scarce in this part of Lancashire.

6.4.2 Badger setts do not occur on site and a lack of feeding signs or runs across the site would suggest that they do not occur within 30m of site boundaries.

6.5 Bats

6.5.1 There are 72 records of bats within 2km of the site. Pipistrelle Sp., Common Pipistrelle (*Pipistrellus pipistrellus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Brown Long-Eared (*Plecotus auritus*) and Whiskered (*Myotis mystacinus*) have been recorded but no records occur on site.

6.5.2 The foraging habitat at the was assessed in accordance with Collins, J. (ed) (2016), Figure 11. Habitat was mapped on a scale of potential for use for commuting and foraging from Negligible to High.

6.5.3 The majority of the site would appear to be of negligible quality due to its being open and exposed grassland and arable fields with species poor hedges.

6.5.4 The presence of lakes and ponds, although these have low water quality, with scrub on their banks, makes these areas of low quality. The ponds are somewhat isolated in the landscape and there appears to be few suitable roosting sites in the local landscape.

6.5.5 There is a steel shed on site which may be demolished as part of work. This was found to be well sealed and have negligible potential for use by roosting bats.

6.5.6 There are no other buildings on site affected by the proposal for bats to utilise for roosting. A bungalow and stable are on the redline boundary and will not be affected by the proposal.

6.5.7 There are no trees on the site with potential for use by roosting bats. T5 is identified in the Arboricultural report (Ref: BTC2147) as having a large tear on its North-west side, G6 has a tree with a snapped branch. These trees are within a private garden, and outside the application site boundary. They can not be closely inspected but no bat activity has been recorded around them and they are retained in the scheme. G3 includes a rowan with an open cavity at its base. This cavity is of insufficient height and is too shallow for use by bats for roosting.

6.5.8 Given the site having negligible and low quality habitat for commuting and foraging, and there being no suitable roost sites, no bat activity surveys were considered necessary in accordance with Collins, J. (ed) (2016) to determine impacts on bat species.

“If the habitat has been classified as having low suitability for bats, an ecologist should make a professional judgement on how to proceed based on all of the evidence available. It may or may not be appropriate for bat activity surveys to be carried out in low suitability habitats. However, caution should be exercised in fringe areas (e.g. some areas of Scotland) where ‘low suitability habitat for bats’ may be extremely important to local bat populations due to the relative scarcity of better habitats. In such situations, bats are likely to also be more widely dispersed and may use a larger number of sites, therefore survey effort may actually need to be increased to detect use on the proposed site in question.”

6.5.9 Two bat activity surveys had been undertaken over part of the site on 25th April 2019 and 23rd May 2019 by MT and JS. Only the higher quality areas of the site were assessed. A map showing the observed direction of the arrival of bats is shown on Figure 12. No bats were seen to originate on site. Cumulatively over both surveys, three Common Pipistrelle and one Noctule (*Nyctalus noctula*) bat were recorded flying into site. The abundance and diversity of bats observed foraging on site was low and as expected given the low quality of habitats present on site and the lack of available roosting opportunities.

6.5.10 Two bat activity surveys were undertaken over the entire site on 1st May and 19th June 2023 by AG. No bats were seen to originate on site. Cumulatively over both surveys, two Common Pipistrelle and one Noctule (*Nyctalus noctula*) bat were recorded flying into site.

6.5.11 Three bat activity surveys were undertaken over the entire site on 9th May, 14th August and 18th September 2024 by AG and or AC for a period of 15mins before sunset until 2hrs after sunset. No bats were seen to originate on site. Cumulatively over three surveys a peak count of

12 Common Pipistrelle one Noctule and one Myotis Sp. bat were recorded flying into site. Foraging was concentrated over the lakes, to be retained, and associated trees. All bats appeared to fly into the site.

6.5.12 Two anabats were deployed to the site for at least 5 days in each of the three seasons, Spring, Summer and Autumn. The cumulative total number of bat passes recorded and species are shown on Table 5-9.

6.5.13 The number of bat passes is considered relatively small and species recorded match those found during the manual surveys.

KALEIDOSCOPE 4.0.1								
Bats of Europe 3.1.3	MYBR	MYDAU	MYNA	NYNO	PINA	PIPI	PIPY	PLAUR
*				166	1	1		

Table 5- Anabat 1 (21st to 27th May 2024)

KALEIDOSCOPE 4.0.1								
Bats of Europe 3.1.3	MYBR	MYDAU	MYNA	NYNO	PINA	PIPI	PIPY	PLAUR
*						3	140	

Table 6- Anabat 1 (9th to 14th August 2024)

KALEIDOSCOPE 4.0.1								
Bats of Europe 3.1.3	MYBR	MYDAU	MYNA	NYNO	PINA	PIPI	PIPY	PLAUR
*				9		1		1

Table 7- Anabat 1 (18th to 25th September 2024)

