PENNINE ecological

Ecological Surveys

- Wrea Green, Flood Alleviation Scheme -

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- Wrea Green, Flood Alleviation Scheme -

A report for

Ribble Rivers Trust, c/o Hanson Cement,
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PART 1 INTRODUCTION:

1.1 REASONS FOR SURVEY:

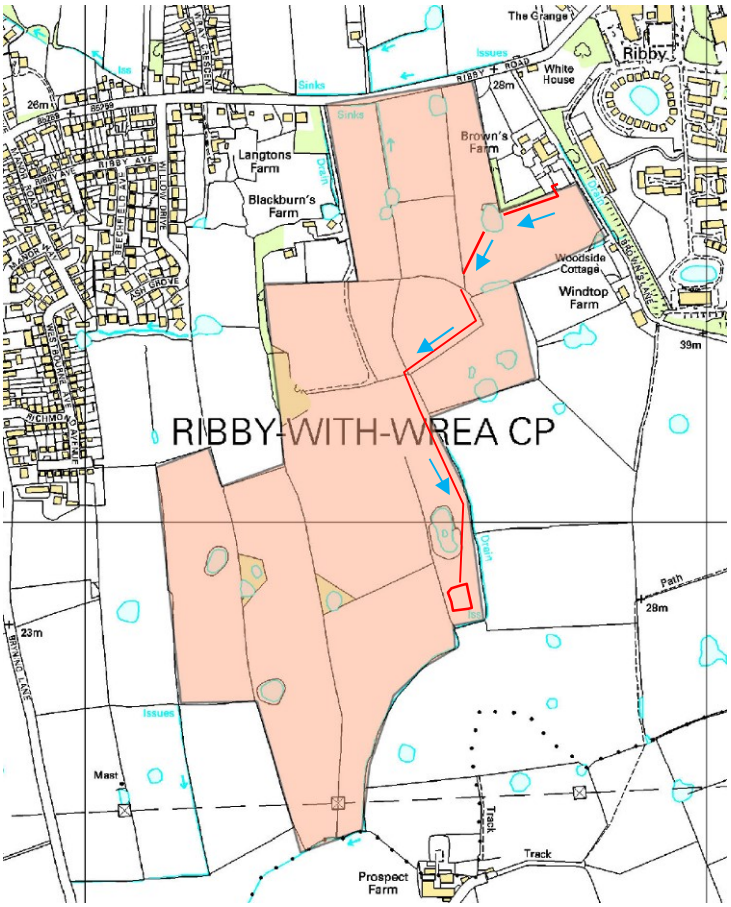
PENNINE Ecological have been commissioned to undertake Ecological Surveys of land affected by a proposed flood alleviation scheme at Wrea Green.

The study includes; a desk top study with the governments Magic website and consultation with Lancashire Environment Record Network (LERN), to provide details of non-statutory sites and protected species records. A vegetation survey, Hedgerow Regulations Assessment, Habitat Suitability Index (HSI survey) / assessment of all ponds (where accessible) within 250m of the proposed culvert / drain route, preliminary bat roost assessment of any trees affected, a water vole, otter and badger survey together with assessment for other potential protected species issues.

The report includes a full evaluation of the ecological significance of the survey findings. The surveys are required due to proposals for the construction of a culverted drain and attenuation pond within existing pasture and arable farmland.

1.2 SITE LOCATION:

The site extends from Browns Lane in the north following a south / south westerly route of approximately 900m terminating at the southern end of an arable field where the attenuation pond will be located. The site location is shown below along with a Google Earth image on the following page.



An aerial photograph of the site is shown below;

Culvert route

1.3 SITE STATUS:

A desk top study was commissioned as part of the survey. This included searches for both statutory protected sites and non-statutory sites and records of protected species within 500m of the working area. Lancashire Environment Record Network (LERN), were consulted to provide details of non-statutory sites and protected species records. LCC now provide data up to a 2km search radii as standard, this is also included in Appendix 3.

1.3.1 Statutory Sites:

Details of statutory sites were sought from the Natural England web site search:

http://www.natureonthemap.naturalengland.org.uk/MagicMap.aspx

There are no statutory wildlife sites within 2km of the site.

Site of Special Scientific Interest (SSSI) Impact Risk Zones (IRZ's):

The site does not fall within any relevant SSSI Impact Risk Zones (IRZ's).

1.3.2 Non-Statutory Sites:

There are no County Biological Heritage Sites *(BHS)* within 500m of the sites boundaries.

1.3.3 Protected Species / Habitat Data:

Section 41 Habitats of Principal Importance in England (NERC) Act 2006;

There are two Section 41 Habitats of Principal Importance in England (NERC) Act 2006 associated with the site that are affected by development. These are hedgerows and ponds.

Section 41 Species of Principal Importance in England (NERC) Act 2006;

A single brown hare was recorded bolting from its form at the southern end of the scheme. There were no other Section 41 species recorded during the survey.

N.b. Refer to Appendix 3 Desk Top Study for full details of protected species records and other species within the wider landscape.

The data search does not include any records that relate to the site or in close proximity to the works. Details of all other species within 2km of the site are included in Appendix 3 Desk Top Study.

Data Search Records:

Within 250m of the working area:

Species:	Distance from site:
Japanese knotweed	≤ 100m (see plan below, the 2017 record is based on a six fig grid reference accurate only to 100m square area). No field evidence noted.
Moorhen	125m east
Grey heron	125m east
Petty spurge	180m west
Black headed gull	180m west
Mallard	180m west
Pipistrelle species	180m west
Snowdrop	180m west
Mallard	240m NE

Records 250 – 500m from the working area:

Species:	Distance from site:
Great crested newt	315m NW on the opposite side of Ribby Road from the site.
Lapwing	360m SW
Grey Partridge	360m SW
Brown hare	360m SW

A full list of species within the wider search area is shown in the interactive .pdf file in Appendix 3.

1.4 SURVEYOR EXPERINECE:

Surveyor experience:

The surveys and assessment were undertaken by Robert Leatham, a highly experienced ecological consultant and surveyor with approximately 30 years' experience in a wide range of ecological survey and assessment.

