

Ecological Impact Assessment of land at Mulsford

near Threapwood,
Wrexham County Borough,

Main site SJ43454504
South-west access point SJ42984478)

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CONTENTS

Summary	2
E1. Introduction	7
E1.1 Background,	7
E1.2 Site description	7
E1.3 Proposed works	8
E1.4 Purpose of report	8
E1.5 Sources of information	8
E2 Planning Policy and Legislation	9
E2.1 Legislation	9
E2.2 Planning Policy	10
E2.3 Other Guidance	12
E2.4 Legal status of species relevant to his site	14
E3. Methodology	16
E3.1 Scope of the ecological assessment	16
E3.2 Desk study	16
E3.3 Habitat and plant survey	16
E3.4 Protected species survey	17
E3.5 Evaluation methodology	18
E3.6 Assessment methodology	19
E4. Baseline conditions (findings and evaluation)	21
E4.1 Designated sites	21
E4.1.1 Statutory sites	21
E4.1.2 Non statutory sites	21
E4.1.3 Priority habitats	22
E4.2 Site habitats and plants	22
E4.2.1 Overview	22
E4.2.2 Habitat descriptions	23
E4.2.3 Habitats in site surrounds	28
E4.2.4 Flora	31
E4.3 Protected species survey	31
E4.3.1 Bats	31
E4.3.2 Great Crested Newt	31
E4.3.3 Otter	33
E4.3.4 Water Vole	33
E4.3.5 Dormouse	34
E4.3.6 Badger	34
E4.3.7 Reptiles	34
E4.3.8 Birds	35
E4.3.9 Other priority species	36
E4.4 Site evaluation summary	36
E4.5 Survey limitations	36
E4.6 Further survey recommendations	36
E4.7 Personnel	37
E5. Assessment of Impacts and Effects	37
E5.1 Habitats in the surrounds	37
E5.2 Site habitats	38
E5.3 Protected species	39
E5.3.1 Bats	39
E5.3.2 Great Crested Newt	39
E5.3.3 Birds	40
E5.3.4 Otter and UK priority fish species	41
E6. Proposed avoidance measures, mitigation and enhancement	42
E6.1 Avoidance measures and mitigation	42
E6.1.1 Habitats in the zone of influence	42
E6.1.2 Bats	42
E6.1.3 Great Crested Newt	42
E6.1.4 Birds	44
E6.1.5 Otter and UK priority fish species	45
E6.2 Habitat enhancement recommendations	45
E6.3 Long-term management, surveillance and 'wardening'	45
7. Conclusion	46
8. References	47
Appendix EA1 Phase 1 map	48
Appendix EA2 Detailed methodology and results for great crested newt	51
Appendix EA3 Map of special sites in 2km surround	54
Appendix EA4 Map of protected and priority fauna species in the 2km surround	56
Appendix EA5 Plant list	58
Appendix EA6 Copy of Landscape plan with added mitigation notes	64
Appendix EA7 Reasonable Avoidance Measures	66
Appendix EA8 Biodiversity Risk Assessment and Management Plan	69
Appendix EA9 Long-term management, surveillance and 'wardening'	71

SUMMARY

Background

This report (originally drawn up over the summer of 2017) provides information suitable for an Ecological Impact Assessment and may be used to inform the ecology chapter in an Environmental Impact Assessment. The report, commissioned by Roger Parry and Partners LLP, will accompany a planning application and considers the likely impacts on nature conservation of a poultry shed development on land at Mulsford, Wrexham County Borough (main site at SJ4345.4504, south-west access point at SJ4298.4478). The site lies close to the Cheshire/Denbighshire border. The site measures approximately 1.5ha with an additional area of nearly 0.1ha taken up by access track.

The report has been updated in December 2017, to cover the relevant points set out in a response from NRW dated 27/10/17, and following a repeat site visit on 4/12/17.

Method of study

A desk study and Extended Phase 1 habitat survey were carried out on April 23rd 2017 in order to assess the current ecological value of the site and immediate surrounds (the zone of influence), to identify potential impacts and ecological constraints and to make recommendations for general mitigation, compensation and further surveys, as appropriate. The desk study search covered a surround of 10km for European designated sites and 5km for nationally designated sites, as recommended for an EcIA. Other data (priority habitats and previous species' records) was sought in a 2km surround, as recommended for all development sites.

The data from the presence/absence survey for Great Crested Newt, carried out in two nearby pools in May 2016, was also used.

A repeat site visit was carried out on 4/12/17 to assess the current condition of the site and the pools.

Baseline Ecological Conditions

Habitats

There are two European designated sites in the 10km surround, two additional national statutory sites in the 5km surround, and one Local Wildlife Site in the 2km surround.

There is some ancient semi-natural woodland, ponds, streams and hedgerows (all of which are priority habitats at national or local levels) in the 2km surround.

The site is not a designated site for nature conservation and is part of a larger arable field (currently Rape – April and December 2017). Access to the site has been created along existing rough track, upgrade of which with hard core is more or less complete; it now leads to a new grain store erected on the site since the field visit in April 17. A small river/stream (Wych Brook) runs close to the north boundary of the site; a broad bank between the site and the river supports semi-improved grassland, woodland, scrub and trees. A hedgerow, with some mature trees, runs close to the south-east boundary of the site. Other hedgerows with trees run close to the access track. There are two ponds in the 250m surround.

Arable land is not a priority habitat and is not considered to be an important ecological feature of the site's zone of influence. However, hedgerow is a Wales priority habitat and the south-east hedgerow is considered to be an important ecological feature at a local/site level. The stream falls into the Wrexham Borough Council priority habitat 'linear aquatic habitats' (which includes the bank and associated land) and is also considered to be an important ecological feature at a local/site level.

The two ponds near the site fall into the Wales (and district) priority habitat 'ponds' since both support breeding Great Crested Newt and the south pool supports a Nationally Scarce plant species – Cowbane. As breeding pools, they are considered to be an important ecological feature at a local level.

Species

The stream is known to be used by Otter and UK priority fish species. The stream and hedgerows are likely to be used by a number of other species e.g. by nesting birds, foraging & commuting bats and Great Crested Newt.

The two nearby ponds support a medium sized breeding population of Great Crested Newt and a significant population interchange between these two pools, which are 210m apart, appears to occur. Great Crested Newt are considered unlikely to use the site for shelter since it offers only poor terrestrial habitat, the two ponds are over 100m from the site and there are no pools to the south for GCN to migrate to.

Otter, Great Crested Newt, bats and the UK priority fish species are considered to be important ecological features at a local level, breeding birds at a site level.

Key Impacts without mitigation

Pollution

The development is of a size and type that may have an impact on the statutory sites in the surround. Air pollution is one consideration; however, emissions levels are likely to be so low as to have no predicted negative impact on these sites (a Habitats Regulations Assessment will likely be required to ascertain this).

The potential risk for pollution via water courses is more likely given that the nearby Wych Brook provides a direct link to the River Dee SAC. The impact of water pollution, at any stage of the development but particularly in the operational phase (either directly from the site or from fields spread with chicken manure), could have a significant effect on the River Dee SAC at an international level, and could have a significant effect on Otter and UK priority species using Wych Brook (and the River Dee).

Pollution is dealt with in another chapter of the EIA.

Site specific (GCN)

Negative impacts can be limited to i) the potential disturbance, capture and subsequent harm of (only) small numbers of dispersing Great Crested Newt and ii) the creation of suitable resting places as a result of development related activities (e.g. piles of building materials can create new suitable habitat, albeit temporary), with subsequent disturbance etc. These impacts are relevant to the construction phase only, since the completed development will not result in an obstructive new landscape element which might negatively affect migration behaviour.

Disturbance of better terrestrial habitat along hedgerows and the river corridor is not envisaged, but may occur where works are being carried out close by.

Pollution of the two breeding pools may occur if waste is spread in close proximity to them.

Site specific (other)

Indirect loss of the south-east boundary hedgerow could occur if works are carried out within its root protection zones, with potential negative impacts on protected species.

The potential negative impact of illumination of the south-east hedgerow and/or the river corridor in the operational phase may have a significant effect, in a local/site context, on foraging and commuting bats and/or Otter in the operational phase.

Development work (in the construction phase) that may remove, damage or destroy a nest of a wild bird whilst it is in use must be avoided as it may constitute an offence.

Avoidance and mitigation

Habitats

With rigorous precautions taken with regards construction run-off (construction phase), site drainage (operational phase) and management of waste (operational phase), there will be no residual effects on biodiversity. These issues are dealt with in another chapter of the EIA.

The south-east hedgerow and river corridor will be protected by temporary fencing during construction.

A Biodiversity Risk Assessment and Management Plan, relating to Himalayan Balsam, has been set out in Appendix EA8.

Great Crested Newt

Impacts on GCN can be avoided by using Reasonable Avoidance Measures (RAMs), with works carried out only in winter, see 6.1.3. If winter works are not possible, works would need to be carried out under a mitigation licence; this would require exclusion of the site by newt fencing and a period of trapping, before works could commence. It is highly unlikely that any newts would be captured given the unsuitable terrestrial habitats present; however, a licence application without an exclusion period is unlikely to be successful. Ultimately the licence will ensure that a perimeter fence can be erected legally around the site to stop newts migrating through the construction zone and becoming at risk. Compensation and monitoring measures recommended for a non-licensed approach will be the same as for a licensed approach.

NRW has requested that there must be long-term compensatory proposals including an appropriate sized compensation area (based on 'like for like') and appropriated tenure. Since there will be loss of only poor terrestrial habitat (approximately 1.5ha on the main development site), the size of the compensatory area is likely to be sufficiently covered by the following and amounts to 0.5ha (one third of the size of the development site):

- a broad band (10m) of land along the south-east side of the buildings will be sown and managed as rough grassland – area = 0.14ha (this was on the original landscape plan).
- two areas of tree planting using a woodland mix i) between the buildings and the river corridor – area = 0.15ha, and ii) alongside the west hedgerow of the development

field, outside the development site - area = 0.14ha (this was on the original landscape plan).

- a 5m strip of rough grassland along the field boundary north of the planned woodland – area = 0.08ha

In addition a 2-3 m buffer of rough grassland will be created around the margins of both of the breeding Great Crested Newt pools in the surrounds.

Other species

In the construction and operational phases, external lighting must not illuminate the south-east hedgerow or river corridor (see 6.1.2)

Any clearance of scrub must be carried out i) within the bird nesting season, after a negative inspection for nests has been undertaken ii) outside the bird nesting season between August 31st and March 1st .

Enhancement

The original plan provided for the following:

- the west and south-east hedgerows will be allowed to grow to 3m in height and managed at this height; any gaps will be planted up with native species.
- new native hedge will be planted alongside an open section of the access track.
- several new trees will be planted in surrounding hedgerows.
- the rough grassland and woodland areas (now mitigation for GCN) and the buffer zones around the pools will enhance the site for wildlife

Long-term management, surveillance and 'wardening'

A time table of works for the long-term management, surveillance and 'wardening' of the GCN compensation areas and enhancements has been set out in tables in Appendix EA9. The first table sets out the activities involved and which person should carry them out – ecologist, landscape and/or landowner – and when.

A second table is a check list for the ecologist.

1. INTRODUCTION

1.1 Background

Churton Ecology was commissioned by Roger Parry and Partners LLP to carry out the necessary ecological surveys to inform an Ecological Impact Assessment. This report will accompany the planning application and considers the likely impacts on nature conservation of a poultry shed development on land at Mulsford, Wrexham County Borough (main site at SJ4345.4504, south-west access point at SJ4298.4478). The site lies close to the Cheshire/Denbighshire border.

The report has been updated in December 2017, to cover the relevant points set out in a response from NRW dated 27/10/17, and following a repeat site visit on 4/12/17.

1.2 Site Description

The site measures approximately 1.5ha with an additional area of nearly 0.1ha taken up by access track. The site has no wildlife designation, and comprises arable land within a larger arable field with hedgerow boundaries. The access track passes through arable fields more or less following or crossing hedgerows. Most of the hedgerows have several mature trees. The site and access track is flanked by arable land (dominated by Rape in April, corn in December 2017) on three sides, with river and associated scrub and woodland running close to the north boundary, and pasture to the north.

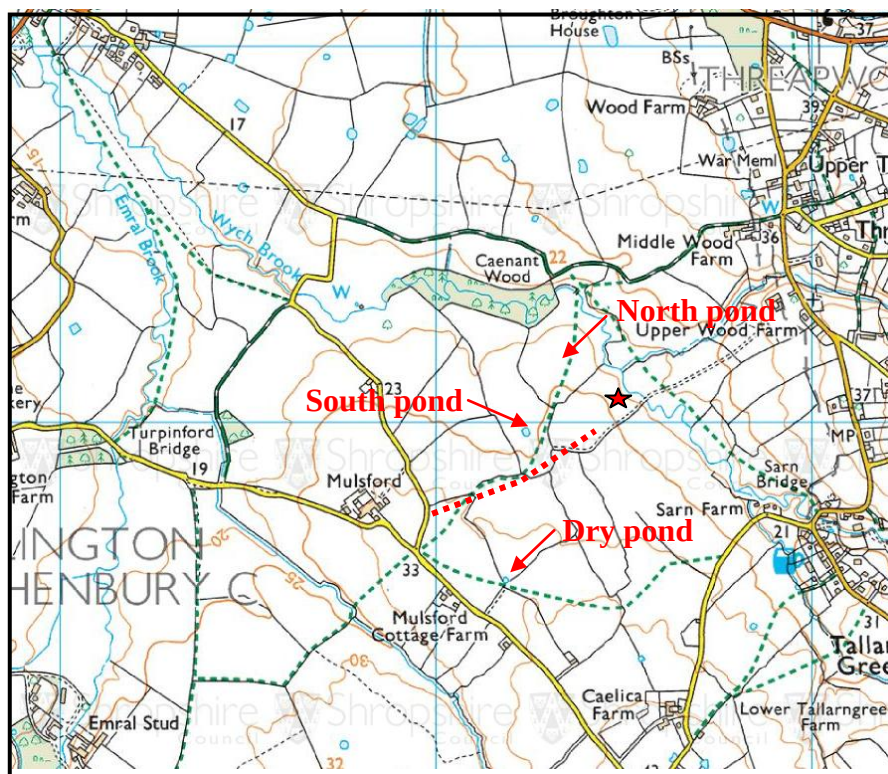


Figure E1: Site location (red star) and access route (red dots) with pools in 250m surround;
OS map licence no.100048619

The access track, which originally was to exit onto the lane using an existing field access, will now exit onto the lane 25m to the south; this will require removal of a short section of hedgerow, see landscape plan in Appendix EA6.