KALEIDOSCOPE 4.0.1								
Bats of Europe 3.1.3	MYBR	MYDAU	MYNA	NYNO	PINA	PIPI	PIPY	PLAUR
*		1	0	5	79	276		

Table 8- Anabat 1 (21st to 27th May 2024)

KALEIDOSCOPE 4.0.1								
Bats of Europe 3.1.3	MYBR	MYDAU	MYNA	NYNO	PINA	PIPI	PIPY	PLAUR
*				4		66		

Table 9- Anabat 1 (9th to 14th August 2024)

KALEIDOSCOPE 4.0.1								
Bats of Europe 3.1.3	MYBR	MYDAU	MYNA	NYNO	PINA	PIPI	PIPY	PLAUR
*		1		41	30	94	6	

Table 10- Anabat 1 (18th to 25th September 2024)



Stable building are well sealed and retained



Bungalow is retained



T5 and G6 in a private garden and are retained in the scheme



G3 rowan with a cavity at ground level not suitable for use by roosting bats

Table 11- *Buildings and trees*

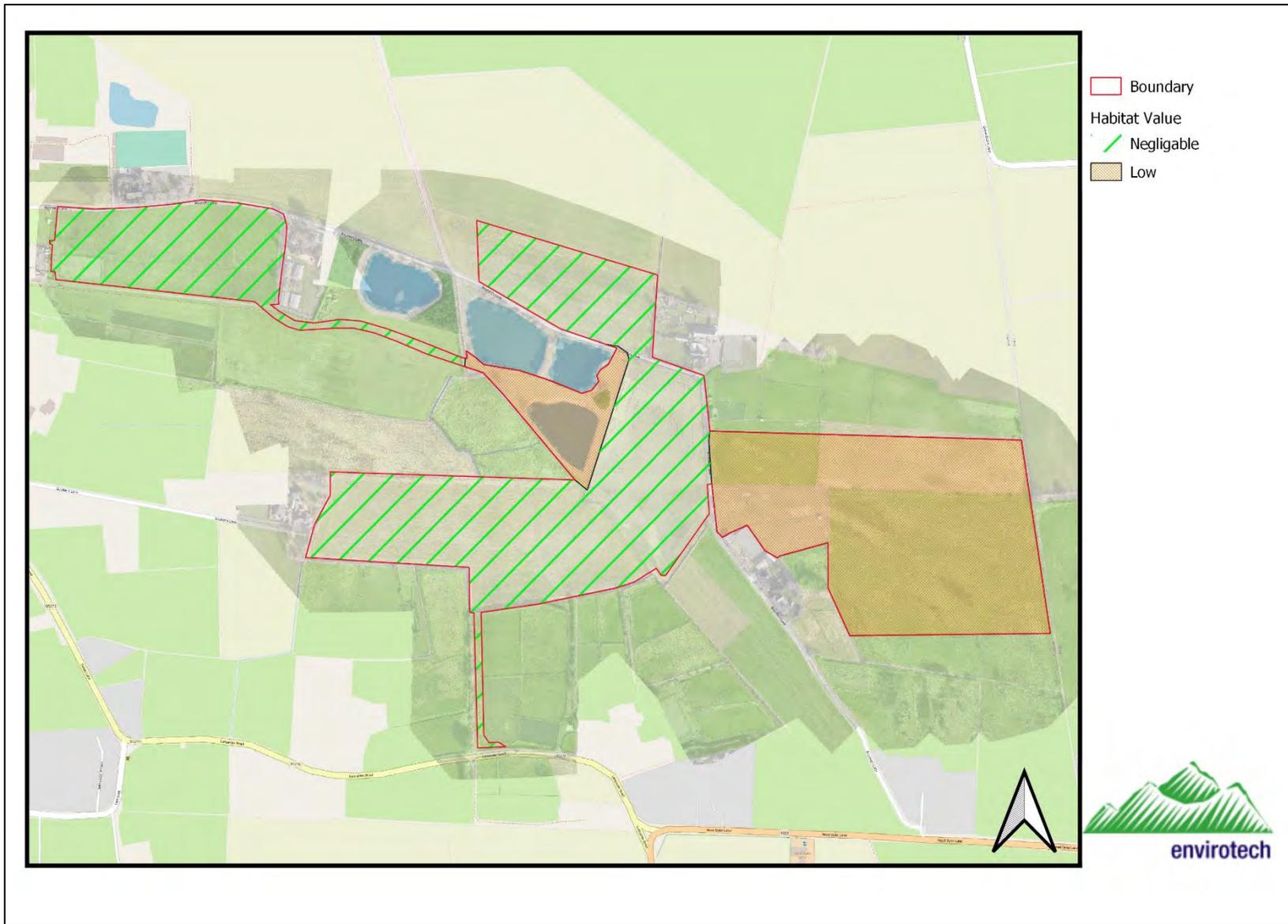


Figure 11 - *Bat foraging habitat quality*



Figure 12 - *Bat activity 2019*

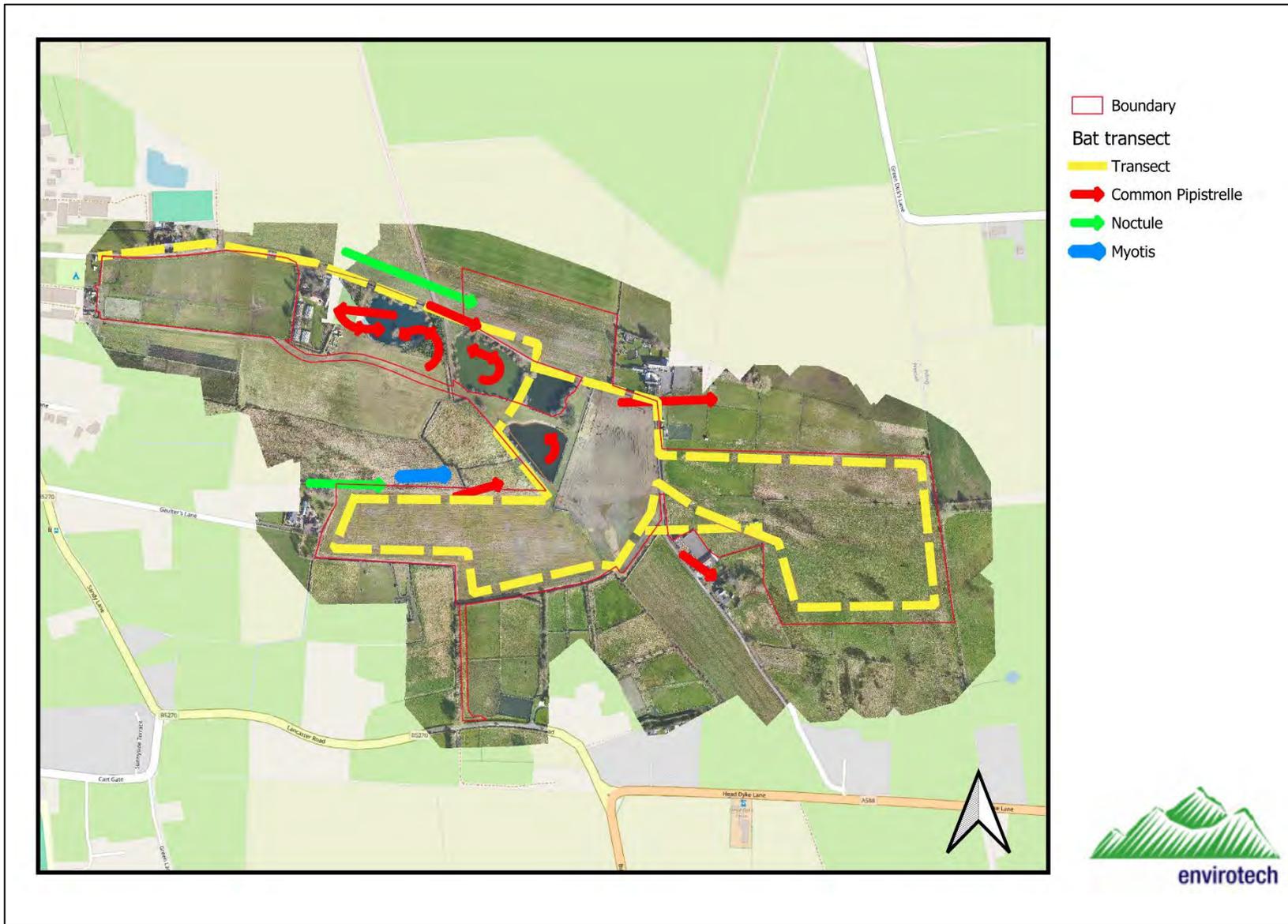


Figure 14 - Bat activity 2024



Figure 15 - Anabat locations 2024

6.6 Birds

6.6.1 A standalone report on overwintering birds has been compiled and is appended. This relates to the site potential importance to species associated with nearby Natura 2000 sites and the BHS. The site and zone of influence is considered to be of International importance to overwintering birds as it constitutes functionally linked land for overwintering wildfowl. Whopper swan and Pinkfooted Geese have been recorded adjacent the site at numbers in excess of 1% of the adjacent SPA overwintering population. There may be an impact due to disturbance of these species of bird on FLL outside the site boundary. Shellduck have been recorded on site in numbers in excess of 1% of the adjacent SPA overwintering population. Use of one of the ponds which appears to be favored by this species will occur. There would be displacement of this species from the site during work, albeit it appears tolerant to anthropogenic activity. Curlew and Little egret have also been recorded adjacent the site in numbers in excess of 1% of the of the adjacent SPA overwintering population but the fields these were recorded in are outside the ZOI and impact is unlikely.