Key skills include the following;

- Extended Phase 1 Habitat Survey and National Vegetation Classification Survey.
- Highly proficient field botanist, including some difficult plant groups.
- Mammal surveys including surveys for badger, water vole*, otter*, brown hare and preliminary bat surveys.

*Over 400km of river reaches surveyed in England for the National Rivers Authority / Environment Agency.

- Extensive experience in great crested newt (GCN) survey, evaluation, licensing and mitigation. Natural England Class Licence WML-CL08 held.
- Over 25 Great Crested Newt development licences held *(Natural England / Defra licences).*
- [1]Contributor to English Nature *(Natural England)* research papers in respect of great crested newt licensing and mitigation issues.
- Several Great Crested Newt Conservation Licences *(Natural England)* held, including extensive work at Hic Bibi Local Nature Reserve, Coppull, safeguarding a high population of Great Crested Newts.
- Bats: Accredited agent on the Class 2 Licence of Mr Stuart Macpherson, (Natural England Class 2 bat licence (2021-10079-CL18-BAT). Under this accreditation Mr Leatham is permitted to carry out work on all bat species in all UK counties using artificial light only.
- Ecological Evaluation and Impact Assessments in association with large scale commercial development and civil engineering.

[1] *English Nature (2004) *An assessment of the efficiency of capture techniques and the value of different habitats for the great crested newt (Triturus cristatus).* English Nature Research Report 576. PENNINE *Ecological* were contributors to this study.

PART 2 SURVEY RESULTS:

2.1 ECOLOGICAL SURVEYS:

2.1.1 Habitat Survey Methodology:

The survey method applied is an adaptation of Extended Phase 1 Habitat Survey *(Nature Conservancy Council 1990)* undertaken on 20/05/24, 30/05/24 and 26/06/24.

The surveys have been focused on the linear route of the proposed culvert / attenuation pond and habitats directly affected within the immediate vicinity (approximately 50m either side) of the work.

2.1.2 Habitats Present:

A1.1.2 Broad-leaved plantation woodland
A2.1 Dense scrub
A2.2 Scattered scrub
A3.1 Broad-leaved scattered tree
B4 Improved grassland
B5 Marshy grassland
C3.1 Tall ruderal herb
G1 Standing water
J1.1 Arable
J2.2.1 Defunct species-poor hedge
J2.2.1 Defunct species-poor hedge
J2.6 Dry ditch (intermittently wet with standing water)

2.1.3 General Description:

The proposed culvert route will start at Browns Lane in the north. The culvert will then pass through a gap in a line trees (poplar species) and into an Improved field which has a temporary pond (TP1) which dries out annually. The route will then run parallel to a plantation woodland within an improved pasture where it then outfalls into a pond (P4).

The culvert then discharges from P4 via a headwall and runs in a SW direction across an improved pasture where it then outfalls into a temporary pond (TP2) which comprises of Juncus species dominated marsh. The culvert then discharges from TP2 and runs parallel with two hedgerows across improved pasture.

The culvert meets a ditch with standing water at Target Note 6. At this point the culvert runs parallel with a hedgerow / ditch within an arable field. At the southern end of the arable field the culvert discharges into a proposed flood storage basin. The flood storage basin will then discharge into an existing ditch via a flow controlled weir constructed from sleepers. The existing ditch is steep sided with bank heights of between 1.5 – 1.8m located within the base of a species-rich hedgerow. The ditch has intermittent standing pools of shallow water but was otherwise largely dry.

2.1.4 Target Notes:

Refer to Appendix 1, Map 1 for the location of Target Notes 1 – 13.

Target Note 1: Broadleaved Plantation Woodland / Tree line:

The woodland was viewed from the field to the south since access was not possible into the woodland.

A linear area of semi-mature / mature plantation woodland is present adjacent to the proposed route of the culvert. Canopy species include; white poplar, alder, poplar species and sycamore. Understory species include; hawthorn, ash, elder, hazel and cherry species.

Where visible the ground flora is dominated by coarse grasses including; Yorkshire-fog and smooth meadow-grass. Stands of common nettle are frequent.

Target Note 2: Defunct species-poor hedge:

A hawthorn dominated hedge is present to the north of the culvert route. The hedge bottom is grazed out and dominated by coarse rank grasses and occasional ruderal herbs.

Target Note 3: Defunct species-poor hedge:

A hawthorn dominated hedge and grey willow scrub is present at the point where the culvert crosses the hedge immediately south of temporary pond TP2. The hedge bottom is grazed out and dominated by coarse rank grasses and occasional ruderal herbs.

Target Note 4: Two x Defunct species-poor hedge:

Two hawthorn dominated hedges are present immediately east of a point where an existing culvert will be replaced. The hedge bottoms are grazed out and dominated by coarse rank grasses and occasional ruderal herbs.

Target Note 5: Two x Defunct species-poor hedgerows:

Two hawthorn dominated hedges run parallel to the proposed culvert route. The hedge bottoms are grazed out and dominated by coarse rank grasses and occasional ruderal herbs.

Target Note 6: Hedge / ditch intersection:

The proposed culvert route crosses a point where three hedges / ditches meet. The hedges are all defunct and dominated by hawthorn with occasional dog rose. Where the ditches meet there is minor ponding of shallow water that supports; reed canary-grass, brooklime, common nettle, hogweed, common figwort, great willowherb, bulrush, soft-rush and common water starwort.

Target Note 7: Defunct species-poor hedge:

A hawthorn dominated hedge with dog rose, bramble and elder is present to the west of the culvert route forming an intersection with two other hedgerows (TN 5 and 9). The hedge bottom is dominated by coarse rank grasses and occasional ruderal herbs.

Target Note 8: Defunct species-poor hedge:

A hawthorn dominated hedge is present to the east of the culvert route and forms an intersection with hedgerow TN 9. The hedge bottom is dominated by coarse rank grasses and occasional ruderal herbs.

Target Note 9: Defunct species-poor hedge / ditch:

A long section of hedge / ditch with intermittent standing water running from the central section of the proposed culvert route to the southern end adjacent to where the flood basin will created. The hedge is hawthorn dominated with locally abundant gorse. Other species present include; bramble, hazel, crab apple, elder and dog rose.

