

RPS

**ECOLOGICAL APPRAISAL AND
PROTECTED SPECIES REPORT**

Gatewen Road, Wrexham
Glyndwr University



January 2019

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To achieve the study objectives stated in this report, we were required to base our conclusions on the best information available during the period of the investigation and within the limits prescribed by our client in the agreement.

No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information. Thus, we cannot guarantee that the investigations completely defined the degree or extent of e.g. species abundances or habitat management efficacy described in the report.



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1 Executive Summary

RPS Planning and Development Ltd was instructed by Glyndwr University to carry out an Ecological Appraisal of the land off Gatewen Road to inform a planning application for development of the site as residential units. The Ecological Appraisal was conducted in 2017, with the initial surveys at Gatewen Road conducted and completed in 2018. The report provides ecological information relevant to the site.

Recommendations for mitigation and compensation based on the protected species surveys are outlined below to negate or minimise potential ecological impacts:

Table 1: Summary of recommendations

Notable Ecological Feature	Consideration	Further Surveys Required ¹	Mitigation, Compensation and Enhancement	Optimal Timings
Bats	The site is considered to provide 'Moderate' foraging habitat for bats	No	Avoid lighting impacts to features suitable for bats such as treelines and bat boxes. Include landscaping features and planting schemes to enhance the site for local bat species (will be detailed in LEMP for the site)	During and post construction During and Post construction
	A number of bat boxes were recorded along northern boundary of site	Emergence surveys of bat boxes if recommendations cannot be met	Avoid any adverse impacts to bats such as increased lighting levels or noise disturbance to bat boxes adjacent to the northern site boundary	Prior to works
Nesting birds	Potential for nesting birds to be present in areas of scrub and trees	No	Vegetation to be cleared outside of nesting season or any areas to be affected to be checked for active nests by the ecologist prior to removal	October – February
			Introduction of bird boxes and landscape features targeting birds of conservation concern to introduce biodiversity enhancements	During works

¹ Please note that all further surveys should be completed before a planning application is submitted / works commence on site

Notable Ecological Feature	Consideration	Further Surveys Required ¹	Mitigation, Compensation and Enhancement	Optimal Timings
Badgers	Potential for badgers to excavate a sett within site Potential for badgers to cross construction site	Yes; pre-commencement inspection No	To be confirmed following results of survey Best-practice working methodologies (i.e. mammal ladders etc.)	In the two months prior to work starting During works
Reptiles	Potential for small numbers to be present in some locations across the site	No	Sympathetic vegetation clearance methods such as two-phase cut should be implemented at the site alongside supervision by an ecological clerk of works.	During works

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2 Introduction and Background

2.1 Purpose and Scope of this Report

RPS Consulting Services Ltd (RPS) was commissioned to carry out an Ecological Appraisal including bat activity transects and great crested newt (GCN) surveys of the land off Gatewen Road, Wrexham in support of a planning application for the residential development of the site.

This report is based on a review of the development proposals provided by the client, desk study data (third party information) a survey of the site and initial protected species surveys. This report pertains to these results only; recommendations included within this report are the professional opinion of an experienced ecologist, based on their personal interpretation of legislation and planning policy.

The study area is defined as shown in Figure 1 and the Phase 1 Habitat plan (Appendix A) plus a buffer zone extended to include the Zone of Influence (Refer to Section 2.3) of the proposals (hereafter referred to as the “site”).

The aims of this report are to:

- Classify the habitat types at the site based on standard Phase 1 Habitat survey methodology (JNCC, 2010);
- Evaluate any potential for protected species to be present;
- Identify any significant ecological impacts likely to result from the proposed development;
- Conduct GCN presence/absence surveys and eDNA collection;
- Conduct bat activity surveys to establish the level of bat activity at the site, the features used and species present, and;
- Provide recommendations for any further surveys that might be required, for example to confirm presence/likely absence of protected species, which would need to be proven in order for a planning decision to be concurrent with current planning policy.

This report pertains to these results only; recommendations included within this report are the professional opinion of an experienced ecologist and therefore the view of RPS. The surveys and desk-based assessments undertaken as part of this review and subsequent report including the Ecological Appraisal Notes are prepared in accordance with the British Standard for Biodiversity Code of Practice for Planning and Development (BS42020:2013).

2.2 Proposed Site Plans

Current proposals are for the development of approximately 110 residential units and associated infrastructure. Approximately 4.8 hectares of open grassland would be lost to facilitate the works with existing trees being retained under the current proposals.

The currently proposed site plan is provided in Appendix B.

2.3 Zone of Influence

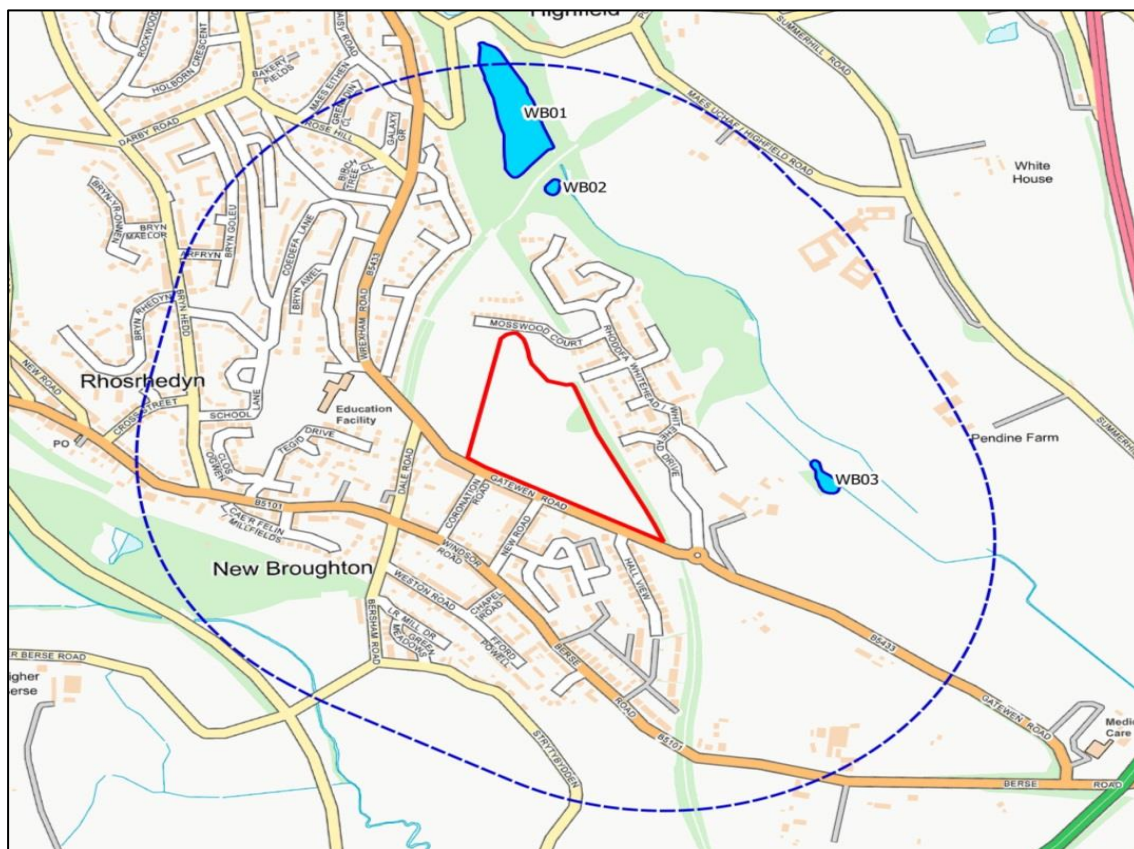
The term Zone of Influence is used to describe the geographic extent of potential impacts of a proposed development. The Zone is determined by the nature of the development and also in relation to individual species, depending on their habitat requirements, mobility and distances indicated in any best practice guidelines.

For this site, the Zone of Influence is considered to be land on and immediately adjacent to the site and, specifically in respect of great crested newts *Triturus cristatus*, land within 500m of the site boundary as illustrated on the location plan.

2.4 Site Context and Location

The site comprises approximately 4.8ha of open pasture with tree lined boundaries and small copses to the north west of Wrexham, central grid reference SJ 31259 51578. At the time of

Figure 1: Site location plan (red line denotes site location and dotted blue line illustrates the zone of influence)



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Aerial imaging was also reviewed to assess the site in relation to its context in the wider landscape. The site forms part of a mosaic of habitats within a mixed-use landscape. Lines of trees and areas of woodland provide connectivity to distant parcels of woodland and water features. An ongoing residential development site also sits to the immediate east of the site and has been subject to ecological surveys and mitigation.