6.6.2 The construction of lodges may result in increased recreational use of the site, adjacent farmland and coastal areas. This could impact on the interest of the Natura 2000 sites.

6.6.3 Mitigation both embedded and specific for overwintering birds is proposed.

6.6.4 In respect of the non-overwintering bird interest, no kingfisher (*Alcedo atthis*) were recorded on site and this is likely due to the poor quality of the lakes on site and the species poor assemblages of fish in the lakes.

6.6.5 The hedges on site, areas of scrub and small stands of woodland are likely to offer nesting habitat to a range of small passerine species.

6.6.6 There were no apparent tree holes or crevices that could support notable species such as redstart (*Phoenicurus phoenicurus*) or pied flycatcher (*Ficedula hypoleuca*), or larger species such as owl or goosander (*Mergus merganser*).

6.6.7 A standalone report on the breeding bird interest has been compiled. Overall impacts on breeding birds are considered to be minor although mitigation will be embedded into the project. Impacts relate to potential disturbance to nesting birds and temporary loss of habitat.

6.7 Brown Hare

6.7.1 Brown hare are a UK BAP priority species. There are nine records of brown hares within 2km of the site. Local residents report this species occurring on and around the site.

6.7.2 Brown hares were recorded in small numbers (peak count 3) across the site in the Spring of 2024. These were concentrated in the more open arable fields and duck breeding pen. Rabbits (*Oryctolagus cuniculus*) were seen in the grassland fields and wider landscape.

6.7.3 The site boundaries have some potential for use by brown hares to create forms but the sites potential for use is reduced due to its exposed nature and regular human presence to the fishing lakes.

6.7.4 A risk assessment of the site in respect of its future potential for and value to brown hares could be adequately made. We consider the risk to brown hares is very low.

6.8 Invertebrates

6.8.1 Numerous notable invertebrates have been recorded within 2km of the site.

6.8.2 No deadwood or vegetation on site was recorded which would provide an important resource for invertebrates in the local area.

6.8.3 The arable and improve pasture fields are likely to be of only local importance to invertebrates.

6.8.4 Hedges are species poor, the lakes are heavily stocked with fish which would have a strong predatory impact on aquatic invertebrates.

6.8.5 The neutral and marshy grassland could be utilized by common species of butterfly but none were noted during the field surveys.

6.8.6 Given the poor quality habitats contained within the site in comparison to the wider area, it is not considered that this site is of any local significance for invertebrates.

6.9 Otter

6.9.1 There are no records of otters within 2km of the site and this species would likely be an unwelcome visitor to the site given its use for fishing and breeding wildfowl.

6.9.2 No indication of the presence or past use of the site by otter was found. There are no potential holt sites on the site.

6.9.3 The site is not well linked with other potentially high quality habitats for this species.

6.9.4 It is unlikely there is a significant risk to this species from the proposals. Precautionary mitigation would be appropriate.

6.10 Reptiles

6.10.1 There are no records for reptiles within 2km of the site.

6.10.2 The habitats on site would appear suitable for use by this species, however in the absence of amphibians or significant sources of invertebrates; foraging opportunities are likely to be very poor.

6.10.3 There is an absence of features that would offer potential refuge or hibernation opportunities.

6.10.4 It was considered that these species are likely absent from the site.

6.11 Water vole

- 6.11.1 There are records of water voles within 250m of the site from 2010.
- 6.11.2 The vegetation growing along the ditches could be accessed by this species. The fishing lakes are of low suitability due to disturbance and wildfowl provisioning damage to the banks.
- 6.11.3 No signs of water voles, such as droppings, feeding piles or footprints were present during any of the field surveys. Mink (*Neovison vison*) Scat was recorded to edge of one of the fishing lakes in 2024 and are a key predator to Watervole. Watervole are considered to be absent from the site.

7. Ecological Receptors

7.1.1 Based on the survey results and the data search 'Key Ecological Receptors' have been identified, as set-out in Table 6.

Ecological Receptor	Nature Conservation value
Morecambe Bay and Duddon Estuary Special Protection Area (SPA) and Morecambe Bay Ramsar (Functionally Linked Land for overwintering birds)	International
Morecambe Bay Ramsar and Special Area of Conservation (SAC), and Morecambe Bay and Duddon Estuary Special Protection Area (SPA) (Recreational disturbance)	International
Wyre Lune Marine Conservation Zone (Water pollution)	International
Lune Estuary and Wyre Estuary Site of Special Scientific Interest (SSSI) (Recreational disturbance)	National
Pilling Moss – Head Dyke BHS	County
Hedgerows	Borough
Neutral and Marshy Grassland	Borough

Table 6 Key Ecological Receptors and their conservation value

7.1.2 In accordance with CIEEM (2022) at the scoping stage it was determined that other 'potential' ecological receptors should be scoped out of the assessment, either because these receptors would not be measurably affected by the Development, or because the receptors are not considered sufficiently valuable to be a material consideration in decision-making.