1.3 Proposed works

Development proposals include the construction of poultry units and associated infrastructure at the site. The access track is an upgrade to an existing track and is near completion. A landscape plan, drawn up in September 2017, shows the proposed enhancements, see Appendix EA6. Notes have been added in December 2017, to show that some of the enhancements are now regarded as mitigation for GCN; the additional rough grassland strip along the west and buffer zones around pools (additional mitigation) has also been annotated.

1.4 Purpose of report

The EcIA aims to a) to provide and evaluate ecological information based on the results of field surveys and desk study b) identify and assess any potentially significant ecological effects associated with the proposed development (before and after mitigation) c) identify mitigation measures that might be necessary prior to the submission of a planning application d) identify appropriate enhancement measures.

1.5 Sources of Information

Information used in the production of this report was derived from a desktop search (2017), an extended phase 1 survey (2017), assessment of pools within 250m surround (2016), a detailed Great Crested Newt survey (2016) and a re-assessment of the site and pools on 4/12/17.

2 PLANNING POLICY AND LEGISLATION

2.1 Legislation

2.1.1 International, European and National Legislation

The EU Habitats Directive (together with the Birds Directive) forms the cornerstone of Europe's nature conservation policy. It is built around two pillars: the Natura 2000 Network of protected sites (Special Protection Areas/SPAs and Special Areas of Conservation/SAC's) and the strict system of species protection. All in all, the Directive protects over 1.000 animals and plant species and over 200 so called "habitat types" which are of European importance.

The Habitats Directive is implemented, in England and Wales, by The Conservation of Habitats and Species Regulations 1994 (the 'Habitats Regulations'), amended in 2010, which provides for the protection of 'European sites' and EU protected species.

The protection and management of nationally designated sites is achieved under the Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way Act 2000. The protection of other selected species (other than EU protected species) is through Part I of the Wildlife and Countryside Act 1981. Some animals are protected under their own legislation (for example, the Protection of Badgers Act 1992).

E2.1.2 Designated Sites

Designated sites are areas of high nature conservation value which are protected to varying degrees by UK statutory or international conventions, or local planning policy. The sites form a network of habitats which may be of global, international, European, national, regional or local importance. Information on such sites is sought for all development sites, with a search of a wider surround for an EcIA.

Generally, the priority for the protection of designated sites is as follows:

1. Global/International/European/National sites (Special Areas of Conservation - SACs, Special Protection Areas (for birds) - SPAs, Sites of Special Scientific Interest - SSSIs);
2. Regional or local sites
3. Other wildlife sites.

The protection afforded to sites by local authorities, such as County Wildlife Sites (CWS), Local Nature Reserves (LNR) and Sites of Importance for Nature Conservation (SINC), is normally significantly less than for statutory designations. Such designations are

predominantly for planning purposes only and, while a local authority may have a stated policy of avoiding development in these areas, there is no statutory protection process.

A Local Nature Reserve is a statutory designation made under Section 21 of the National Parks and Access to the Countryside Act 1949.

E2.1.3 Protected Species

In addition to habitats, a number of species are considered to be rare or subject to persecution and are also afforded protection through international/European and national law. Species or habitats which are threatened (including many that receive no statutory legal protection), receive national status under the 'UK post-2010 Biodiversity Framework' (formally the UK Biodiversity Action Plan).

Other species are considered to contribute to our 'quality of life'. Although these species do not benefit from legal protection, the possible effect that development may have on their habitat can be a material consideration in the decision making process.

The Wildlife and Countryside Act (WCA), 1981, as amended, The Protection of Badgers Act 1992 and the Habitat Regulations 1994 are the main legislative frameworks for the protection of wild animals in the UK.

Information on such species is sought for all development sites, with a search of a 1-2km surround as well as on the site and immediate surrounds.

Developers must be able to demonstrate that all reasonable measures have been taken to ensure that protected species are not subject to disturbance. The habitats of all Schedule 2 species in the Habitat Regulations, WCA Schedule 1 and some WCA Schedule 5 species are also protected from disturbance and destruction. Again, all reasonable precautions should be taken to ensure that disturbance does not happen.

E2.2 Planning Policy

The following sections briefly outline the policies that are relevant to the ecology of the site at International, European, national and local levels.

E2.2.1 National Planning Policy

The National Planning Policy Framework (NPPF) provides local planning authorities with guidance in relation to conserving and enhancing the natural environment when preparing development plans. The government circular 06/2005, 'Biodiversity and Geological Conservation - Statutory Obligations and Their Impact within the Planning System', provides

administrative guidance on the application of the law relating to planning and nature conservation.

The government's advice to local authorities on reconciling the potentially conflicting objectives of development and nature conservation can be found in chapter 11 of NPPF. The key objective most relevant to this site is:

- minimising impacts on biodiversity through the preferential use of degraded sites or sites with the least environmental value

The main changes from the previous PPS9 seem to be a greater emphasis on creating ecological networks, with net gains for biodiversity wherever possible. The NPPF places less emphasis on legally protected species than PPS9, although does identify the need to maintain biodiversity and protect priority species (formerly BAPs), which typically include protected species.

The presence of a protected species or habitat is still a material consideration when a local authority considers a development proposal. In addition, priority (BAP) species and habitats, or BAP/priority species' habitats receive protection under the provisions of the NERC Act (see Other Guidance below).

As part of the planning process, the competent authority is required to carry out an appropriate assessment to establish whether a proposed development would adversely affect the integrity of European sites. Such a development could only be granted planning permission under very restricted circumstances.

E2.2.2 Local Planning Policy

Wrexham Local Development Plan (2013 – 2028) will replace the currently adopted Unitary Development Plan 2005.

The following policies in the UDP, under Environment and Conservation, relate to agricultural land and are, therefore, the most relevant to this site:

Policy EC2 Development on agricultural land of grades 1, 2 or 3a will only be permitted if it does not lead to the irreversible loss of that land.

Re Agricultural buildings Policy EC3 The construction of new agricultural buildings will be permitted unless the development is materially detrimental in terms of its impact on the environment or surrounding landscape. The development should form part of an existing farm complex and take advantage of topography and other landscape features for screening.

Isolated buildings will only be permitted in exceptional circumstances where there is an essential agricultural need, and no reasonable alternative location for the development.

Policy EC4 Development proposals should provide for the conservation and management of hedgerows, trees, orchards, woodland, wildlife and other natural landscape and water features, and include new planting in order to enhance the character of the landscape and townscape. Development which results in the loss or significant damage to valuable trees, important hedgerows or ancient woodland sites will not be permitted.

Policy EC5 Within Special Landscape Areas, priority will be given to the conservation and enhancement of the landscape. Development, other than for agriculture, small-scale farm-based and other rural enterprises, and essential operational development by utility service providers, will be strictly controlled. Development will be required to conform to a high standard of design and landscaping, and special attention will be paid to minimising its visual impact both from nearby and distant viewpoints.

Policy EC6 Development either within or close to sites of biodiversity interest will only be permitted where it can be clearly demonstrated that the need for the development outweighs the need to safeguard the intrinsic nature conservation value of the site. Where such development is permitted, damage should be kept to a minimum, and compensatory measures should be provided. Measures to improve the biodiversity value of sites and enhance their natural conservation interest and landscape quality including the establishment of local nature reserves, will be supported.

Policy EC13 Development which would result in an unacceptable adverse impact on the water environment due to additional surface water run-off will not be permitted

E2.3 Other Guidance

The UK Post-2010 Biodiversity Framework and UK Biodiversity Action Plan (UK BAP)

The UK Biodiversity Action Plan (UK BAP) was first published in 1994 and set out the UK's response to Article 6 of the European Convention on Biological Diversity. The original lists of UK BAP priority species (SAPs) and habitats (HAPs) were subsequently updated in 2007, following a review.

At its termination, 943 Species Action Plans (SAP) and 56 Habitat Action Plans (HAP) were listed in England. These habitats and species are listed in Section 74 of The Countryside and Rights of Way (CROW) Act 2000 and subsequently became habitats and species 'of

principal importance' for the conservation of biological diversity in England under the NERC Act.

The 'UK Post-2010 Biodiversity Framework', published in July 2012, has now succeeded the UK Biodiversity Action Plan. In summary of the relevant points, the framework sets out to identify and address causes of biodiversity loss; reduce direct pressures on biodiversity and; improve the status of biodiversity by safeguarding species, habitats and genetic diversity (presumably through linking habitats). In particular, much of the work previously carried out under the UK BAP is now focused at a county level and supports changing international priorities identified in the Convention on Biological Diversity's (CBD's) *Strategic Plan for Biodiversity 2011-2020* and the 2011 EU Biodiversity Strategy (EUBS).

NERC Act (2010)

Section 41 of The Natural Environment and Rural Communities (NERC) Act 2006 requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England (the list forms a continuation of S74 of the CRow Act).

The S41 list is used to guide decision-makers such as planning authorities in implementing their duty under section 40 of the Natural Environment and Rural Communities Act 2006, to have regard to the conservation of biodiversity in England, when carrying out their normal functions. Most notably this gives additional protection to those species or habitats that do not necessarily receive statutory protection within the planning system (e.g. an area of land used by Slow-worm).

The Wrexham Biodiversity Action Plan has habitat and species action plans for the following, with those relevant to the site in bold type:

Great Crested Newt, Barn Owl, Song Thrush, Badger, **Otter**, Lesser Horseshoe Bat, Black Poplar, Derelict and Industrial Land, Garden, **Linear aquatic habitats** (rivers, streams, canals), **ponds**, upland moorland, woodland, lowland raised bog, lowland wood pasture & parkland and wet woodland. Those highlighted are relevant to this development site.

It is worth noting that the Wrexham Biodiversity Action Plan for 'ponds' states:

Ponds are by definition small bodies of water (under 2ha), a fact that makes them inherently vulnerable to damage. The factors which can degrade ponds are wide-ranging and include: pollution caused by agricultural chemicals, urban run-off and

acid rain; direct loss caused by in-filling; vegetation succession; introduction or colonisation of non-native species and inappropriate pond management.

E2.4 Legal status of species relevant to his site

Bats

All UK bat species are protected under both UK and European Law. Essentially this makes it unlawful to; deliberately capture, injure or kill a bat; intentionally or recklessly disturb a bat whilst it occupies a roost or deliberately cause disturbance to a bat or group of bats; damage, destroy or cause deterioration to the roosting site of a bat; intentionally or recklessly obstruct access to a bat roost.

Notably, legal protection gives absolute protection to bat roosts and their continued ability to function, regardless of deliberate, intentional or reckless action. A roost is defined loosely as a place used for the purposes of breeding, resting or sheltering. Legal protection also extends to seasonal roosts which are not always occupied by bats throughout the year.

Disturbance caused through excessive noise or lighting and/or alterations to the landscape could potentially impact on bat roosting, foraging and/or commuting habitats and may have legal implications with regards European disturbance/roost deterioration laws. It is therefore the duty of the competent authority to take habitat severance, disturbance and land use change issues and their potential for impact on bat populations into consideration when assessing applications for the relevant consent/s.

Great Crested Newt

Great Crested Newt is protected under both UK and European Law. Essentially this makes it unlawful to; deliberately capture, injure or kill a newt; intentionally or recklessly disturb a newt whilst it occupies a place of rest or deliberately cause disturbance to a newt or group of newts; damage or destroy the resting or breeding site of a newt; intentionally or recklessly obstruct access between terrestrial and/or aquatic habitats.

Disturbance caused through excessive lighting and/or alterations to the landscape could potentially impact on terrestrial or aquatic habitats and may have legal implications with regards European disturbance/roost deterioration laws. It is therefore the duty of the relevant competent authority to take habitat severance, disturbance and land use change issues and their potential for impact on Great Crested Newt populations into consideration when assessing applications for the relevant consent.

Otter

Otter is protected under both UK and European Law. Essentially this makes it unlawful to; deliberately capture, injure or kill an Otter; intentionally or recklessly disturb an Otter whilst it uses a place of rest, shelter or protection or deliberately cause disturbance to an Otter or group of Otters; damage or destroy a breeding site or resting place of an Otter; intentionally or recklessly obstruct access to any structure or place that it uses for shelter or protection.

Notably, legal protection gives absolute protection to breeding and resting places used by Otter, regardless of deliberate, intentional or reckless action.

Disturbance caused through excessive lighting and/or alterations to the landscape could potentially impact on the foraging and/or commuting habitats of Otter and may have legal implications with regards European disturbance laws. It is therefore the duty of the Planning Authority to take lighting and land use change issues and their potential for impact on Otter populations into consideration when assessing planning applications.

Birds

With the exception of Schedule 1 listed bird species, which receive a higher level of protection against breeding disturbance, all common species of bird are protected during their breeding activities under the Wildlife and Countryside Act 1981.

Essentially, this makes it an offence to intentionally take, damage or destroy the nest of any wild bird whilst that nest is occupied or being built; intentionally take or destroy the egg of any wild bird.

E3 METHODOLOGY

E3.1 Scope of Assessment

Since the access track is an upgrade to an existing track and is near completion, this part of the development site has not been considered further in this report.

The zone/area of influence was considered to be the site within the red line boundary and its immediate surrounds (stream corridor and east hedgerow); however, the presence of Great Crested Newt breeding ponds was considered within 250m of the site. In addition, the presence of special sites for nature conservation, which could be influenced by pollution much further from the site, was also considered.

The ecological features considered included a) all habitats within the site and immediate surrounds, noting presence or not of priority habitats b) presence and/or potential for presence of protected, priority or notable species within the site and immediate surrounds c) pools in the 250m surround d) special sites in the 2-10km surround.

E3.2 Desk study

The desk study was conducted in April 2017 using the following sources:

- MAGIC maps
- Record (Cheshire)
- Cofnod
- OS maps and aerial photographs, to identify landscape features of potential interest including ponds, streams and ditches, and areas of apparent (semi-) natural value.

The desk study sought ecological information on the presence of:

- high value ecological sites in the wider surround (European designated sites within 10km and nationally designated sites within 5km)
- locally designated and non-designated sites and habitats of principle importance (UK priority habitats) within 2km
- protected species, UK and local priority species and other notable species in the 2km surround. This search highlights the species that are present or have been found in the area.

E3.3 Habitat and plant survey

A phase 1 survey of the site and immediate surrounds was conducted on 23/4/2017 by Kate and Rob Thorne following the JNCC (1993) Phase 1 methodology, see Appendix EA1 for Phase 1 map. All plants on site were noted and have been listed in Appendix EA5. In the

text species are referred to using their English names (Appendix 4 provides a list of their scientific names). Nomenclature follows Stace, C. (2011) New Flora of the British Isles.