2.5 Legislation and Planning Policy

2.5.1 General

Articles of British wildlife and countryside legislation, policy guidance and both Local and National Biodiversity Action Plans (BAPs) are referred to throughout this report. Their context and application are explained in the relevant sections of this report. The relevant articles of legislation are:

- The National Planning Policy Framework (NPPF, 2018);
- ODPM Circular 06/2005 (retained as Technical Guidance on NPPF 2018);
- Local planning policies (Wrexham City Council);
- The Conservation of Habitats and Species Regulations 2017;
- The Wildlife and Countryside Act 1981 (as amended);
- EC Council Directive on the Conservation of Wild Birds 79/409/EEC;
- National Parks and Access to the Countryside Act 1949;
- The Protection of Badgers Act 1992;

- The Countryside and Rights of Way Act 2000;
- The Hedgerow Regulations 1997;
- The Natural Environment and Rural Communities Act 2006; and
- Local Biodiversity Action Plan for Wrexham.

Under the National Planning Policy Framework 2018 the presence of any protected species is a material planning consideration. The Framework states that impacts arising from development proposals must be avoided where possible or adequately mitigated/compensated for and that opportunities for ecological enhancement should be sought.

2.5.2 Great Crested Newt (GCN)

GCN are fully protected under Schedule 2 of the Conservation of Species and Habitats Regulations (2010) and Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Combined, these acts make it an offence to:

- Kill, injure or take a great crested newt (or attempt to);
- Destroy any place where they live or breed;
- Damage any one of the above places (or any part of it);
- Obstruct access to these places;
- Disturb a great crested newt in any place it uses for shelter;
- Disturb the species such that it affects its ability to hibernate or migrate;
- Sell/exchange (or offer for sale/exchange) any part of a great crested newt, live or dead.

Offences can be deliberate, intentional or reckless and penalties for any of the above include fines of up to £5k and imprisonment of up to 6 months, per animal affected.

At the local level, the site falls within the area covered by the Wrexham Biodiversity Action Plan (WBAP), in which GCN are identified as a Priority Species. GCN are also listed in Section 41 of the NERC Act 2006 as Species of Principal Importance; national objectives and targets include the maintenance of the geographical range and viability of existing great crested newt populations to ensure that it remains in favourable conservation status.

Under the NPPF the presence of a protected species such as GCN is a material planning consideration. The Framework states that impacts on protected species arising from development proposals must be avoided where possible or adequately mitigated for and that opportunities for ecological enhancement should be sought.

2.5.3 Bats

All UK species of British bats are fully protected under *The Conservation of Habitats and Species Regulations 2017* (as amended). The Regulations prohibit:

- Intentionally, recklessly or deliberately kill, injure or take a bat;
- The deliberate disturbance of any bat species in such a way as to be significantly likely to affect:
 - Their ability of to survive, hibernate, migrate, breed, or rear or nurture their young;
 - or;
 - The local distribution or abundance of that species.
- Damage or destruction of a breeding site or resting place (roost);
- The possession or transport of bats or any other part of.

Bats are also protected under the *Wildlife and Countryside Act 1981* (as amended) through their inclusion in Schedule 5. Under the Act, they are protected from:

- Intentional or reckless disturbance (at any level);

- Obstruction of access to any place of shelter, breeding or rest;
- Selling, bartering or exchange of these species, or parts of.

Seven British bat species are listed as Species of Principal Importance (SPI) under the *Natural Environment and Rural Communities (NERC) Act 2006*. These are barbastelle *Barbastella barbastellus*, Bechstein's *Myotis bechsteinii*, noctule *Nyctalus noctula*, soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared *Plecotus auritus*, greater horseshoe *Rhinolophus ferrumequinum* and lesser horseshoe *Rhinolophus hipposideros*.

2.5.4 Badger

Badgers are protected under the Protection of Badgers Act 1992. This act is based on the need to protect badgers from baiting and deliberate harm or injury. The act makes it an offence to:

- Wilfully kill, injure, take, possess or cruelly ill-treat a badger, or attempt to do so;
- Intentionally or recklessly interfere with a sett. Sett interference includes disturbing badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access routes.

A sett is defined as “any structure or place that displays signs indicating current use by a badger”.

2.5.5 Birds

The Wildlife & Countryside Act 1981 (as amended) protects wild birds, their nests and young. The Act makes it an offence to intentionally or recklessly kill, injure or take any wild bird, or damage or destroy the nest whilst being built or in use, or the eggs of breeding birds. Species listed on Schedule 1 of the Act, including barn owl, are further protected to include the intentional or reckless disturbance of birds and their dependant young whilst at or near the nest as an offence.

3 Methodology

3.1 Impact Appraisal

The overall ecological appraisal is based on the standard best practice methodology provided by the Guidelines for Preliminary Ecological Appraisal (CIEEM, 2018). The assessment identifies sites, habitats, species and other ecological features that are of value based on factors such as legal protection, statutory or local site designations such as Sites of Special Scientific Interest (SSSI) or Local Wildlife Sites (LWS) or inclusion on Red Data Book Lists or Biodiversity Action Plans.

The assessment also refers to planning policy guidance (e.g. NPPF) where relevant to relate the value of the site and potential impacts of development to the planning process, identifying constraints and opportunities for ecological enhancement in line with both national and local policy.

The methodology for evaluation of the nature conservation value of ecological features affected by development (ecological receptors) is adapted from the current Chartered Institute of Ecology and Environmental Management Guidelines for Ecological Impact Assessment (CIEEM, 2018). These guidelines recommend assignment of value (or potential value) to ecological receptors in accordance with the following scale:

- I. International;
- II. UK;
- III. National (i.e. England/Northern Ireland/Scotland/Wales);
- IV. Regional;
- V. County (or Metropolitan - e.g. in London);
- VI. District (or Unitary Authority, City, or Borough);
- VII. Local or Parish; and/or
- VIII. within immediate zone of influence only.

Following on from the above, potential constraints to development are identified on that basis, with recommendations for further, more detailed surveys made as appropriate, for example to fully investigate botanical value or to confirm presence/likely absence of a protected species.

In appraising any impacts, the review considers the client's site proposals and ensures any subsequent recommendations made are proportionate and appropriate to the site and have considered the Mitigation Hierarchy as identified below:

Avoid: Provide advice on how the development may proceed by avoiding impacts to any species or sites by either consideration of site design or identification of an alternative option.

Mitigate: Where avoidance cannot be implemented, mitigation proposals are put forward to minimise impacts to species or sites as a result of the proposals. Mitigation put forward is proportionate to the site.

Compensate: Where avoidance cannot be achieved, any mitigation strategy will consider the requirements for site compensatory measures.

Enhance: The assessment refers to planning policy guidance (e.g. NPPF) to relate the ecological value of the site and identify appropriate and proportionate ecological enhancement in line with both national and local policy.

When describing impacts on ecosystem structure and function, reference is made to the following aspects where appropriate:

- I. extent;
- II. magnitude;
- III. duration;
- IV. reversibility;
- V. timing and frequency; and
- VI. cumulative effects.

Understanding the nature of the impact enables determination of the effect on the ecological integrity of the ecological receptor. This in turn is assessed against the importance of the receptor to determine the significance of the effect on nature conservation interests as being (i) not significant, or (ii) a significant positive or adverse impact.

3.2 Desk Based Assessment

Data regarding statutory and non-statutory designated sites, plus any records of protected or notable species and habitats was obtained from the local ecological records centre and online resources, details of which are provided in Table 2 below.

Table 2: Consulted resources

Consultee/resource	Data sought		Search radius from boundary
Cofnod – North Wales Environmental Information Service	Site designations, protected/notable species records		2km
www.magic.gov.uk ²	Statutory Site Designations	International	5km
		National	2km
	NERC 2006 Habitats of Principal Importance		1km

3.3 Phase 1 Habitat Survey

An extended Phase 1 Habitat survey of the site was carried out on 10th May 2017. Habitats were described and mapped following standard Phase 1 Habitat survey methodology (JNCC, 2010), which categorises habitat type through the identification of individual plant species, botanical community and habitat conditions.

Nomenclature follows Stace (Stace, 2010) for vascular plant species and uses the DAFOR scale for relative abundance (D = dominant, A = abundant, F = frequent, O = occasional and R = rare/infrequent).

3.3.1 Surveyor

The habitat survey was carried out by Joseph Dance BSc Hons GradCIEEM and Michelle Cullimore-Pike BSc (Hons) MSc. Both have been professional ecologists for over three years and are appropriately experienced to carry out this type of survey.

The protected species surveys were led by Phillipa Mudd BSc (Hons) MSc and assisted by Rose Poston-Saynor and Lucy Boyer. Phillipa has been a professional ecologist for three years and is appropriately qualified to carry out these types of survey.

3.3.2 Hedgerow Assessments

Hedgerows on site were assessed using the Hedgerow Evaluation and Grading System (HEGS) (Clements & Tofts, 1992). This method of assessment includes noting canopy species composition, associated ground flora and climbers, structure of the hedgerow including height, width and gaps, associated features including number and species of mature trees, banks, ditches and grass verges.