The other receptors considered, and the reasons for scoping them out. Ecological Receptor-Designated Sites and Habitats	Reasons for scoping the receptor out of the assessment
Amphibians	No amphibians have been recorded during the field surveys. No high quality breeding ponds were identified near the site. The Site is therefore likely to support, at most, very small numbers of common species, and the amphibian assemblage would not be considered to be of more than Local (Parish/Neighbourhood) value. Amphibians are therefore not considered further in this assessment.

The other receptors considered, and the reasons for scoping them out. Ecological Receptor-Designated Sites and Habitats	Reasons for scoping the receptor out of the assessment
Badger	Although likely to occur locally this species has not been recorded on site or within 30m. The sites value to this species would not be considered to be of more than Local (Parish/Neighbourhood) value. Badgers are therefore not considered further in this assessment.
Bats	The habitats within site are of very low value to bat species and only common species have been identified or are expected to be using the site in low numbers. No roosts occur on site. Development is not considered to be significant at even the local level for the species.
Breeding birds	An unexceptional number and diversity of breeding birds have been recorded on the site. Development is not considered to be significant at even the local level for this species group
Brown Hare	Habitats within the Site are suitable for Brown Hare and its presence was recorded. Whilst it does occur at low densities on Site, the Development is not considered to be significant at even the local level for the species as the habitat it relies on is common and widespread locally.
Invertebrates	<p>The habitats within the Development are considered likely to be of relatively low value for invertebrates.</p> <p>No features or habitats of particular value for invertebrates are present within the development area. Invertebrates are therefore not considered further in this assessment.</p>
Otters	Habitats within the Site are suitable for Otter but its presence was not recorded. Whilst it may occur at low densities the Development is not considered to be significant at even the local level for the species.

The other receptors considered, and the reasons for scoping them out. Ecological Receptor-Designated Sites and Habitats	Reasons for scoping the receptor out of the assessment
Reptiles	Although full presence/ absence surveys and population size class assessments were not undertaken. No reptiles have been recorded during the field surveys. The Site is therefore likely to support, at most, very small numbers of common species, and the reptile assemblage would not be considered to be of Local (Parish/Neighbourhood) value. Reptiles are therefore not considered further in this assessment.
Watersvole	No watersvoles have been recorded during the field surveys. Indications of the presence of mink have been found. Watersvole are therefore not considered further in this assessment.

Table 7 Key Ecological Receptors Scoped out of additional assessment

8. EMBEDDED MITIGATION

8.1.1 Embedded mitigation relates to mitigation which has been designed into the project at an early stage. The following are common/ widely use recommendations which are not specific to this development. Embedded mitigation

- Demonstrates the purpose of EIA early in the design process and its iterative nature;
- Encourages the incorporation of mitigation measures early on in the design process;
- Demonstrates how the design of a project has evolved; and
- Demonstrates how the applicant has “designed out” significant effects.

8.1.2 Species and habitats which have been scoped out of further impact assessment because these receptors would not be measurably affected by the Development, or because the receptors are not considered sufficiently valuable to be a material consideration in decision-making, may be enhanced as a result of embedded mitigation.

8.2 Compensatory planting and habitat enhancement

8.2.1 A full landscaping and restoration scheme has been devised for the site.

8.2.2 A Construction Environmental Management Plan (CEMP) will be formulated for the operational period of development. A Biodiversity Enhancement Management Plan (BEMP) will be formulated for the post operation period of habitat restoration.

8.2.3 The roots of trees on the site and its boundaries should be adequately protected during work in accordance with industry standards. All trees should as far as possible be retained in the scheme. New trees, ideally including a range of other native species could be introduced to the site post development.

8.2.4 The proposal will utilize land in sequential basis with each area being restored as the next is used. This will allow landscaping to be undertaken throughout the development rather than at the end of works. Existing habitat will therefore be retained as long as possible, before loss, with new habitat created in advance of the end of site works.

8.2.5 The landscaping scheme will utilise plants which are native and wildlife friendly. Wildflower seed should be used to across the site on all verge areas, hedgerow bases and open areas to enhance the ecological value of the site and continuity between the site and the wider area.

8.2.6 Hedgerows around the site will be retained or improved where possible. The roots of retained hedgerow plants/trees will be adequately protected during development from compaction/ground disturbance.

8.2.7 Newly created ponds/ lakes will be planted with suitable native species.

8.3 Amphibians

8.3.1 Should any trenches and excavations be required, an escape route for animals that enter the trench must be provided, especially if left open overnight. Ramps should be no greater than of 45 degrees in angle. Ideally, any holes should be securely covered. This will ensure amphibians are not trapped during work.

8.3.2 Additional ponds/ lakes will be created and the reduction in wildfowl use due to the cessation of releases onto the lakes may result in enhanced amphibian breeding opportunities.

