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Maelor Works, Wrexham

Protected Species Survey Report

May/June 2014



Protected Species Survey Report

Protected Species Report

(with reference to badgers, bats, birds, great crested newts, otters and water voles)

at

National Grid

Maelor Works

Marchwiell

Wrexham

LL13 0UW

for

James Wood

I & H Brown Ltd

On behalf of

National Grid Gas Property Holdings Limited

Protected Species Survey Report

0. Executive Summary

This report has been prepared at the request of James Wood (I & H Brown Ltd) on behalf of National Grid Property Holdings Ltd, to provide an overview of the likelihood of protected fauna species being present at the former gaswork site located at Maelor Works, Marchwiel, Wrexham, LL13 0UW (OS Grid Reference: SJ 38108 48134). A number of site surveys were undertaken throughout May and June 2014 by Evolution Ecology Ltd.

The former gaswork site located at Maelor Works is situated approximately 5km to the south-east of the town of Wrexham, with residential areas to the south-west and a large industrial estate expanding from the north-west to the north-east of the site. Open countryside occupies the vast majority of the surrounding area (to all sides) which comprises of; agricultural grasslands, scattered trees and hedgerows. Additionally, running water courses are present in the surrounding area, (one of which - a small brook which diverts from the River Clywedog - runs through the site itself), as are a number of standing water bodies.

A Preliminary Ecological Appraisal was conducted [by Evolution Ecology] of the site in its entirety on the 18th November 2013. This survey revealed that many areas within the site boundary possess the potential to house protected species, and it is because of this, that the protected species surveys to be discussed were commissioned. It has been discussed since with the client that the only areas of the site which are to be impacted by the proposed works [at this time] are:

- The aforementioned brook which cuts through the site towards the east – which is to be dredged in order to remove contaminated sediments;
- The woodland habitat surrounding the brook – which is proposed to be cut back (roughly 5m each side) to allow machine access;
- The standing water body which is situated roughly 100m from the most south-westerly point of the brook – which is again proposed to be dredged in order to remove contaminated sediments;
- Two of the buildings within the centre of the compound - which are proposed to be demolished.

Recommendations**Preliminary Ecological Appraisal – Flora**

With regards to the flora identified on the proposed redevelopment area, there are no habitats of legal conservation concern (i.e. BAP Priority Habitats etc.). However, a number of areas do hold the capacity to provide important nesting/foraging/sheltering habitats for a number of fauna species. In relation to the proposed works, the main areas to be affected are the woodland area to the east, the brook (within the woodland) and the pond (with a medium population of smooth/palmate newts).

Firstly, vegetation clearance will need to take place (up to 5m from the watercourse on each bank side) along the [entirety of the] brook, within the clients ownership, in order to allow the access of the required machinery onsite. As the site currently stands, it is anticipated the abundance of ramsons (*Allium ursinum*) plants within the ground are likely to contribute towards providing an important food source for a number of invertebrate species such as hoverflies, butterflies and longhorn beetles (one species from the latter of which was

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identified onsite – a [possible] Welsh oak longhorn beetle *Pyrrhidium sanguineum*). With this being the case, it is recommended that all of the ramsons bulbs within this area be scraped up and stockpiled along the bankside during the autumn/winter months (when plants are dormant), in order for them to be relayed once the works have been completed. This should help towards restoring the original understorey habitat which currently holds such high value for local invertebrates.

The second measure which should be adhered to throughout the proposed works, is the retention of all semi-mature/mature trees within the woodland habitat. As mentioned previously, a 5m buffer either side of the brook will need to be cleared to allow machine access, however, it is suggested that this clearance, occurs without impacting the longevity of the trees. This could be done by cutting branches back and altering the proposed machinery path to accommodate the trees. This also [most importantly] applies to the mature common lime (*Tilia × europaea*) specimen and the standing deadwood, both of which are located almost centrally along the northern brook bankside. Because of the instability of the standing deadwood, for health and safety reasons, an 8m exclusion zone will need to be erected around it (as a precautionary measure, just in case the movement of the machinery impacts its stability). Ultimately, if the trees are retained/incorporated into the proposed works and if they are cut back and managed accordingly, this will allow light to enter the woodland once again, which should diversify the range of understorey floral species which are able to colonize and enhance the quality of the brook. Additionally, potential bat roosting features and known nesting trees will be saved, so that they can be continuously used in the future by these species. As a further conservation measure, any of the branches which are cut from the trees or any deadwood discovered, should be stockpiled (log piles) in an appropriate area, which will create an excellent sheltering habitat for a number of species, both fungal and faunal (i.e. invertebrates).

Finally, [in relation to the woodland], it is recommended that if it need be moved, the tree which has fallen across the brook and unintentionally formed a natural ‘wildlife bridge’, should be placed back in its original position after the works have been completed. This is said, as it is considered that this natural structure has formed an important migratory route from the north to the south of the brook for small mammals [such as mice and shrews], which may have otherwise been inaccessible to them.

The final measure to consider in relation to the habitats present onsite is the pond which is currently known to harbour a healthy medium population of smooth/palmate newts during the breeding season (March-June). Under the current proposals, it is anticipated that the pond will be drained, and the contaminated sediment present on the pond bed, be removed (again with the use of machinery which is likely to access the site through the immediately adjacent security fence to the west). Because of the ecological value attached to this pond, it is recommended that the pond water be stored [outside of the amphibian breeding season] and any newts collected (bottle traps and nets), whilst the contaminated sediment is being removed. At the same time that this is being conducted, the immediately surrounding vegetation should be cut back (with particular reference to the overhanging trees) in order for 80/90% of the pond to be open to direct sunlight. This should allow the colonization of further emergent/floating plant species (which could be used for egg laying), and should ultimately

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further improve the ponds suitability for invertebrates (which are an important food source for amphibians). Once these measures have been achieved, the pond can be refilled and allowed to recolonize naturally. These measures should ultimately ensure that the medium population of smooth/palmate newts which are known to use the pond, should continue to have a suitable breeding area in the long term.

Badgers/ Rabbits

With regards to badgers (*Meles meles*) and rabbits (*Oryctolagus cuniculus*) an exclusion zone will need to be put in place so that the proposed works will not negatively impact the badger clan (including rabbits) which are present within the most south-westerly section of the woodland habitat. Additionally, by ensuring that the works remain between 20m and 30m away (which will be dependent upon the type of machinery used) from the nearest active sett entrance, there should be no issues with the continuation of the proposed vegetation clearance and contaminated sediment removal within the woodland and running water habitats.

Bats

With regards to the proposed demolition of the buildings, there are no issues in relation to bats, as both of the buildings were deemed as being unsuitable for roosting specimens. This was supported by the results of the dusk emergence survey which was conducted on B2, which identified passing bats only. With this being the case, the buildings can be demolished as planned, with no negative impacts upon local bat colonies being predicted.

With regards to the trees of interest within the woodland habitat (i.e. the mature common lime and the standing deadwood with woodpecker holes), no bats were detected emerging from either of these habitats during the two dusk emergence surveys conducted on this area. Although no bats were identified, this is thought to be due to the density of the vegetation within the woodland, which would currently prevent a clear flight path when emerging from the trees. With this being the case, these trees should be retained throughout the vegetation clearance works, as they are likely to provide suitable roosting habitats for these species, once the woodland has been managed slightly to increase the light availability and reduce the vegetation density.

Birds

The main areas of concern with regards to nesting birds are the semi-mature/mature tree specimens, both within the woodland and surrounding the pond which is to undergo contaminated sediment removal. Evidence of nesting birds was discovered within the woodland (in the form of an egg shell on the ground and cuckoo and wood pigeon calls) and as such, it is imperative that any works which are likely to disturb breeding birds, occur outside of the bird nesting season (which is between the months of March-August). If this is achieved and the trees within the woodland be retained, there is no reason why the proposed works would have any negative impacts upon local breeding bird populations.

Great Crested Newts

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No evidence of great crested newt (*Triturus cristatus*) presence was identified throughout any of the four presence/absence surveys. However, a healthy medium population (peak count of 43) of smooth/palmate newts was identified within the pond. With this being the case (and as discussed in detail within section 5.1), it is recommended that the pond be restored [post-sediment removal] to its former layout and enhanced via managing the immediately surrounding vegetation. These measures should ultimately improve the habitat in the long term for breeding smooth/palmate newts, and may also improve its suitability for any local GCN. These works need to take place during Autumn/Winter.

Otters and Water Voles

With regards to water voles, no evidence of their utilization of the brook became apparent throughout the survey, as no footprints, feeding remains or burrows were identified. With this being the case, [and as the nearest water vole record was over 1500m from the site], it is anticipated that the proposed contaminated sediment removal works within the running water course are unlikely to harm any water voles or damage their resting habitat.

The only evidence of otter utilization was the presence of two potential footprints which were identified upon the northern embankment of the brook. However, as no further evidence was revealed (such as otter holts, feeding remains or signs of tail drag), it is anticipated that this brook would be of commuting use only to local otter populations. This being said, similarly to the water vole records, the nearest otter record to the site was approximately 1465m away, so it is quite unlikely that this area would be used as a regular commuting route. With this being the case, the proposed contaminated sediment removal works within the running water course are unlikely to harm any otters or damage their resting habitat.

Additionally, the site supervision works (to be discussed within section 5.7) should also function to ensure that [although unlikely] no commuting otters or water voles are harmed during the proposed works.

Site Supervision

Finally, in addition to all of the proposed conservation/mitigation measures, site supervision by a licenced ecologist will need to be arranged throughout the duration of the works (particularly within the woodland and around the pond). It may not be necessary for the site to be attended daily by the ecologist, however, a timetable of works will be discussed further once detailed plans of the proposed works have been received.

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1. INTRODUCTION

1.1 Background

This report has been prepared at the request of James Wood (I & H Brown Ltd) on behalf of National Grid Property Holdings Ltd, to provide an overview of the likelihood of protected fauna species being present at the former gaswork site located at Maelor Works, Marchwiel, Wrexham, LL13 0UW (OS Grid Reference: SJ 38108 48134). A number of site surveys were undertaken throughout May and June 2014 by Evolution Ecology Ltd.