The hedge bottom includes the following species; barley, barren brome, perennial rye-grass, rosebay willowherb, cow parsley, great willowherb,, common nettle, reed canary-grass, meadow foxtail, false oat-grass, male-fern and hogweed.

Target Note 10: Arable field (location of proposed flood basin):

The southern low lying end of a linear arable field subject to periodic inundation. The field is overwhelmingly dominated by sown barley, although significant areas of bare ground are present where germination / growth has been impeded by periodic inundation. Other species present include; common nettle, scentless mayweed, perennial rye-grass, common orache, creeping bent, annual meadow-grass, smooth meadow-grass, marsh foxtail, reed canary-grass, Yorkshire fog, creeping thistle and cock's-foot.

Target Note 11: Defunct species-poor hedge:

A hawthorn dominated hedge is present to the east of the proposed flood basin, alongside a track. Other species include; bramble, elder and crab apple. The hedge bottom is dominated by coarse rank grasses and occasional ruderal herbs including; great willowherb and common nettle.

Target Note 12: Defunct species-poor hedge:

An unmanaged hawthorn dominated hedge is present immediately south of the proposed flood basin. The hedge bottom is dominated by coarse rank grasses and ruderal herbs including; great willowherb, creeping thistle, hogweed, false oat-grass and common nettle.

Target Note 13: Defunct species-rich hedge / ditch:

A long section of hedge / ditch runs to the south of the proposed flood basin. The existing ditch is steep sided with bank heights of between 1.5 – 1.8m located within the base of a species-rich hedgerow. The ditch has intermittent standing pools of shallow water but was otherwise largely dry.

The hedge is hawthorn dominated but includes a good range of other woody species, including; goat willow, elder, blackthorn, ash, sycamore and dog rose.

The hedge bottom includes the following species; great willowherb, common nettle, reed canary-grass, meadow foxtail, false oat-grass, male-fern, cock's-foot, bramble and hogweed.

The hedge is unaffected by the proposed work. The ditch will receive overflow waters from the flood attenuation basin.

This hedge meets the criteria for qualification as an 'Important Hedgerow' under the Hedgerow Regulations (1997).

Pond / Temporary Pond Descriptions:

Refer to Appendix 1, Map 1 for the location of Ponds P1 – P12 and Temporary Ponds TR1 / TR2.

Refer to Appendix 2, for full details of Pond Habitat Suitability Index (HSI) Scores.

Pond P1: **Distance from working area: 190m North.** **HSI Score: 0.42 (Poor)**
Egg Search: No records

A large unfenced partially shaded field pond significantly poached by geese with poor water quality. Very little if any aquatic vegetation. Marginal stands of soft-rush are present. Fish are present and were seen topping the surface.

Pond P2: **Distance from working area: 160m North West.** **HSI Score: 0.62 (Average)**
Egg Search: No records

An unfenced heavily shaded field pond with some waterfowl present. Aquatic marginal vegetation includes; soft-rush, amphibious bistort, celery-leaved buttercup, water forget-me-not and common spike-rush.

Pond P3: **Distance from working area: 152m North West.** **HSI Score: 0.54 (Below average)**
Egg Search: No records

An unfenced heavily shaded field pond with some waterfowl present and poor water quality. Aquatic marginal vegetation absent where visible.

Pond P4: **Distance from working area: 0m.** **HSI Score: 0.7 (Good)**
Egg Search: No records

A large (36 x 26m) heavily cattle poached unfenced field pond shaded by marginal scrub and a large stand of crack willow growing within the pond. Some waterfowl present and very poor water quality. Aquatic marginal vegetation is largely absent apart from marginal areas of cattle poached soft-rush.

Pond P5: **Distance from working area: 97m South East.** **HSI Score: 0.34 (Poor)**
Egg Search: No records

A fenced very heavily shaded pond on the edge of Brown Lane. The pond has very poor water quality with deep layers of organic rich detritus and timbers within the pond. Aquatic marginal vegetation is absent.

Pond P6: **Distance from working area: 40m East.** **HSI Score: 0.51 (Below average)**
Egg Search: No records

A long unfenced, heavily poached linear field depression (33 x 3-4m). Water quality is poor. Aquatic marginal vegetation is restricted to floating sweet-grass. This pond will almost certainly dry out annually as evidenced by Google Earth historical imagery.

Pond P7: **Distance from working area: 57m South East.** **HSI Score: 0.42 (Poor)**
Egg Search: No records

A small, circular, unfenced, heavily poached field depression (10 x 10m). Water quality is poor. Aquatic marginal vegetation is restricted to perennial rye-grass and creeping bent. This pond will almost certainly dry out annually as evidenced by Google Earth historical imagery.

Pond P8: **Distance from working area: 65m South East.** **HSI Score: 0.69 (Average)**
Egg Search: No records

A moderate to large, circular, unfenced, heavily poached pond (27 x 20m). Water quality is reasonable. Aquatic marginal vegetation is restricted to locally frequent brooklime and soft-rush . The pond is partially shaded by hawthorn and goat willow.

Pond P9: **Distance from working area: 85m South East.** **HSI Score: 0.71 (Good)**
Egg Search: No records

A moderate to large, circular, unfenced, heavily poached pond (27 x 25m). Water quality is reasonable. Aquatic marginal vegetation is restricted to locally frequent brooklime and soft-rush. Broad-leaved pondweed is present within the open water area. The pond is partially shaded by goat willow.

Pond P10: **Distance from working area: 20m West.** **HSI Score: 0.77 (Good)**
Egg Search: No records

A large, unshaded, two lobed, unfenced pond (57 x 18m) located within an arable barley field. Water quality is good. The pond supports a good assemblage of both marginal and submerged aquatic vegetation. The southern pond lobe is very shallow and dries out seasonally.

The following species were recorded; abundant moss species, locally frequent; bulrush, yellow iris, brooklime and floating sweet-grass. Other species present include; water plantain, curled pondweed, common spike rush, glaucous sedge, great willowherb, soft-rush, goat willow, jointed rush and gorse.

The pond supports populations of fish that were observed topping the water during the survey.