The habitats were assessed, and their importance/value noted based on botanic diversity and/or their potential to support uncommon or rare species of fauna (e.g. axiophytes/Red Data Book species).

E3.4 Protected species survey

E3.4.1 Bat species

Trees in the hedgerow near the south-east boundary of the site were assessed for potential bat roosts on 23/4/17, from ground level. There are no trees or other structures on the site that might support roosting bats.

A general habitat suitability assessment of the site and surrounds was carried out to determine their value as potential foraging and commuting habitats.

E3.4.2 Great Crested Newt (*Triturus cristatus*)

Aquatic habitats with the potential to support breeding Great Crested Newt were sought within 250m of the original site (further to the north-west). Three possible pools were identified, visited and assessed in 2016 and two of the pools subsequently were surveyed in detail, see detail of methods in Appendix EA2; the third pool was dry. These two pools also fall within the 250m surround of the new site location and were re-visited on 23/4/17 **and 4/12/17**.

The habitats on site were assessed for their suitability to provide resting places or areas suitable for shelter or protection (referred to as terrestrial habitats) in April 17 **and December 2017**. The potential for newts to traverse the site and any dispersal limitations that might interrupt such migrations were also considered.

E3.4.3 Otter (*Lutra lutra*) and Water Vole (*Arvicola amphibious*)

Signs such as holts, hovers, couches, paths, footprints, spraints and feeding remains were sought along the nearby stream and its supporting habitats on 23/4/17. This was achieved by walking along the stream and checking for features likely to be marked by commuting individuals or used for the purposes of rest or shelter.

E3.4.4 Dormouse (*Muscardinus avellanarius*)

Suitable woodland and hedgerow habitats were noted within or adjacent to the site on 23/4/17. Dispersal links and barriers to suitable woodland habitats were also considered in relation to hedgerow/woodland links.

E3.4.5 Badger (*Meles meles*)

Burrows were sought on the site and within a 50m surround (at least) on 23/4/17.

Other evidence of activity, such as latrine pits, paths, snuffle holes, feeding remains and hairs (in burrow spoil or snagged along trails) were also sought.

E3.4.6 Reptiles

Suitable habitat within the site and adjacent surrounds, with potential to support the 'widespread' reptile species, was sought on 23/4/17. Areas were assessed for their potential to provide permanent, seasonal and/or temporary reptile habitats. Dispersal links and barriers between more abundantly suitable habitats were also considered in relation to mobile and/or transient species.

E3.4.7 Birds

Habitats with potential to support common, priority or Schedule 1 species of bird were sought within the site and surrounds. A list of bird species using the site and adjacent surrounds was established during the survey and old nests encountered were attributed to species, where possible.

E3.4.8 Other protected or priority species

The walkover process is generally designed to pick up on anything that may be encountered or inferred from habitat suitability.

E3.5 Evaluation methodology

Evaluation of ecological features (habitats and species) follows the current CIEEM guidelines for Ecological Impact Assessment (2016).

In order to assess impacts arising from a particular development, it is necessary to establish the nature conservation importance (value) of each feature that may be affected by development proposals.

This evaluation process assesses the geographical scale of importance as follows:

- International (Europe)
- National (Wales),
- County (Denbighshire)

- District (Wrexham County Borough),
- Local ().

The CIEEM guidelines suggest that importance/value assigned to a feature should be a matter of professional judgement based on available guidance and information, which can include the following:

- existing designations;
- biodiversity value (including rare species, habitats that may support rare species, notably large or diverse species populations, habitat availability, extent and diversity, priority habitats and species).

Individual species that are protected under European or domestic legislation are evaluated as above, but with an additional consideration of legal obligations.

E3.6 Assessment methodology

E3.6.1 Characterising Ecological Impacts

The potential impacts (and effects) of the proposed development, which might arise from the development in the absence of avoidance measures and/or mitigation, are considered only for 'important ecological features (habitats or species)' identified as such in the 'Baseline Conditions' (section E4). Impacts cover those in the construction and operational phases in this report.

The following terms are used to describe impacts (and effects)

- Direct or indirect
- Positive or Negative;
- Magnitude;
- Extent;
- Duration;
- Reversibility; and
- Timing and Frequency.

E3.6.2 Estimation of Significance level of Impacts and Effects

An ecologically significant impact or effect is defined as an impact (negative or positive) on the *integrity* of a defined site or ecosystem and/or *conservation status* of habitats or species within a given geographical area. Positive impacts are likely to be rarer, but are possible if ecological enhancements are included within a scheme's design at an early stage in the project.

In the new CIEEM guidelines for EcIA, there appears to be more of a distinction between impact and effect. An impact and effect is likened to 'cause' and 'effect' e.g. loss of hedgerow (impact) leading to loss of bird breeding habitat. (effect). However, the use of one or other of these terms is not always clear.

A level of significance is applied to all impacts and effects.

The level of significance of the impacts and effects of a development is a product of the characteristics of the impact (direct or indirect etc, see above) and the importance of the receptor (in terms of development control, policy guidance and legislation against the level at which it is valued).

When evaluating the level of significance of impacts and effects on sites and ecosystems at sub-national levels of importance, the description of the ecologically important characteristics of the site or ecosystem falls to the ecologists carrying out the assessment.

The main purpose, however, of the EcIA is to assess 'the significance or not (and the level of significance) **of any residual effect**' on each important ecological feature after mitigation and enhancements.

As with 'importance' of an ecological feature, the level of significance follows the same hierarchy – international, national etc. However, an impact on a species or habitat of e.g. national importance does not mean that that impact is significant at a national level.

E4 BASELINE CONDITIONS (findings and evaluation)**E4.1 Designated sites****E4.1.1 Statutory sites**

The River Dee and Bala Special Area for Conservation (a European designation) is located at 3km to the N/NW of the site at its nearest point. The River Dee is also an SSSI.

Fenn's, Whixall, Bettisfield, Wem and Cadney Mosses, as part of the Midland and Mosses Phase 2 Ramsar site, and also a Special Area for Conservation (both European designations) as well as being a National Nature Reserve and an SSSI (national designations) is located at nearly 10km to the south-east of the site. Hanmer Mere at around 6km from the site is also part of the same Ramsar Site.

Within 5km there is one other SSSI – Well Rough and Long Plantation SSSI – which lies along the Wych Brook at 1.8km upstream to the south-east. Cloy Brook Pastures SSI are located just outside 5km to the SW.

Details of the above sites are set out in table E1 below.

E4.1.2 Non-statutory sites

Tallarn Green Meadows Local Wildlife Site is present in the 2km surround, to the east of the site.

Table E1: Statutory and non statutory sites in the 2-10km surround (European 10km, national 5km, local 2km)				
Site name	Legis-lation	Level of importance	Distance from site	Details
River Dee and Bala SAC	Hab regs	International	3km N/NW nearest point	Important features: Water courses of plain to montane level, Atlantic Salmon, Floating Water-plantain, Sea Lamprey, River Lamprey, Brook Lamprey, Bullhead, Otter
Fenn's, Whixall, Bettisfield, Wem and Cadney Mosses SAC	Hab regs	International	Nearly 10km to to SE	Important features: Active raised bog, and Degraded raised bog capable of recovery
Fenn's, Whixall, Bettisfield, Wem and Cadney Mosses Ramsar Site	Hab regs	International	Nearly 10km to to SE	Wetland of international importance
Fenn's, Whixall, Bettisfield, Wem and Cadney Mosses NNR and SSSI	WCA	National	Nearly 10km to to SE	The meres and mosses of the Clwyd-Cheshire-Shropshire-Staffs plain form a nationally and internationally important series of open water and peatland sites. They have developed in natural depressions in the glacial drift (sands and boulder clays) left by the ice sheets as they retreated from this plain some 15,000 years ago. Fenn's etc Mosses together form an outstanding example of a lowland raised mire. The moss complex, which straddles the border between Shropshire and Clwyd is one of the largest and most southerly raised mires in Britain. The site is highly valued ecologically as an example of mire development occurring under relatively warm and dry conditions and lying at the edge of the British range for this type of habitat.
River Dee SSSI	WCA	National	3km N/NW nearest point	The River Dee is notified for its nationally important transition through a range of river types from mesotrophic to eutrophic. It is also notified for Atlantic salmon, otter, club-tailed dragonfly and fluvial geomorphology
Well Rough and Long Plantation SSSI	WCA	National	1.8km to the south-east	Woodland on steep slopes in Wych Brook valley; Ash, Oak and wet woodland
Tallarn Green Meadows WS		County	Just under and over 2km to the south-east	

E4.1.3 Priority habitats

There is some ancient semi-natural woodland in the 2km surround, largely associated with streams. The nearest such woodland is nearly 1km to the south. Caenant Wood, 265m to the north-west, is not ancient but is a mix of coniferous and broadleaved woodland flanking the Wych Brook. Other priority habitats (at national and/or local levels) in the surrounds include ponds, streams and hedgerows.

E4.2 Site habitats and plants

E4.2.1 Overview

The site is not a designated site for nature conservation.

The site is part of a larger arable field (fully grown Rape in April and immature self-set Rape in December 2017). Access to the site has been created along existing rough track, upgrade of which with crushed stone is more or less completed; the track runs along and through a series of hedgerows and now leads to a new grain store erected on the site since the field visit in April 17. A small stream ('Wych Brook') runs close to the north-east boundary of the site; a bank between the site and the river supports semi-improved grassland, woodland, scrub and trees. A hedgerow, with some mature trees, runs close to the south-east boundary of the site with a grassland margin between the Rape crop and the hedgerow. The only habitat on the site is arable land i.e. there will be loss of 1.5ha of arable land to development.

Arable land is not a priority habitat and is not considered to be an important ecological feature of the site's zone of influence.

Hedgerow is a Wales priority habitat but the nearby hedgerows tend to be species-poor and compromised by trimming; their importance is raised, however, by the presence of mature trees and the likelihood that they are used by a number of species. The nearby/south-east hedgerow is, therefore, considered to be an important ecological feature at a site level.

The stream falls into the Wrexham Borough Council priority habitat 'linear aquatic habitats' (which includes the bank and associated land) and, since it supports a number of species, is also considered to be an important ecological feature at a local level.

The two ponds near the site fall into the Wales (and district) priority habitat 'ponds' since both support Great Crested Newt and pond 2 supports a Nationally Scarce plant species – Cowbane. As breeding pools, they are considered to be an important ecological feature at a local level.

E4.2.2 Habitat descriptions (site and immediate surrounds)

Arable

The site is almost solely arable land, which was supporting a fully grown Rape crop in April and immature self-set Rape in December 2017, with a very few arable weeds e.g. Red Dead-nettle, Common Chickweed, Hedge Mustard, Groundsel, Pineappleweed and Fat Hen. In December, the Rape appeared to be self-set.

Grassland*Field margin*

A wide species-poor grassland margin runs along the south-east side of the Rape crop; this is more or less the east boundary of the site. Improved grassland is dominant but merges into an older grassland type near the hedge. Grasses present overall include Perennial Rye-grass, Meadow Foxtail, Annual Meadow-grass and Cock's-foot. Grassland herb species include White Clover, Hogweed and Cut-leaved Crane's-bill with a few arable weeds present [Sticky Mouse-ear and Greater Plantain] and Cow Parsley.



Photograph 1 and 2: south end of site with new grain store (December 2017), viewed from the north-west



Photograph 3: site viewed from the south-east, April 2017; south-east hedgerow right/east; riparian corridor (distant tree line); grassland field margin (foreground)



Photograph 4: site viewed from the south-east, December 2017; south-east hedgerow and grassland margin (right/east; riparian corridor (distant tree line)



Photograph 5: site viewed from the north-east, April 2017; south-east hedgerow left; grassland field margin (foreground); site on right/north-west

Bank

A wide bank (approx 4m wide) of semi-improved long grassland descends to the wooded river corridor just to the north-east of the site. This supports a few grasses [Yorkshire-fog (dominant), Meadow Foxtail, Cock's-foot and Red Fescue] and grassland herbs [Common Sorrel, Knapweed, Creeping Buttercup, Yarrow, Dandelion and Cuckooflower]. There is some content of shade-loving species as the grass merges with the tree zone e.g. Red Campion, Cow Parsley, Garlic Mustard, Lesser Celandine and Hedge Woundwort. Also present are Nettle, Broad-leaved Dock, Curled Dock, White Dead-nettle and Ground-elder.



Photograph 6: site viewed from the north-east April 2017; grassland bank (foreground) descending to river corridor (right/north); site on left/south-west

Stream

The stream is moderately fast flowing but quite deep with silted margins (TN3 on phase 1 map in Appendix EA1).

Trees and shrubs flank the margins. Shrub species include Hawthorn (in old hedge), Osier and Grey Willow; tree species (mature and immature) include Alder, Ash, Oak and Crack Willow. There is a mix of woodland ground flora species [Ramsons, Wood Speedwell, Dog's Mercury, Ivy-leaved Speedwell, Wood Avens, False Brome, Yellow Archangel, Large Bitter-cress, Bugle, Golden-saxifrage and Ground-ivy] and wetland species [Reed Canary-grass, Water Chickweed and Himalayan Balsam]. Nettle is frequent.



Photograph 7: Wych Brook and riparian woodland north-east of site, April 2017

Hedgerow

Hedgerow near south-east site boundary

The hedgerow close to the south-east boundary of the site (TN6) is intact and closely trimmed, with a few mature Oak trees. Woody species present include Hawthorn, Hazel, Blackthorn, Oak and Dog Rose. Woodland ground flora (as listed under the Hedgerow Regulations) includes only one species – Dog's Mercury – but a few other typical hedgerow herbs are present e.g. Greater Stitchwort and Cow Parsley. The hedge links with three other hedgerows and the riparian corridor, and also runs alongside an old grassy track (links with a bridge over the stream). Given the combination of the above features, the hedge is considered to be an 'important' one (as per the Hedgerow Regulations).

Hedgerows near access track

Hedgerows associated with the access track are all similar. All are closely trimmed, with only 4-5 woody species per hedge [Hawthorn (often dominant, Blackthorn, Elder and Field Maple] and occasional significant sized gaps. Most of the hedges have some content of mature trees [Oak (dominant) and Ash] but have few or no woodland ground flora species [Wood Avenas]. Other typical hedgerow ground flora species include Hemlock and Cow Parsley. A few hedges have accompanying ditches with wetland ground flora species including Hemlock Water-dropwort and Wavy Bitter-cress.