1.2 Site Description

The former gaswork site located at Maelor Works is situated approximately 5km to the south-east of the town of Wrexham, with residential areas to the south-west and a large industrial estate expanding from the north-west to the north-east of the site. Open countryside occupies the vast majority of the surrounding area (to all sides) which comprises of; agricultural grasslands, scattered trees and hedgerows. Additionally, running water courses are present in the surrounding area, (one of which - a small brook which diverts from the River Clywedog - runs through the site itself), as are a number of standing water bodies.

A Preliminary Ecological Appraisal was conducted [by Evolution Ecology] of the site in its entirety on the 18th November 2013. This survey revealed that many areas within the site boundary possess the potential to house protected species, and it is because of this, that the protected species surveys to be discussed were commissioned. It has been discussed since with the client that the only areas of the site which are to be impacted by the proposed works [at this time] are:

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- Two of the buildings within the centre of the compound - which are proposed to be demolished.

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1.3 Surveyor Details

The site was surveyed and the protected species surveys were conducted by licenced ecologist(s): Mr Paul Keeling BSc (Hons) MCIEEM – Senior Ecologist, Miss Charlotte Richardson BSc (Hons) - Assistant Ecologist and Mr Richard Millington – Assistant Ecologist.

Figure 1: A map which illustrates the layout of Maelor Works in relation to the immediately surrounding landscape and the areas which are proposed to be affected by the planned works. The areas highlighted in green (and labelled B1 and B2) represent the two buildings which are to be demolished, the red circle illustrates the location of the pond to be dredged, the blue line shows the rough location of the stream to be dredged and the two yellow lines represent the areas in which vegetation clearance will be required.



2. LEGISLATION

2.1 Habitat Legislation

“Planning authorities have a duty to consider biodiversity when assessing planning applications. Where there is a reasonable likelihood that a planning proposal might affect important protected species or habitats, the council will require information on the species and habitat likely to be affected, and an assessment of the impacts of the proposals. This information will need to be provided before a planning decision is made and if this information is not provided, the council may refuse to register the application.

This Duty was introduced by the **Natural Environment and Rural Communities Act (The NERC Act)** and came into force on 1 October 2006. This act clarified existing commitments with regard to biodiversity, raised the profile of biodiversity. It aimed to make the consideration of biodiversity a natural and integral part of policy and decision making.

In addition to the NERC Act there is also national and international biodiversity legislation. This includes legislation in relation to protected species and sites which operates outside of the planning system. Local Authorities and developers have a duty to comply with this legislation. Planning Policy Statement 9 - Biodiversity and Geological Conservation Local Policy in relation to biodiversity can be found in the Local Development Framework, retained Local Plan policies and in the emerging Core Strategy.”

For further information please go to
http://www.enfield.gov.uk/info/200052/advice_for_developers/1083/ecological_assessments_for_planning_applications

2.2 Badger Legislation

The main piece of legislation in England and Wales which aims to safeguard badgers (*Meles meles*) is the **Protection of Badgers Act 1992**. This species and their setts are legally protected under this legislation from intentional cruelty which includes activities such as badger-baiting, snaring and poisoning. In combination with this, under the Protection of Badgers Act 1992, it is illegal to:

- Wilfully kill, injure, take or attempt to kill, injure or take a badger;
- Possess a dead badger or any part of a badger;

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- Use badger tongs in the course of killing, taking or attempting to kill a badger;
- Dig for a badger;
- Sell or offer for sale or control any live badger;
- Mark, tag or ring a badger; and
- Interfere with a badger sett by:
 - Damaging a sett or any part thereof;
 - Destroying a sett;
 - Obstructing access to a sett;
 - Causing a dog to enter a sett; and
 - Disturbing a badger while occupying a sett.

It is important that the location of any setts onsite or nearby are known in order for us to adhere to these regulations during the proposed works. For additional information please visit:

http://www.badger.org.uk/Attachments/Resources/469_S4.pdf

2.3 Bat Legislation

All of the bat species found within the UK are **European Protected Species (EPS)** and are also protected under domestic legislation, as are their breeding and resting sites (roosts). The two primary sets of legislation which protect bats and their roosts are the **Wildlife and Countryside Act (W&CA) 1981** and the **Conservation of Habitats and Species Regulations 2010**. Under these pieces of legislature, it is an offence (unless licenced) to:

- Intentionally kill, injure or handle a bat;
- Possess a bat (whether live or dead);
- Disturb a roosting bat, or sell or offer a bat for sale without a licence;
- Damage, destroy or obstruct access to any place used by bats for shelter, whether they are present or not.

Because of the legal protection afforded to bats, it is important that any roosting areas are identified and incorporated into a mitigation package, to ensure that the proposed works abide by the current laws.

For further information regarding bats and the law, please visit:

<http://www.naturalengland.org.uk/ourwork/regulation/wildlife/species/bats.aspx#legal>; http://www.bats.org.uk/pages/bats_and_the_law.html; http://www.lbp.org.uk/downloads/Publications/SpeciesInfo/NE_EU_bats.pdf.

2.4 Bird Legislation

In the UK, all wild birds, their nests and their eggs are protected under the **Wildlife and Countryside Act 1981** and additional legislation including the **Countryside and Rights of Way Act 2000** and the **Natural Environment and Rural Communities (NERC) Act 2006**.

This means that under the current laws, it is an offence to:

- Kill, injure or take any wild bird;
- Take, damage or destroy the nest of any wild bird while it is in use or being built;
- Take or destroy the egg of any wild bird;
- Have in one's possession or control any wild bird (dead or alive) or any part of a wild bird which has been taken in contravention of the Act or the Protection of Birds Act 1954;
- Have in one's possession or control any egg or part of an egg which has been taken in contravention to the Act. This includes items taken or killed before the passing of the Act;
- Have in one's possession or control any live bird of prey of any species in the world (with the exception of vultures and condors) unless it is registered and ringed in;
- Have in one's possession or control any bird of a species occurring on Schedule 4 of the W&CA 1981 unless registered (and in some cases ringed) in accordance with the Secretary of State's regulations;
- Disturb any wild bird listed on Schedule 1 of the W&CA 1981 while it is nest building, or at a nest containing eggs or young, or disturb the dependent young of such a bird.

In addition to this, some rarer species are afforded additional protection, such as the barn owl (*Tyto alba*) which is afforded the highest level of protection possible under the **Wildlife and Countryside Act 1981**. This means that for being convicted of attempting any of the following actions, there is a maximum fine of up to £5,000:

- Killing or injuring a barn owl;
- Catching a barn owl;
- Taking or destroying any egg of a barn owl;
- Damaging or destroying the active nest site with eggs or young or before eggs are laid;
- Disturbing the dependent young of a barn owl.
- Possessing, offering for sale or selling a barn owl (excluding captive bred specimens);
- Releasing or allowing the escape of a barn owl into the wild.

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For further information regarding birds and the law, please visit:

<http://www.rspb.org.uk/ourwork/policy/wildbirdslaw/>;

<http://www.naturenet.net/law/birds.html#Bas>;

http://www.rspb.org.uk/images/wbatl_tcm9-132998.pdf;

http://www.rspb.org.uk/advice/law/barn_owls_law/.

2.5 Great Crested Newt Legislation

The great crested newt (*Triturus cristatus*) is fully protected under Schedule 5 of the **Wildlife and Countryside Act 1981** (as amended) and Schedule 2 of **The Conservation of Habitats and Species Regulations 2010** (as amended) making it a European Protected Species. The table below (as taken from the Great Crested Newt Conservation Handbook) illustrates the activities which are classified as being punishable by law, under the current legislation protecting this species.

Table 1: This table illustrates the actions which are punishable by law with regards to great crested newts under both the W&CA (1981) and the Conservation of Habitats and Species Regulations (2010).

Actions prohibited under: Wildlife and Countryside Act 1981	Actions prohibited under: Conservation (Natural Habitats & c) Regulations 1994
Intentional killing	Deliberate killing
Intentional injuring	-
Intentional taking	Deliberate taking/destruction of eggs
Possession/control	Keeping
Intentional or reckless* damage to/destruction of/obstruction of any structure/place used for shelter/protection	Damage to/destruction of breeding site/resting place
Intentional or reckless* disturbance at occupied structure/place	Deliberate disturbance
Sale offering/advertising for sale (includes any part or derivative) or transport for sale	Sale/exchange, offering for sale (includes any part or derivative) and transport

For further information regarding great crested newts and the law, please visit:

http://www.naturalengland.org.uk/Images/GreatCrestedNewts_tcm6-21705.pdf

2.6 Otter Legislation

Otters (*Lutra lutra*) are protected under the **Wildlife and Countryside Act 1981** and also under the **Conservation of Habitats and Species Regulations 2010**, as a result of substantial declines in the recent past. Within these European regulations, Otters are classed as a

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European Protected Species (EPS) which means that they are given the highest level of legal protection. Of the above two, the Habitats and Species Regulations is the primary legislation which protects otters, and under this act, it is an offence to:

- Deliberately capture, injure or kill an otter;
- Deliberately disturb an otter in such a way as to be likely to significantly affect the local distribution or abundance of otters or the ability of any significant group of otters to survive, breed, rear or nurture their young;
- Damage or destroy an otter holt;
- Possess or transport an otter or any part of an otter;
- Sell (or offer for sale) or exchange an otter.

For further information regarding otters and the law, please visit:

http://www.naturalengland.org.uk/Images/wmlg02_tcm6-3750.pdf;

<http://www.naturalengland.org.uk/ourwork/regulation/wildlife/species/otters.aspx>

2.7 Water Vole Legislation

During the last 30 years, water vole (*Arvicola amphibius*) numbers have dramatically declined due to the spread of the invasive American mink (*Neovison vison*) and also due to habitat loss, which has left the current UK population of this species fragmented and minimal. For many years, the water vole received limited legal protection, as only their habitat was protected (not the water voles themselves). However, as of 6th April 2008, the water vole has received full protection under section 9 of the **Wildlife and Countryside Act 1981**. Legal protection under this act makes it an offence to:

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

Offences under Section 9 of the W&CA 1981 carry a maximum penalty of imprisonment for up to six months or a fine [or potentially both]. In addition, the courts may order the forfeiture of any vehicle or other thing that was used to commit the offence.

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In addition to the protection afforded to the water vole under the W&CA 1981, the water vole is also considered to be a **UK BAP priority species (UK BAP)** under the **UK Biodiversity Action Plan**, due to its decline and need for conservation. For further information regarding water voles and the law, please visit:
<http://publications.naturalengland.org.uk/file/86043>;
<http://jncc.defra.gov.uk/page-5170>.