Each hedgerow is given a grade using HEGS with the suffixes '+' and '-', representing the upper and lower limits of each grade respectively. These grades represent a continuum on a scale from 1+ (the highest score and denoting hedges of the greatest nature conservation priority) to 4- (representing the lowest score and hedges of the least nature conservation priority) as follows:

- Grade 1 – High to very high value
- Grade 2 – Moderately high to high value
- Grade 3 – Moderate value

² Multi Agency Geographic Information for the Countryside Interactive GIS Map.

- Grade 4 – Low value

Hedgerows graded 1 or 2 are considered to be a priority for nature conservation.

The hedgerows were also assessed against the Wildlife and Landscape criteria contained within The Hedgerow Regulations 1997 to determine whether they qualified as ‘Important Hedgerows’ under the Regulations. This was achieved using a methodology in accordance with both the Regulations and DEFRA guidance.

3.4 Protected / Notable Species Scoping

The habitats on site were assessed for their suitability to support any legally protected or notable species that may present constraints to the proposed development. This includes invasive non-native plant species such as Japanese knotweed *Fallopia japonica*, giant hogweed *Heracleum mantegazzianum* and Himalayan balsam *Impatiens glandulifera*.

Any incidental sightings of individual species or field signs such as footprints, latrines or feeding remains identified during the survey were noted.

3.4.1 Great Crested Newt (GCN)

Environmental DNA

Environmental DNA (eDNA) testing is a survey technique that can determine the presence or absence of great crested newt (GCN) in ponds. GCN DNA is released into aquatic environments through shed skin cells, urine, faeces and saliva. It can persist in water for several weeks and a test has been developed for detecting the eDNA of the species in water samples.

Water samples must be gathered between 15th April and 30th June and sent to an accredited laboratory³ for analysis, which can take up to several weeks. To avoid potential timing issues associated with the processing of the eDNA, presence/absence surveys were conducted alongside testing to avoid delays if a positive result was received. The survey methods and conditions are detailed below.

Presence / Likely Absence Surveys

The survey followed industry standard best practice guidelines (English Nature, 2001) and comprised two survey visits during the period May to June 2018.

The survey methods comprised a combination of the following approaches:

- Torching – 1 million candlepower torches was used to illuminate the pond after dusk and any amphibians seen were recorded. Particular attention was paid to any marginal vegetation or potential display areas within the pond;
- Bottle trapping – bottle traps were placed along the accessible margins of areas of open water around the edge of the pond, approximately every 2m. Traps were set early in the evening and collected early the following morning. Any animals captured were identified and immediately released back into the pond.
- Egg search – vegetation along the water margin was searched for the presence of newt eggs. Due to the invasive nature of this survey method, egg searching is discontinued following discovery of the first GCN egg in any pond.

Where any of these above methods was not possible, then netting was used as an alternative. Environmental variables such as overnight temperature, turbidity of water and vegetation cover were noted on survey forms.

³ An accredited laboratory analyses eDNA according to Technical Advice Note WC1067 and participates in Natural England’s Proficiency Testing Scheme.

Numbers of any GCN encountered were recorded on each occasion, together with life-stage (adult/juvenile) and sex, where this could be determined.

In accordance with Natural England guidance, the highest adult count from the six visits/per metapopulation recorded was then used to estimate GCN population size class. Population size classes are defined as follows:

- Small: maximum counts of up to 10 adults;
- Medium: maximum counts between 11 and 100 adults;
- Large: maximum counts of over 100 adults.

Records of other species were also noted, including any fish or common amphibians, such as smooth newt *Lissotriton vulgaris* or palmate newt *L. helveticus*, common frog *Rana temporaria* and common toad *Bufo bufo*.

Table 3: Survey visit dates and weather conditions

Visit	Date	Min overnight temp	Weather
1	29 th May 2018	13°C	6/8cc, no rain, B1
2	6 th June 2018	12°C	2/8cc, no rain, B1

3.4.2 Bats

Nocturnal Bat Activity Surveys (Transect and Automated Monitoring)

The overall value of the site for foraging and/or commuting bats was assessed based on the occurrence and connectivity of suitable habitat features, as detailed in the standard best practice methodology (Collins, 2016). A summary of the site value assessment and associated habitat features are outlined in Table 4 below.

Table 4: Assessment of site value for bats, based on the occurrence of habitat features

	Description of feature
Low	No features likely to be used by bats (for roosting, foraging or commuting) Small number of potential (opportunistic) roost sites (i.e. probably not maternity roosts or hibernacula).
Increasing site value for bats	Isolated habitat that could be used by foraging bats (e.g. a lone tree or patch of scrub – not parkland)
	Isolated site not connected by prominent linear features to suitable adjacent/other foraging habitat
	Several potential roost sites in buildings, trees or other structures
	Habitat could be used by foraging bats (e.g. trees, shrub, grassland or water)
High	Site is connected with the wider landscape by linear features that could be used by commuting bats (e.g. lines of trees and scrub or linked gardens)
	Buildings, trees or other structures (e.g. mines, caves, tunnels, ice houses and cellars) of particular significance to roosting bats
	Site includes habitat of high quality for foraging bats (e.g. broadleaved woodland, tree-lined watercourses and grazed parkland)
	Site is connected with the wider landscape by strong linear features that could be used by commuting bats (e.g. river valleys, streams, hedgerows)
Confirmed presence ▼	Site is close to known roosts
	Bats recorded or observed using an area for foraging or commuting close to a potential roost
	Evidence indicates that a building, tree or other structure is used by bats (e.g. bats seen roosting or observed flying from a roost or freely in the habitat; droppings, carcasses, feeding remains etc. found; and/or bats heard 'chattering' inside a roost on a warm day or at dusk.

Transect Surveys

A nocturnal transect route taking in all the habitat types at the site was devised. The surveyors were equipped with a hand-held BatBox Duet II bat detector for identification of bats in the field and an EM3+ with the capability to record bat calls for later sonogram analysis.

The transect commenced at sunset and continued for approximately 2 hours. Fixed point counts were taken for periods of approximately five minutes at appropriate intervals during each transect to effectively assess activity within different areas at the site. Table 5 below shows the survey dates and conditions for each of the transects undertaken.

Table 5: Summary of survey dates and conditions for walked transects

Date	Surveyors	Start / end time	Sunrise / sunset time	Survey conditions
15.06.18	Rose Poston-Saynor & Amy Tose	21:39 – 23:44	21.39	1/8cc, B1, 14°C, no rain
12.09.18	Amy Tose & Amy Sherwin	19.35 – 21.35	19.35	0/8cc, B1, 11°C, no rain
23.10.18	Amy Tose & Amy Sherwin	17.59 – 19.55	17.59	8/8cc, B1, 16°C, no rain

Static Monitoring

Two Anabat SD2 automated bat detectors were left in situ at the site to record bat calls at two specific points along the transect route for a period of 5 days. Details of the static locations can be found in Appendix C with the survey dates and timings outlined in Table 6 below.

Table 6: Summary of Survey Dates and timings for Static Monitoring

Dates	Start / end time	Sunrise / sunset time
15.06.18 – 19.06.18	21:09 – 05:15	Sunset: 21.39, Sunrise: 04:45
12.09.18 – 16.09.18	19.05 – 07.11	Sunset: 19.35, Sunrise: 06.41
23.10.18 – 27.10.18	17.29 – 07.53	Sunset: 17.59, Sunrise: 07.23

3.5 Limitations

3.5.1 Desk Based Assessment

The desk study data is third party controlled data, purchased for the purposes of this report only. RPS cannot vouch for its accuracy and cannot be held liable for any error(s) in this data.

3.5.2 Survey

It should be noted that whilst every effort has been made to provide a comprehensive description of the site, no investigation could ensure the complete characterisation and prediction of the natural environment.

The protected/notable species assessment provides a preliminary view of the likelihood of these species occurring on the site, based on the suitability of the habitat, known distribution of the species in the local area provided in response to our enquiries and any direct evidence on the site. It should not be taken as providing a full and definitive survey of any protected/notable species group.

The entirety of the land within 30m of the site's boundaries could not be directly accessed to survey so a thorough visual inspection was made where views permitted.

Due to the late commission of the GCN presence/absence surveys, the two surveys conducted on the ponds at Gatewen Road were not conducted during the peak survey window of mid-April to mid-May. Given that eDNA testing provided a negative result for GCN presence within the ponds, the slight delay in presence/absence surveys is not considered to be a significant constraint.

3.5.3 Accurate Lifespan of Ecological Data

The majority of ecological data remain valid for only short periods due to the inherently transient nature of the subject. The survey results contained in this report are considered accurate for two years, notwithstanding any considerable changes to the site conditions.

4 Results

4.1 Desk Based Assessment

Two statutorily designated sites were recorded within the search area identified in Section 3.1. Details of these are provided in Table 7 below.