Photograph 8: access approaching new shed, December 2017. Red arrows = west field boundary.
Green dashes = proposed new hedgerow



Photograph 9: Upgraded access track alongside hedge and ditch, April 2017



Photograph 10: Access track exit onto lane (red dashes), April 2017

E4.2.3 Habitats in the site surrounds

The site lies in a rural location close to a stream (Wych Brook) which marks the Wrexham County Borough/Denbighshire and Cheshire county boundaries. The surrounding farmland is a mix of grassland and arable land with hedgerow boundaries containing several mature trees, and areas of woodland largely located along the stream. Pools are also a feature of the landscape, with two in the 250m surround of the site as follows:

In April 2017, both pools were surrounded by cultivated land with a Rape crop (improved grassland in 2016). Bulrush, as in 2016, is frequent in the margins. The south pool (TN5)

supports a couple of plants of particular interest (Cowbane and Cyperus Sedge). This pool otherwise has few wetland species and appears not to have much suitable egg laying material for Great Crested Newt. The north pool (TN1) has much more egg laying material (includes Water Forget-me-not) and supports a greater variety of wetland plants.

In December 2017, both pools were surrounded by fairly recently sown corn right up to the margins. The Bulrush appears to have increased considerably around the margins of the south pool. Some felled Oak branches had been thrown onto the margins of the north pool.



Photograph 11: north pool (south end), viewed from the west, April 2017



Photograph 12A: south pool, viewed from the south (2016)



Photograph 12B: south pool, viewed from the south (April 2017)



Photograph 12C: south pool, viewed from the south (December 2017)



Photograph 13: south pool with extensive surround of poor terrestrial habitat, viewed from the east (December 2017)

E4.2.4 Flora

Most of the species on the site and in the immediate surrounds are common. *Cardamine amara* (Large Bitter-cress), a county scarce plant, was noted in the river corridor. *Carex pseudocyperus* (Cyperus Sedge), found in both ponds, has some rarity status in Wales ('near threatened') and *Cicuta virosa* (Cowbane), found in the south pond is nationally scarce.

Cowbane, in particular, is characteristic of many of the meres and pools in this region (cross county).

E4.3 Protected species survey

Note: some are also UK priority species

E4.3.1 Bats

Species recorded post 2000, within 2km, have been from over 1km of the site and include *Pipistrellus pipistrellus* Common Pipistrelle, *Pipistrellus pigmaeus* Soprano Pipistrelle, *Plecotus auritus* Brown Long-eared Bat, *Nyctalus noctula* Noctule and *Myotis sp.* Natterer's bat. These are largely records of bats in flight with a very few being roost sites.

Some of the mature trees near the site may be used for roosting; those in the hedgerow near the south-east boundary have no obvious bat roost features but they are of an age and type that might support smaller roosts.

The site represents poor foraging habitat but the hedgerows, and river corridor close to the site boundaries may be used by foraging and commuting bats.

This species group is considered to be an important ecological feature, likely at a local level.

E4.3.2 Great Crested Newt

There is a single record for Great Crested Newt at nearly 2km to the south-east.

The Habitat Suitability Index for each of the two pools was 'good' in 2016, see Table E2 in Appendix EA2. This has not changed in 2017, although the immediate surrounds of the pools was improved pasture in 2016, and is arable in 2017. A small area of rough ground (good for newts) close to the pool margins, present in 2016, has been lost to cultivation.

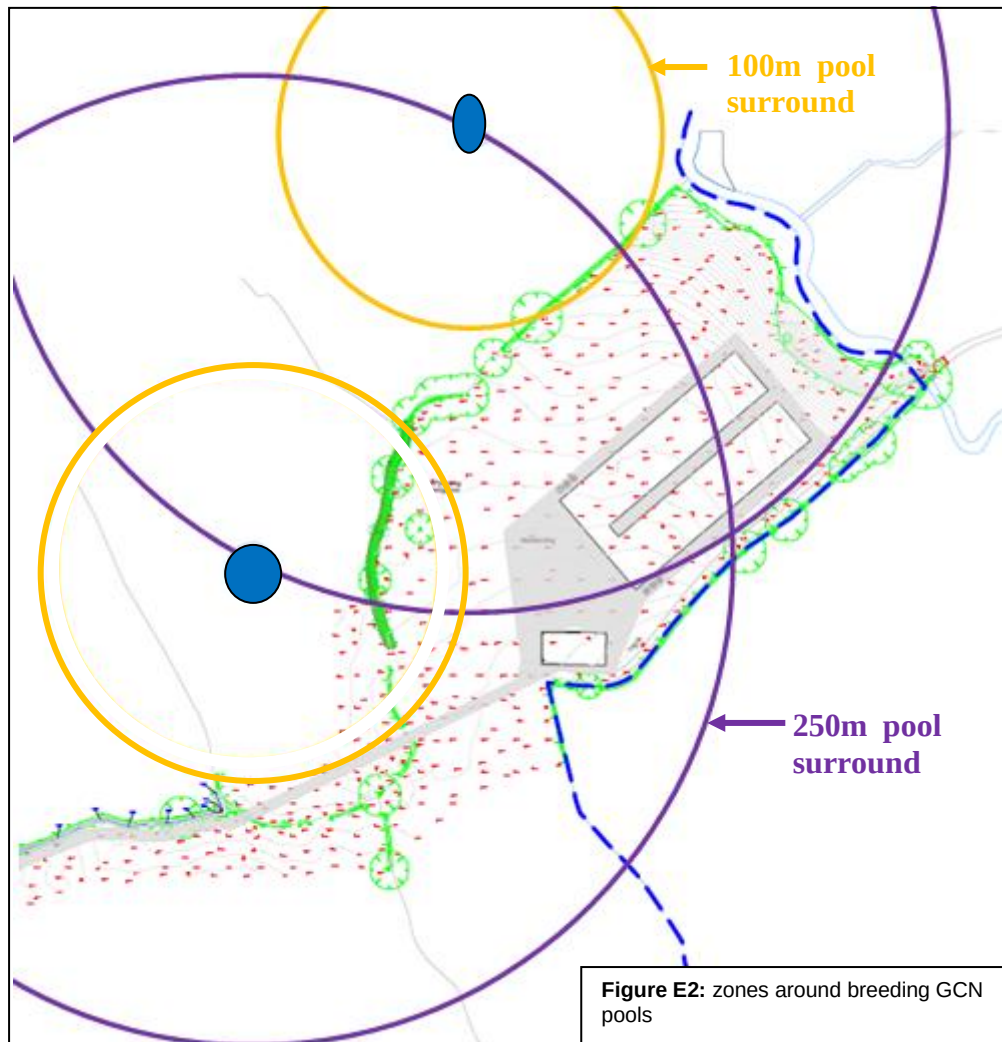
In 2016, the presence of Great Crested Newt was established on the initial visit when eggs were found in both pools. [Egg laying was noted again in April 2017].

A detailed GCN survey was subsequently carried out in 2016 see Appendix EA2 for method and results. Together, the ponds were found to support a medium breeding population of Great Crested Newt (62 individuals in traps) on 13/5/16. On this date, only 20% were found in the north pool, although there was much more evidence of egg laying here. The next highest count (30 individuals) was on 31/5/16 (fifth visit) when only 13% of individuals were in the north pool.

Significant population interchange between these two pools, which are 210m apart, appears to occur; the large number of adults found in the south pool on 13/5/16, with little evidence of egg laying, at the same time as numerous eggs and few adults were noted in the north pools, suggest that there may have been recent migration from one pool to the other. The GCN in each of these two pools is considered to be part of the same (meta-) population and may be an isolated one, given that i) the Wych Brook represents a significant barrier to dispersal to and from a number of pools in the 1km surrounds to the north ii) the nearest pool to the south is at 650m distance, well outside the typical area of population interchange.

The development site and the immediate pool surrounds (and land between the pools), as grassland in 2016 and now arable in 2017, remain poor quality terrestrial habitat. High quality terrestrial habitats are provided by the hedgerows; the hedgerow along the north-west of the site field (TN4) provides a covered link between the two pools. Additional suitable terrestrial habitat in the wider surrounds is provided by the woodland flanking the Wych Brook, to the north of the pools (90m from the north pool, 275m from the south pool).

Although the site location comprises poor terrestrial habitat and only covers an area of 1.5ha, with all land between 100m and 250m of either of the two pools (see figure E2), this species is considered to be an important ecological feature, at a local level



E4.3.3 Otter

There are several post 2000 records for this species along Wych Brook [SJ4444 (the site monad), SJ4245 and SJ4146] and along Emral Brook [SJ4245 and SJ4244].

On 23/4/17 some likely Otter footprints were noted but no spraints along Wych Brook; the water appeared to have been up to a higher level recently and there were few features suitable for Otters to mark. No potential holts were found but the river corridor does provide opportunities for shelter (hovers), commuting and foraging.

Otter is considered to be an important ecological feature at a local level.

E4.3.4 Water Vole

There are two post 2000 records for Water Vole at over 1km from the site in SJ4245 (Wych Brook) and SJ4144.

No evidence of Water Vole was noted along the section of brook adjacent to the site. The survey was not aimed at being comprehensive (it was an incidental part of the Otter survey) as the site is well clear of the stream banks.

Water Vole is not considered to be an important ecological feature of the site's zone of influence.

E4.3.5 Dormouse

There are no records for this species in the 2km surround.

The site itself lacks suitable habitat for Dormouse but there is some potential in the river corridor and hedgerows. However, given the lack of records, the trimmed nature of the hedgerows and the distance to woodland, it is considered highly unlikely that this species is present on or near the site.

Dormouse is not considered to be an important ecological feature within the site's zone of influence.

E4.3.6 Badger

Badger has been recorded in SJ4345 at over 500m from the site.

A marked trail was noted running through hedge to the north-west of the site; this runs along the river bank under tree cover with a well-used path branching off to cross the stream via a fallen log. Latrines are located close to the branch path.

No setts were found in the riparian woodland near the site. There is no Badger activity on the site.

Badger is not considered to be an important ecological feature within the site's zone of influence.

E4.3.7 Reptiles

There are no previous records for reptiles in the 2km surround.

The intensively farmed nature of much of the site and its surrounds makes the presence of reptiles on or near the site unlikely. Grass Snake probably uses the river corridor.

Reptiles are not considered to be an important ecological feature within the site's zone of influence.

E4.3.8 Birds

Previous bird records

Note: potentially breeding specially protected and UK priority species in the area are in bold type.

Previous recent (post 2000) records for UK specially protected birds in the 2km surround include i) **Common Kingfisher** (a few records along Wych Brook in SJ4245 and SJ4345) ii) several wetland birds [Bewick's Swan, Northern Pintail and Common Goldeneye] iii) birds of prey [**Barn Owl** (in SJ4245, SJ4346, and SJ4443), Red Kite (in SJ4246)] iv) smaller overwintering non wetland birds [Fieldfare].

In addition, there are previous recent (post 2000) records for several Wales priority (S7 species) in the surrounds as follows:

Woodland species – **Willow Tit**

Hedgerow/scrub species – **Reed Bunting** (plus wetland), **Eurasian Tree Sparrow**, **Dunnock** and **Bullfinch**

Species associated with housing – **House Sparrow** and **Common Starling**.

Ground nesting birds: **Skylark**, **Eurasian Curlew**, **Northern Lapwing** and Ring Ouzel

Wetland species: Black-headed Gull

Other species: **Kestrel**.

Other birds with some sort of rarity status (but not specially protected or S7 species) include some additional wetland ducks, swans and geese species, waders [Redshank] some ground nesting birds [Eurasian Woodcock], some species associated with buildings [Common Swift and House Martin] and other species [Mistle Thrush and Common Gull].

Birds noted during the field surveys were largely just off site around the boundaries or around the pools. UK priority species noted included Reed Bunting (north pool 2016). Birds with amber status noted included Redstart and Willow Warbler. Common species included Blackbird, Chiff-chaff, Robin, Pheasant and Blackcap.

Evaluation (birds)

The site (with Rape dominance) lacks suitability for the priority ground nesting birds previously recorded in the surrounds.

Hedgerow, woodland and mature trees, present only near the site and access route, have potential for species typical of these habitats to breed.

Birds are considered to be an important ecological feature at a site level.

E4.3.9 Other protected and priority species

Fish

Atlantic Salmon (*Salmo salar*), River Lamprey (*Lampetra fluviatilis*), Sea Lamprey (*Petromyzon marinus*), Brown Trout (*Salmo trutta*) and European Eel (*Anguilla anguilla*) have all been reliably recorded post 2000 in Wych Brook and Emral Brook.

These species are considered to be important ecological features at a local level.

Other

Brown Hare has been recorded rarely from distances between 1.5km and 2km from the site (2005 - 2016) – UK protected and priority species.

No evidence of or potential for other protected or priority species was noted.

E4.4 Site evaluation summary

The following ecological features are considered to be of some importance within the zone of influence:

- South-east hedgerow - of importance in a site context
- Stream - of importance in a local context
- Breeding GCN ponds - of importance in a local context
- Great Crested Newt - of importance in a local context
- Bats - of importance in a local context
- Otter - of importance in a local context
- Birds - of importance in a site context
- UK priority fish species - of importance in a local context

E4.5 Survey limitations

There were no significant survey limitations.

E4.6 Further survey recommendations

No further surveys are recommended.

E4.7 Personnel

Kate Thorne has about twenty years experience surveying sites for development and conservation purposes, covering Ecological Impact Assessment, botanical and vegetation surveys, and surveys for the range of protected species most typically relevant to planning proposals. She holds NE and NRW bat and Dormouse survey and mitigation licences and is an accredited agent to survey for Great Crested Newt. She holds an IdQ in Vascular Plants (Natural History Museum) and is a botanical tutor for the Field Studies Council (also the BSBI county recorder for vascular plants in Montgomeryshire) and has years of experience assessing and monitoring vegetation. She is also experienced in breeding bird survey techniques.

Rob Thorne has over twelve years' experience surveying sites for development and conservation purposes, covering Ecological Impact Assessment, botanical and vegetation surveys, and surveys for the range of protected species most typically relevant to planning proposals. He holds NE and NRW bat and Great Crested Newt survey and mitigation licences. He holds, or is accredited to work under, survey licences for Barn Owl, White-clawed Crayfish and Dormouse. He is also an experienced reptile worker having undertaken large scale reptile surveys for Natural England and the Wildlife Trusts. He is also experienced in reptile mitigation, habitat management and translocation from development sites.

E5 ASSESSMENT OF IMPACTS AND EFFECTS

This section identifies and describes all the potential impacts of the proposed development, which might arise from the development in the absence of avoidance measures and/or mitigation, on each ecological feature identified important in the 'Baseline Conditions', including impacts associated with all phases (construction and operation).

The significance of any residual effects is further discussed with mitigation in place, and/or enhancements that have been agreed upon by the client.