8.4 Badger

8.4.1 Should any trenches and excavations be required, an escape route for animals that enter the trench must be provided, especially if left open overnight. Ramps should be no greater than of 45 degrees in angle. Ideally, any holes should be securely covered. This will ensure badgers are not trapped during work.

8.4.2 All excavations left open overnight or longer will be checked for animals prior to the continuation of works or infilling.

8.5 Bats

8.5.1 Pole mounted bat boxes at the site will be erected as there is currently negligible potential for bats to roost on the site.

8.5.2 Introducing a wider diversity of aquatic plants to the site will increase water quality at the site.

8.5.3 Overall it is considered that with increased plant species diversity at the site and improvement in water quality, use of the site by bats is likely to increase.

8.6 *Breeding Birds*

8.6.1 If vegetation clearance is to occur in the March-September period a check for nesting birds should be conducted first by a suitably qualified individual.

8.6.2 New planting within the site and the retention of trees and shrubs on the site boundary will maintain the ecological functionality of the site for breeding birds.

8.6.3 A range of bird boxes could be erected across the site, these could be placed into hedgerows or trees to the edges of ponds/ lakes.

8.6.4 If nesting birds are found at the site all site works shall cease and further ecological advice shall be sought.

8.6.5 The proposal will utilize land in sequential basis with each area being restored as the next is used. This will allow landscaping to be undertaken throughout the development rather than at the end of works. Existing habitat will therefore be retained as long as possible, before loss, with new habitat created in advance of the end of site works.

8.7 *Brown Hares*

8.7.1 The points in respect of not working at night and leaving open trenches with means of escape detailed for badgers are also applicable to this species.

8.8 *Invertebrates*

8.8.1 Landscaping should include native or wildlife friendly species including night flowering plants.

8.8.2 Contaminants should not be allowed to enter the soils or water bodies during work. To effect this, spill kits should be provided on site. Re-fuelling of all plant and machinery should be undertaken away from open drains and water courses. Drip trays should be used under static machinery.

8.9 *Otter*

8.9.1 The points in respect of not working at night and leaving open trenches with means of escape detailed for amphibians are also applicable to this species which is only likely to pass through the site at night.

8.10 *Reptiles*

8.10.1 The points in respect of not leaving open trenches without means of escape detailed for badgers are also applicable to these species.

9. SITE SPECIFIC MITIGATION

9.1 Morecambe Bay and Duddon Estuary Special Protection Area (SPA) and Morecambe Bay Ramsar

- 9.1.1 Morecambe Bay and Duddon Estuary (SPA) and Morecambe Bay Ramsar has been identified as having Functionally Linked Land for overwintering birds on and adjacent the site. This land is used by overwintering wildfowl associated with the SPA and Ramsar for feeding.
- 9.1.2 Use of the site and land within the ZOI by Pinkfooted Geese, Whooper Swan and Shellduck in numbers above 1% of the overwintering population of the SPA/ Ramsar were recorded. Impacts may therefore be significant on these species and mitigation is required.
- 9.1.3 There will be partial loss of the site during work, with restoration ongoing. The creation of lakes and grassland would enhance the site for some species of wildfowl, including shellduck. It is not possible to provide compensation for this species during work, as their favored pond is within the work area. Use of the site by larger geese and swans was not recorded and the increase in enclosure of the fields in the application site would therefore not impact these species.
- 9.1.4 The wider landscape will remain in the same land use throughout work and still available for use. There may however be displacement of overwintering birds from fields to the East, outside the site boundary, during work due to the increase in anthropogenic activity. Whilst birds using fields will become accustomed to such impact, short term, high impact noise may result in a disturbance response. This can be mitigated with the appropriate timing of work, in particular at times when wildfowl are most sensitive due to periods of extreme cold and stress.
- 9.1.5 To avoid disturbance to peak overwintering bird interest features, for which the period October to March is the most important. Site activity on the field to the East (Phase 2), Figure 13, during the period that any voluntary restraint or statutory suspension of waterfowl shooting from 9th November to 20th February comes into force within Morecambe Bay and Duddon Estuary Special Protection Area (SPA) will cease.
- 9.1.6 This scheme is designed to help with the conservation of waterfowl; ducks, geese, and waders, by reducing disturbance to them during periods of prolonged cold weather. Whilst it operates to prevent disturbance from shooting, the trigger for the suspension of shooting can be used for the suspension of site activities which may also have negative impacts on waterfowl when they are most sensitive.
- 9.1.7 The scheme operates when more than half of these meteorological stations (in Scotland and/or England/Wales) have recorded frozen conditions (determined from minimum air and grass temperatures) for seven consecutive days (but allowing short periods of thaw), the country conservation agencies liaise with BASC who normally advise a period of voluntary restraint of shooting where appropriate whilst severe weather conditions last.