Pond P11: **Distance from working area: 175m West.** **HSI Score: 0.72 (Good)**
Egg Search: No records

A heavily shaded pond on the edge of a track. The pond is surrounded by mature woodland with many decaying branches within the pond. The pond has moderate water quality and appears to be deep with deep layers of organic rich detritus and timbers within the pond. Aquatic marginal vegetation is limited to occasional floating sweet-grass and bittersweet. The pond surface has abundant cover of common duckweed.

Pond P12: **Distance from working area: 230m North West.** **HSI Score: 0.55 (Below average)**
Egg Search: N/A No access

Note: no direct access, viewed from the adjacent track.

A heavily shaded pond on the edge of a track and within a private garden. The pond is surrounded by mature woodland with decaying branches and organic material within the pond. The appears to have poor water quality. The pond is partially vertically sided and support an island with willow scrub. Aquatic vegetation appears to be absent where visible.

Temporary Pond TP1: **Distance from working area: 0m.** **HSI Score: N/A Not suitable.**
Egg Search: No records

A field depression with very shallow water over mud that dried out by the end of the survey period. The pond is heavily cattle poached. Aquatic vegetation is absent.

Temporary Pond TP2: **Distance from working area: 0m.** **HSI Score: N/A Not suitable.**
Egg Search: No records

A former fenced field pond that is now marshy grassland and holds very little water. Emergent aquatic / marsh vegetation chokes the pond and includes abundant; soft rush and branched bur-reed with locally abundant common nettle and great willowherb.

2.2 PROTECTED SPECIES SURVEYS:

During the Phase 1 Habitat Survey additional surveys were undertaken where appropriate for the presence of other potential protected species. The following surveys were undertaken.

2.2.1 Badger Survey:

Method:

A badger survey was undertaken of the site. The badger survey used standard techniques for establishing the use of the site by badger, and includes searches for evidence of badgers including:

- Setts
- Pathways
- Footprints
- Latrines
- Foraging areas
- Scratching posts
- Boundary searches for runs, pathways and latrines.

The survey results are outlined below.

Results:

Sett Search:

The survey found no setts on site.

Search for Foraging Signs and Pathways:

The site was thoroughly searched for badger pathways and signs of foraging. No sign of badger activity was found therefore it can be concluded that the species is not using this area for foraging or commuting.

Boundary Search:

All of the boundaries of the site were walked and examined for potential runs, pathways and latrines. The search found no evidence to suggest badger activity along any of the site boundaries.

The absence of any activity signs indicates that badgers are not entering the site. The absence of latrines indicates a lack of territorial activity in the near vicinity of the site.

2.2.2 Bats:

During the survey an assessment of bat roost potential and foraging habitats was undertaken.

None of the areas affected including trees / scrub have features suitable for roosting bats. The trees / scrub affected are defined as having **negligible** bat roost potential.

2.2.3 Water Vole:

Survey Methodology:

A water vole survey was undertaken of all ponds and a dry / intermittently wet ditch with occasional standing shallow water, the locations are shown on Map 1. The survey was based on the standard methodology as outlined in the Dean, M., Strachan, R. Gow, D. and Andrews, R. (2016). The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series).

Searches were made for the following signs;

- Sightings of individual animals
- Latrines
- Feeding stations
- Burrows
- Runs

Survey Constraints:

There were significant constraints to water vole survey due to a lack of physical and visual access, particularly from the mid-section (south of Target Note 7) and the southern end of the ditch. However, given the unsuitability of the ditch to support the species this constraint is not considered significant. Access restrictions also apply to Ponds 2, 3, 5 and 12 (limited / no access).

Survey Results:

Where visible the channel / banks supported no evidence of the species, in terms of; burrows, feeding stations/remains, latrines, runs etc.

The ditch does not support sufficient levels of water / flow to support the species and is considered totally unsuitable for water vole. Some of the ponds are potentially suitable for the species, however no evidence was recorded from any of the ponds. Ponds where access constraints applied are not affected by the scheme.

2.2.4 Otter:

Survey Methodology:

The survey undertaken follows guidance provided in the *New Rivers & Wildlife Handbook* RSPB, NRA and RSNC (2001). Searches were undertaken of the adjacent ditch for footprints, spraints, holts and potential couches and trails.

Survey Constraints:

There were significant constraints to otter survey due a lack of physical and visual access. However, given the unsuitability of the ditch to support the species this constraint is not considered significant.

Survey Results:

Where visible the channel / banks supported no evidence of the species. The ditch does not support sufficient levels of water / flow to support the species and is considered unsuitable for otter.

2.2.5 Great Crested Newt:

Survey Methodology:

Great crested newt (GCN) egg searches of ponds were undertaken on May 20th.

Survey Constraints:

All ponds were accessible apart from Pond P12 and those shown to the east of the proposed work, where access was refused. This is a significant constraint, but unavoidable.

The egg search was undertaken on May 20th . This is rather late in the season for this survey method which is best undertaken in April / early May. However, this was unavoidable due to delays in the commission relating to access agreements for survey.

eDNA surveys were considered. However, due to the fact that access was not possible to four ponds east of the proposed work and within the terrestrial range of the species, results of surveys on accessible ponds would not have been conclusive in terms of a definitive site wide risk assessment for the species.

Survey Results:

No GCN or other newt eggs were found.

2.2.5 Other Protected Species:

Issues in relation to other potential protected species where no specific survey was undertaken are assessed in the following section.

PART 3 ECOLOGICAL EVALUATION & RECOMMENDATIONS:

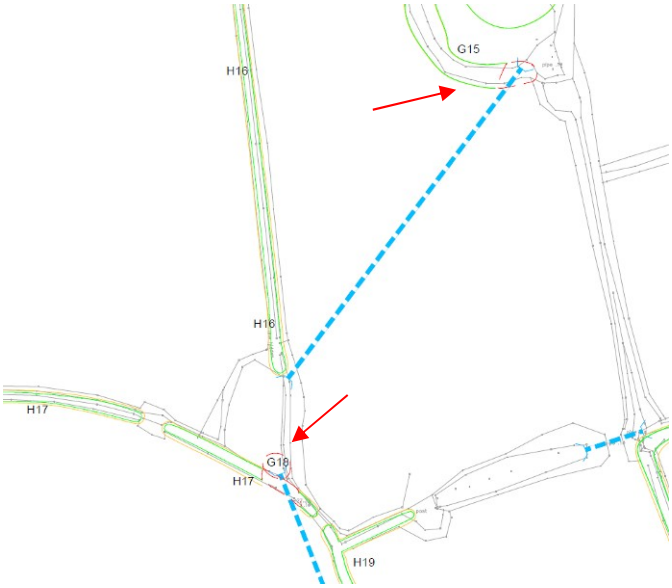
3.1 EVALUATION OF SURVEY & RECOMMENDATIONS:

There are no statutory or non-statutory sites affected by the work.