3. METHODOLOGY

3.1 Desktop Study (Ecological Data Search)

Before the Preliminary Ecological Appraisal was conducted in November 2013, North Wales Environmental Information Service (COFNOD) was commissioned to carry out an ecological data search of all protected species and sites recorded within 2km radius of the site. Please see results for further information.

3.2 Preliminary Ecological Appraisal (Extended Phase 1 Habitat Survey)

In November 2013, a Preliminary Ecological Appraisal (Extended Phase 1 Habitat Survey) was conducted according to the methodology of the JNCC (2010). Preliminary Ecological Appraisal is a standard technique for classifying British habitats. The aim was to provide records of habitats that are of significant ecological value and it is the results from this, which have prompted the commission of the protected fauna surveys contained within this report.

Additional Target Notes

During the initial Preliminary Ecological Appraisal, additional target notes were made where applicable to record:

- Key habitat features;
- Urban ecological features not covered in sufficient detail in the Phase 1 Methodology;
- Important habitats too small to be mapped and to identify dominant species;
- Other features of ecological interest.

3.3 Badger Survey

The badger surveys conducted by Evolution Ecology are conducted in line with the recommendations outlined by Natural England. The survey involves examining all suitable habitats (with particular reference to scrub, woodland and fence lines) for setts and other signs of badger activity. Such signs include:

- Badger paths;
- Latrines;
- Snuffle holes;
- Scratching posts;
- Badger hairs on fences/barbed wire/bushes etc.

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If any potential setts are discovered, attempts are made to establish the activity levels of the sett. If active, there may be fresh tracks nearby, hairs around the entrance or freshly disturbed dirt around the entry hole; if inactive, the entry hole may have cobwebs inside or it may have overgrown vegetation covering it). Once the activity levels of the sett are established, it would be beneficial, if possible, to establish the type of sett that it is. A list of the different types of badger sett and their definitions can be observed in table 2.

Table 2: A table which defines the definitions of the different types of badger sett.

SETT TYPE	DEFINITION
Main	Several holes with large spoil heaps and obvious paths emanating from and between sett entrances.
Annexe	Normally less than 150m from main sett, comprising several holes. May not be in use all the time, even if main sett is very active.
Subsidiary	Usually at least 50m from main sett with no obvious paths connecting to other setts. May only be used intermittently.
Outlier	Little spoil outside holes. No obvious paths connecting to other setts and only used sporadically. May be used by foxes and rabbits.

More information regarding the survey methodology of badgers and the different sett types can be found at:

http://www.naturalengland.org.uk/Images/Badgers_tcm6-21692.pdf;
<http://www.highland.gov.uk/NR/rdonlyres/21C6CD40-9B48-4768-A471-19F22633598B/0/BestPracticeGuidanceBadgerSurveysSeptember2006.pdf>.

3.4 Bat Scoping Survey

The actions of the surveyor(s) on site and during the production of the report were conducted in accordance with the Bat Conservation Trust guidelines (2nd edition). The aim of the survey is to undertake an appraisal of the buildings/mature trees and their surrounding area to establish the following:

- The probability of bats and their roost sites being present in the areas which are proposed to be affected by the proposed works;
- To assess the roost status;
- To assess suitable food resources and habitat requirements;
- If a roost site is found, to provide an impact assessment.

It is worth noting that dusk/dawn activity surveys can only be conducted during the optimal survey period (May-September). Any time before or after these months are not considered to be representative of

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presence/absence, as bats are generally in hibernation between these months.

3.4.1 Bat Dusk Activity Surveys

If anecdotal evidence of bat utilization is apparent during the scoping survey, it may be necessary to conduct bat detector emergence surveys. The object of these surveys is to detect active bats leaving possible roost sites identified in the external and internal surveys. This is achieved by:

- Being at the site 1 hour before sunset;
- Listening for social calls at potential roost sites;
- Standing at different transect points around the buildings [and trees], using the bat detector to hear the bats plus trying to see the first bats emerge;
- Standing at different transect points at foraging areas;
- Carrying out this survey up to 2 hours after the first bats emerge as this will cover the emergence period and possibly the first bats returning to the roost site [for some bat species].

Evidence will be used to determine whether a European Protected Species (EPS) licence will be required to ensure legal compliance during development. This will also include identifying which mitigation measures [if any] would be most appropriate.

Batcorder

The EcoObs batcorder is the first worldwide data recorder that distinguishes bat calls from other sound sources in real-time (online signal analysis). Calls are recorded digitally as call sequences. The batcorder is used alongside Batbox Duet and SSF Bat2 Heterodyne and Frequency Division bat detectors, and provides an unbiased statistical analysis of bat species recorded during survey on site. Recorded bat sound is subsequently analyzed using bcAdmin, batIdent and bcAnalyze software, which calculates a confidence interval of accuracy (CI=%) and is used in conjunction with visual and audible data recorded during survey to ascertain a holistic view of the bat species present.

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3.6 Great Crested Newt Surveys

Surveys were undertaken following the techniques described in the Great Crested Newt Mitigation Guidelines (Natural England, 2001). This states that four survey visits are required to determine the presence/absence of GCN, and that a further two visits (i.e. a total of six) are required if GCN are present, in order to obtain an estimate of the population size in each pond.

A minimum of three of the following survey techniques were employed at the pond of interest.

- Torchlight Search: All ponds that contained water were searched after dusk using a Club-light CB2 torch. The perimeter [where accessible] was walked around and all marginal vegetation and pond edges searched for newts where visibility allowed. No torchlight searches took place if the air temperature was below 5°C.
- Bottle Trapping: Empty [modified] 2-litre drinks bottles, were placed in marginal vegetation in the accessible areas of each pond. The traps were set during the early evening of the first day on site, checked and emptied then removed by 9am the following morning. Each bottle had a pocket of air trapped inside in order for animal welfare issues to be avoided. All of the traps were counted both before and after the survey to ensure that none were left behind. The traps were set at a density of one trap per 2 metres around all accessible banks of the pond(s).
- Netting: A dip net was swept across the pond to catch any newts within reach of the pond perimeter.
- Egg Searching: Accessible emergent aquatic vegetation was searched for the eggs of all newt species. In the absence of suitable emergent vegetation, submerged leaves from bank side vegetation and litter were examined.
- Refuge search: Searches of the land were carried out for GCN resting places by looking under logs, bark, rocks, and debris (e.g. discarded furniture, carpets, and plywood).

Habitat Suitability Index (HSI)

The Great Crested Newt Habitat Suitability Index (HSI) is a quantitative measure of habitat quality (source: Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000)) and was used to evaluate the suitability of the pond located to the south-east of Maelor Works and its immediately surrounding area.

3.7 Otter and Water Vole Surveys

The surveys to assess otter and water vole presence/absence use a similar methodology (wading through watercourses and observing the bank sides for characteristic signs of use by these species), so in the interests of simplicity these surveys have been combined.

According to Natural England, otter surveys are required when an area which has potential to be used by an otter is likely to be impacted during a development. Although a licence is not required (only in the case of using non-intrusive survey methods), these surveys should be conducted by suitably experienced surveyors, who know the signs to look out for. Such signs include:

- Spraints;
- Footprints;
- Feeding remains;
- Otter holts;
- Slides.

Some of these signs (i.e. footprints and holts) are easier to identify during the spring months, before the surrounding vegetation is able to fully establish, however, otter surveys can be conducted all year round. For more information regarding the survey methods of otters, please visit: http://www.naturalengland.org.uk/Images/wmlq02_tcm6-3750.pdf.

Water vole surveys are conducted in accordance with the guidelines set out by Natural England in the 'Guidance for Planners and Developers' document. This involves examining waterways and their associated banks for signs of water vole presence, the species themselves are rarely openly seen. Such signs include:

- Faeces/latrines;
- Burrows (which are often visible on the bank side);
- Footprints;
- Feeding stations.

It is worth noting that water vole activity lessens during the winter months, so for the most representative results, any presence/absence surveys should be conducted between the months of April and October. This being said, outside of these months activity does not completely cease, so it is possible to identify potential burrows and also look for other signs of anecdotal evidence (such as footprints, faeces). For more information, please visit:

<http://publications.naturalengland.org.uk/publication/50006?category=9012>.

4. FIELD SURVEY RESULTS

4.1 Desktop Survey (Ecological Data Search)

North Wales Environmental Information Service (COFNOD) was commissioned to carry out an ecological data search of all protected species recorded within 2km radius of the site. The search uncovered records of numerous protected species, but none of which have been recorded directly on the site. This being said, a few records were identified immediately adjacent to the site. The approximate locations of the closest known record for each of the species groups of interest can be observed below in figure 2.

Figure 2: This map illustrates the location of Maelor Works (as indicated by the red pin) in relation to the closest known record for each protected fauna species within the groups of interest.



With regards to bats, two distinct species were recorded within the immediately surrounding area; the common pipistrelle (*Pipistrellus pipistrellus*) and the whiskered bat (*Myotis mystacinus*). The closest of any bat record was of a common pipistrelle (*Pipistrellus pipistrellus*) and it was located approximately 530m to the east of the gaswork site.

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Badgers (*Meles meles*) have been identified within the nearby area, and according to the ecological data search, the closest record was located roughly 1335m to the south-west of the site. This being said, it is worth pointing out that evidence of recent badger utilization was identified within the westerly woodland/semi-improved grassland habitat during the 2013 Preliminary Ecological Appraisal.

A number of declining bird species have also been recorded within the 2km search radius. These included; Kingfisher (*Alcedo atthis*), kestrel (*Falco tinnunculus*), red kite (*Milvus milvus*) and fieldfare (*Turdus pilaris*), all of which have been noted as having either amber (unfavourable conservation status) or red population status (globally threatened). This being said, none of these records were identified upon the site itself, and the nearest of any bird record to the site was of the red-listed cuckoo (*Cuculus canorus*) which was identified approximately 595m to the north-east.

A number of great crested newt (*Triturus cristatus*) records were identified within the immediately surrounding area. The closest of these records was identified as being approximately 270m to the north-east of the site, but again, no records were identified anywhere within the gaswork site boundary itself.

With regards to otters (*Lutra lutra*) and water voles (*Arvicola amphibius*) a number of records of their presence nearby were identified. Firstly, approximately 15 records of otter were revealed, however, the closest of these was identified as being roughly 1465m to the north-east of the site. Similarly, in relation to water voles, only two past records of their presence within a 2km radius of the site were identified, both of which were over 1500m away.