- 9.1.8 On the 13th day of frozen conditions, if more than half the relevant meteorological stations are still frozen, a case is presented to the relevant Secretary of State(s) requesting a suspension on waterfowl shooting due to the severe weather. Such suspensions can be instituted in Scotland alone, and/or in England/Wales dependent on the extent of the cold weather. Once the Statutory Instrument has been signed, it comes into force at 00h01, two days after the case was presented.
- 9.1.9 With respect to the agreed process of counting days of severe weather, short periods of thaw (one or two days with less than half stations frozen) have no effect on the counting process, but periods of thaw of three or more days have the effect of resetting the severe weather day number to 0.
- 9.1.10 Such short periods of thaw are 'neutral' in terms of counting days towards a suspension - that is they neither count nor terminate the process. A restriction on work to other fields and phases is not considered necessary as potential disturbance from these areas is limited by existing landform screening.



Figure 13 - Sensitive area (Phase 2)

9.1.11 There is proposed to be the creation of new lodges on a field which is currently under arable cultivation and this would be lost for potential use by overwintering birds as a result of the proposal. Use of these fields by overwintering birds was not recorded during the surveys.

9.1.12 There may be an increase in the local population as a result of works which would give rise to increased recreational use of Morecambe Bay Ramsar, SSSI, SAC and Morecambe Bay and Duddon Estuary SPA. This impact is not easily quantifiable but it is possible. To mitigate the effect it is recommended that a Lodge owner Pack is made available to all new residents of the development highlighting the sensitivity of the area and impacts caused as a result of recreational disturbance.

9.1.13 Lodge owner packs should comprise, but are not limited to;

- Introduction letter to the pack, setting out the issue and providing a contents page of included documents.
- Description of the Natura 2000 sites and their features, this should include a map explaining the boundaries of European designated sites.
- An explanation of the sensitivities of features to recreational disturbance and key sensitive times for the features of the European designated sites.
- List any access restrictions in the local area (i.e. under the Countryside and Rights of Way Act 2000, Marine and Coastal Access Act 2009 or Byelaws).
- Suggestions of alternative recreational sites (i.e. parks, walking or cycling routes).
- Code of conduct (i.e. not disturbing flocks of feeding / roosting birds, suggested distances to keep from birds).
- Suggested areas for responsible bird watching and opportunities for people to get involved in the local natural environment (i.e. volunteering opportunities).

9.1.14 The following principles to be followed for the packs;

- The lodge owner packs are tailored to the location of the development and the European designated sites in the area.
- Tailored to the audience using clear and easy to understand language.
- An appropriate format is used to present and share the lodge owner packs (i.e. print, size).

9.2 Wyre Lune Marine Conservation Zone

9.2.1 Pollution control measures to surface waters will be embedded into the project during construction and will form part of a CEMP.

9.3 Lune Estuary and Wyre Estuary Site of Special Scientific Interest (SSSI)

9.3.1 Disturbance impact on these sites from site operation will be covered by the same mitigation as detailed for Morecambe Bay and Duddon Estuary SPA and Morecambe Bay Ramsar.

9.4 Pilling Moss – Head Dyke BHS

- 9.4.1 Disturbance impact on this site from site operation will be covered by the same mitigation as detailed for Morecambe Bay and Duddon Estuary SPA and Morecambe Bay Ramsar.
- 9.4.2 In respect of this site however there will be direct loss of habitat as a result of work. The sequential use of the site with restoration ongoing will minimize the length of time habitat in this area will be lost.
- 9.4.3 Ponds are to be created in the fields to the East which will be lined with native trees and planted with native species. The fields adjacent will be retained as open grassland and re-seeded with a neutral grassland seedmix. The retained open character of these fields will retain their potential for use by feeding wildfowl. The ponds may be more attractive to species of duck. Small scrapes/ depressions in the landform of the restored ground would create shallow pools in winter and potential for feeding and breeding by species such as Snipe (*Gallinago gallinago*) and Lapwing.

9.5 Hedgerows

- 9.5.1 Hedgerows around the site are species poor and their protection is embedded into the proposal. New hedgerow will be planted and scrub areas to the sides of new ponds also compensate for the loss of this habitat type during construction.
- 9.5.2 New hedgerow and scrub areas will be planted with a mix of native species and subject to management to ensure establishment.

9.6 Neutral and Marshy Grassland

- 9.6.1 The fields adjacent will be retained as open grassland and re-seeded with a neutral grassland seedmix. The retained open character of these fields will retain their potential for use by feeding wildfowl. Small scrapes/ depressions in the landform of the restored ground would create shallow pools in winter and potential for feeding and breeding by species such as Snipe and Lapwing.
- 9.6.2 The mixing of subsoil and topsoil will be avoided as far as possible during topsoil removal but there will inherently be a degree of mixing and the bringing of more vigorous weed species to the surface during restoration.
- 9.6.3 The re-seeded grassland will retain its original seed bank and re-seeding will supplement and enhance the existing species present. Establishment of neutral grassland will require selective spraying with herbicide during the first and second year to remove more competitive weed species. This should be undertaken with care to avoid killing non-weed species of interest and as such spot rather than boom spraying with a selective herbicide would be appropriate to ensure establishment.