Table 7: Statutory designated sites

Site name	Designation	Location	Brief description
Gatewen Marsh	SSSI ⁴	220m E	Significant example of the “southern mesotrophic mires” wetland type
Johnstown Newt Sites	SAC ⁵	4.1km S	Noted for its nationally significant Great Crested Newt (GCN) population

Five non-statutorily designated sites were also identified, details of which are provided in Table 8.

Table 8: Non-statutory designated sites

Site name	Designation	Location	Brief description
Moss Valley (site ref: W311)	LWS ⁶	50m to N	Well wooded valley slopes with adjoining grassland
New Broughton Meadow (site ref: W334)	LWS	280m to SW	Site with variety of semi-natural habitats, including pond and wet alder/willow carr
Berse Drelincourt (site ref: W335)	LWS	650m to S	Small site with mosaic of semi-natural habitats, including grassland and woodland with a stream
Higher Berse Marsh (site ref: W333)	LWS	680m to SW	Marsh and marshy grassland
Afon Gwenfro (site ref: W213)	LWS	1km to W	Reclaimed coal site with grasslands and scrub

The closest NERC (2006) Habitat of Principal Importance is deciduous woodland, located c. 50m from the survey area.

Protected species records were received from COFNOD. A summary of the records considered most relevant to the site are provided in Table 9. A full species list is available on request.

Table 9: Summary of protected and notable species records

Species	Most Recent record	Closest Record to Site	Total Number of Records	Conservation Status
Amphibians				
Great crested newt	2017	270m to N	113	Fully protected EPS7, NERC 2006
Palmate newt	2017	270m to N	2	Partially protected under WCA 1981 ⁸

⁴ SSSI - Site of Special Scientific Interest

⁵ SAC - Special Area of Conservation

⁶ LWS - Local Wildlife Site

⁷ European Protected Species (EPS), protected by the Conservation of Habitats and Species Regulations 2010 (as amended) and the wildlife and countryside act 1981

⁸ Protected from sale and advertising for sale under the Wildlife and Countryside Act 1981 (as amended)

Species	Most Recent record	Closest Record to Site	Total Number of Records	Conservation Status
Smooth newt	2017	1.2km to NNE	47	Partially protected under WCA 1981
Reptiles				
Common lizard	2010	1.6km to NE	1	Partially protected under WCA 1981 ⁹ , NERC 2006
Birds				
Bullfinch	2017	450m to ESE	6	Amber List (BoCC ¹⁰)
Mistle thrush	2015	480m to NW	6	Red List (BoCC)
Song thrush	2015	480m to NW	9	Red List (BoCC)
Starling	2015	480m to NW	7	Red List (BoCC)
Swift	2015	480m to NW	21	Amber List (BoCC)
Tree sparrow	2013	480m to NW	1	Red List (BoCC)
Dunnoch	2015	640m to SSW	10	Amber List (BoCC)
House sparrow	2016	640m to SSW	13	Red List (BoCC)
Kestrel	2016	640m to SSW	7	Amber List (BoCC)
Cuckoo	2013	1.8km to ENE	4	Red List (Birds of Conservation Concern – BoCC)
Mammals				
Soprano pipistrelle	2015	Adj. to site ¹¹	3	Fully protected EPS, NERC 2006
Common pipistrelle	2013	0.4km to NW	9	Fully protected EPS
Unknown bat species	2002	0.5km to NW	5	Fully protected EPS
Noctule	2015	0.6km to SSE	1	Fully protected EPS, NERC 2006
Badger	2017	Location confidential however, records were over 600m from site	8	PBA ¹²

Full species records are available to view upon request.

4.2 Phase 1 Habitat Survey Results

The site was dominated by species-poor pasture but also contained a narrow range of several different habitat types, as described under the individual sub-headings below. No protected, notable or invasive plant species were recorded.

4.2.1 Dense Scrub

Several patches of this habitat type were recorded around the boundaries of the site; most notably along the northern boundary where the marginal vegetation of the adjacent woodland had spilled over the fencing into the site; see Figure 3. These areas were largely dominated by hawthorn *Crataegus monogyna* but with some occasional blackthorn *Prunus spinosa*. Other occasional species within this compartment were elder *Sambucus nigra*, bramble *Rubus fruticosus* agg., holly *Ilex aquifolium*, hazel *Corylus avellana* with some sycamore *Acer pseudoplatanus* and hornbeam *Carpinus betulus* trees. The ground flora in this area was noted to comprise Spanish or

⁹ Protected from killing and injury under the Wildlife and Countryside Act 1981 (as amended)

¹⁰ Birds of Conservation Concern

¹¹ A small soprano pipistrelle roost was recorded in a disused railway bridge adjacent to the site in 2007; this roost was subsequently dismantled

¹² Protection of Badgers Act 1992

hybrid bluebells *Hyacinthoides sp.*, wild mustard *Sinapis arvensis*, hedge bindweed *Calystegia sepium*, common hogweed *Heracleum sphondylium*, cleavers *Galium aparine* and dog's mercury *Mercurialis perennis*. The woodland adjacent to the site was outside of the site's boundaries so was not surveyed.

A small strip of dense bramble scrub was also noted along the southern boundary of the site adjacent to Gatewen Road.

Figure 2: Dense scrub along northern boundary of site



4.2.2 Scattered Scrub

Small patches of loose hawthorn scrub were noted along the western boundary of the site adjacent to the fence line. Another patch of scattered scrub was noted in the centre of the site, growing on a west-facing bank. The species present in this area were hawthorn, elder, immature ash *Fraxinus excelsior* and sycamore trees and saplings and some blackthorn. The ground cover in this area varied between bare earth and grassland but with some dense patches of wild garlic *Allium ursinum* and native bluebells *Hyacinthoides non-scripta*; see Figure 4 below for an overview of this area.

The remnants of a red brick building were also recorded within this area and this area is discussed, along with photographs, in Section 4.3 of this report. For location see Target Note 01 (TN01) in Appendix A.

Figure 3: Scattered scrub in centre of site



4.2.3 Scattered Broad-leaved Trees

A small copse of broad-leaved trees was recorded along the eastern boundary of the site and was an extension of the woodland which ran along the entirety of the eastern boundary; see Figure 5. The species present within the copse were sycamore, ash and oak *Quercus sp.*, with a ground cover of sparse elder and hawthorn. The remnants of an old red brick circular structure were also recorded in this area; a photograph and discussion of this feature is provided in Section 4.3. For location see TN02 in Appendix A.

Figure 4: Scattered broad-leaved trees



4.2.4 Improved Grassland

This habitat type dominated the coverage of the site and the structure of the grassland was predominantly short-sward but with some unmanaged areas that had a richer diversity of species. The field was subject to regular horse grazing, with horses recorded present during the summer surveys up until October. The species composition was dominated by meadow buttercup *Ranunculus acris* and meadow foxtail *Alopecurus pratensis* with frequent cock'sfoot *Dactylis glomerata*, creeping buttercup *Ranunculus repens*, ribwort plantain *Plantago lanceolata* (locally abundant), greater plantain *Plantago major*, ragwort *Jacobaea vulgaris*, daisy *Bellis perennis*, red clover *Trifolium pratense* (locally abundant), common sorrel *Rumex acetosa*, Yorkshire fog *Holcus lanatus*, sweet vernal grass *Anthoxanthum odoratum* (locally abundant, most notably in the northwest), common mouse-ear *Cerastium fontanum*, chickweed *Stellaria media*, dandelion *Taraxacum officinale* sp., yarrow *Achillea millefolium*, forget-me-not *Myosotis* sp., speedwell *Veronica* sp., and some cow parsley *Anthriscus sylvestris* around the margins.

Figure 5: Improved grassland



4.2.5 Tall Ruderal Vegetation

Narrow strips of this habitat type were noted along the southern boundary of the site and also around the perimeter of the scattered scrub in the centre of the site. The species present were common nettle *Urtica dioica*, broad-leaved dock *Rumex obtusifolius*, meadow buttercup, creeping thistle *Cirsium arvense* and common hogweed.

Figure 6: Tall ruderal vegetation along southern boundary of site



4.2.6 Wall / Fence

A combination of post-and-wire and post-and-rail fencing comprised the boundaries of the site and the walls of a partially-demolished brick structure were also recorded within the site; see Figures 8 and 9.

Figure 7: Post-and-wire fence along western boundary of site



Figure 8: Wall within site



4.3 Protected / Notable Species Assessment

4.3.1 White-clawed Crayfish, Water Vole and Otter

No aquatic habitat with the potential to support white-clawed crayfish, water vole and otter was recorded either within or adjacent to the site and the likelihood of the presence of these species within the site is, therefore, considered to be negligible. There would be no adverse impacts on these species as a result of any development within the site and there is no recommendation for further survey, mitigation or licensing. These species will not be considered further in this report.