3.1.1 Habitats:

Both ponds and hedgerows are Section 41 Habitats of Principal Importance in England (NERC) Act 2006. The impacts on these habitats are very limited, localised and temporary.

The only direct disturbance to hedgerows relates to removal of a short length of hawthorn hedge (H17 of the tree report) and a single goat willow (G18 of the tree report) on the southern side of Temporary Pond 2. In addition, a short length of hawthorn scrub (G15 of the tree report) will be removed on the southern side of Pond P4. These are shown below;



The data search reveals a record for the invasive Japanese knotweed near to the point where the proposed culvert crosses a tree line west of Browns Lane, (see below);

The only direct impacts on ponds relates to inflow / outflow of the culvert into/from Pond P4 and inflow / outfall of the culvert into / from Temporary Pond TP2.

These impacts are unavoidable in relation to the scheme design. Pond P4 could be enlarged by receiving additional water from the culvert. Temporary Pond TP2 is currently a marsh with very little standing water, discharge of additional water into TP2 could alter the habitats present and enlarge the feature. This habitat is undergoing natural colonisation and drying, additional water input is likely to be beneficial in maintaining this wetland feature.

Recommendations: Habitats & Higher Plant Species:

The very minor losses of scrub and short lengths of hedgerow are unavoidable in relation to the scheme design. To compensate for these losses, it would be advisable to re-stock and fill in hedgerow gaps adjacent to these areas in agreement with the farmer / landowner. These hedgerows would also benefit from stock fencing since the hedge bottoms are heavily grazed out by cattle poaching.

Pond 4 would benefit from stock fencing (to include a cattle drink), this will encourage the development of aquatic marginal vegetation since at present the pond is heavily poached by cattle.

Any water discharged into Pond P4 and Temporary Pond TP2 must be free of contaminants and pollutants. Interceptors / pollution prevention measures must be incorporated into the design of the scheme.

It was not possible to verify the data search record of Japanese knotweed (dated 2017). This area was not accessible at the time of the survey. Once access is available and prior to commencement of any work, surveys of the culvert route / area of ground disturbance in this location must take place to establish the presence / absence of Japanese knotweed.

3.1.2 Protected Species:

Badgers:

Badgers are protected under Schedule 6 of the Wildlife and Countryside Act 1981, and under the Protection of Badgers Act 1992, which prohibits deliberate interference with the animal or its sett. The survey found no evidence of historic, recent or current use of the site by badgers for foraging, commuting or occupation and the species is considered to be absent.

Recommendations: Badgers;

There are no issues in relation to badgers arising from the development. No further surveys are required.

Bats:

Bats are comprehensively protected by European legislation. There are no structures or features affected that have bat roost potential.

Recommendations: Bats;

There are no issues in relation to badgers arising from the development. No further surveys are required.

Birds:

All birds are offered various levels of protection under the Wildlife and Countryside Act (1981) as amended. There are very localised impacts on two hedgerows / areas of scrub as outlined in section 3.1.1. These have potential to support breeding birds.

Recommendations: Birds;

No further surveys are required.

In order to minimize impacts on birds any removal of hedgerow / scrub / trees should take place outside of the breeding season, i.e. between September 1st and February 28th.

If removal of the above vegetation types is envisaged during the breeding season *(March 1st to August 31st)*, then checks should be made to establish any nesting or breeding activity, prior to removal.

Water Vole:

Water voles *(Arvicola terrestris)* are protected by the Wildlife & Countryside Act (1981) as amended. In 1998 particular emphasis on protection was given to the water voles burrow in respect of Section 9(4) of the above act.

Water vole is protected under Section 41 of the NERC Act and is a species listed as of principle importance for the conservation of biological diversity in England.

No evidence in terms of; burrows, feeding stations/remains, latrines, runs etc. was found associated with the surveyed areas. The ditch was found to be mainly dry and unsuitable for the species. Pond P4 and TP2 where some disturbance is scheduled did not support any evidence of the species.

Recommendations: Water Vole:

The ditches are considered highly unsuitable for water voles. Pond P4 and TP2 did not support any evidence of the species. Therefore, no further surveys are considered necessary.

Otter:

Otters are fully protected under Schedule 5 of the Wildlife & Countryside Act (1981). Otter is a UK BAP Priority / Section 41 Species (NERC) Act.

No evidence of the species was found within any of the surveyed areas. There are no watercourses suitable for the species.

Recommendations: Otter:

No further surveys are required. There are no issues in relation to otters.

Great Crested Newt:

Great crested newt (GCN) is comprehensively protected under European legislation.

The study area has a relatively high density of ponds located within 250m of the proposed works. There are 23 ponds within 250m of the working areas.

Risk to GCN / Amphibians from the proposed culvert work and flood alleviation pond / storage basin:

The work involves the ground excavation of a channel to lay an underground culvert pipe carrying excess flood waters from Wrea Green.

In earlier stages of the design process the proposal was to utilise the existing ditch network as far as possible, thereby creating new habitats and creating more permanent levels of water in the ditches which are at present largely dry for much of the year. However, this involved significant disturbance / re-grading of ditch embankments and disturbance to hedgerows, including hedge root protection areas.

On the advice of the author of this report, the proposed work was amended to avoid, where possible, all direct disturbance to ditches / ponds and their associated vegetation / habitats.

The proposal now involves the excavation of a trench that runs parallel with hedgerows / ditches and is located on short improved heavily grazed pasture / arable land. The culvert pipe will then be laid into the trench and the trench backfilled with the excavated earth.