E5.1 Habitats in the surrounds

Potential (pre-mitigation) impacts

The development is of a size and type that may have an impact on the statutory sites in the surround, as demonstrated on MAGIC, which identifies impact zones around special sites. Air pollution is one consideration; however, emissions levels are likely to be so low as to

have no predicted negative impact on these sites (a Habitats Regulations Assessment will likely be required to ascertain this). This is dealt with in another chapter of the EIA.

The potential risk for pollution via water courses is more likely given that the nearby Wych Brook provides a direct link to the River Dee SAC; the actual junction with the Dee is at nearly 5km distance.

The impact of water pollution, at any stage of the development but particularly in the operational phase (either directly from the site or from fields spread with chicken manure), could have a significant effect on the River Dee SAC at an international level.

Significance of residual effects after mitigation

With rigorous precautions taken with regards construction run-off (construction phase), site drainage (operational phase) and management of waste (operational phase), there will be no residual effects on biodiversity. These issues are dealt with in another chapter of the EIA.

E5.2 Habitats on site and in the immediate surrounds

Potential (pre-mitigation) impacts

On site there will be permanent direct loss of habitats (approximately 1.5ha of improved grassland and arable land) which are not considered to be important ecological features; this (impact) will not have a significant effect on biodiversity at any stage of the development.

Minimal loss of higher value hedgerow is envisaged only around the access track exit, but indirect loss of the south-east boundary hedgerow could occur if works are carried out within its root protection zones, with potential negative impacts on protected species, see below.

Disturbance of land near a water-course may result in invasion of the site by non-native and invasive Himalayan Balsam, with possible subsequent establishment of this species along all nearby water-courses or water bodies.

Significance of residual effects after mitigation

With mitigation in place (protection of the south-east hedge during construction **and a** Management Plan in place for invasive non-native species), there will be no residual effects on hedgerows or other habitats.

After enhancement

With newt mitigation and enhancements in place (creation of areas of rough grassland and woodland, planting of a new length of hedgerow, buffer zones for pools, and less intensive management of some of the hedgerows) there could be a net gain for biodiversity.

E5.3 Protected species

The survey has shown that no development related impact on Dormouse, Badger or reptiles can be reasonably predicted and no further survey or assessment is required.

E5.3.1 Bats*Potential (pre-mitigation) impacts*

The potential impact (direct, negative and permanent) of illumination of the south-east hedgerow and the river corridor in the construction and/or operational phases, may result in the deterioration of foraging and/or commuting habitat; this in turn, could result in deterioration of any nearby roosts. It is difficult to quantify the significance of this (effect), as the species using these features are not known. It should be assumed that a significant effect (likely only at a very local level) is possible.

Significance of residual effects after mitigation

With mitigation in place (a sensitive lighting plan), there will be no residual effects on bats.

E5.3.2 Great Crested Newt*Potential (pre-mitigation) impacts*

With reference to the site plans provided, the entire development site (an area measuring approximately 1.5ha) lies just beyond 100m at its nearest point to the south pool, but within 250m of both breeding pools, see Fig 2 in section 4.3.2. Using the Natural England rapid risk assessment tool the return is 'Amber, offence likely' - which would tend to take into account the presence of suitable terrestrial habitat within the site as well as potential impacts on migrating newts.

Since the site only supports poor terrestrial habitat it is unlikely that works would result in the damage, destruction or deterioration of a resting site or in the (significant) loss of foraging habitat i.e. a loss that would result in a detrimental impact on the status of the population.

The site does not lie on any significant potential migration route as there are no pools or notable/significant areas of terrestrial habitat to the south of the proposed development site - which might otherwise influence regular trans-site migrations. Therefore, negative impacts can be limited to i) the potential disturbance, capture and subsequent harm of (only) small

numbers of dispersing Great Crested Newts and ii) the creation of suitable temporary resting places within the site as a result of development related activities, with subsequent disturbance etc. These impacts and effects are relevant to the construction phase only since the completed development will not result in an obstructive new landscape element which might negatively affect migration behaviour.

Disturbance of better quality terrestrial habitats along hedgerows and the river corridor is not envisaged, but may occur where works are being carried out close by.

Pollution of the two breeding pools may occur if waste is spread in close proximity to them.

Significance of residual effects after mitigation

NRW has requested that there must be long-term compensatory proposals including an appropriate sized compensation area (based on 'like for like') and appropriated tenure.

With mitigation in place in the construction phase i.e. use of Reasonable Avoidance Measures with works carried out only in winter (or works carried out under a licence if winter work is not possible), protection of hedgerows and river corridor during construction and creation of areas of suitable terrestrial habitat for GCN -there will be no residual effects on Great Crested Newt.

After enhancement

The recent change of each pool's surround, with cultivation now extending close to the pool margins, poses a risk of their becoming nutrient enriched (through use of fertiliser or chicken waste). Nutrient enrichment and isolation of the pools is a threat to the local population of GCN. Although this impact is not due to the development, rectifying the situation by buffering the pools may be the most significant mitigation/enhancement that could be carried out as part of the development.

With a buffer provided around pools (regardless of whether they are at risk from pollution or simply from cultivation in close proximity to them), the population of GCN is likely to be maintained at a favourable conservation status.

E5.3.3 Birds

Potential (pre-mitigation) Impacts

The potential impact (direct, negative and permanent) of habitat loss, during the operational phase, is not likely to have a significant effect on birds. However, development work (in the

construction phase) that may remove, damage or destroy a nest of a wild bird whilst it is in use must be avoided as it may constitute an offence.

Significance of residual effects after mitigation

With mitigation in place (see 6.1.4), any offence against breeding birds will be avoided.

After enhancement

With enhancements in place – a new hedgerow and areas of woodland planted, plus more sensitive management of some hedgerows – there is likely to be a net gain in nesting and foraging habitat.

E5.3.4 Otter and UK priority fish species

Potential (pre-mitigation) impacts

The impact of water pollution on the nearby Wych Brook, at any stage of the development but particularly in the operational phase (either directly from the site or from fields spread with chicken manure), could have a significant effect, at a county level, on Otter or any of the priority fish species using it - Atlantic Salmon, River Lamprey, Sea Lamprey, Brown Trout and European Eel.

Significance of residual effects after mitigation

With rigorous precautions taken with regards construction run-off (construction phase), site drainage (operational phase) and management of waste (operational phase), there will be no residual effects on biodiversity. These issues are dealt with in another chapter of the EIA.

E6 PROPOSED AVOIDANCE MEASURES, MITIGATION AND ENHANCEMENT

E6.1 Avoidance measures and mitigation

E6.1.1 Habitats in the zone of influence

The south-east hedgerow and the river corridor will be protected by temporary fencing during construction.

Loss of hedgerow around the access track exit will be kept to a minimum.

Rigorous precautions will be taken with regards construction run-off (construction phase), site drainage (operational phase) and management of waste (operational phase). These issues are dealt with in another chapter of the EIA. If a swale is required, this must be located south of the access track (see star on the phase 1 map) in order to avoid a 100m buffer zone (at least) around the nearest Great Crested Newt breeding pond.

E6.1.2 Bats

To mitigate lighting issues, external lighting must be located in the least ecologically sensitive areas i.e. away from the east hedgerow and the river corridor. Lighting should be fixed on low columns with light-spread kept at, or below, the horizontal using cowls, hoods, screens or simply by downward directionality. Bulbs should be low intensity with a narrow or UV reduced spectrum (<150W, high or low pressure sodium types or LEDs). LED lighting, preferably incorporating an orange filter, may be appropriate near all boundary features – LED lamps effectively reduce light spill and are highly directional. PIR systems [if applicable] should be set on a short timer and responsive only to larger moving objects. Note: refer to Bats and Lighting (Bat Conservation Trust).

E6.1.3 Great Crested Newt

RAM'S

Impacts on protected habitats are not likely to occur since there is no suitable terrestrial habitat within the site. Negative impacts can be limited to the potential disturbance, capture and subsequent harm of Great Crested Newts and the creation of suitable resting places as a result of development related activities. Given these impacts can be avoided by using Reasonable Avoidance Measures (RAMs), **with works carried out only in winter**, no further survey is considered necessary. A non-licensed method statement has been provided in Appendix EA7.

If winter works are not possible, works would need to be carried out under a mitigation licence; this would require exclusion of the site by newt fencing and a period of trapping, before works could commence. It is highly unlikely that any newts would be

captured given the unsuitable terrestrial habitats present; however, a licence application without an exclusion period is unlikely to be successful. Ultimately the licence will ensure that a perimeter fence can be erected legally around the site to stop newts migrating through the construction zone and becoming at risk. Compensation and monitoring measures recommended for a non-licensed approach will be the same as for a licensed approach.

RAMs will reduce the potential for impacts to an appropriate level by regulating the storage of building materials and minimising opportunities for animal disturbance, capture and harm. Provided entrapped animals can quickly escape unaided there is little potential for (deliberate) capture, or any need for subsequent animal handling or transportation and release (an offence without a mitigation licence). Additionally the level of disturbance incurred by the fall and escape is likely to be equal to that which an animal might occasionally experience in its wild or natural habitat (i.e. falling into a dry ditch and climbing out).

Compensation areas

NRW has requested that there must be long-term compensatory proposals including an appropriate sized compensation area (based on 'like for like') and appropriated tenure. Since there will be loss of only poor terrestrial habitat (approximately 1.5ha on the main development site), the size of the compensatory area is likely to be sufficiently covered by the creation of some rough grassland strips and woodland areas amounting to 0.5ha (one third of the size of the development site).

- An area of 'woodland' (0.15ha), using native broadleaved species, will be created to the north-east of the building– this will also act as a buffer zone for the river corridor. A second area of 'woodland' will be created alongside the west hedgerow of the development field (area of 0.14ha) – this is likely to be of particular value for Great Crested Newt, given its proximity to one of the breeding pools. The woodland areas will include Pedunculate Oak, Sessile Oak, Downy Birch, Alder (native), Field Maple, Rowan and Crab Apple). The woodland areas were on the original landscape plan as enhancements.
- A 10m wide strip of rough grassland will be sown as a band along the south-east side of the buildings and will also serve as a buffer for the south-east hedgerow. A 'floristically enhanced buffer strip' mix (Boston seeds) will be used [which contains fine leaved Fescues, Meadow-grass, Bird's-foot-trefoil, Yarrow, Common Knapweed, Wild Carrot, Red Clover, Self-heal and Ox-eye Daisy] and will be managed by annual topping* in autumn at a height of 15-20cm. Injurious weeds (Thistle and Dock) and Common Ragwort may take hold and will need to be controlled; herbicide treatment

(Glyphosate) will be used but cutting or pulling are other options, pulling being particularly effective for Ragwort. Some Bramble presence is likely to occur and is acceptable, but saplings are not desired components. Depending on the degree of invasion by Bramble and saplings, a second cut may be required; this will be carried out in the spring (March – April). The grassland will require more intensive management in the first year to allow the sward to become established. This grassland area was on the original landscape plan as an enhancement.

- A second buffer strip of 5m width has been suggested along the east side of the west field boundary, north of the woodland. This could be sown or left untilled when the rest of the field is ploughed, and allowed to develop naturally into rough grassland, with annual cutting, as for the rough grassland strip above.
- Rough grassland could be sown in a buffer zone (2-3m wide is suggested) or a margin left untilled after the corn cycle is completed and allowed to develop naturally into rough grassland, around both of the breeding Great Crested Newt pools. This could be cut annually when there is an opportunity to access the pools in the arable calendar, as for the rough grassland strips above

*A flail topper is recommended for cutting the grassland because cuttings are mulched and spread out in the process and this avoids cut grass lying on the surface. Some toppers can be used behind and alongside a tractor but using a hedge cutter flail arm is an alternative.

The west grassland strip and pool buffer zones could be sown with a 'bufferstrip and beetle bank' mix (Boston seeds' BS ELS1/CSS1) – this includes some tussock forming grasses [fine leaved Fescues, Cock's-foot (*Dactylis glomerata*), Timothy (*Phleum pratense*) and Tall Fescue (*Schedonurus arundinaceae*)] and will be managed by annual topping* in autumn (September – November) at a height of 20-30cm. Management would be similar to the 'floristically enhanced grassland'.

All areas of new habitat lie within the ownership of the client

In addition there will be 150m of new native hedgerow as an enhancement, see below

E6.1.4 Birds

Any clearance of scrub must be carried out i) within the bird nesting season, after a negative inspection for nests has been undertaken ii) outside the bird nesting season between July 31st and March 1st.

E6.1.5 Otter and UK priority fish species

Rigorous precautions will be taken with regards construction run-off (construction phase), site drainage (operational phase) and management of waste (operational phase). These issues are dealt with in another chapter of the EIA.

Mitigation of lighting issues along the river corridor is also relevant to Otter, see bats (6.1.2).

E6.2 Habitat enhancement recommendations, also see Landscape Plan in Appendix EA6*Hedgerow and woodland*

- Screening at this site will be partially achieved by allowing relevant hedgerows to grow to 3m. These will likely require side trimming in an arable landscape but the hedgerows will be considerably enhanced in this way for species such as bats and birds. In addition there will be planting of several hedgerow trees (using Pedunculate Oak, Sessile Oak and Field Maple) in many of the surrounding hedgerows.
- A new native hedgerow will be planted where the access track crosses open land; this will also be managed at 3m height. Plants will include Hawthorn, Blackthorn, Holly, Field Maple and Hazel.
- A few gaps in hedgerows associated with the development field and the access will be planted up with native species.

Swale

If a swale is required, it could be designed to support a sump suitable for retaining a more permanent area of water for Great Crested Newt to colonise.

EA6.3 Long-term management, surveillance and ‘wardening’

A time table of works for the long-term management, surveillance and ‘wardening’ of the GCN compensation areas and enhancements has been set out in tables in Appendix EA9. The first table sets out the activities involved and which person should carry them out – ecologist, landscape and/or landowner – and when.

A second table is a check list for the ecologist.

7 CONCLUSION

The ecological assessment has shown that potential impacts associated with the proposed development in the construction phase include i) pollution of nearby water courses with adverse effects on the River Dee SAC, Otter and fish ii) the potential disturbance, capture and subsequent harm of (only) small numbers of dispersing Great Crested Newt iii) the creation of suitable temporary GCN resting places within the site as a result of development related activities, with subsequent disturbance etc. iv) damage to the river corridor and south-east hedgerow leading to disturbance of protected species using them v) disturbance of nesting birds if removal of any scrub is carried out within the breeding season.