4.3.2 Great Crested Newt (GCN)

Terrestrial Habitat Assessment

During the initial PEA conducted in 2017 (RPS, 2017 ref: OXF10388_02), a total of three standing bodies of water were identified within the 500m Zone of Influence. Of these waterbodies, WB02 had previously been subject to presence/absence surveys for GCN in 2007 in relation to an adjacent development¹³. A single GCN was recorded in this waterbody across the survey visits and as a result, a GCN mitigation licence was acquired in order for the adjacent development at the former colliery site to proceed (development ref: BRO P/2008/1066 and BRO P/2007/0700). WB01 and WB03 were not previously surveyed. The desk study also highlighted the widespread presence of this species in the surrounding landscape. The mitigation package for the adjacent colliery development site included details for the provision of waterbodies which were identified as retention ponds during the 2018 surveys. Of these ponds, only one contained water at the time of the surveys and this pond was added to the survey effort.

The grassland across the site was considered to be of little value to GCN due to the short-sward and open nature, but the areas of dense scrub and woodland along the northern boundaries of the site were considered to provide suitable commuting corridors and foraging habitat. In addition, the rubble piles and brick foundations associated with the brick structures within the site were also considered to provide suitable refugia and hibernacula sites.

Presence / Absence and eDNA

During the presence/absence surveys, no GCN were recorded within any of the ponds identified within 500m of the proposed development. In conjunction, the results of the eDNA testing for all four ponds was negative. Results of the eDNA testing can be found in Appendix D.

4.3.3 Bats

Buildings and Trees

None of the built structures or trees within the site boundary contained any features with the potential to support roosting bats and they were, therefore, considered to provide **Negligible** roosting potential. The mature trees outside of the southern and northern boundaries of the site were not fully inspected to ascertain their potential to support roosting bats so the presence of roosting bats within these trees cannot be ruled out.

A number of bat boxes (both summer roost and hibernation roost boxes) were recorded on trees adjacent to the northern boundary of the site; see Figure 10 below (for approximate location see TN03 in Appendix A). Some of these boxes are likely to have been installed in association with the mitigation package for the licence associated with the adjacent development site. A review of the documentation for the adjacent development showed the mitigation was compensation for a small soprano pipistrelle roost which was present within a disused railway bridge adjacent to the site that was subsequently removed as part of the works.

¹³ Report ref: Hiremade Furbs and Fifers 11 Ltd – Gatewen Colliery, Wrexham: Great Crested Newt Mitigation Strategy – Background and Supporting Information – dated February 2009.

Figure 9: Bat boxes adjacent to site



Bat Foraging Habitat

The majority of the site was open, short-sward grassland which was considered to provide very low value for foraging and commuting bats. The northern and part of the southern boundary of the site was tree-lined and connected to the adjacent woodland, providing suitable bat foraging corridors. The areas of trees and scrub within the site were also noted for their suitability for foraging/commuting bats.

Based on the presence of suitable foraging habitat within the site and connectivity to adjacent land through strong linear features, the site was assessed as providing **Moderate** value for foraging bats and as such, monitoring surveys were undertaken.

Nocturnal Transect and Static Bat Surveys

A team of two surveyors walked a predetermined transect route around the site, walking both the perimeter and intersecting hedgerows. Point counts were conducted at approximately 30-minute intervals.

The surveys followed Bat Conservation Trust (BCT) Good Practice Guidelines and were coordinated by a licenced bat worker. Surveyors were equipped with a BatLogger bat detector with recording capability and GPS tracking capabilities.

The route of each transect is depicted in Appendix C along with the locations of the bat calls recorded during the surveys. Not all bat activity was observed (i.e. bats heard but not seen) and whilst the location of the bat recording has been mapped, this reflects the position of the recording device and only an approximate location of individual bats.

Transect Survey Results

A total of four bat species were recorded during the transect surveys. These species comprised common pipistrelle *Pipistrellus pipistrellus*, Soprano pipistrelle *Pipistrellus pygmaeus*, Noctule *Nyctalus noctula* and *Myotis* sp..

During the transect surveys a total of 78 bat calls were detected. Of the calls recorded, the majority of bat activity within the site to date can be attributed to common pipistrelle (38 calls) with Soprano pipistrelle being the second highest call rate at 32 calls over the three transects. Noctule were recorded 7 times during the transect surveys with a single call attributed to *Myotis* sp..

The results of the surveys are summarised in Table 10 below.

Table 10: Summary of transect data

Month	Common pipistrelle	Soprano pipistrelle	Noctule	Myotis sp.	Total number of passes per transect
June	15	4	1	0	20
September	16	25	6	1	48
October	7	3	0	0	10
Total passes/species	38	32	7	1	
Average passes/species	12.6	10.6	2.4	0.4	
% of bat passes/species	49	41	9	1	

Static Monitoring

Static monitoring devices (Anabat SD2) were positioned in different locations around the site (see Appendix C) in order to give an accurate representation of bat activity within the site. The static detectors were deployed on three occasions for a minimum of five nights per survey. Table 11 provides details of the total bat passes recorded during the static monitoring surveys and the species recorded.

Table 11: Summary of static monitoring results

Survey Period	Common pipistrelle	Soprano pipistrelle	Noctule	Myotis sp.	Total bat passes
9.10.2017-23.10.2017	3,482	311	2	7	3,802
12.09.18 – 16.09.18	823	287	9	6	1,125
23.10.18 – 27.10.18	26	56	0	0	82
Total	4,331	654	11	13	5,009
Average passes/species/night	289	44	<1	<1	
Average passes/species/hour	24	4	<1	<1	
Percentage of bat passes/species	86	13	<1	<1	

The results of the activity surveys and monitoring suggest that common pipistrelle comprised the largest percentage of bat activity (86%) recorded within the site, with soprano pipistrelle, noctule and *Myotis* collectively comprising less than 15% of the activity recorded during the surveys. In order to assess bat activity at the site, the total number of bat calls was divided by the total number of survey hours. The resulting figure can be used to assess the bat activity per species within the site. The results suggest that the bat activity and utilisation of the site by soprano pipistrelle, noctule and *Myotis* populations are low¹⁴, whilst common pipistrelle activity at the site was considered to be moderate.

¹⁴ Based on criteria outlined in a report by Enzygo Environmental Consultants, 2016.

The results of the activity surveys were then used to calculate the value of the foraging and commuting routes the site provided for the bat species recorded using criteria set out by Wray *et al.* (2010). The results suggested the site was of value on a district, local or parish scale, as opposed to being of regional or national importance.

4.3.4 Birds

The majority of the site comprised short-sward grassland which was considered to be unsuitable for all species of nesting birds, although this grassland would provide suitable foraging habitat for a range of red-listed species such as song thrush, starling (a number of young fledglings were observed in trees on the northern boundary of the site), mistle thrush and over-wintering Schedule 1 species such as fieldfare *Turdus pilaris* and redwing *Turdus iliacus*.

The areas of scattered/dense scrub within the site and trees directly adjacent to it were considered to provide suitable habitat for a range of nesting birds, with a number of records returned in the desk study including species listed under the Amber and Red List of Birds of Conservation Concern.

4.3.5 Badgers

No evidence of badger such as setts, latrines or snuffle holes were recorded during the survey, however the site is considered to have some limited habitat for sett excavation, with the adjacent woodland considered to provide suitable habitat for sett excavation. The grassland across the site was also considered to provide suitable foraging habitat for this species.

4.3.6 Reptiles

The short-sward grassland within the site was considered to be sub-optimal for all species of reptile given the lack of cover from predators. The area of scattered scrub in the centre of the site was, however, considered to provide suitable habitat for basking (i.e. in association with rubble piles) and also refugia/hibernacula. The woodland edge along the northern boundary of the site may also provide a commuting route for reptiles through the landscape. No reptiles were recorded during previous surveys of the adjacent colliery site¹⁵; with a single record of common lizard over 1.6km from the site identified in the desk study.

4.3.7 Other Notable Fauna Species

A medium-sized population of palmate newts was recorded in WB02 through the presence/absence surveys conducted in 2007 and as with GCN, the site contained habitat with the potential to support this species, but this was largely restricted to the northern boundary and areas of scattered trees and scrub within the site.

¹⁵ Report ref: Hiremade Furbs and Fifers 11 Ltd – Gatewen Colliery, Wrexham: Ecological Appraisal (dated February 2009).

5 Evaluation

5.1 Habitats and Botanical Value

5.1.1 Designated Conservation Sites (Statutory)

The closest statutorily designated site is Gatewen March SSSI located approximately 220m to the east of the proposed development. It is considered that the housing development to the north of the site provides a suitable buffer between the development and the SSSI so as to avoid any negative impacts on the marsh. Measures by which to reduce noise and dust pollution as a result of the development should be implemented at the site as good practice. The site lies within the Impact Risk Zone for the SSSI. Natural England define impact risk zones (IRZ) around each SSSI which reflect the sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts. It should be noted that the site does not fall into the criteria for developments which would require further consideration.