In addition, the culvert will inflow / outfall into / from Pond P4 and Temporary Pond TP2 which is now a marshy grassland depression.

At the southern end of the scheme a large attenuation pond will be excavated at the southern end of an arable field. The outfall from this pond will flow via a weir into an existing ditch flowing in a south westerly / southern direction.

It is intended that some of the spoil from this excavation will be spread thinly across existing intensively cultivated / farmed arable land.

Great Crested Newt (GCN) Surveys and Evaluation:

It is important to note that the survey evaluation below is based on risk to the species once all factors have been considered in relation to; survey and desk study information, the nature / location of the proposed work and the ***adoption of a Precautionary Working Measures Method Statement, see Page 21.***

Five of the 23 ponds were created by Lancashire Wildlife Trust (LWT) at Blackburns Farm in Autumn 2021. These ponds were subject to eDNA analysis and were found to be negative for GCN. **These five ponds are discounted from any impact.**

Two ponds are located to the east of Brown's Lane within the Ribby Hall development. These ponds have mature woodland and extensive refuge / overwintering habitats in immediate / very close proximity. [2]Research by Natural England has shown that where such habitat exists around GCN ponds the vast majority of the population is likely to be contained within 100m of the breeding pond creating a 'terrestrial sponge' effect. In addition Browns Lane provides an amphibian deterrent to dispersal towards the working area. These ponds are also at significant distance (160 / 225m) from the working area. **These two ponds are discounted from any impact.**

Two ponds (P6 and P7) and TP1 are seasonally wet field depressions and dry out every year. **These two ponds and TP1 would not be capable of supporting GCN and are discounted from any impact.**

Of the 14 remaining ponds, six ponds (P1, P2, P3, P5, P11 and P12) are discounted from potential impacts by combinations of 'terrestrial sponge' effect, distance and /or below average / poor HSI scores. An additional pond that was not surveyed due to access constraints lies 235m from the working area with nearby habitats providing a terrestrial 'sponge' effect is also discounted from potential impacts. **These seven ponds are discounted from any impact.**

Of the remaining 7 ponds, three of these are not accessible for surveys. All three ponds are at distances beyond 100m from the working area (115 – 185m) and have been evaluated as **'Very Low Risk'.**

This leaves four ponds; P4, P8, P9 and P10. With the exception of P8 scoring 'Average', ponds P4, P9 and P10 all score as 'Good' on the HSI index. Pond 4 is directly affected by culvert inflow and outfall. Ponds P8 – P10 are all within 85m of the working area. These four ponds have been evaluated as **'Very Low Risk'.**

The data search revealed that only one known record of GCN is available for the 2km search radii centered on the site. This relates to a 2010 record for the species 315m north / north west of the nearest point to the working area and located on the opposite side of the busy B5259 Ribby Road which will function as an amphibian barrier to dispersal towards the site / working area.

The lack of historic records for the species in the general area is also a factor to be considered when evaluation of the risk to the species. However, it should be noted that lack of records of the species, is not evidence of the species absence.
The above information is summarised in a table on the following page.

[2] *English Nature Research Report 575 (2004); An evaluation of the effectiveness of great crested newt Triturus cristatus mitigation projects in England, 1990 – 2001. (PENNINE Ecological were contributors to this study).*

3.2 Table Summarising Risk to Great Crested Newts

The following table summarises the survey results and evaluation of risk to the species once all factors have been considered in relation to the proposed work and the **adoption of precautionary working measures.**

Pond	Distance from work	Access possible	HSI Score	Egg Search	eDNA 2023	Fish Presence	Barrier / Distance / 'sponge' effect	Risk Evaluation
P1	190m N	Yes	Poor	Negative	N/A	Yes	Yes Sponge & Distance	No Risk
P2	160m NW	Yes	Average	Negative	N/A	Possible	No	No Risk
P3	152m NW	Yes	Below Average	Negative	N/A	Possible	No	No Risk
P4	0m	Yes	Good	Negative	N/A	Possible	No	Very Low
P5	97m SE	Yes	Poor	Negative	N/A	Possible	No	No Risk
P6	110m NE	Yes	Below Average	Negative	N/A	Absent	No	No Risk
P7	57m S	Yes	Poor	Negative	N/A	Absent	No	No Risk
P8	65m SE	Yes	Average	Negative	N/A	Possible	No	Very Low
P9	85m SE	Yes	Good	Negative	N/A	Possible	No	Very Low
P10	20m W	Yes	Good	Negative	N/A	Yes	No	Very Low
P11	175m W	Yes	Good	Negative	N/A	Yes	Yes Sponge & Distance	No Risk
P12	230m NW	Visual only	Below Average	N/A	N/A	Possible	Yes Sponge & Distance	No Risk
Ribby Hall Pond	160m NE	No	N/A	N/A	N/A	Unknown	Yes Sponge / Distance	No Risk
Ribby Hall Pond	225m E	No	N/A	N/A	N/A	Unknown	Yes Sponge / Distance	No Risk
5 newly created ponds (2021 LWT)	60 – 190m W	Yes	N/A	N/A	Negative	Absent	No	No Risk
No Access Pond	115m SE	No	N/A	N/A	N/A	Unknown	No	Very Low
No Access Pond	140m E	No	N/A	N/A	N/A	Unknown	No	Very Low
No Access Pond	185m SE	No	N/A	N/A	N/A	Unknown	No	Very Low
No Access Pond	235m SW	No	N/A	N/A	N/A	Unknown	Yes Sponge / Distance	No Risk

3.3 Proposed Culvert Work and Precautionary Measures Method Statement:

In order to address the potential for impacts on amphibians outlined in the previous sections of this report the following measures will apply. Based on our extensive experience of amphibian ecology and licensing we consider that there is a no / very low risk to great crested newts as a result of this development.

Item 1: Mowing / strimming / vegetation removal: Timing: 5 days prior to work commencement.

The vast majority of the proposed culvert route is located on short grazed improved pasture (northern areas) or arable land (southern areas including the attenuation pond area).