4.2 Preliminary Ecological Appraisal (Extended Phase 1 Habitat Survey)

The Preliminary Ecological Appraisal Report conducted [by Evolution Ecology] in November 2013 provides detailed information regarding the floral habitats present onsite. However, a number of limitations were identified during the surveys discussed within this report. Firstly, the woodland area surrounding the brook (which is proposed to undergo vegetation clearance) was densely overgrown in parts [particularly over and within the brook itself], so this slightly limited the number of areas which could be physically investigated for otter/water vole presence. Additionally, the brook bed itself consisted largely of a clay-like material, so walking along the brook became problematic in parts. This being said, Evolution Ecology feels confident that the information

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gathered during the survey(s) present an accurate representation of the brooks potential to house otters and/or water voles.

4.3 Badger Survey

A badger survey was conducted to establish whether or not any local badger populations would be affected by the proposed vegetation clearance works within the eastern woodland area.

As mentioned previously, it is known [from the Preliminary Ecological Appraisal conducted in November 2013] that badgers are present upon the southern woodland embankment [and the northern embankment which leads to an agricultural grassland habitat] to the west of the Maelor Works site. Bearing this in mind, the woodland area towards the east of the site was thoroughly searched for badger presence, in order to establish whether or not any potential setts would be disturbed by the proposed vegetation clearance works. Upon following the brook (from the east to the west), it became apparent that an active badger sett (which is likely to be an annexe or subsidiary. It was difficult to assess because rabbits are using some of the entrances to the sett, which has 15 plus entrances. Also, a fox could be using one of the entrances because animal bones were found near to an entrance) with the numerous associated entrances was present along the far westerly wooded embankment. In addition to the sett, a number of badger tracks were also noticeable which further suggests that the sett may well be active. This being said, no other anecdotal evidence, such as snuffle holes and/or latrines, were immediately apparent.

In addition to the presence of an active badger sett, rabbit (*Oryctolagus cuniculus*) burrows were also identified in abundance (stated above), within the same sett/area. With this being the case, it will also be necessary to consider the rabbits (from an animal welfare point of view) before any of the vegetation clearance works begin.

4.4 Bat Scoping Survey

A bat scoping survey was conducted on the two buildings which are proposed to be demolished [within the compound] and the woodland habitat to the east of the site on 8th May 2014, in order to establish the likelihood of these features supporting roosting bats. Please see table 3 respectively for the environmental variables.

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Table 3: Roost/scoping survey – Environmental Variables.

Environmental variables	Roost/scoping survey of the building(s) and woodland area – 8 th May 2014
Temp Start	19.3°C
Temp Finish	16°C
Humidity Start	80%
Humidity Finish	82%
Cloud Cover Start	70%
Cloud Cover Finish	30%
Wind Speed Average	Low
Precipitation	None

The first area inspected was the woodland habitat to the east of the Maelor Works compound. Upon closer inspection, it became apparent the woodland is currently densely overgrown, with mature hawthorn (*Crataegus monogyna*) and ivy (*Hedera helix*) along with nettle (*Urtica dioica*) and ramsons (*Allium ursinum*) being the dominant colonizers.

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Figure 3: This image illustrates the easterly woodland habitat. A number of semi-mature/mature trees can be observed, as can a dense scattering of nettle within the understory layer.



Due to the density of the vegetation, it is anticipated that continuous flight of bat [and/or bird] species within this area would not be easily achieved. Other scattered semi-mature and immature tree specimens were also identified which included species such as ash (*Fraxinus excelsior*), silver birch (*Betula pendula*) and wych elm (*Ulmus glabra*). Within the woodland, two trees were thought to provide potential roosting opportunities for bats, and these were located within relatively close proximity to one another to the north of the central portion of the brook woodland embankment. A mature common lime (*Tilia × europaea*) with a broken limb (which had fallen to the ground and ultimately allowed a small area to be opened up to sunlight) was present and it was considered that the loss of this limb may have created a potential roosting cavity within the tree. In addition to this, a standing [and relatively unstable] rotten deadwood tree (which could not be identified due to a lack of identifiable features) was discovered to the west of the common lime and it was covered in woodpecker holes of various sizes. These inactive woodpecker holes provide perfect ready-made roosting opportunities for bats. With this being the case, it is anticipated that dusk emergence surveys will need to be conducted within this woodland, in order to establish whether any bats are

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roosting within either of the trees of interest (i.e. the mature common lime and the standing deadwood).

After the inspection of the woodland, the two buildings of interest were investigated. For ease of reference, these have been categorized as B1 and B2 (please see figure 1 for their precise locations).

B1 was investigated first, and it was found to be of corrugated steel construction with intact [and new] windows and doors. In addition to this, the building possessed no fascia or soffit boards (which can often be used as potential access points into a building) and ultimately possessed minimal utilizable features. The only identifiable gaps were where the front corrugated panels meet the 'bargeboard' at the front of the building. However, it is anticipated that, even if bats could get beneath these gaps there would be nothing for them to 'grip' onto, as the corrugated material is too smooth. With this being the case, it is considered that B1 is of minimal roosting interest to local bat species, and as such, no further surveys will need to be conducted on this building. This conclusion also includes nesting birds.

Figure 4: A view of the front of B1 from an eastern viewpoint.



The second [and final] building to be inspected was B2 (again, see figure 1 for the precise location of this building). This building was derelict, single storey and of cavity brick wall construction. Although derelict buildings with cavity brick walls often provide ideal roosting opportunities for bats, the fact that the building is single storey with

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intact windows and doors [and where not intact, they have been boarded up], means that there are minimal access opportunities into the building and ultimately limited flight and roosting space (which would be abundant within a pitched roof building). With regards to the fascia/soffit boards, they are of wooden construction and are again largely intact, however, a few areas along the northern elevation do present large enough gaps for bat access. Bearing all of the information in mind, it is anticipated that [although relatively low] the building does house some potential for roosting bats. With this being the case, it is anticipated that at least one (possibly two) dusk emergence surveys be required in order to determine bat presence/absence within this building.

Figure 5: This photograph illustrates the size and layout of B2 as taken from a south-western viewpoint.



Overall, the results from the bat scoping survey have concluded the following:

- That two of the trees within the easterly woodland habitat (the mature common lime and the standing deadwood) have moderate/high potential to support roosting bats, due to a number of potential utilizable features being present (i.e. woodpecker holes and rotholes). Subsequent dusk activity surveys (at least two) will be required within this area to prove bat presence/absence.

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- That B1 is considered to be of low potential for supporting roosting bats, as it is of corrugated steel construction with no visible access points or roosting features. With this being the case, no dusk activity surveys will need to be conducted on this building.
- That B2 is much larger than the previously discussed building, and it is slightly older in terms of its construction. Although flat-roofed, a number of potential access points into the building were identified, so at least one (possibly two) dusk activity surveys will need to be conducted on this building in order to determine bat presence/absence.

4.4.1 Bat Dusk Activity Surveys

Bat dusk emergence surveys were carried out on the easterly woodland and B2, due to the scoping survey revealing these areas to have the potential to house protected bat species.

Firstly, B2 was surveyed on 8th May 2014 for bat activity at 8.40pm. During this survey, no bats were observed emerging from the building itself, but a number of common pipistrelle (*Pipistrellus pipistrellus*) bats were detected flying in the adjacent areas to the building and a noctule (*Nyctalus noctula*) was recorded [but not visually verified] passing over the building. Due to the lack of evidence discovered during this dusk survey and the minimal potential access points observed, it was anticipated that no further dusk surveys would be required, as the building is highly unlikely to support roosting bats. In addition to these points, it is thought that the building may be too light to support roosting bats, as the southern elevation in particular is illuminated by security lights.

Two dusk emergence surveys were conducted within the eastern woodland (on 27th May 2014 and 29th May 2014), which was deemed necessary due to the high suitability of some of the trees [two in particular] within said woodland. During these surveys, three surveyors were positioned within the woodland itself (with the trees of interest being within immediate sight) and upon the amenity grassland/hard standing which is immediately adjacent to the north/north-east of the woodland. These areas were selected in order for the greatest visibility [of potential bat flight paths/roost emergence] to be achieved. During both surveys, no bats were found to emerge from either of the trees of interest, which is likely to be due to the density of the tree shading. It is thought that this vegetative overgrowth may impact the ability of bats to gain a clear immediate flight path from the roost to an open foraging

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habitat. This being said, a number of bat species were once again identified passing over the site, including the common pipistrelle (*Pipistrellus pipistrellus*), noctule (*Nyctalus noctula*) and soprano pipistrelle (*Pipistrellus pygmaeus*). If the vegetation was cut back along the water course within the woodland (which is to occur under the current proposals), it is anticipated that this will have a positive impact upon local bat colonies, as it may allow them to roost and forage within the woodland (which at the moment, it relatively unusable). In addition to this, the standing deadwood and the mature common lime specimens provide potential roosting opportunities, and as such, it is recommended that these specimens be retained throughout the proposed works.