The SAC Johnstown Newt Site, noted for its populations of GCN, was identified over 4km from the site. Given the distance and intervening habitats it is considered the development does not pose a negative impact to the SAC nor the newt populations present.

5.1.2 Designated Conservation Sites (Non-Statutory)

The closest non-statutory site is Moss Valley LWS located approximately 50m north west from the site boundary. The housing estate to the north of the site provides a buffer between the proposed development and the LWS, therefore it is considered the LWS will not be impacted by the development. As above, Measures by which to reduce noise and dust pollution as a result of the development should be implemented at the site as good practice.

5.1.3 Semi-natural Broad-leaved Woodland

Semi-natural broad-leaved woodland was recorded outside of the site's boundary, therefore there would be no direct impacts on the habitat as a result of the development. The lighting design for the construction and operational phase of the development must, however, avoid any direct light spillage onto this habitat given its value for nocturnal species such as bats.

5.1.4 Scattered Trees

Although afforded no specific protection, the trees within the site provide an important habitat structure for wildlife and should be retained where possible, as is currently proposed. Where this is not possible, it would be best-practice to replace any tree loss on a like-for-like basis to ensure there is no net loss in the biodiversity value of the site as a result of the proposed development.

5.1.5 Landscape and Environmental Management Plan

Details of compensation, mitigation and enhancements should be provided within a Landscape and Environmental Management Plan (LEMP), as part of any reserved matters stage. The LEMP should include (as a minimum):

- a) Description and evaluation of features to be managed, enhanced and/or created
- b) Ecological trends and constraints on site that might influence management
- c) Aims and objectives of management
- d) Appropriate management options and methods of achieving aims and objectives
- e) Timescales
- f) Prescription of management actions
- g) Preparation of work schedule
- h) Details of the body or organisation responsible for implementing the plan
- i) Ongoing monitoring and remedial measures.

The plan should also include details of the legal and funding mechanism(s) by which the long-term implications of the plan will be secured.

The plan should also set out how contingencies and/or remedial action will be identified, agreed and implemented so that the development delivers biodiversity objectives.

5.2 Protected and Notable Species

5.2.1 Great Crested Newts

During surveys conducted in 2007, a small population of GCN was confirmed present in WB02 located approximately 260m to the north of the proposed site. The habitats on site are considered to offer some limited terrestrial habitat for GCN. As such, eDNA testing and two initial presence/absence surveys were conducted in 2018 on the three ponds identified in 2017, plus an additional pond identified in 2018.

The results of the eDNA testing were negative for all of the ponds surveyed, with no instances of GCN being recorded in the two presence/absence surveys conducted. As such, it is considered that GCN are not breeding in the ponds within 500m of the site and therefore it is considered unlikely GCN be present within the proposed development or negatively impacted as a result of the development.

No further investigation for GCN is considered necessary at this time.

5.2.2 Bats

Roosting

No features with the potential to support roosting bats would be directly impacted as a result of the proposed development and there would be no constraints to this regard for any removal of trees or brick structures within the site.

It is considered the bat boxes adjacent to the northern site boundary have the potential to support roosting bats. As such impacts to these boxes such as illumination or disturbance through increased noise levels/vibration should be avoided as to cause a disturbance to or negatively impact roosting bats would constitute an offence under current legislation. If impacts to these bat boxes cannot be avoided, further surveys may be required.

Foraging

The site was assessed as offering **Moderate** foraging habitat for bats. As such, activity surveys were undertaken. The results of the activity surveys and monitoring surveys suggested that the site supported Low populations of foraging and commuting soprano pipistrelle, noctule and *Myotis* and a Moderate population of foraging and commuting common pipistrelles. The foraging and commuting routes within the site were assessed as being of district, local or parish value. As such, it is considered that the value of the existing foraging and commuting habitat be retained as part of the development. Under current proposals, the treeline which forms the main habitat of value within the site (although the area of scrub is also considered to provide some low value) is to be retained as part of the development. If the treeline cannot be retained, further investigation for foraging bats may be required.

It is considered that if the development can implement a sympathetic lighting design whereby there is no increased illumination of the treeline, the development will not negatively impact local bat populations. It is considered that the details of bat mitigation and compensation to be undertaken on site be outlined in a Landscape and Environmental Management Plan (LEMP) which should be in place prior to the commencement of works on site. The plan will detail methods by which to protect the existing bat foraging at the site and enhancements by which to increase its value to foraging and commuting bats, thus resulting in a net gain for biodiversity as outlined by the NPPF 2018.

5.2.3 Nesting Birds

The vast majority of the site comprises short-sward grassland which offers negligible potential for nesting bird habitat. Development of this habitat would, therefore, have no impact on nesting birds.

The outline proposals supplied indicate the retention of the boundary features (i.e. dense scrub/trees) and habitats within the site (i.e. scattered scrub/trees) which offer suitable nesting habitat for a wide range of birds. It is therefore considered the development does not pose adverse impacts to nesting birds. Where any vegetation clearance is required during the nesting bird season (March – August inclusively) mitigation measures should be put in place to ensure no nesting birds are impacted.

It is considered the proposed development provides an opportunity to enhance the site for nesting birds through the introduction of nest boxes targeting species of conservation concern, which would otherwise not nest within the site. Similarly, the implementation of a sympathetic landscape scheme for the site would also enhance the value of the site to nesting birds.

The introduction of rear gardens would also inevitably increase the value of the site to foraging birds through the introduction of insect-attracting plants and bird feeders; enhancement measures have also been recommended in Section 6 to further increase the value of the site to foraging birds wherever possible.

If the mitigation and enhancement measures outlined in this report can be implemented in full, it is considered that there would be a net gain in the value of the site to both nesting and foraging birds.

5.2.4 Badgers

Although no evidence of badger activity was recorded during the survey, suitable sett excavation habitat was recorded within and adjacent to the site. Given the transient nature of this species it is considered badgers could move into or adjacent to the site at any time prior to development. As such, a pre-commencement survey for badgers is considered necessary before works on site are undertaken. In the event that a sett is found on site or within 30m of the proposed development, further mitigation will be required.

It is considered that badger may utilise the site for commuting purposes. As such, mitigation for the protection of badgers and other mammals, such as hedgehogs should be implemented during the construction phase.

5.2.5 Reptiles

The majority of the site was considered sub-optimal for reptiles given the nature of the grassland habitat (horse grazed short-sward) however, some limited suitable habitat for reptiles was present on site, notably along the tree line and within rubble piles. As such, any vegetation clearance or removal of brick/rubble piles within the site should be conducted in a manner so as to eliminate the potential of killing or injuring any reptiles, which would be an offence under the Wildlife and Countryside Act 1981 (as amended).

Under current proposals the majority of the suitable habitat is to be retained as part of the development, with the treeline to the north of the site being retained in such a manner as to maintain the connectivity of the site to the wider landscape. If the mitigation measures outlined in Section 6 can be implemented in full, it is considered that there would be no overall adverse impacts on local reptile populations, if present. Where the mitigation cannot be adhered to, further investigation for reptiles may be required.

5.2.6 Other Notable Faunal Species

Small populations of smooth newts were recorded within WB02 and WB04. Whilst this species is only partially protected under the Wildlife and Countryside Act, the habitats which are of value to this species (i.e. scrub/woodland) are also of value to a wide range of other fauna and any site enhancements for this species would also serve to enhance the site for wildlife in general.

6 Recommendation and Mitigation

6.1 Further Investigations Required

6.1.1 Roosting Bats

If the impacts outlined in Section 5.2.2 cannot be implemented, bat boxes should be subject to endoscope inspection by a licensed ecologist. Where inspection via endoscope is not feasible, nocturnal surveys may be required. The results of these surveys would inform any further mitigation requirements.

6.1.2 Badger

Due to the transient nature of badgers and potential time delays associated with the commencement of works on site, a pre-commencement badger check should be conducted prior to the start of works. In the event badgers are found within the site or within 30m of the development, further mitigation will apply.

6.2 Mitigation

It should be noted that the mitigation and enhancement measures outlined in this report are indicative at this stage and should be used to inform the finalised site layout and landscape scheme/management of the developed site. Once a final layout has been developed, these mitigation measures should be re-visited and made more specific where necessary to ensure that there are no residual adverse impacts on any species or species groups as a whole.

6.2.1 Herptile

Construction Phase

Sympathetic vegetation and rubble clearance methods such as two-phase cutting should be implemented and supervised by an ecological clerk of works during the construction phase of the proposed works within the site to protect any reptiles or amphibians which may be present.

Operational Phase

Consideration should also be given to the replacement of any thick scrub/shrub habitat to offset the loss of the suitable foraging/refugia habitat currently present.