There are two locations where the culvert route passes through taller grassland / woodland / scrub. These are at the extreme northern end alongside Brown's Lane and the intersection of Target Note hedgerows 5,6,7 and 9. In addition the banks of TP2 also support tall grass and herb vegetation.

All areas of vegetation along the whole route and around the attenuation pond will be mown / strimmed or vegetation removed to a height of approximately 5cm above ground level with the arisings removed. This will encourage dispersal of amphibians in these areas and reduce any refuge potential.

Item 2: Ground excavations and all earth works / ground disturbance: Timing: Project duration.

The ground excavation/trench work will be undertaken in a phased / staggered manner, whereby the culvert will be laid in the trench and backfilled / covered with the excavated material on the same day, section by section.

There will be no open trenches or excavations left unfilled overnight. The length of trench excavation on a daily basis will only go as far as what can be infilled on the same day as excavated.

Item 3: Spoil: Timing: Project duration.

In order to prevent the possibility of amphibians colonising piles of spoil, the following will be observed. Throughout the duration of the work all excavated spoil will be placed back into the culvert trench on the same day as which it was excavated. There will be no loose piling of spoil left overnight where it could be colonised by amphibians.

It is understood that spoil from the attenuation pond will be spread thinly and 'lost' on existing arable land. To ensure that large piles of spoil are not left overnight on areas adjacent to the attenuation pond, daily excavation of this material will be loaded onto vehicles and spread onto fields on the same day as when it was excavated.

Item 4: Building aggregate and materials storage: Timing: Project duration.

In order to prevent the possibility of amphibians colonising piles of materials, the following will be observed. Throughout the duration of the work all building aggregates and construction materials will be stored on pallets or in bags. There will be no loose piling of building aggregates or materials.

Notes:
1. In the highly unlikely event that GCN are discovered during the implementation of the avoidance measures or during site development, then all work will stop and further advice will be sought from the acting ecologist and Natural England.

APPENDIX 1:

Map 1 Ecological Survey Map (separate file)

Site Photographs

APPENDIX 2:

Pond Habitat Suitability Index (HSI) Scores.

APPENDIX 3:

Desk Top Study (Separate files)

APPENDIX 1: SITE PHOTOGRAPHS: 20/05/24, 30/05/24 and 26/06/24.


TP1 Looking east/NE towards Browns Lane.


Pond P4 heavily cattle poached.


Looking west along the approximate culvert line from Browns Lane.


Pond P4 heavily cattle poached.


Looking east along the approximate culvert line from Browns Lane.


Temporary Pond TP2 (now marshy grassland).

Temporary Pond TP2 (now marshy grassland).

Pond P6.

Temporary Pond TP2 (now marshy grassland).

Looking NE along Target Note hedgerow 5 and showing approximate route of the culvert.

Looking south from TP2 showing the approximate culvert route.

Pond P8.


Pond P8.


Pond P9.

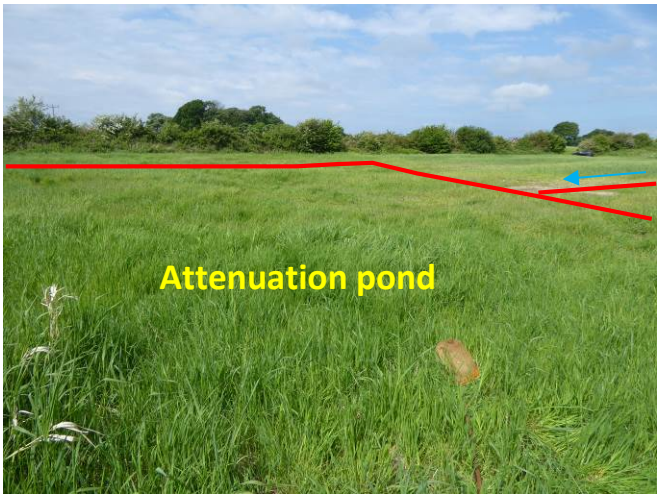

Pond P7.


Pond P10

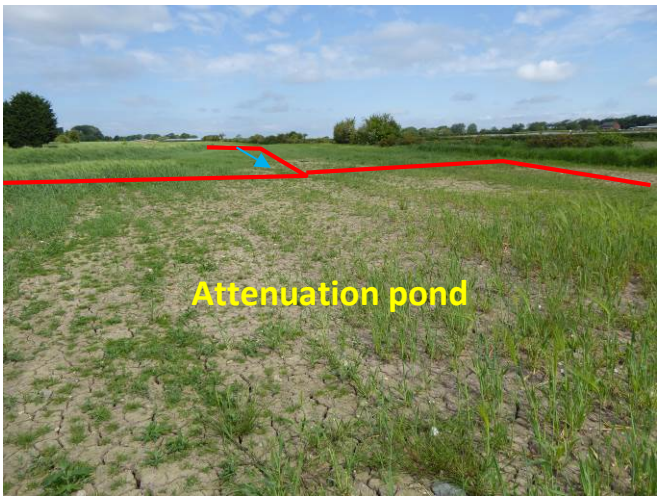

Pond P9.


Pond P10.

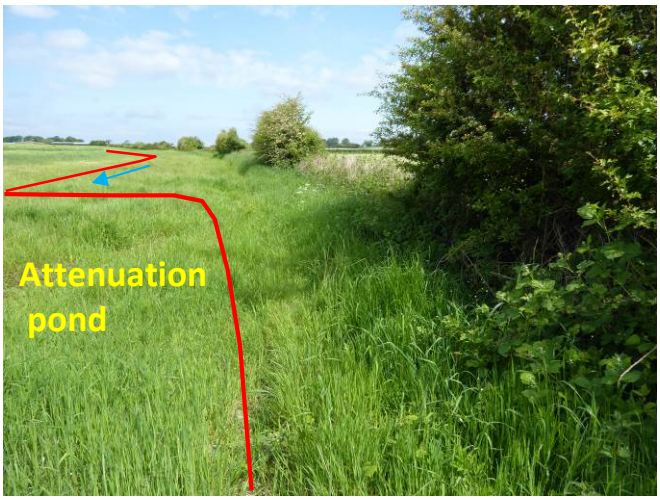
Pond P10 (southern marshy lobe)