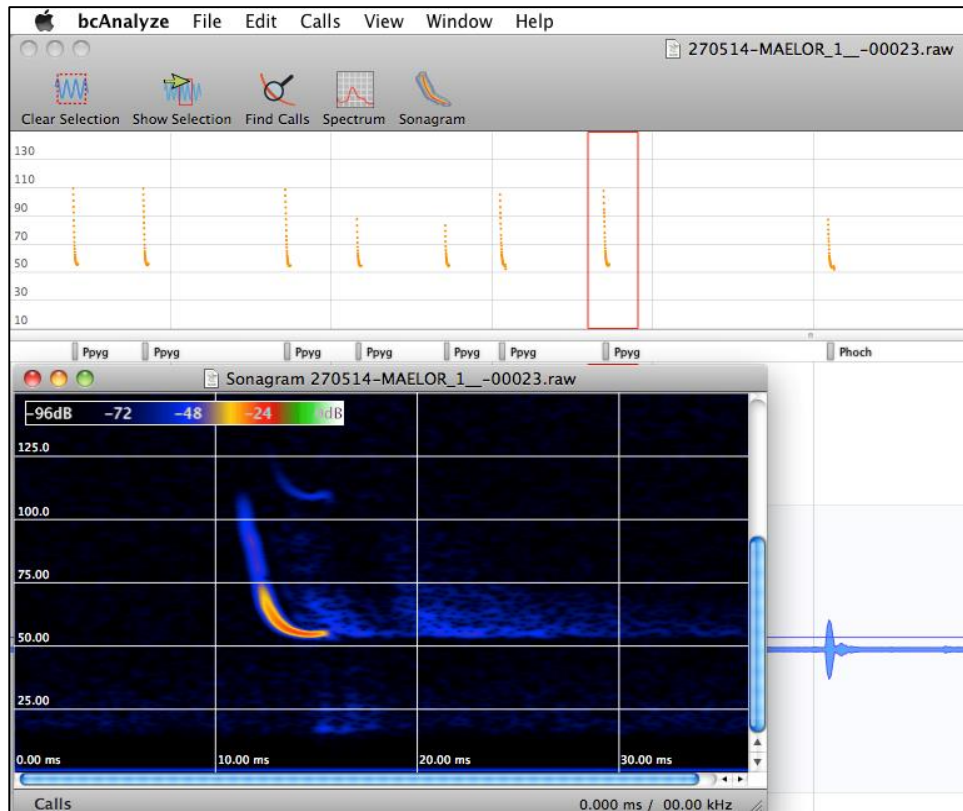
Please see figure 6 for a map illustrating the approximate locations of the surveyors during the dusk emergence surveys of the brook corridor and B2.

Figure 6: This image illustrates the approximate locations of the surveyors during the dusk emergence surveys of the eastern woodland area and B2. The yellow circles indicate the locations of the surveyors, the green outline represents B2 and the blue line illustrates the rough location of the brook.



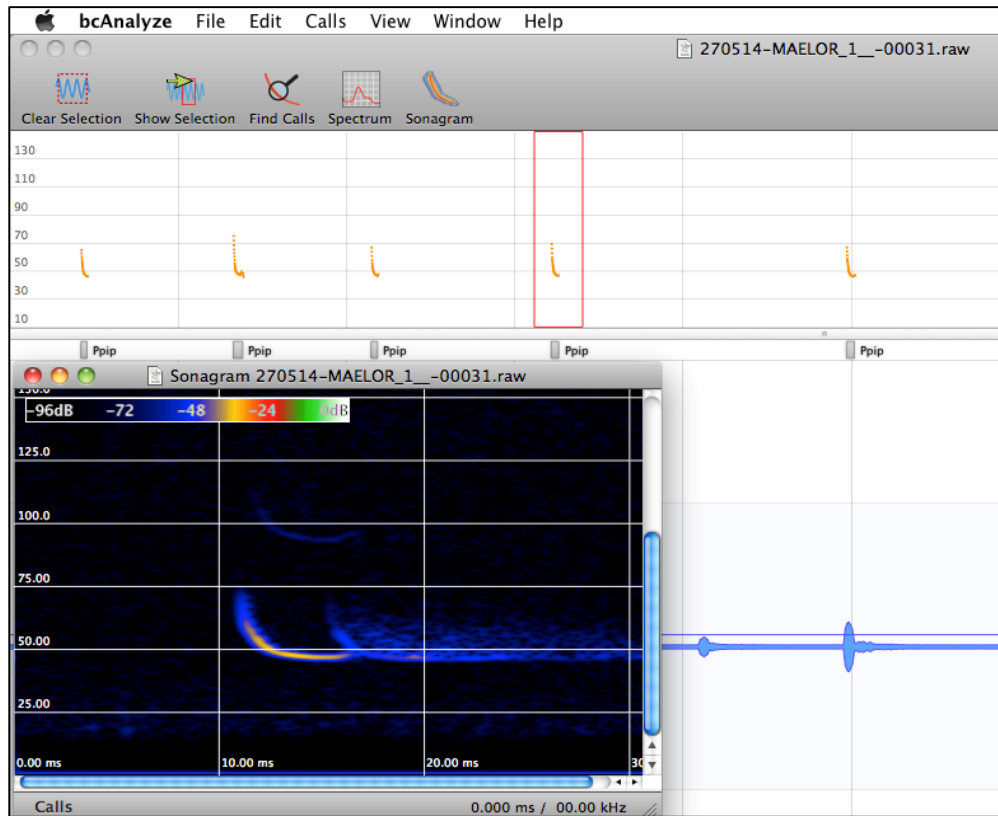
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Figure 6A: A sonogram of a soprano pipistrelle - Ppyg (*Pipistrellus pygmaeus*) which was detected during one of the dusk surveys, with a 95% CL (confidence interval of accuracy).



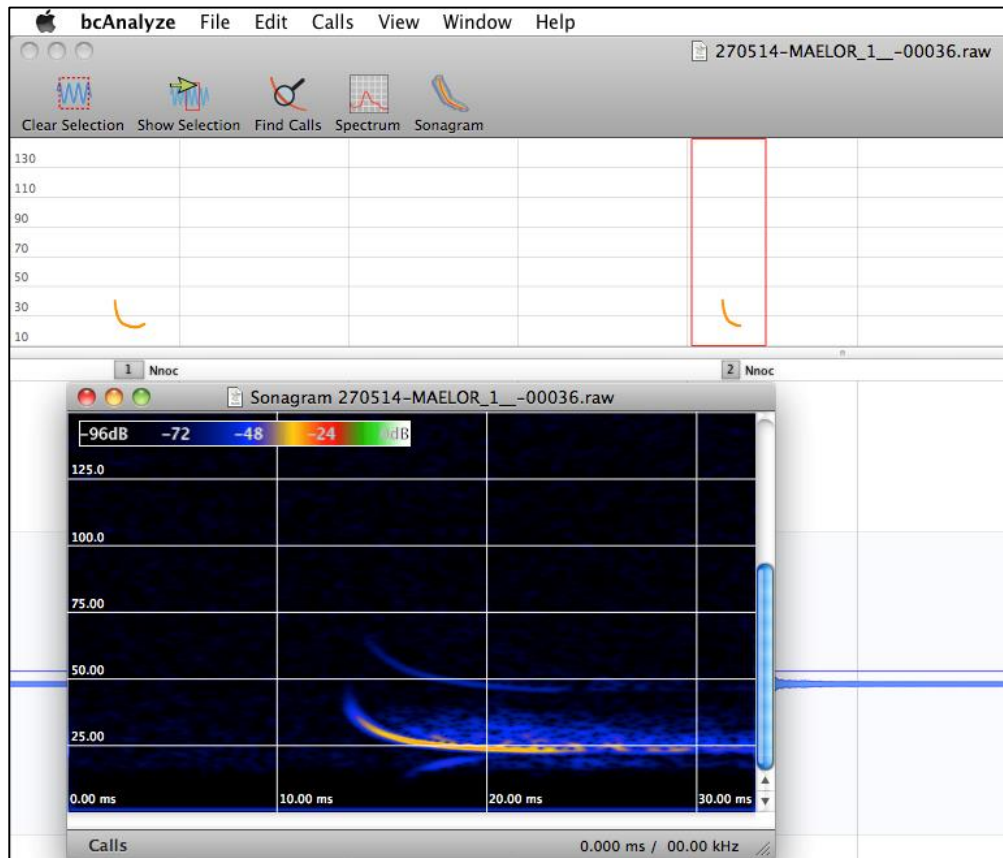
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Figure 6B: A sonogram of a Common Pipistrelle - Ppip (*Pipistrellus pipistrellus*) which was detected during one of the dusk surveys, with a 100% CL (confidence interval of accuracy).



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Figure 6C: A sonogram of a noctule (*Nyctalus noctula*) - Nnoc (*Pipistrellus pipistrellus*) which was detected during one of the dusk surveys, with a 100% CL (confidence interval of accuracy).



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4.5 Bird Survey

With regards to birds, their only presence onsite was identified within the eastern woodland habitat. This being said, all of the evidence discovered was anecdotal (i.e. bird calls and egg shells) and no visual sightings were made (which is largely due to the overgrown nature of the woodland vegetation). Within the woodland, numerous cuckoo (*Cuculus canorus*) calls were heard, as were those of the wood pigeon (*Columba palumbus*). In addition to this, an egg shell was found on the ground towards the most easterly section of the woodland, which is again thought to belong to the wood pigeon (due to its colour and size). This finding clearly illustrates that the area is being utilized by nesting birds. With this being the case, it is anticipated that nesting birds will need to be considered before attempting any vegetation clearance along the brook belt.

4.6 Great Crested Newt Survey

The vast majority of the Maelor Works site is thought to be of minimal use to great crested newts, as it predominantly consists of buildings and hard standing (please refer to the Preliminary Ecological Appraisal conducted in 2013 for a Phase 1 Habitat Map of the site). However, a number of scattered habitats do provide some potential foraging, commuting, breeding and hibernation areas for GCN, including semi-natural broad-leaved woodland, dense/continuous scrub, poor semi-improved rough grassland and standing water bodies. The standing water body located to the north of the site is not proposed to be affected by the proposed works, however, the pond situated to the south-east of the site is. Under the current guidelines, it will not be necessary to survey all ponds within a 500m radius of the pond of interest. This is said, as this pond will not be lost [in the long term] as it is proposed that it undergo contaminated sediment removal. The pond is immediately surrounded by woodland and tall ruderal, with emergent and floating vegetation colonizing some areas of the pond itself. Additionally, a number of young and semi-mature willow species (*Salix spp.*) have also established along the pond edge (and growth has continued into the pond itself). Pond dipping revealed a relatively diverse range of invertebrate species which could serve as a potential food source to great crested newts, including diving beetles (*Dytiscidae*), freshwater shrimp (*Gammarus pulex*) and waterlouse (*Asellus aquaticus*). Post-contaminant removal, it is proposed that the pond will be refilled and enhanced (remove overhanging trees, to increase the daylight), which should ultimately improve this habitat for local amphibians. In addition to the ponds located on site, the immediately [and wider] surrounding landscape houses numerous

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scattered standing water bodies, which provides the perfect landscape structure to support meta-populations of GCN.

A Habitat Suitability Index (HSI) was also conducted on the pond in order to establish its suitability to support great crested newts. Please see Table 4 on the next page.

Figure 7: A photograph which illustrates the relatively overgrown nature of the pond of interest. This has subsequently meant that the majority of the pond is devoid of emergent aquatic vegetation, with the exception of a small area located to the south-west. The remainder of the pond was colonized by aquatic floating plants (i.e. duckweed species - *Lemnoideae*) in varying densities during each survey visit.