Potential impacts in the operational phase include i) pollution of nearby water courses with adverse effects on the River Dee SAC, Otter and fish ii) pollution of nearby pools with adverse effects on GCN and plant species ii) the deterioration of bat and Otter foraging and/or commuting habitat through illumination of the stream corridor and south-east boundary hedge.

Mitigation is required in order to prevent any offence being committed (birds and Great Crested Newt) and/or to remove any significant effects on habitats and species (stream, hedgerow, ponds, bats, Otter and fish), as follows:

- Rigorous precautions must be in place with regards construction run-off (construction phase), site drainage (operational phase) and management of waste (operational phase). These issues are dealt with in another chapter of the EIA.
- The river corridor and south-east hedgerow must be protected by temporary fencing during construction.
- Reasonable Avoidance Measures must be adhered to in the construction phase, and all works carried out in winter months
- If winter works are not possible, works would need to be carried out under a mitigation licence
- Any clearance of scrub should, where possible, be carried out in the late summer or winter months to avoid the main bird-nesting season.
- In the construction and operational phase, external lighting must not illuminate the south-east boundary hedge or river corridor.
- Areas of rough grassland and woodland will be created as compensation measures for Great Crested Newt.
- 2-3m wide buffer zones (of rough grassland) will be created around both GCN breeding pools

Enhancement of the site (planting of a new length of hedgerow, scattered hedgerow tree planting and less intensive management of some of the hedgerows) alongside some of the newt mitigation measures, could result in a net gain for biodiversity.

A time table for the long-term management, surveillance and 'wardening' of the mitigation and enhancements at this site are set out in Appendix EA9.

8 REFERENCES

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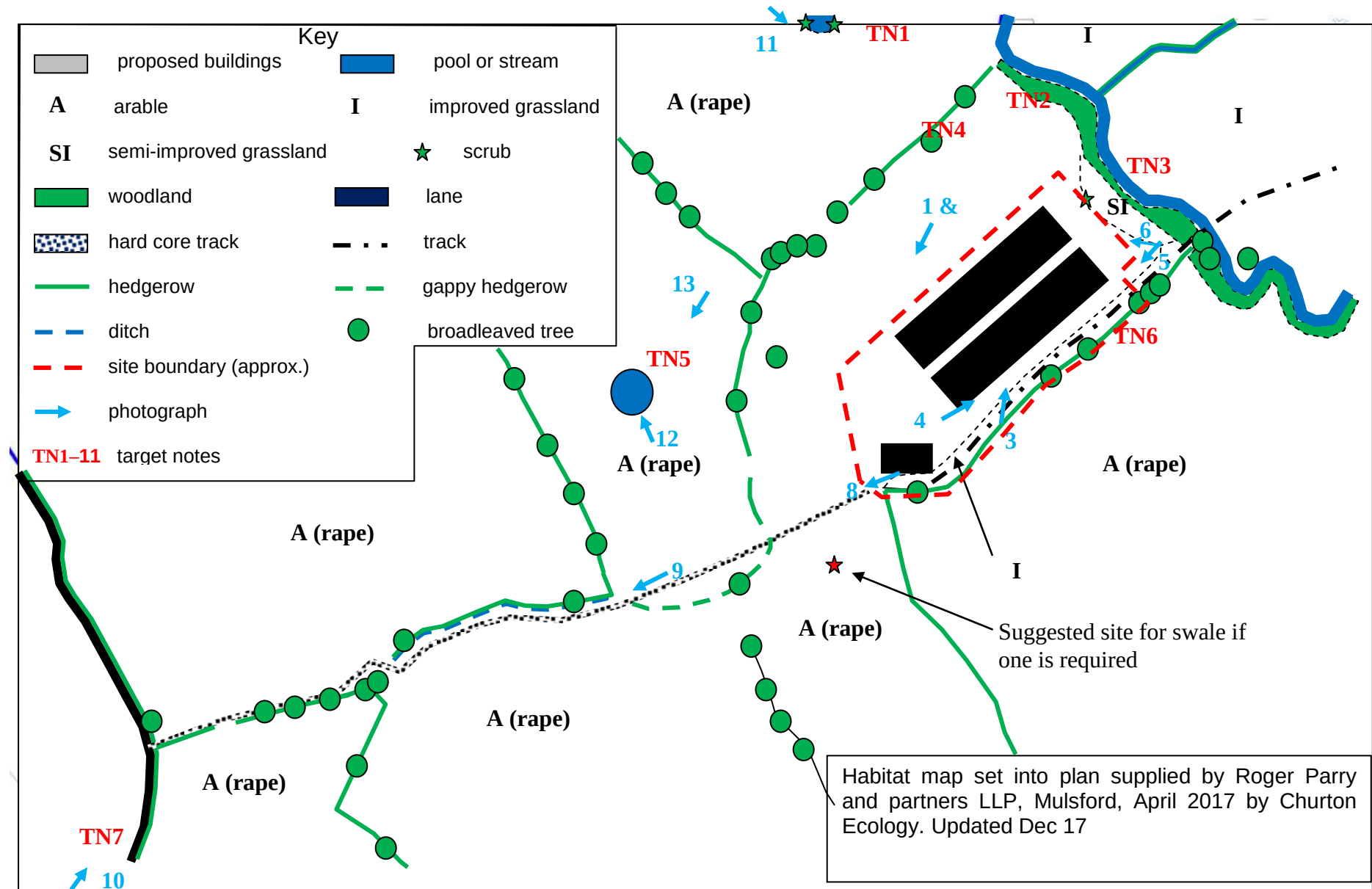
jncc.defra.gov.uk/page-5705 (2015) UK BAP Priority species and habitats
www.magic.gov.uk *Magic (for maps and conservation data)* Natural England

Google Earth aerial photographs and and/or Bing maps

wtp2.appspot.com/wheresthepath.htm
Wrexham Unitary Development Plan

Wrexham's Biodiversity Action Plan

Appendix EA1
Phase 1 habitat map



Target Notes

TN1: north pool, breeding Great Crested Newt. Reed Bunting noted in 2016

TN2: narrow band of riverside woodland; south-west edge is remnant hedgerow (Hawthorn) in the west. Badger activity, no setts

TN3: Wych Brook

TN4: hedgerow typical of the area – species-poor and trimmed, with several mature trees. North end of this hedge is more diverse than all the other hedgerows near the site

TN5: south pool, breeding Great Crested Newt. Cowbane present

TN6: east hedgerow, with mature trees, runs alongside strip of grassland and old grassy track

TN7: access track leaves road

APPENDIX EA2 DETAILED METHODOLOGY AND RESULTS FOR GREAT CRESTED NEWT

Great Crested Newt

Habitat Suitability Index 2016

Three potential breeding habitats were identified within the 250m surround of the possible development and all were visited in early May 2016. One of the pools (south of the possible access) was found to be dry. A Habitat Suitability Index Assessment was carried out on the other two pools - this is based on a list of recognised characteristics that can be used to predict whether a pond represents suitable, moderate or unsuitable potential breeding habitat. The pools, anyway, were found have Great Crested Newt eggs at the same time as the assessment and were, therefore, subsequently surveyed in detail.

The Habitat Suitability Index for each of the two pools with standing water was 'good', see table below.

Table E2: Habitat Suitability Index of pools within 500m of the site		
	North Pool , SJ4334.4519	South pool, SJ4324.4497
Location	1	1
Pond area	1 (520m ²)	1 (450m ²)
Pond drying	0.9	0.9
Water quality	0.67	0.67
Shade	1 (20%)	1 (0)
Fowl	0.67(minor)	0.67(minor)
Fish	1	1
Ponds (within 1km/by 3.14)	0.7 (4, Wych Brook = barrier)	0.8 (6, Wych Brook = barrier)
Terrestrial habitat	0.33	0.33
Macrophytes	1 (70%)	0.7 (40%)
HSI score	0.79 (good)	0.77 (good)

Presence/absence surveys 2016

Each pond was surveyed using a combination of bottle trap, egg search and torch-light survey techniques, on a total of six occasions, as follows.

The techniques are those recommended in the Natural England's guidelines; the use of three techniques is advocated.

- **Egg searching** – whilst in the breeding pool a single female Great Crested Newt can lay between 200-300 eggs over a period of some weeks. Eggs are laid individually on a wide range of pliable materials present within a suitable waterbody. These are most

commonly encountered on marginal emergent and/or aquatic vegetation. Individual eggs, which are laid in a coating of adhesive jelly, are attached to the leaf which is then folded over to form a protective 'parcel'.

Vegetation (if present) within the waterbody is systematically scanned for signs of this characteristic folding. Once located, the leaf will often need to be opened to correctly identify the egg within. All other native (and non-native) species of newt lay in the same fashion therefore visual confirmation is needed. Once a single egg has been identified the search is terminated, presence has been determined and breeding proved.

Egg searches were made on initial surveys and Great Crested Newt presence confirmed.

- **Netting** – this involves the systematic netting of the pool margins using a long handled net with the aim being to capture newts either in the larval or adult stage. It is recommended that fifteen minutes of netting is spent per 50m of shoreline. If the shoreline is less than 50m then the netting time is reduced accordingly. Netting is often only required in waterbodies where the presence of newts is undetected and is usually not an effective method of gauging population size class estimates. Netting can be useful to determine fish presence, invertebrate levels and indicators of water quality which may further help to justify results or fulfil HSI criteria.

Netting was carried out on four occasions.

- **Bottle trapping** – bottle traps are constructed from 2 litre plastic drinks bottles. Each trap is sunk, taking care to leave an air bubble within, at 2m intervals around the pool margins. These are secured in place using a length of cane and remain in position until early the following morning. During the night newts may enter in and become trapped.
- **Torching** – this involves walking around a pool after dusk and shining a high powered torch into the margins. The circumference of the pool is walked around once at a steady pace and individual newts seen are counted and sexed. This method is less effective if the water has a high level of turbidity and/or high levels of obscuring vegetation.

Torching was undertaken using a 1,000,000 cp torch. Egg searches were conducted on each survey occasion until found.

Together, the ponds were found to support a medium breeding population of Great Crested Newt (62 individuals in traps) on 13/5/16. On this date, only 20% were found in the north

pool, although there was much more evidence of egg laying here. The next highest count (30 individuals) was on 31/5/16 (fifth visit) when only 13% of individuals were in the north pool.

The following results tables include the weather and numbers of GCN and other amphibian species captured and/or torched during each survey period. All surveys were carried out in suitable weather conditions between 13/5/16 and 8/6/16.

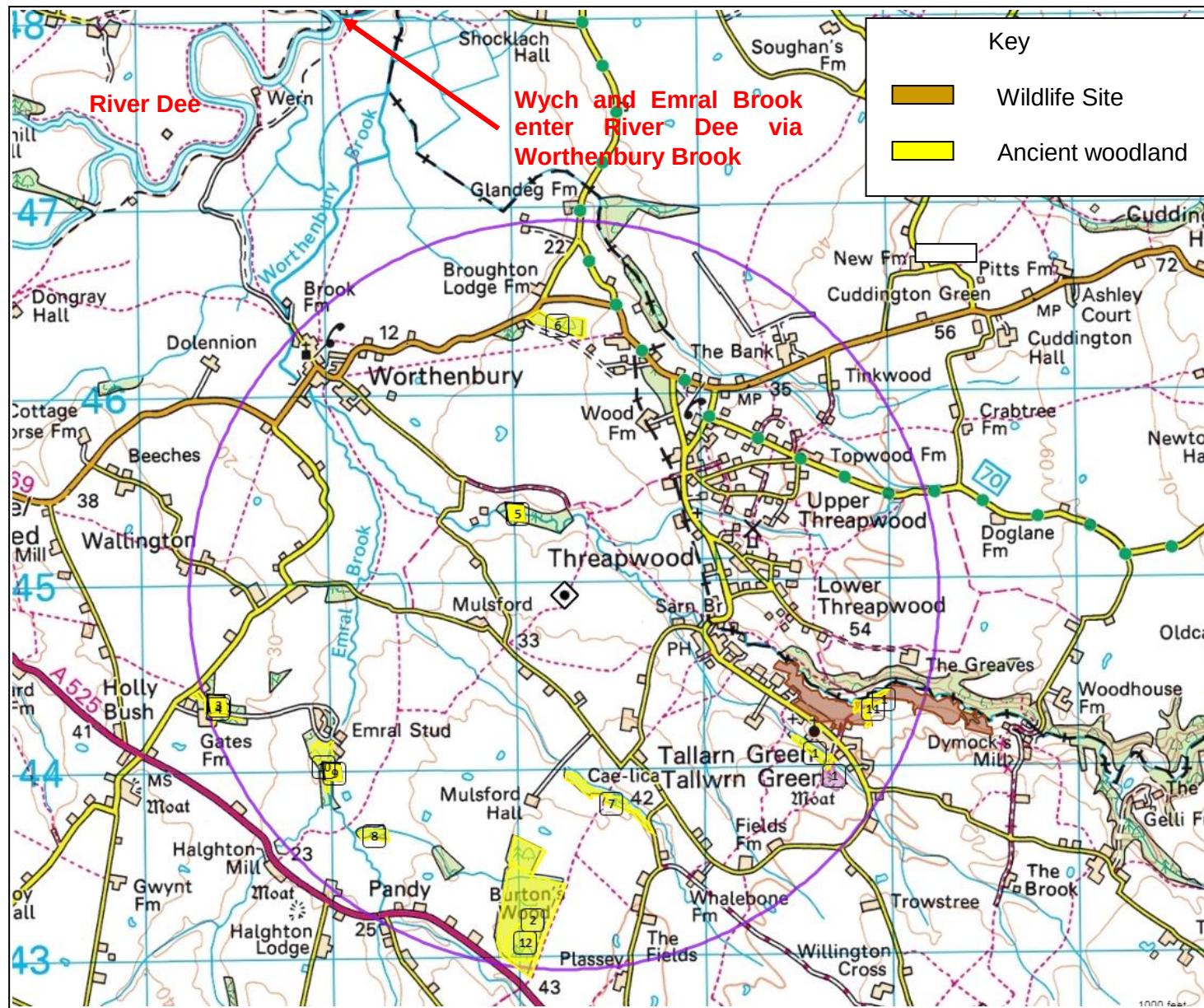
Table 2A: Great Crested Newt survey results (42 bottle traps)					North Pond
Date	Method	Results	Turb 0-5	Veg 0-5	Weather
13/5/16	Torch	4Tc (4M), 3 Lv/Lh	1 -3*	3	Overcast, light wind, minimum overnight temp 6 deg C
	Trap	14Tc (2M, 13F), 2Lv (1M, 1F)			
15/5/16	Torch	1Tc (1M), 1Lv	1 -3*	3	Overcast, light wind, minimum overnight temp 6.5 deg C
	Trap	1Tc (1F), 2Lv (1M, 1F)			
19/5/16	Torch	1Tc, 1Lv	1 -3*	3	Some cloud, moderate wind, some rain overnight, minimum overnight temp 11.5 deg C
	Trap	10Tc (3M, 7F), 2Lv (1M, 1F)			
27/5/16	Torch	3Tc, 3Lv	1 -3*	3	Overcast, minimum overnight temp 12 deg C
	Trap	9Tc (9F), 1Lv			
31/5/16	Torch	1Tc (1M), 3Lv	1 -3*	3	Cloud, moderate wind, minimum overnight temp 12.5 deg C
	Trap	4Tc (3M, 1F), 1Lv (1M)			
8/6/16	Torch	1Tc (1M), 1Lv	1 -3*	3	Overcast, light winds, minimum overnight temp 14 deg C
	Trap	0Tc			
Eggs: many GCN noted on 13/5/16					
<u>Key:</u> Tc – Great Crested Newt Lv – Smooth Newt M – Male F - Female					
Table 2B:Great Crested Newt survey results (33 bottle traps)					South Pond
Date	Method	Results	Turb 0-5	Veg 0-5	Weather
13/5/16	Torch	2Lv/Lh	1 -3*	2	Overcast, light wind, minimum overnight temp 6 deg C
	Trap	48Tc (9M, 39F)			
15/5/16	Torch	0Tc	1 -3*	2	Overcast, light wind, minimum overnight temp 6.5 deg C
	Trap	15Tc (4M, 11F)			
19/5/16	Torch	0Tc	1 -3*	2	Some cloud, moderate wind, some rain overnight, minimum overnight temp 11.5 deg C
	Trap	6Tc (5F, 1M)			
27/5/16	Torch	0Tc	1 -3*	2	Overcast, minimum overnight temp 12 deg C
	Trap	19Lv (7M, 12F)			
31/5/16	Torch	11Tc (7M, 2F, 2 uncertain)	1 -3*	2	Cloud, moderate wind, minimum overnight temp 12.5 deg C
	Trap	26Tc (3M, 23F)			
8/6/16	Torch	1Tc	1 -3*	2	Little cloud, warm, light wind, minimum overnight temp 13 deg C
	Trap	5tc (5F)			
GCN eggs noted on 13/5/16 on grass. Egg laying material infrequent					
<u>Key:</u> Tc – Great Crested Newt, Lv – Smooth Newt Rt – Frog M – Male F - Female					