Summary description of the identified impact	Sensitivity of Receptor	Impact Magnitude	Significance and Nature of Effect	Additional Mitigation (Not embedded)	Residual Impact Magnitude	Residual Significance and Nature of Effect	Confidence Level
Construction (During work)							
Morecambe Bay and Duddon Estuary Special Protection Area (SPA) and Morecambe Bay Ramsar Loss of and or disturbance to Functionally Linked Land for overwintering birds	Very High	Low	Moderate	Suspension of activity to East of site in harsh weather	Very Low	Minor	Certain/ Near Certain
Pilling Moss – Head Dyke BHS Loss of and or disturbance to Functionally Linked Land for overwintering birds	Medium	High	Moderate	Suspension of activity to East of site in harsh weather	Medium	Minor Adverse	Certain/ Near Certain
Hedgerows loss during construction (BAP Habitat)	High	Low	Minor	Plant scrub and trees as part of construction work on bunds	Very Low	Negligible	Certain/ Near Certain
Neutral and Marshy Grassland loss during construction	Low	High	Minor	Do not mix subsoil and topsoil.	Medium	Minor Adverse	Certain/ Near Certain

Operation (Post work)							
Morecambe Bay and Duddon Estuary Special Protection Area (SPA) and Morecambe Bay Ramsar disturbance from recreation	Very High	Low	Minor	Lodge owner information packs	Very Low	Minor	Certain/ Near Certain
Lune Estuary and Wyre Estuary Site of Special Scientific Interest (SSSI) disturbance from recreation	High	Low	Minor	Lodge owner information packs	Very Low	Negligible	Certain/ Near Certain
Pilling Moss – Head Dyke BHS Loss of and or disturbance from recreation	Medium	Low	Minor	Lodge owner information packs	Very Low	Negligible	Certain/ Near Certain
Pilling Moss – Head Dyke BHS Restoration of land and creation of ponds/ lakes	Medium	Low	Minor	Ponds and lakes landscaped	Medium	Minor Beneficial	Certain/ Near Certain
Hedgerows replanted with additional scrub planting	Medium	Low	Minor	Replant with native species and early in restoration scheme	High	Moderate Beneficial	Certain/ Near Certain
Neutral and Marshy Grassland re-seeded with minimal topsoil and subsoil mixing	Low	High	Minor	Suitable seed mix and selective use of herbicide during establishment	High	Minor Beneficial	Certain/ Near Certain

10. CONCLUSION

10.1.1 Ecological surveys, site appraisals and impact assessments were carried out with respect to land comprising a complex of three lakes used for carp fishing and duck shooting, with arable fields and an area fenced and used for rearing wildfowl. Fields to the South and East are used for grazing livestock, including horses.

10.1.2 The site is under significant pressure from its current use as a carp fishery and duck shoot with very high stocking densities. Water quality at the site in the lakes is currently low and the lakes value to wildlife is generally low. Ponds in the redline boundary are poor quality or were found to be dry in summer.

10.1.3 Some areas of the site have vegetation associated with neutral and marshy grassland which are of borough significance, a large area of the site comprises improved grassland and arable fields of only local value.

10.1.4 There is the potential for disturbance/ displacement of Pinkfooted Geese, Whooper Swan and Shellduck from the site and adjacent fields within the ZOI and the populations recorded are significant. With both embedded and additional mitigation, the impact can be reduced to a level that it is not considered significant.

10.1.5 There may be Minor adverse impacts during work with moderate beneficial impacts post work. Overall impacts are likely to be minor beneficial with retention of open grassland and the creation of new landscape ponds and lakes benefiting the wildlife locally.

10.1.6 The introduction of additional floral species to the site and reduced pressure on the water bodies should improve their quality and should will encourage a wider variety of wildlife to use the site than already occurs.

10.1.7 The above is contingent on the implementation of the mitigation outlined within this report and its implementation via a CEMP and BEMP.

11. REFERENCES

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12. APPENDIX

Folio No: E13481
 Report No: 1
 Purchase Order: 5115
 Client: ENVIROTECH
 Contact: Andrew Gardner

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: 11/05/2022
Date Reported: 18/05/2022
Matters Affecting Results: None

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
3778	6 Bourbles	SD 383 473	Pass	Pass	Pass	Negative	0
3779	2 Bourbles	SD 374 478	Pass	Pass	Pass	Negative	0
3780	7 Bourbles	SD 379 474	Pass	Pass	Pass	Negative	0
3781	1 Bourbles	SD 372 480	Pass	Pass	Pass	Negative	0
3782	8 Bourbles	SD 375 474	Pass	Pass	Pass	Negative	0
3783	3,4,5 Bourbles	SD 376 477	Pass	Pass	Pass	Negative	0

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

Reported by: Esther Strafford

Approved by: Jennifer Higginbottom



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.