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Field Survey Results

A summary of the field survey results obtained by Evolution Ecology Ltd.

Table 4: Habitat Suitability Index Results Summary

Pond ref	1
SI1 - Location	1
SI2 - Pond area	0.2
SI3 - Pond drying	1
SI4 - Water quality	1
SI4 - Shade	1
SI6 - Fowl	0.67
SI7 - Fish	0.33
SI8 - Ponds	0.55
SI9 - Terr'l habitat	0.67
SI10 - Macrophytes	0.7
HSI	0.64

HSI Categorisation

<0.50	Low Suitability
0.50-0.59	Below Average Suitability
0.60-0.69	Average
0.70-0.79	Good
>0.80	Excellent

The pond surveyed was assessed using the Great Crested Newt Habitat Suitability Index (HSI) [a quantitative measure of habitat quality] and this was used to evaluate the suitability of habitats for GCN (*Triturus cristatus*). As can be seen from the summary table above, the pond of interest has been classed as having 'average' suitability for supporting breeding great crested newts.

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Survey Results**Table 5:** The weather conditions for the great crested newt presence/absence surveys undertaken.

Date	Survey Type	Air Temp (°C)	Weather Conditions
08/05/2014	Scoping and presence/absence	19.3	Dry, 70% cloud cover
12/05/2014	Presence/absence	10.0	Dry, 100% cloud cover
27/05/2014	Presence/absence	24.0	Dry, 95% cloud cover
29/05/2014	Presence/absence	19.0	Dry, 30% cloud cover

The pond of interest was surveyed on four occasions. The survey methods used on the pond largely depended on its water level and clarity. However, at least four of the five aforementioned survey techniques (detailed and prescribed within the Great Crested Newt Mitigation Guidelines and the Herpetofauna Workers Manual) were undertaken on at least one occasion within the pond. Below (table 6) is a summary of the results for each pond showing peak counts of amphibians recorded.

Table 6: A summary table of the results obtained during the great crested newt presence/absence surveys.

Method	Peak count GCN	Peak count Smooth/Palmate	Peak count Common Frog	Peak Count Common Toad
Bottle Trapping	0	8	0	0
Torching	0	43	0	0
Netting	0	0	0	0
Egg Search	0	0	0	0

From the table, it is clear that although this pond does not support any breeding GCN, it does however, support a healthy medium population of smooth/palmate newts (as made clear by a peak torching count of 43 individuals). With this being the case, it can be said that this pond is an important breeding site for this species. However, the current proposals are unlikely to negatively influence this breeding population, as post-contaminant removal, the pond will be restored to its former state and enhanced accordingly.

4.7 Otter and Water Vole Survey

Records of otter and water vole within a 2km radius of the site prompted a survey for these species within the brook (which took place on 27th May 2014), as this is to be heavily impacted throughout the proposed sediment removal (i.e. dredging). One surveyor walked within the brook itself and another along the bank side, in order to gain the best possible overview of the brook and its bank sides.

As mentioned previously, the surrounding woodland/scrub is extremely dense which has meant that much of the brook is largely shaded (and in some areas, fallen vegetation has accumulated within the brook itself). Additionally, a tree was observed which had naturally fallen across the brook and ultimately formed a natural 'wildlife bridge'. It is highly likely that this naturally formed 'bridge' is an important migration route for some species (such as small mammals), which may otherwise be restricted from accessing the opposite site of the brook.

Through conducting this survey, it became apparent that the water level within this water course is extremely variable. At the time of the survey, the water level within the [approximately 150mm deep] channel was low. However, some of the ramsons (*Allium ursinum*) plants along the southern bank side showed evidence of mud/dirt on the leaves, which is likely to have occurred as a result of the water level within the channel reaching full capacity sometime in the recent past. The idea of consistently rising [and falling] water levels is further supported by an almost complete lack of vegetation upon the brook embankments themselves (particularly along the northern embankment), as this habitat would not be considered stable enough to support dense floral colonization. The brook bed itself was largely composed of clay/silt-like substances. Upon inspection of the bank sides and brook embankment, no evidence of otter holts or water vole burrows became apparent.

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Figure 8: This image illustrates the water level within the brook at the time of the survey, in relation to the water levels which have been reached in the recent past (as indicated by the mud upon the leaves of the overhanging ramsons (*Allium ursinum*) plants – red arrow).



Due to the shape and structure of the brook, it is anticipated that it has undergone some sort of human interference in the past. This could be in the form of a sluice gate [or something similar] further upstream which could restrict water flow and could ultimately explain the high variability in the water levels. In addition to this, further up- (to the west) and down- (to the east) stream, the water flow appears to be natural with pebble stone beds and meandering channels. This is in contrast to the area to be impacted, which has a bed made of clay/silt-like substances and is a largely straight continuous channel (which is not likely to occur naturally – especially when considering the layout of the brook further up and down stream).

The proposed vegetation clearance works are to take place within 5m (each side) of the brook (to allow machinery access), and as such, there is a potential risk that any water voles which may be utilizing the water course could be negatively affected. However, as no water voles were observed during the survey, and as no anecdotal evidence of their presence became apparent (i.e. footprints/tracks, burrows, droppings etc.), it is anticipated that the proposed works are highly unlikely to negatively affect any water vole habitats [and subsequently populations of this species].

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With regards to otters, as mentioned previously, no evidence of any otter holts was evident along the bankside of the brook. This being said, two potential otter footprints were identified along the northern embankment (figure 9). As these two were the only footprints identified [which could possibly belong to this species] and as no additional tracks were recorded past this point (i.e. tail drag or further footprints), it cannot be concluded exclusively that otters are using this watercourse. As there is a lack of evidence suggesting the presence of otter holts within the brook (also both up- and down-stream), a lack of any otter records within 1460m of the site and a lack of spraints/food remains, it can be concluded that the brook is of minimal interest to local otter populations. The only way in which it is likely is to be used is for commuting use, as due to the poor water quality, it is almost devoid of aquatic life (both flora and fauna). Ultimately, it is anticipated that the proposed works are unlikely to have a negative impact upon local otters.

Figure 9: A photograph of the potential otter footprints which were identified along the northern embankment in relation to a mammal ID guide, which illustrates the specific features associated with said field signs.

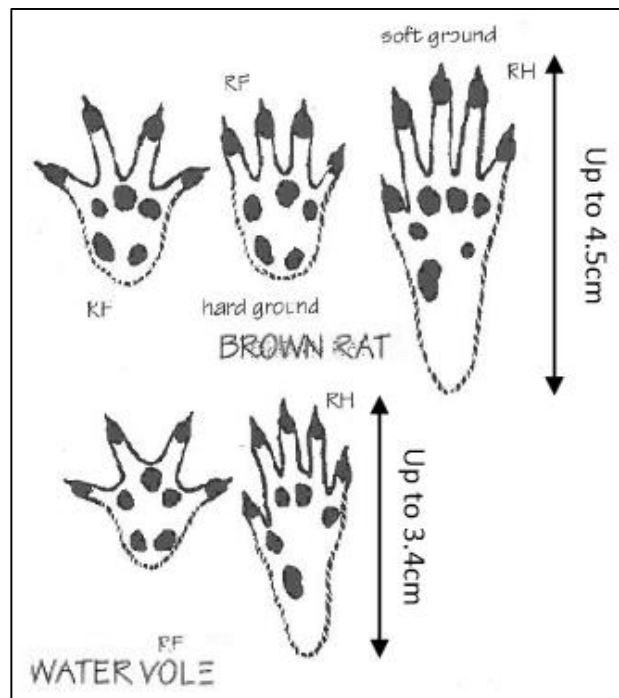


In addition to the protected species searched for, a number of non-protected species footprints were identified including brown rats (*Rattus norvegicus* – figure 10) and rabbits (*Oryctolagus cuniculus*). The discovery of the aforementioned anecdotal evidence further

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illustrates the ecological value which is attached to this hawthorn dominated woodland habitat and its associated brook.

Figure 10: An illustration which shows the approximate footprint pattern of the brown rat (*Rattus norvegicus*).



5. CONCLUSIONS/ RECOMMENDATIONS

5.1 Preliminary Ecological Appraisal – Flora

With regards to the flora identified on the proposed redevelopment area, there are no habitats of legal conservation concern (i.e. BAP Priority Habitats etc.). However, a number of areas do hold the capacity to provide important nesting/foraging/sheltering habitats for a number of fauna species. In relation to the proposed works, the main areas to be affected are the woodland area to the east, the brook (within the woodland) and the pond (with a medium population of smooth/palmate newts).

Firstly, vegetation clearance will need to take place (up to 5m from the watercourse on each bank side) along the [entirety of the] brook, withing the clients ownership, in order to allow the access of the required machinery onsite. As the site currently stands, it is anticipated the abundance of ramsons (*Allium ursinum*) plants within the ground are likely to contribute towards providing an important food source for a number of invertebrate species such as hoverflies, butterflies and longhorn beetles (one species from the latter of which was identified onsite – a [possible] Welsh oak longhorn beetle *Pyrrhidium sanguineum*). With this being the case, it is recommended that all of the ramsons bulbs within this area be scraped up and stockpiled along the bankside during the autumn/winter months (when plants are dormant), in order for them to be relayed once the works have been completed. This should help towards restoring the original understorey habitat which currently holds such high value for local invertebrates.

The second measure which should be adhered to throughout the proposed works, is the retention of all semi-mature/mature trees within the woodland habitat. As mentioned previously, a 5m buffer either side of the brook will need to be cleared to allow machine access, however, it is suggested that this clearance, occurs without impacting the longevity of the trees. This could be done by cutting branches back and altering the proposed machinery path to accommodate the trees. This also [most importantly] applies to the mature common lime (*Tilia × europaea*) specimen and the standing deadwood, both of which are located almost centrally along the northern brook bankside. Because of the instability of the standing deadwood, for health and safety reasons, an 8m exclusion zone will need to be erected around it (as a precautionary measure, just in case the movement of the machinery impacts its stability). Ultimately, if the trees are retained/incorporated into the proposed works and if they are cut back and managed

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accordingly, this will allow light to enter the woodland once again, which should diversify the range of understorey floral species which are able to colonize and enhance the quality of the brook. Additionally, potential bat roosting features and known nesting trees will be saved, so that they can be continuously used in the future by these species. As a further conservation measure, any of the branches which are cut from the trees or any deadwood discovered, should be stockpiled (log piles) in an appropriate area, which will create an excellent sheltering habitat for a number of species, both fungal and faunal (i.e. invertebrates).