*In both pools there was frequent Bulrush in the margins, and the water tended to be clear amongst it. Outside this margin the water was cloudy due to some presence of water fowl.

Appendix EA3

Map of

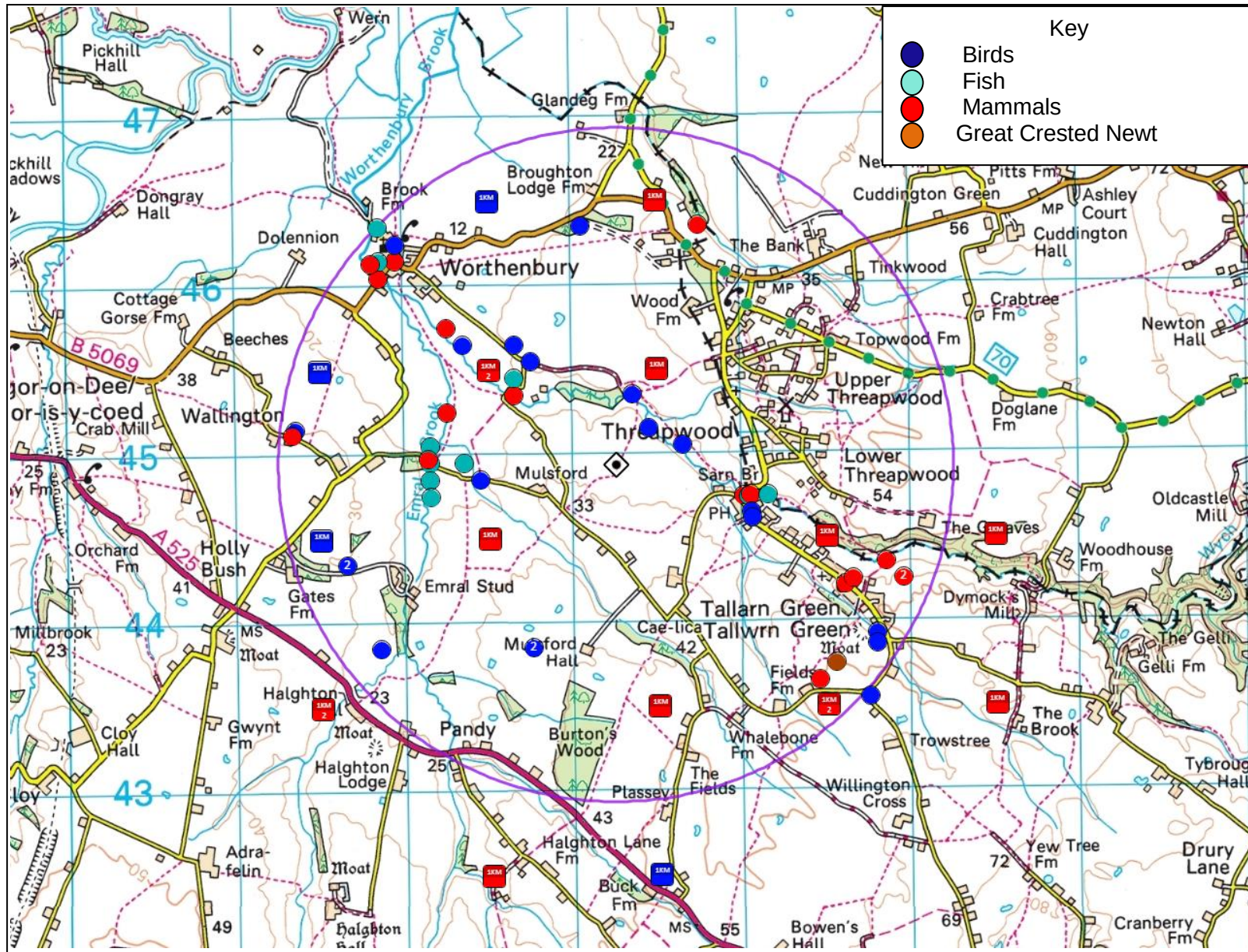
Local Wildlife sites and ancient woodland in the 2km of the
development site at Mulsford, map supplied by Cofnod



Appendix EA4

Map of

Protected and priority fauna species in the 2km of the development site at Mulsford, map supplied by Cofnod



Appendix EA5

Vascular plant list

Vascular plant list for Mulsford 2016 and 2017, by A. K. Thorne				
Taxon	Vernacular	Gridref	Date	Comment
<i>Acer campestre</i>	Field Maple	SJ4345	23-Apr-17	hedgerow
<i>Achillea millefolium</i>	Yarrow	SJ4345	23-Apr-17	grassland bank near river
<i>Aegopodium podagraria</i>	Ground-elder	SJ4345	23-Apr-17	by river
<i>Agrostis stolonifera</i>	Creeping Bent	SJ4345	23-Apr-17	grassland
<i>Ajuga reptans</i>	Bugle	SJ4345	23-Apr-17	river woodland
<i>Alisma plantago-aquatica</i>	Water-plantain	SJ43244497	31-May-16	by pool
<i>Alliaria petiolata</i>	Garlic Mustard	SJ4345	23-Apr-17	hedgerow
<i>Alliaria petiolata</i>	Garlic Mustard	SJ4344	23-Apr-17	hedgerow
<i>Alnus glutinosa</i>	Alder	SJ4345	23-Apr-17	river margin
<i>Alopecurus geniculatus</i>	Marsh Foxtail	SJ4344	31-May-16	grassland
<i>Alopecurus pratensis</i>	Meadow Foxtail	SJ4345	23-Apr-17	grassland
<i>Alopecurus pratensis</i>	Meadow Foxtail	SJ4344	23-Apr-17	grassland
<i>Anthriscus sylvestris</i>	Cow Parsley	SJ4345	23-Apr-17	hedgerow
<i>Anthriscus sylvestris</i>	Cow Parsley	SJ4344	31-May-16	hedgerow
<i>Arctium minus</i>	Lesser Burdock	SJ4345	23-Apr-17	hedgerow
<i>Arctium minus</i>	Lesser Burdock	SJ4344	31-May-16	hedgerow
<i>Arum maculatum</i>	Lords-and-ladies	SJ4345	23-Apr-17	arable land
<i>Atriplex prostrata</i>	Spear-leaved Orache	SJ4344	31-May-16	by pool
<i>Barbarea vulgaris</i>	Winter-cress	SJ43244497	31-May-16	by pool
<i>Berula erecta</i>	Lesser Water-parsnip	SJ43244497	31-May-16	by pool, infrequent
<i>Brachypodium sylvaticum</i>	False-brome	SJ4345	23-Apr-17	river woodland
<i>Bromus hordeaceus</i>	Soft-brome	SJ4344	31-May-16	grassland
<i>Capsella bursa-pastoris</i>	Shepherd's-purse	SJ4344	31-May-16	arable land
<i>Cardamine amara</i>	Large Bitter-cress	SJ4345	23-Apr-17	small stand in river woodland
<i>Cardamine flexuosa</i>	Wavy Bitter-cress	SJ4344	31-May-16	by pool
<i>Cardamine pratensis</i>	Cuckooflower	SJ4345	31-May-16	pond edge and grassland near river
<i>Carex pseudocyperus</i>	Cyperus Sedge	SJ43344519	31-May-16	2 clumps around pond edge

<i>Carex pseudocyperus</i>	Cyperus Sedge	SJ43244497	31-May-16	pond edge, 1 clump
<i>Centaurea nigra</i>	Knapweed	SJ4345	23-Apr-17	grassland bank near river
<i>Cerastium glomeratum</i>	Sticky Mouse-ear	SJ4345	23-Apr-17	arable land
<i>Chaerophyllum temulum</i>	Rough Chervil	SJ4345	23-Apr-17	
<i>Chelidonium majus</i>	Greater Celandine	SJ4345	23-Apr-17	
<i>Chenopodium album</i>	Fat-hen	SJ4345	23-Apr-17	arable land
<i>Chrysosplenium oppositifolium</i>	Opposite-leaved Golden-saxifrage	SJ4345	23-Apr-17	river woodland
<i>Cicuta virosa</i>	Cowbane	SJ43244497	31-May-16	many plants around pond edge
<i>Cirsium arvense</i>	Creeping Thistle	SJ4345	31-May-16	
<i>Cirsium vulgare</i>	Spear Thistle	SJ4345	23-Apr-17	
<i>Conium maculatum</i>	Hemlock	SJ4344	23-Apr-17	field margins
<i>Corylus avellana</i>	Hazel	SJ4345	23-Apr-17	hedgerow
<i>Crataegus monogyna</i>	Hawthorn	SJ4345	23-Apr-17	hedgerow
<i>Crataegus monogyna</i>	Hawthorn	SJ4344	31-May-16	hedgerow
<i>Dactylis glomerata</i>	Cock's-foot	SJ4345	31-May-16	field margins
<i>Dactylis glomerata</i>	Cock's-foot	SJ4344	31-May-16	field margins
<i>Epilobium hirsutum</i>	Great Willowherb	SJ4344	31-May-16	pool
<i>Festuca rubra</i>	Red Fescue	SJ4345	23-Apr-17	grassland bank near river
<i>Ficaria verna</i>	Lesser Celandine	SJ4345	23-Apr-17	woodland
<i>Fraxinus excelsior</i>	Ash	SJ4345	23-Apr-17	hedgerow
<i>Fraxinus excelsior</i>	Ash	SJ4344	23-Apr-17	hedgerow
<i>Galium aparine</i>	Cleavers	SJ4345	23-Apr-17	field margins
<i>Galium aparine</i>	Cleavers	SJ4344	23-Apr-17	field margins
<i>Geranium dissectum</i>	Cut-leaved Crane's-bill	SJ4345	23-Apr-17	field margins
<i>Geum urbanum</i>	Wood Avens	SJ4345	23-Apr-17	woodland
<i>Glechoma hederacea</i>	Ground-ivy	SJ4345	23-Apr-17	woodland
<i>Hedera helix</i>	Ivy	SJ4345	23-Apr-17	hedgerow and woodland
<i>Heracleum sphondylium</i>	Hogweed	SJ4345	23-Apr-17	

<i>Heracleum sphondylium</i>	Hogweed	SJ4344	31-May-16	
<i>Holcus lanatus</i>	Yorkshire-fog	SJ4345	23-Apr-17	
<i>Holcus lanatus</i>	Yorkshire-fog	SJ4344	31-May-16	
<i>Impatiens glandulifera</i>	Indian Balsam	SJ4345	23-Apr-17	river
<i>Juncus effusus</i>	Soft-rush	SJ4344	31-May-16	by pool
<i>Juncus inflexus</i>	Hard Rush	SJ4344	31-May-16	
<i>Lamiastrum galeobdolon</i> subsp. <i>montanum</i>	Yellow Archangel	SJ4345	23-Apr-17	river woodland
<i>Lamium album</i>	White Dead-nettle	SJ4345	23-Apr-17	field margins
<i>Lamium album</i>	White Dead-nettle	SJ4344	31-May-16	field margins
<i>Lamium purpureum</i>	Red Dead-nettle	SJ4345	23-Apr-17	arable land
<i>Lemna trisulca</i>	Ivy-leaved Duckweed	SJ43244497	31-May-16	in pool
<i>Lepidium didymum</i>	Lesser Swine-cress	SJ4345	23-Apr-17	arable land
<i>Lolium perenne</i>	Perennial Rye-grass	SJ4345	23-Apr-17	grassland
<i>Lolium perenne</i>	Perennial Rye-grass	SJ4344	31-May-16	grassland
<i>Lycopus europaeus</i>	Gypsywort	SJ43244497	31-May-16	by pool
<i>Matricaria chamomilla</i>	Scented Mayweed	SJ4344	23-Apr-17	arable land
<i>Matricaria discoidea</i>	Pineappleweed	SJ4345	23-Apr-17	arable land
<i>Mercurialis perennis</i>	Dog's Mercury	SJ4345	23-Apr-17	hedgerow and woodland
<i>Myosoton aquaticum</i>	Water Chickweed	SJ4345	23-Apr-17	river
<i>Oenanthe crocata</i>	Hemlock Water-dropwort	SJ4344	31-May-16	pond and river edge
<i>Phalaris arundinacea</i>	Reed Canary-grass	SJ4345	23-Apr-17	river
<i>Plantago major</i>	Greater Plantain	SJ4345	23-Apr-17	
<i>Poa annua</i>	Annual Meadow-grass	SJ4345	23-Apr-17	arable land
<i>Poa trivialis</i>	Rough Meadow-grass	SJ4344	31-May-16	
<i>Potamogeton natans</i>	Broad-leaved Pondweed	SJ4344	31-May-16	in pool
<i>Potentilla anserina</i>	Silverweed	SJ4345	23-Apr-17	
<i>Primula veris</i>	Cowslip	SJ4345	23-Apr-17	river woodland
<i>Prunus spinosa</i>	Blackthorn	SJ4345	23-Apr-17	hedgerow