Modified kerbs around gully pots should also be installed throughout the developed site to prevent the risk of herptiles (amphibians and reptiles) becoming trapped. The ACO Wildlife Kerb is a suitable example of such a kerb.

The retention of the treeline along the northern boundary will maintain the existing commuting corridor around the site and to the wider landscape, reducing the potential for habitat fragmentation and species isolation. Where the recommended enhancements can be implemented within the treeline i.e. additional planting of appropriate native shrubs and ground flora, this would be considered a net gain for herptiles.

6.2.2 Bats

Roosting Bats

It is likely that roosting bats are present within the bat boxes along the northern boundary of the site. Where impacts to these bat boxes cannot be avoided, the boxes should be checked by a licenced ecologist, or where this is not practicable, emergence surveys will be required.

Foraging Bats

Bats are adept to foraging in low light intensities, therefore it is considered the following guidance for the reduction of impacts caused by the lighting of bat roost/foraging/commuting features, in

line with the Bat Conservation Trust (BCT 2009¹⁶) should be adhered to during the construction phase:

- No direct illumination of any new or existing roost entrances, whether bat boxes or features on trees;
- Individual lamps should be hooded and directed where needed to avoid unnecessary light spillage – luminaires have been chosen to minimise light spillage and direct light onto the playing surface;
- The area affected by light spill should be considered, taking into account height of lighting columns and lighting angle – the impacts of light spillage modelled at 1.8m height has been considered;
- The use of asymmetric beam floodlights to reduce horizontal spill – as second point above; and
- Low level lighting such as LED's are preferable as they reduce the levels of light spillage (Stone, 2013).

Design recommendations for wildlife friendly lighting is included in the *Statement on the impact and design of artificial light on bats* produced by the Bat Conservation Trust (BCT) in 2011. This includes:

- Do not "over" light. This is a major cause of obtrusive light and is a waste of energy. Use only the minimum amount of light needed for safety. There are published standards for most lighting tasks, adherence to which will help minimise upward reflected light.
- Eliminate any bare bulbs and any light pointing upwards. The spread of light should be kept near to or below the horizontal.
- Use narrow spectrum bulbs to lower the range of species affected by lighting.
- Use light sources that emit minimal ultra-violet light. Insects are attracted to light sources that emit ultra-violet radiation.
- Reduce light-spill so that light reaches only areas needing illumination. Shielding or cutting light can be achieved through the design of the luminaire or with accessories, such as hoods, cowls, louvers and shields to direct the light.
- Reduce the height of lighting columns. Light at a low level reduces ecological impact. However, higher mounting heights allow lower main beam angles, which can assist in reducing glare.
- For pedestrian lighting, use low level lighting that is directional as possible and below 3 lux at ground level.
- Use embedded road lights to illuminate the roadway and light only high-risk stretches of roads, such as crossings and merges, allowing headlights to take up the slack at other times.
- Limit the times that lights are on to provide some dark periods for wildlife.
- Use lighting design computer programs and professional lighting designers to predict where light spill will occur.

Given the numbers of common pipistrelle (medium population) utilising the site and presence of a low population of light adverse bat species (*Myotis*), it is considered that the lighting plan

¹⁶ Bat Conservation Trust and Institution of Lighting Engineers (2009) *Bats and Lighting in the UK Bats and the Built Environment Series* (3rd edn.) London: The Bat Conservation Trust

required for the development should be designed in such a way as to limit impacts to existing foraging and commuting habitat. As such, it is considered that light spillage should not reach the treeline along the back of the residential gardens and should endeavour to maintain a 5m 'dark corridor' in order to retain the features for local bats. As it is considered difficult to demonstrate complete darkness, it would be considered this be achieved where luminance is below 0.2lux on the horizontal plane and below 0.4lux on the vertical plane. Lighting at these levels is considered to be lower than those on a moonlit night and have been shown to be acceptable for light adverse bat species such as *Myotis* (BCT 2018).

Currently, no lighting plan for the proposed development has been submitted for review. As such it is recommended that any proposed lighting plan for the development be reviewed by an ecologist prior to implementation. It is strongly recommended that the submission of the lighting plan for review by an ecologist be added as a condition of planning by the LPA.

6.2.3 Nesting Birds

The trees and scrub present on site is considered to provide suitable habitat for nesting birds. As such, any vegetation removal should be conducted outside of the nesting bird season (March-August inclusively) to avoid disturbance to nesting birds which would constitute an offence under the Wildlife and Countryside Act 1981 (as amended). Where this is not possible, any clearance of suitable vegetation should be preceded by a nesting bird check conducted by a suitably qualified ecologist.

6.2.4 Badgers

It is considered that badgers and other mammals may use the site for commuting purposes. It is therefore recommended that the following precautions are observed during construction:

- Mammal ladders (such as a plank) or earth ramps to be placed in any open excavations at the end of each day;
- Any open pipework to be capped overnight to prevent larger mammals such as badger from accessing the pipe work and becoming stuck;
- Night work should be avoided where possible, and any flood lighting should face away from the site boundaries; and
- Any chemicals or machinery are to be stored in a secure compound.

6.3 General Recommendations for Enhancement

The National Planning Policy Framework and local development plan encourages ecological enhancement of sites subject to development proposals. Where new landscape planting is proposed species commonly occurring locally such as sycamore, horse chestnut *Aesculus hippocastanum* and oak *Quercus* spp. could be used. Other species such as silver birch *Betula pendula*, rowan *Sorbus aucuparia* and whitebeam *Sorbus aria* would make attractive additions to the site. In particular rowan will provide a valuable source of berries late into the winter months and provide an important food source for native and migratory bird species. Ash and elm should currently be avoided due to the prevalence of 'Ash die-back' and 'Dutch elm disease', as stocks of these species cannot be guaranteed to be free from these afflictions.

In addition to this, the site perimeters could be used to enhance the locality via the creation of artificial refugia for reptiles. These could be in the form of compost piles, log piles or purpose-built hibernacula.

Additional enhancements that could easily be met within the development scope include the incorporation of bat and bird nest boxes, hedgehog-friendly fencing and hedgehog boxes. Bird boxes could be placed on either the new buildings or retained trees within the site boundaries and hedgehog boxes could be placed within any ornamental planting and compost piles. Bat boxes should be placed on new buildings or retained trees, facing south or south-west at heights >2m. They should be away from direct light overspill from street or security lighting and preferably be adjacent to green areas and wildlife corridors.

Details of compensation, mitigation and enhancements should be provided within a LEMP, as part of any reserved matters stage. The plan should incorporate the details outlined above and the LEMP should include (as a minimum):

- a) Description and evaluation of features to be managed, enhanced and/or created
- b) Ecological trends and constraints on site that might influence management
- c) Aims and objectives of management
- d) Appropriate management options and methods of achieving aims and objectives
- e) Timescales
- f) Prescription of management actions
- g) Preparation of work schedule
- h) Details of the body or organisation responsible for implementing the plan
- i) Ongoing monitoring and remedial measures

The plan should also include details of the legal and funding mechanism(s) by which the long-term implications of the plan will be secured.

The plan should also set out how contingencies and/or remedial action will be identified, agreed and implemented so that the development delivers biodiversity objectives.