Finally, [in relation to the woodland], it is recommended that if it need be moved, the tree which has fallen across the brook and unintentionally formed a natural 'wildlife bridge', should be placed back in its original position after the works have been completed. This is said, as it is considered that this natural structure has formed an important migratory route from the north to the south of the brook for small mammals [such as mice and shrews], which may have otherwise been inaccessible to them.

The final measure to consider in relation to the habitats present onsite is the pond which is currently known to harbour a healthy medium population of smooth/palmate newts during the breeding season (March-June). Under the current proposals, it is anticipated that the pond will be drained, and the contaminated sediment present on the pond bed, be removed (again with the use of machinery which is likely to access the site through the immediately adjacent security fence to the west). Because of the ecological value attached to this pond, it is recommended that the pond water be stored [outside of the amphibian breeding season] and any newts collected (bottle traps and nets), whilst the contaminated sediment is being removed. At the same time that this is being conducted, the immediately surrounding vegetation should be cut back (with particular reference to the overhanging trees) in order for 80/90% of the pond to be open to direct sunlight. This should allow the colonization of further emergent/floating plant species (which could be used for egg laying), and should ultimately further improve the ponds suitability for invertebrates (which are an important food source for amphibians). Once these measures have been achieved, the pond can be refilled and allowed to recolonize naturally. These measures should ultimately ensure that the medium population of smooth/palmate newts which are known to use the pond, should continue to have a suitable breeding area in the long term.

5.2 Badgers/ Rabbits

With regards to badgers (*Meles meles*) and rabbits (*Oryctolagus cuniculus*) an exclusion zone will need to be put in place so that the proposed works will not negatively impact the badger clan (including rabbits) which are present within the most south-westerly section of the woodland habitat. Additionally, by ensuring that the works remain between 20m and 30m away (which will be dependent upon the type of machinery used) from the nearest active sett entrance, there should be no issues with the continuation of the proposed vegetation clearance and contaminated sediment removal within the woodland and running water habitats.

5.3 Bats

With regards to the proposed demolition of the buildings, there are no issues in relation to bats, as both of the buildings were deemed as being unsuitable for roosting specimens. This was supported by the results of the dusk emergence survey which was conducted on B2, which identified passing bats only. With this being the case, the buildings can be demolished as planned, with no negative impacts upon local bat colonies being predicted.

With regards to the trees of interest within the woodland habitat (i.e. the mature common lime and the standing deadwood with woodpecker holes), no bats were detected emerging from either of these habitats during the two dusk emergence surveys conducted on this area. Although no bats were identified, this is thought to be due to the density of the vegetation within the woodland, which would currently prevent a clear flight path when emerging from the trees. With this being the case, these trees should be retained throughout the vegetation clearance works, as they are likely to provide suitable roosting habitats for these species, once the woodland has been

managed slightly to increase the light availability and reduce the vegetation density.

5.4 Birds

The main areas of concern with regards to nesting birds are the semi-mature/mature tree specimens, both within the woodland and surrounding the pond which is to undergo contaminated sediment removal. Evidence of nesting birds was discovered within the woodland (in the form of an egg shell on the ground and cuckoo and wood pigeon

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calls) and as such, it is imperative that any works which are likely to disturb breeding birds, occur outside of the bird nesting season (which is between the months of March-August). If this is achieved and the trees within the woodland be retained, there is no reason why the proposed works would have any negative impacts upon local breeding bird populations.

5.5 Great Crested Newts

No evidence of great crested newt (*Triturus cristatus*) presence was identified throughout any of the four presence/absence surveys. However, a healthy medium population (peak count of 43) of smooth/palmate newts was identified within the pond. With this being the case (and as discussed in detail within section 5.1), it is recommended that the pond be restored [post-sediment removal] to its former layout and enhanced via managing the immediately surrounding vegetation. These measures should ultimately improve the habitat in the long term for breeding smooth/palmate newts, and may also improve its suitability for any local GCN. These works need to take place during Autumn/Winter.

5.6 Otters and Water Voles

With regards to water voles, no evidence of their utilization of the brook became apparent throughout the survey, as no footprints, feeding remains or burrows were identified. With this being the case, [and as the nearest water vole record was over 1500m from the site], it is anticipated that the proposed contaminated sediment removal works within the running water course are unlikely to harm any water voles or damage their resting habitat.

The only evidence of otter utilization was the presence of two potential footprints which were identified upon the northern embankment of the brook. However, as no further evidence was revealed (such as otter

holts, feeding remains or signs of tail drag), it is anticipated that this brook would be of commuting use only to local otter populations. This being said, similarly to the water vole records, the nearest otter record to the site was approximately 1465m away, so it is quite unlikely that this area would be used as a regular commuting route. With this being the case, the proposed contaminated sediment removal works within the running water course are unlikely to harm any otters or damage their resting habitat.

Additionally, the site supervision works (to be discussed within section 5.7) should also function to ensure that [although unlikely] no commuting otters or water voles are harmed during the proposed works.

5.7 Site Supervision

Finally, in addition to all of the proposed conservation/mitigation measures, site supervision by a licenced ecologist will need to be arranged throughout the duration of the works (particularly within the woodland and around the pond). It may not be necessary for the site to be attended daily by the ecologist, however, a timetable of works will be discussed further once detailed plans of the proposed works have been received.

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7. APPENDICES

Appendix A: Preliminary Ecological Appraisal (Extended Phase 1 Habitat Map)

Appendix B: Site Plan

Appendix C: Photographic Records

Appendix D: Badger Information

Appendix E: The Bat Year

Appendix F: Great Crested Newt Biology

Appendix G: Otter Information

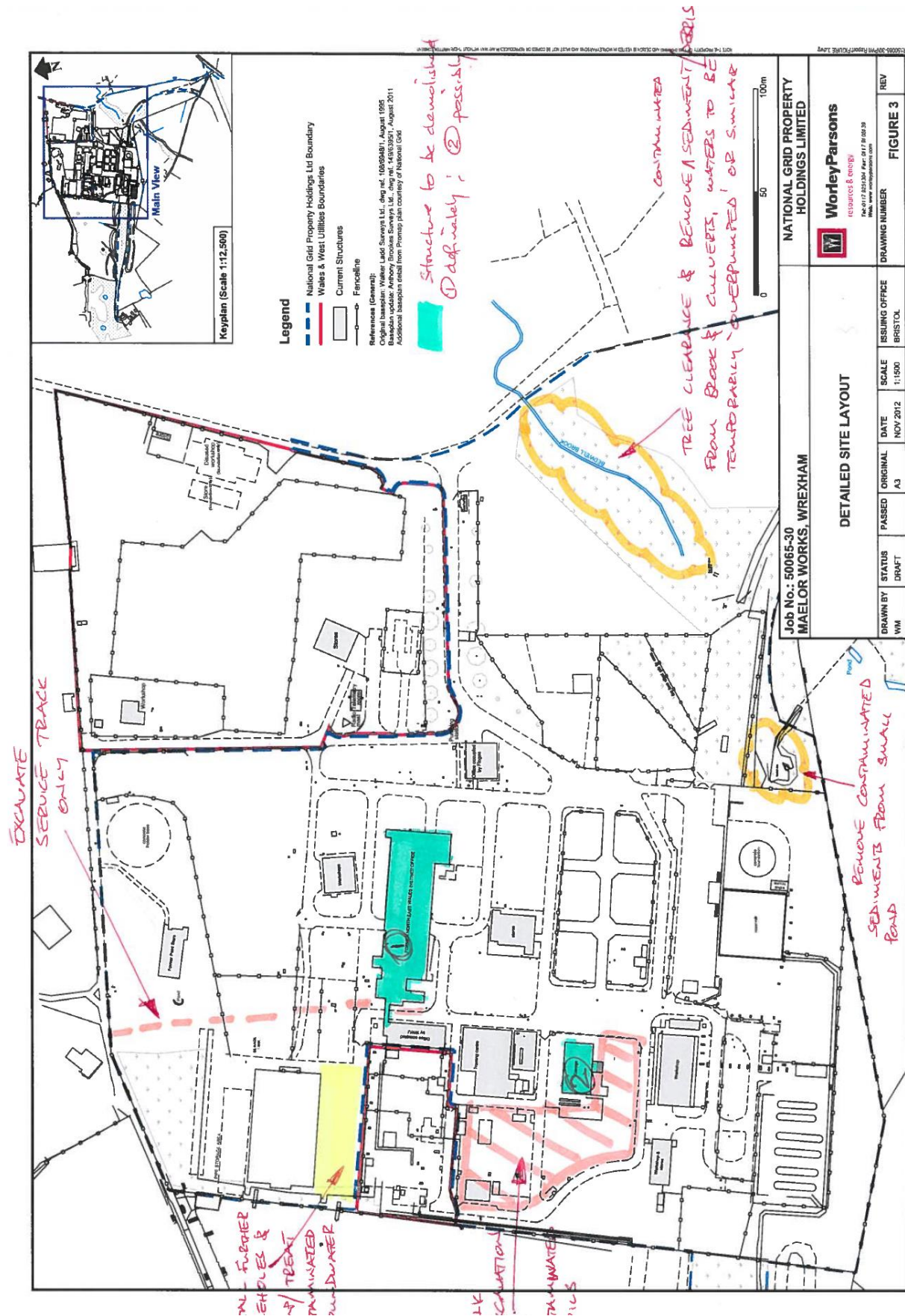
Appendix H: Water Vole Information

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Appendix A: Preliminary Ecological Appraisal (Extended Phase 1 Habitat Map) – As taken from the report created in November 2013.

Key	
	Site boundary
	A1.1 - Semi-natural broad-leaved woodland
	A2.1 - Dense and continuous scrub
	A3.1 - Broad-leaved scattered trees
	B6 - Poor semi-improved grassland
	G1 - Standing water
	G2 - Running water
	J1.2 - Amenity grassland
	J3.6 - Buildings
	J5 - Other habitat: Hard standing
	Rabbit warren with 100+ entrances
	Hard standing which was once occupied by a gas tower
	Badger setts/entrances

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Appendix B: A plan of the site as it currently stands

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Appendix C: Photographic Records

A view of the most westerly section of B2, as taken from a southern viewpoint.