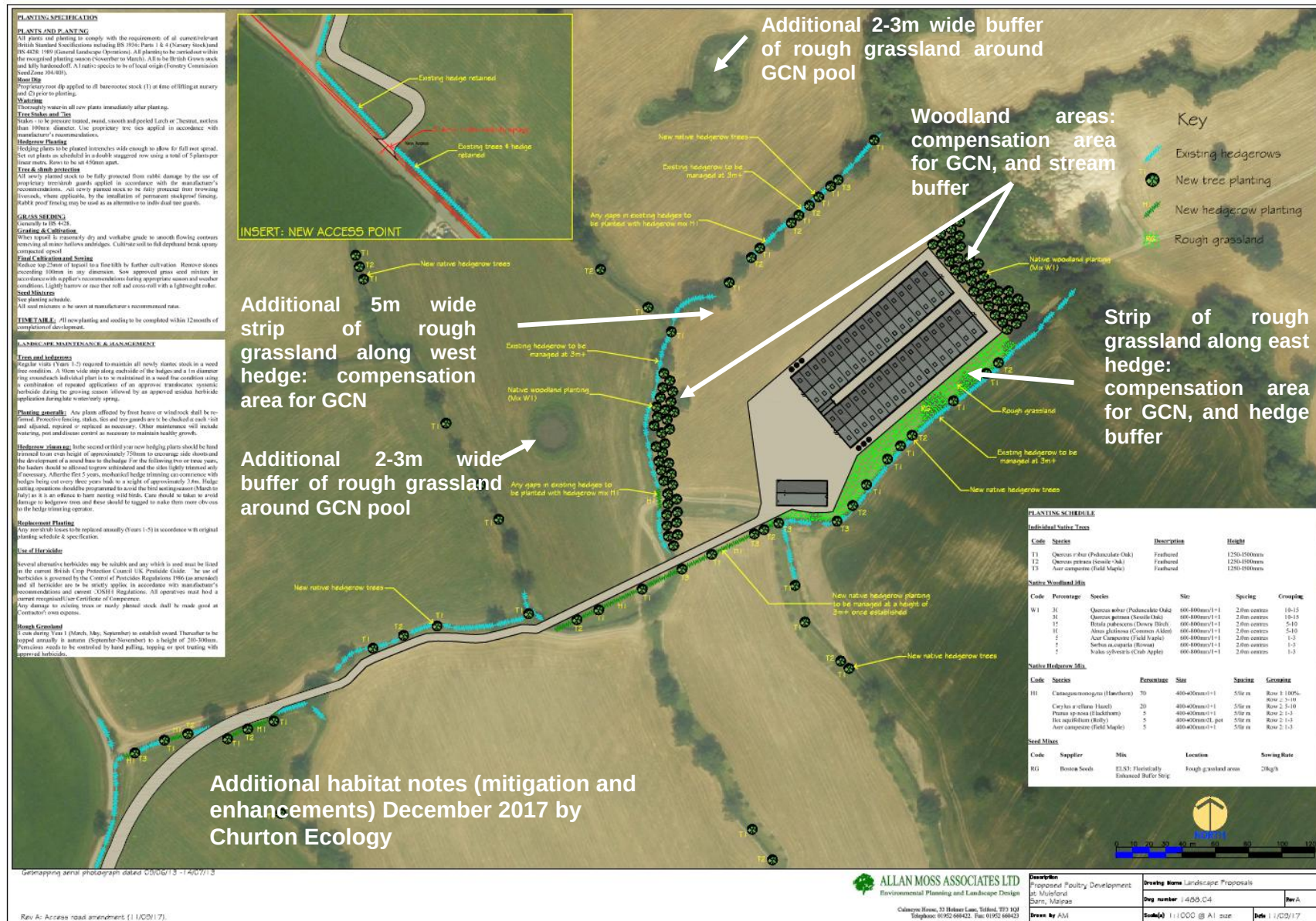
<i>Prunus spinosa</i>	Blackthorn	SJ4344	31-May-16	hedgerow
<i>Quercus</i> sp.	an oak	SJ4344	31-May-16	hedgerow
<i>Ranunculus acris</i>	Meadow Buttercup	SJ4344	31-May-16	
<i>Ranunculus bulbosus</i>	Bulbous Buttercup	SJ43344519	31-May-16	in grassland near pond
<i>Ranunculus repens</i>	Creeping Buttercup	SJ4344	23-Apr-17	
<i>Ranunculus repens</i>	Creeping Buttercup	SJ4344	31-May-16	
<i>Ranunculus sceleratus</i>	Celery-leaved Buttercup	SJ4344	31-May-16	by pool
<i>Rubus fruticosus</i> agg.	Bramble	SJ4344	23-Apr-17	hedgerow
<i>Rumex acetosa</i>	Common Sorrel	SJ4345	23-Apr-17	grassland bank near river
<i>Rumex crispus</i>	Curled Dock	SJ4345	31-May-16	
<i>Rumex crispus</i>	Curled Dock	SJ4344	31-May-16	
<i>Salix cinerea</i>	Grey Willow	SJ4345	31-May-16	pond edge and by river
<i>Salix x fragilis</i> sens. lat.	Hybrid Crack-willow	SJ4345	23-Apr-17	by river
<i>Sambucus nigra</i>	Elder	SJ4345	23-Apr-17	hedgerow
<i>Sambucus nigra</i>	Elder	SJ4344	23-Apr-17	hedgerow
<i>Senecio vulgaris</i>	Groundsel	SJ4345	23-Apr-17	arable land
<i>Silene dioica</i>	Red Campion	SJ4345	23-Apr-17	river woodland
<i>Sisymbrium officinale</i>	Hedge Mustard	SJ4345	23-Apr-17	arable land
<i>Solanum dulcamara</i>	Bittersweet	SJ4344	31-May-16	pond edge
<i>Stachys sylvatica</i>	Hedge Woundwort	SJ4345	23-Apr-17	
<i>Stellaria holostea</i>	Greater Stitchwort	SJ4345	23-Apr-17	hedgerow
<i>Stellaria media</i>	Common Chickweed	SJ4345	23-Apr-17	arable land
<i>Taraxacum</i> agg.	Dandelion	SJ4345	31-May-16	grassland
<i>Taraxacum</i> agg.	Dandelion	SJ4344	31-May-16	grassland
<i>Trifolium dubium</i>	Lesser Trefoil	SJ4344	31-May-16	grassland
<i>Trifolium repens</i>	White Clover	SJ4345	23-Apr-17	grassland
<i>Urtica dioica</i>	Common Nettle	SJ4345	23-Apr-17	
<i>Veronica chamaedrys</i>	Germander Speedwell	SJ4345	23-Apr-17	river woodland
<i>Veronica hederifolia</i>	Ivy-leaved Speedwell	SJ4345	23-Apr-17	river woodland

Veronica montana	Wood Speedwell	SJ4345	23-Apr-17	river woodland
Vicia sativa	Common Vetch	SJ4345	23-Apr-17	river woodland

Appendix EA6

Copy of Landscape plan by Allan Moss Associates

September 2017, with added mitigation notes for Great Crested
newt by Churton Ecology December 2017



Appendix EA7

Reasonable Avoidance Measures

The following sets out a non-licensed method statement or Reasonable Avoidance Measures. **All construction works must be carried in winter.**

Pre-construction phase

- The site must remain sterile (cropped, rolled and treated with herbicide, where appropriate) leading up to and into the development phase.

Construction phase

- A storage compound for materials must be established in a location as far from either pond as possible – this could be located near the south-west corner of the (south) proposed building, **south of the access track.**
- The ground-works period must be carefully planned to run in a quick and orderly succession with the absolute minimum of delays incurred.
- Ground disturbances will be limited solely to unsuitable or pre-sterilised habitats within the site. No spoil or other materials will be pushed into more suitable fringe habitats (e.g. adjacent hedgerows) and there will be no associated damage to these areas (through the manoeuvring of heavy machinery etc.)
- Excavated spoil will be removed from the site immediately – unless it is backfilled, sealed or compacted before nightfall in its permanent location. Alternatively excavated spoil can be stored in raised containers.
- Trenches and pits will be opened, closed and/or backfilled during the same day where possible. Alternatively, excavations will be carried out in achievable daily sections with all soil backfilled before nightfall. Where this is not possible (and only in the very short term), any loose soil lining the trench or pit base will be compacted before nightfall e.g. using the underside of a digger bucket, tamper or vibrating plate. Gently sloping dirt ramps or sloping diagonal scrapes will be created regularly to ensure trapped animals have a means of escape.
- Pits or trenches that remain open for extended periods of time will be avoided. Where smaller excavations are to remain open for longer periods (i.e. at terminals or manifold junctions) the trench lip should be rebated and a covering board slotted in so that this lies flush at ground level. Once complete the board edges will be covered with a layer of fine pea shingle.
- All open excavations will be inspected at the start of each day to check for the presence of trapped amphibians – this must be carried out by a trained member of personnel.

- Construction materials provide cover objects under which migrating newts can potentially find shelter, particularly if stockpiled for extended periods of time. Therefore, construction materials will be brought to site daily or, if stored over time, then on a) raised palettes or timber bearers b) in trailers or in raised containers c) in raised tonne bags or tarpaulins folded up and secured around the edges.
- Where an MOT or hardcore sub-base is required, this will be spread and compacted before nightfall in achievable daily sections. These materials will be brought to site daily and not stockpiled (unless stored in a suitable area or a suitable manner; see above).
- If newts are encountered at any point works will cease immediately and a licensed ecologist will be contacted to identify the species present. If it is suspected or confirmed that a Great Crested Newt has been encountered at any time during the development, works will cease and Natural England will be contacted to advise.

Appendix EA8

Biodiversity Risk Assessment and Management Plan

A biodiversity risk assessment has been suggested by NRW.

At this site, this is likely to relate to Himalayan/Indian Balsam, given the proximity of a water course, and the presence of this species along the nearby rivers.

Himalayan Balsam may be one of the most unwanted non-native invasive species in the UK and is a Schedule 9 annual plant. With a tendency to dominate at the expense of native species, it has a significant impact on native waterside vegetation and is rapidly expanding its range. There appears to be no direct detrimental impact on animal life. However, it may compete for pollinators (such as bumblebees) with the native riverbank species, and so reduce seed set in these other plants.

In the autumn, the plants die back, leaving banks bare of vegetation (where the plant has taken hold), and vulnerable to erosion leading to knock on effects.

It is therefore important to prevent Himalayan Balsam from spreading around a site and contaminating unaffected areas. At this site, the development footprint is likely to become colonised after the ground is disturbed.

If any of this plant becomes established on the site, it will be controlled by cutting or pulling. A 2 year management regime may be sufficient to eradicate it.

A detailed Himalayan Balsam management plan has been drawn up below.

Himalayan/Indian Balsam Management Plan				
Area on site	Step 1: 2018/2019	Step 2: 2018/2019	Step 3: 2018/2019	Step 4: 2019 on
New stands	Note any areas with young plants and check them regularly to guide the cutting/pulling time	Cut or pull in May/June well before any fruits set seed; ensure any cut is below the lowest node	Repeat cutting or pulling in July if any plants re-grow etc	Check for any new stands. Repeat steps 1 – 3 annually until all stands are eradicated.

Appendix EA9

Long-term management, surveillance and ‘wardening’

Table EA9: 1 Timetable of management, surveillance and 'wardening' for 5 years

Activity	Timing	Ecologist	Landscaper	Owner
Check presence of all new areas of woodland and rough grassland on site and in the larger field, after works have been completed	Year 1	Yes	Yes	N/A
Buffer zone of 2-3m around both pools to be left untilled after field is cropped in 2018	Year 1	N/A	N/A	Yes
Check presence of buffer zones around both pools after works have been completed	Year 1	Yes	N/A	Yes
Check vigour of new trees and hedgerow	Year 1 - 3	N/A	Yes	Yes
Cut rough grassland areas annually in September, spot treat nuisance weeds (Dock, Nettle, Thistle)	Annual, on-going	N/A	N/A	Yes
Cut pool buffers zone annually in September	Annual, on-going	N/A	N/A	Yes
Cut rough grassland areas annually in March/April, if woody species start to take hold	Annual (optional)	N/A	N/A	Yes
Cut pool buffers zone in March/April, if woody species start to take hold	Annual (optional)	N/A	N/A	Yes
Check both pools for GCN eggs, also note scrub invasion of pool and surrounds.	Annual	Yes	N/A	N/A
Check new woodland areas on site and in the larger field, September/October	Annual	Yes	N/A	Yes
Check presence of pool buffer zone & management, September/October	Annual	Yes	N/A	Yes
Check all rough grassland areas & management on	Annual	Yes	N/A	Yes

site and in the larger field, September/October				
Replacement of dead plants	Year 1 and 2		Yes	Yes
Population study of GCN	Year 3	Yes	N/A	N/A
Hedgerows	Cut 3 yearly on rotation	Yes	N/A	Yes

Table EA9: 2 Ecologist's time-table, insert dates of visits and findings

Activity and timing	Year 1	Year 2	Year 3	Year 4	Year 5
Check presence of all new woodland and rough grassland areas on site and in the larger field, after works have been completed	Yes	N/A	N/A	N/A	N/A
Check presence of buffer zones around both pools after works have been completed	Yes	N/A	N/A	N/A	N/A
Check both pools for GCN eggs, also note scrub invasion etc. April/May	Yes	Yes	Yes	Review	Review
Check all new woodland areas on site and in the larger field, September/October, annual	Yes	Yes	Yes	Yes	Yes
Check presence of pool buffer zone & management, September/October, annual	Yes	Yes	Yes	Yes	Yes
Check all rough grassland areas & management on site and in the larger field, September/October, annual	Yes	Yes	Yes	Yes	Yes
Population study of GCN	N/A	N/A	Yes	N/A	N/A
Hedgerows, check cut is 3 yearly on rotation				Yes	