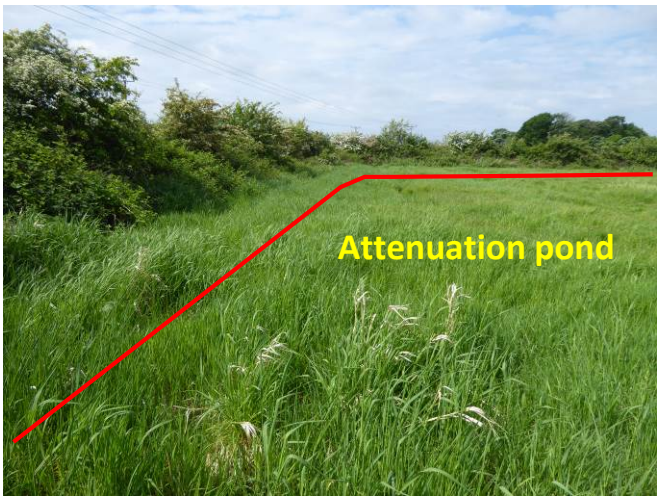
Looking west across the attenuation pond area.



Part of the attenuation pond area looking north towards where the culvert will outfall into the attenuation pond.



Looking north/north west along Target Note 9 hedgerow from the proposed attenuation pond area.



Looking west along Target Note hedgerow 12 and the proposed southern area of the attenuation pond.

Target Note 11 hedgerow.

Target Note 13 species-rich hedgerow south of the attenuation pond and ditch with minimal / occasional standing pools of water.

Target Note 9 hedgerow and ditch with minimal / occasional standing pools of water. Showing approximate culvert route within arable barley field.

Pond P11.

Marshy ditch area at intersection of Target Note hedgerows 5, 6, 7 and 9.

Target Note 9 hedgerow and ditch with minimal / occasional standing pools of water.

Pond P3.

Pond P2

Large circular pond created in 2021 by Lancashire Wildlife Trust and tested negative following 2023 eDNA surveys.

Pond P1

Pond P5

Pond P12

Approximate culvert route alongside Target Note Hedgerow/ditch 9.

Appendix 2: Pond Habitat Suitability Index (HSI) Scores.

Habitat Suitability Index (HSI) Survey:

It is possible to assess whether the species is likely to be present in a pond or waterbody. One survey method that can be used to assist in this evaluation is the **Habitat Suitability Index (HSI).** In addition to this method the experience of the ecologist and particular site circumstances can be used to assess the likely presence or absence of the species. It must be noted however that the HSI survey method is no substitute for a standard 'Presence or Absence Survey'. The HSI survey method was applied to the pond immediately adjacent to the proposed development. The ponds in the wider landscape were on private land and not accessible for survey. The survey method is summarised as follows:

The great crested newt Habitat Suitability Index (HSI) is quantitative measure of habitat quality *(source: Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000)).* Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). Herpetological Journal 10 (4), 143-155). The HSI is number between 0 and 1, derived from an assessment of ten habitat variables known to influence the presence of newts. An HSI of 1 is optimal habitat *(high probability of occurrence),* while an HSI of 0 is very poor habitat *(minimal probability of occurrence)*. The HSI is calculated on a single pond basis, but takes into account surrounding terrestrial habitat and local pond density.

The following text in italics is an extract from the methodology:

'Use and limitations of HSI :

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

There is also a positive correlation between HSI scores and the numbers of great crested newts observed in ponds. So, in general, high HSI scores are likely to be associated with greater numbers of great crested newts. However, the relationship is not sufficiently strong to allow predictions to be made about the numbers of newts in any particular pond.

HSI scoring can be useful in:

- *Evaluating the general suitability of a sample of ponds for great crested newts*
- *Comparing general suitability of ponds across different areas*
- *Evaluating the suitability of receptor ponds in a proposed mitigation scheme.'*

Oldham *et al* (2000).

Pond HSI Scores:

Pond ref: Distance from site:	P1 190m	P2 160m	P3 152m	P4 0m	P5 97m	P6 110m	P7 57m	P8 65m	P9 85m	P10 20m	P11 175m	P12 230m	TP1 0m	TP2 0m
SI1 - Location	1	1	1	1	1	1	1	1	1	1	1	1	1	1
SI2 - Pond area	0.85	0.4	0.4	1	0.08	0.07	0.07	0.8	0.9	1	1	0.25	N/A	N/A
SI3 - Pond drying	0.9	0.9	0.9	0.9	0.9	0.5	0.1	0.9	0.9	0.9	0.9	0.9	N/A	N/A
SI4 - Water quality	0.33	0.67	0.33	0.33	0.01	0.33	0.33	0.67	0.67	0.67	0.67	0.33	N/A	N/A
SI5 - Shade	1	0.6	0.2	1	0.2	1	1	1	1	1	0.9	0.5	N/A	N/A
SI6 - Fowl	0.01	0.67	0.67	0.67	0.67	1	1	0.67	0.67	0.67	0.67	0.67	N/A	N/A
SI7 - Fish	0.33	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.33	0.33	0.33	N/A	N/A
SI8 - Ponds	1	1	1	1	1	1	1	1	1	1	1	1	N/A	N/A
SI9 - Terr'l habitat	0.67	0.67	0.67	0.67	0.67	0.33	0.33	0.33	0.33	0.67	1	1	N/A	N/A
SI10 - Macrophytes	0.32	0.4	0.3	0.3	0.3	0.5	0.3	0.32	0.45	0.85	0.32	0.3	N/A	N/A
HIS Score	**0.42**	**0.62**	**0.54**	**0.7**	**0.28**	**0.51**	**0.42**	**0.69**	**0.71**	**0.77**	**0.72**	**0.55**	**-**	**-**

Categorisation of HSI scores:

Lee Brady has developed a system for using HSI scores to define pond suitability for great crested newts on a categorical scale:

HSI		**Pond suitability**
<0.5	**=**	**poor**
0.5 – 0.59	**=**	**below average**
0.6 – 0.69	**=**	**average**
0.7 – 0.79	**=**	**good**
> 0.8	**=**	**excellent**