A view of B1 from a south-eastern viewpoint. No dusk activity surveys were deemed necessary on this building due to its low potential to support bats.



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A photograph of the pond of interest, as taken from a southern viewpoint.



Another view of the pond of interest from a southern viewpoint. This image illustrates the overgrown nature of the immediately surrounding area.



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This image shows some of the aquatic vegetation emerging from the south-westerly section of the pond of interest.



This photograph shows the most easterly section of the brook which is to be affected by the proposed works, and it was taken from the roadside.



The most easterly section of the brook from a southern viewpoint.

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One of the partially active entrances to the badger sett within the eastern woodland area.



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The standing deadwood which is situated almost centrally to the northern bank side of the brook. This tree is thought to house potential for roosting bats.



One of the holes within the standing deadwood which is likely to have been created by a woodpecker.



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The mature common lime tree with a broken limb. This tree is thought to house potential for roosting bats.



Once again, the mature common lime tree with a broken limb can be observed. This tree is thought to house potential for roosting bats.



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Another view of the brook which is proposed to undergo contaminated sediment removal.



Brown rat footprints which were identified upon the northern embankment of the brook.



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The potential otter footprints which were discovered within close proximity to those of the brown rat. These were the only anecdotal signs of otter presence which were identified throughout the survey, and as such, it is considered that the brook is likely to be of commuting use only.



The most westerly section of the brook as taken from a south-eastern viewpoint. This is the point at which the brook emerges into the proposed works boundary, after being contained underground for a continuous stretch.



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This image shows the other side of the brook (to the north-east of the access road) which is not owned by the client, or to be included within the proposed works. It is immediately noticeable that this section of the brook has a more natural structure as the embankments are densely colonized by vegetation (unlike some areas of the brook to be dredged).



Another view of the other side of the brook (which is situated to the north-east of the site). This shows the pebble bed of the brook which is considered to be a natural feature.



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Appendix D: Badger Information**Behaviour**

Badgers are nocturnal and rarely seen during the day. When not active, badgers usually lie up in an extensive system of underground tunnels and nesting chambers, known as a sett. Each social group usually has a main sett where the majority of the group live most of the time, but there may be odd holes scattered around the territory that are used occasionally. Badgers can live in social groups of two to 23 adults, but usually around six. These defend an area around their main sett as a territory. Territories may be as small as 30ha, but are up to 150ha or more in the Highlands. Badgers mark the boundaries of territories with their distinctive latrines. They leave their faeces in collections of shallow pits, which in aggregate are called latrines.

**Diet and Feeding**

Badgers exploit a wide variety of food items, but earthworms form the majority of the diet.

Reproduction

Mating takes place between February and May, with implantation delayed until late winter. Only one female badger in a social group normally breeds, although sometimes two or more may do so. Litters of 2-3 cubs are born around February blind and hairless in the safety of the nest. They usually appear above ground at about 8 weeks, and weaning usually takes about 12 weeks. By late summer they are usually feeding independently but can be adversely affected by drought at this time causing starvation.

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Appendix E: The Bat Year**The Bat Year**

January Hibernating; using up fat reserves.



February Still hibernating; few fat reserves left.



March Some activity; occasional bat seen feeding.



April Awake and feeding at night.



May Females looking for nursery sites.

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June Young born, usually only one.



July Young still suckling.



August Young start catching insects; females leave nursery to find males.



September Mating season begins; start building fat reserves for hibernation.



October Search for suitable hibernation site.



November Hibernation begins although still some activity in warm weather.

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December Hibernating.

Appendix F: Great Crested Newt Biology

Description

The GCN is Britain's largest and most threatened newt. The body is generally dark brown to black in colour with a warty appearance, which gives the species its other common name, the warty newt. The underside is bright orange with black markings that are unique to each individual. Females tend to be slightly longer than males, and in the breeding season, the latter develop an obvious crest between the head and the tail, and a silver streak along the middle of the tail. The specific name *cristatus* derives from the Latin word meaning 'crested'. Outside the breeding season, males and females are fairly similar in appearance, but females always have an orange line on the tail. Juveniles generally look like females but may have a yellow stripe along the back.



Range

It is widespread throughout northern and central Europe extending east to the Ural Mountains in Russia. The species has a wide distribution in Britain, but is absent from Cornwall, Devon, and parts of Wales and Scotland and is generally uncommon. The population has undergone a very severe decline in the last 50 years.

Habitat

This species inhabits a wide range of habitats, including farmland, woods, grasslands, dunes, quarries, industrial and 'brown-field' sites, within which it favours large ponds with abundant weeds and no fish. The habitat structure within the site such as hedgerows, varied topography and the availability of refuges in which the individuals can hide is very important and can determine whether the species can occupy a site or not. Occasionally they will use garden ponds and commonly occur near natural springs. The condition of land between occupied sites is also an important factor, as many newt populations persist as metapopulations, a series of local populations between which individuals migrate. If there is little connectivity between patches of suitable habitat, migration will be unlikely.

Biology

GCN feed on a range of aquatic invertebrates, but occasionally tackle large prey items such as adult smooth newts and large dragonflies. They are mainly active at night, spending the day at the bottom of ponds or hidden in vegetation. Males have an extravagant display used in courtship, which involves the male standing on his front legs in front of a female with an arched back while he waves his tail around. If the female is receptive, the male transfers a spermatophore. Eggs are laid in

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February or March and are protected from predation by having the leaves of water plants folded over them. The appearance of vegetation showing a characteristic 'concertina' effect is a good indication of the presence of this species. GCN leave the water in August and September; their behaviour during their period on land is poorly understood.

Threats

The decline is due to a number of factors, including a large-scale loss of breeding ponds. Intensification of agriculture has resulted in many farm ponds becoming redundant, leading to neglect, and a decline in the suitability of the surrounding habitat. Many new ponds that would otherwise be suitable for this species are stocked with fish, which predate on both eggs and larvae. Ponds that survive in agricultural land often become polluted with pesticides and fertilisers.

Conservation

The GCN is a priority species under the UK Biodiversity Action Plan (BAP). The species action plan aims to maintain and enhance current populations with a target of the restoration of populations to at least 100 sites. A number of publications on this species have been produced; English Nature has published 'Great crested newt mitigation guidelines' targeted at developers and others involved in land-use changes, which could cause conflict with conservation of this species. Froglife has published 'The Great Crested Newt Conservation Handbook'.

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Appendix G: Otter Information**Distribution & Habitat**

The otter is a secretive semi-aquatic species which was once widespread in Britain. By the 1970s, otters were restricted mainly to Scotland, especially the islands and the north-west coast, western Wales, parts of East Anglia and the West Country (though they remained common and widespread also in Ireland). This decline was caused by organo-chlorine pesticides. Since these were withdrawn from use, otters have been spreading back into many areas, especially in northern and western England.

**Behaviour**

Otters can travel over large areas. Some are known to use 20 kilometres or more of river habitat. Otters deposit faeces (known as spraints, with a characteristic sweet musky odour) in prominent places around their ranges. These serve to mark an otter's range, defending its territory but also helping neighbours keep in social contact with one another. Females with cubs reduce sprainting to avoid detection.

Diet and Feeding

Fish, especially eels and salmonids are eaten, and crayfish at certain times of the year. Coastal otters in Shetland eat bottom-living species such as eelpout, rockling and butterfish. Otters occasionally take water birds such as coots, moorhens and ducks. In the spring, frogs are an important food item.

Reproduction

In England and Wales otter cubs, usually in litters of two or three, can be born at any time of the year. In Shetland and North-west Scotland most births occur in summer. Cubs are normally born in dens, called holts, which can be in a tree root system, a hole in a bank or under a pile of rocks. About 10 weeks elapse before cubs venture out of the holt with their mother, who raises the cubs without help from the male.

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Appendix H: Water Vole Information**Behaviour**

Water voles occur mainly along well vegetated banks of slow flowing rivers, ditches, dykes and lakes. They are sometimes confused with brown rats which often also live near water courses. Water voles excavate extensive burrow systems into the banks of waterways. These have sleeping/nest chambers at various levels in the steepest parts of the bank and usually have underwater entrances to give the animals a secure route for escape if danger threatens.



"Lawns" of closely cropped grass, occasionally with piles of chopped food, may surround burrow entrances. Water voles tend to be active more during the day than at night. Male voles live along about 130 metres of water bank, while females have ranges about 70 metres long. They deposit distinctive black, shiny faeces in latrines. Latrines occur throughout and at the edges of their range during the breeding season.

Diet and Feeding

They eat grasses and waterside vegetation: 227 plant species have been identified in their diet, and additional broadleaved plants may also be eaten at certain times.

Reproduction

Water voles usually have three or four litters a year, depending on the weather. In mild springs the first of these can be born in March or April, though cold conditions can delay breeding until May or even June. There are about five young in a litter, which are born below ground in a nest made from suitable vegetation, notably grasses and rushes. Although blind and hairless at birth, young water voles grow quickly, and are weaned at 14 days.

8. LIMITING CONDITIONS/DISCLAIMERS

1. The Service

- 1.1 Evolution Ecology Ltd agrees to supply Ecological consulting services of a preliminary nature or a more thorough service as advised or as commissioned.

2. Fees

- 2.1 The client(s) will settle the agreed fee in full, within 30 days of receiving the invoice. Reports will remain the property of Evolution Ecology Ltd until full payment has been received. No liability is accepted for the contents of a report that is not paid in full. Any queries should be notified to Evolution Ecology Ltd within 7 days of the invoice date.
- 2.2 If the client(s) fails to pay within the time specified in 2.1 then Evolution Ecology Ltd shall charge the client(s) interest on the outstanding fee, both before and after any judgment, at the rate of 4% per annum above the HSBC Bank base rate, until payment is made in full (A part of a month being treated as a full month for the purposes of calculating interest).
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3. The Report

- 3.1 If any part of the report is lost, or altered without the written consent of Evolution Ecology Ltd, then the entire report becomes invalid.
- 3.2 The general format of reports is a certified product and cannot be shown, copied or distributed to third parties without the permission of Evolution Ecology Ltd. No liability is accepted for the contents of the report, other than to that of the client(s).
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4. Insurance Cover

- 4.1 All work carried out by Evolution Ecology Ltd is covered by a £1,000,000 professional indemnity insurance.

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