7 References

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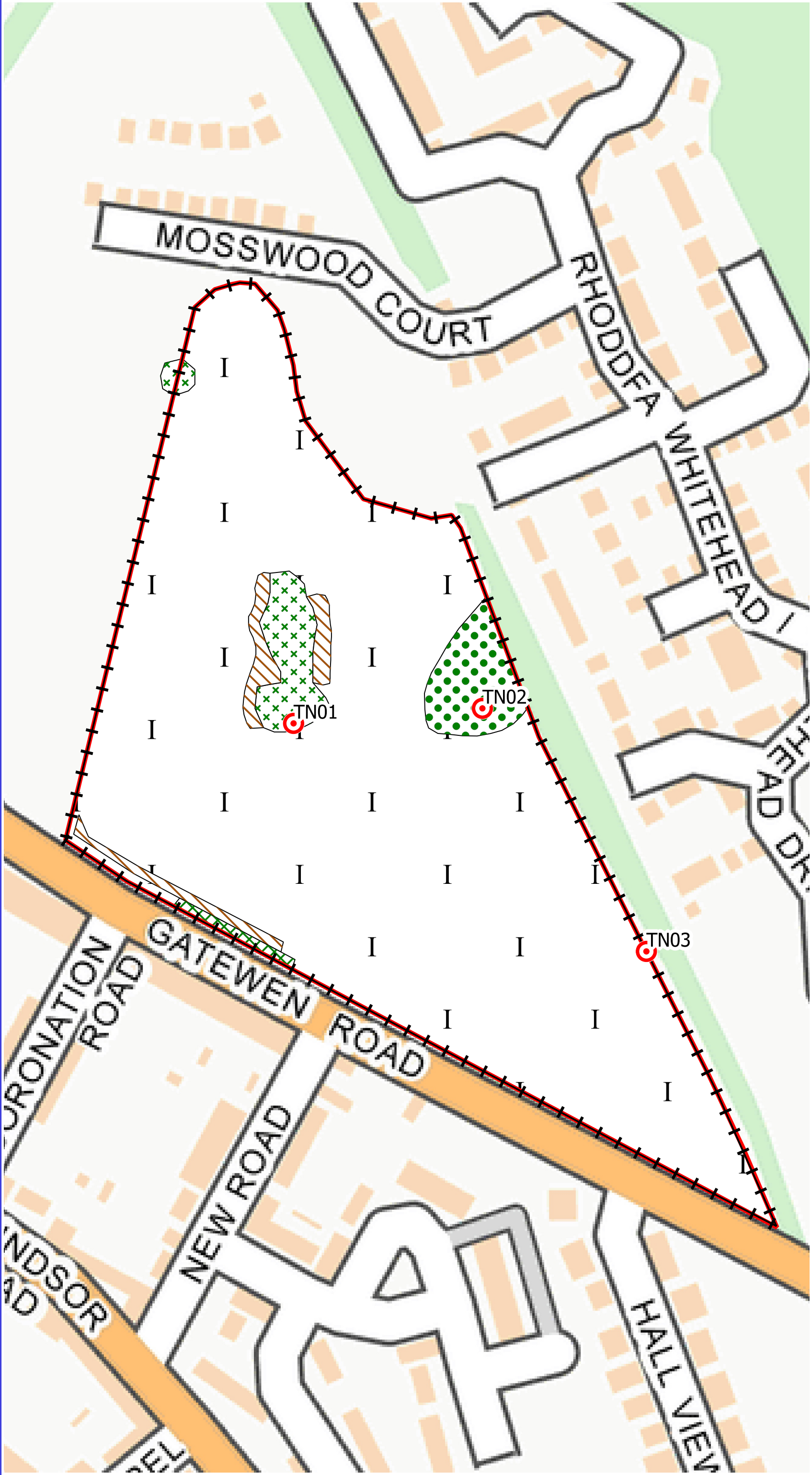
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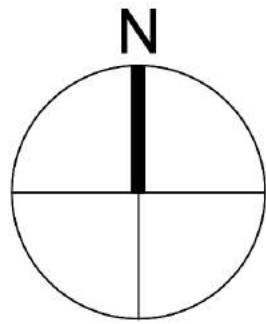
The Conservation of Habitats and Species Regulations 2017. Planning Act 2008, Regulation 110.



Legend

- Site Boundary
- Phase 1 Habitat - Line
- J2.4 - Fence
- Phase 1 Habitat - Area
- A2.1 - Scrub - dense /continuous
- A2.2 - Scrub - scattered
- A3.1 - Broadleaved scattered trees
- B4 - Improved grassland
- C3.1 - Tall ruderal vegetation
- Target Note

Rev	Date	Description	Checked	Authorised
Issue / Revision				
Original Scale 1:1500 @			Drawn 23.06.2017	
Project title OXF10388 Glyndwr University (Gatewen Road)				
Drawing title Appendix C: Phase 1 Habitat Plan				
Client Day Architectural Ltd				
RPS St Paul's House, Enterprise Way, Jubilee Business Park, Stores Road, Derby DE21 4BB T +44(0) 1332 387650 W rpsgroup.com				
Drawing number OXF10388_02 (Gatewen Road)				Rev 0



Key

	Type A - 4 Bed Detached House	19 no.
	Type B - 4 Bed Semi/Detached House	17 no.
	Type C - 3 Bed Semi-Detached House	24 no.
	Type D - 3 Bed Detached House	24 no.
	Type E - 2 Bed Affordable House	28 no.
	Type E - 2 Bed Affordable House	112 no.

Housing Mix

- 4 Beds = 32%
- 3 Beds = 43%
- 2 Beds (Affordable) = 25%



GENERAL NOTES:

- DAY Architectural Ltd accepts no responsibility for any costs, losses or claims whatsoever arising from these drawings, specifications and related documents unless there is full compliance with the Client or any unauthorised user of the following:
- All boundaries, dimensions and levels are to be checked on site before construction and any discrepancies reported to the Architect / Designer.
 - Partial Service: Any discrepancies with site or other information is to be advised to the Architect / Designer and direction and / or approval is to be sought before the implementation of the detail.
 - Block and site plans are reproduced under license from the Ordnance Survey.
 - Do not scale this drawing.
 - For the purpose of coordination, all relevant parties must check this information prior to implementation and report any discrepancies to the Architect / Designer.

DRAWING NOTES:

A	Amendment of layout	11.06.2018
STATUS	REVISION	DATE

CLIENT
Wrexham Glyndwr University

PROJECT
Campus 2025

DRAWING
Gatewen Road - Proposed Masterplan

SCALE	1:1000	PAPER SIZE	A1
DATE	June 2018	DRAWN BY	LB

DRAWING No.	AL-00-001	REVISION	A	PROJECT No.	531-17-5
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DRAWING STATUS
PLANNING

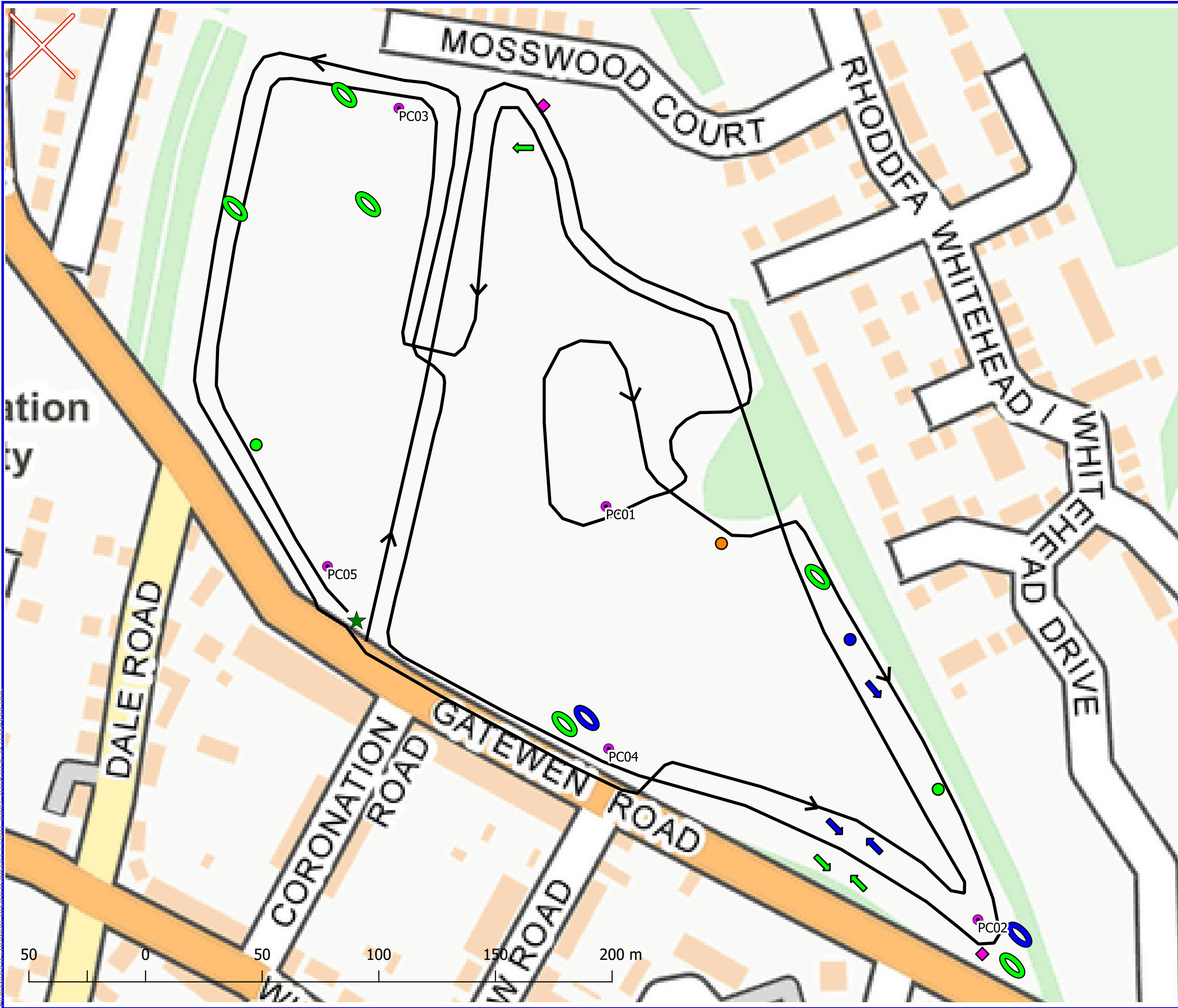
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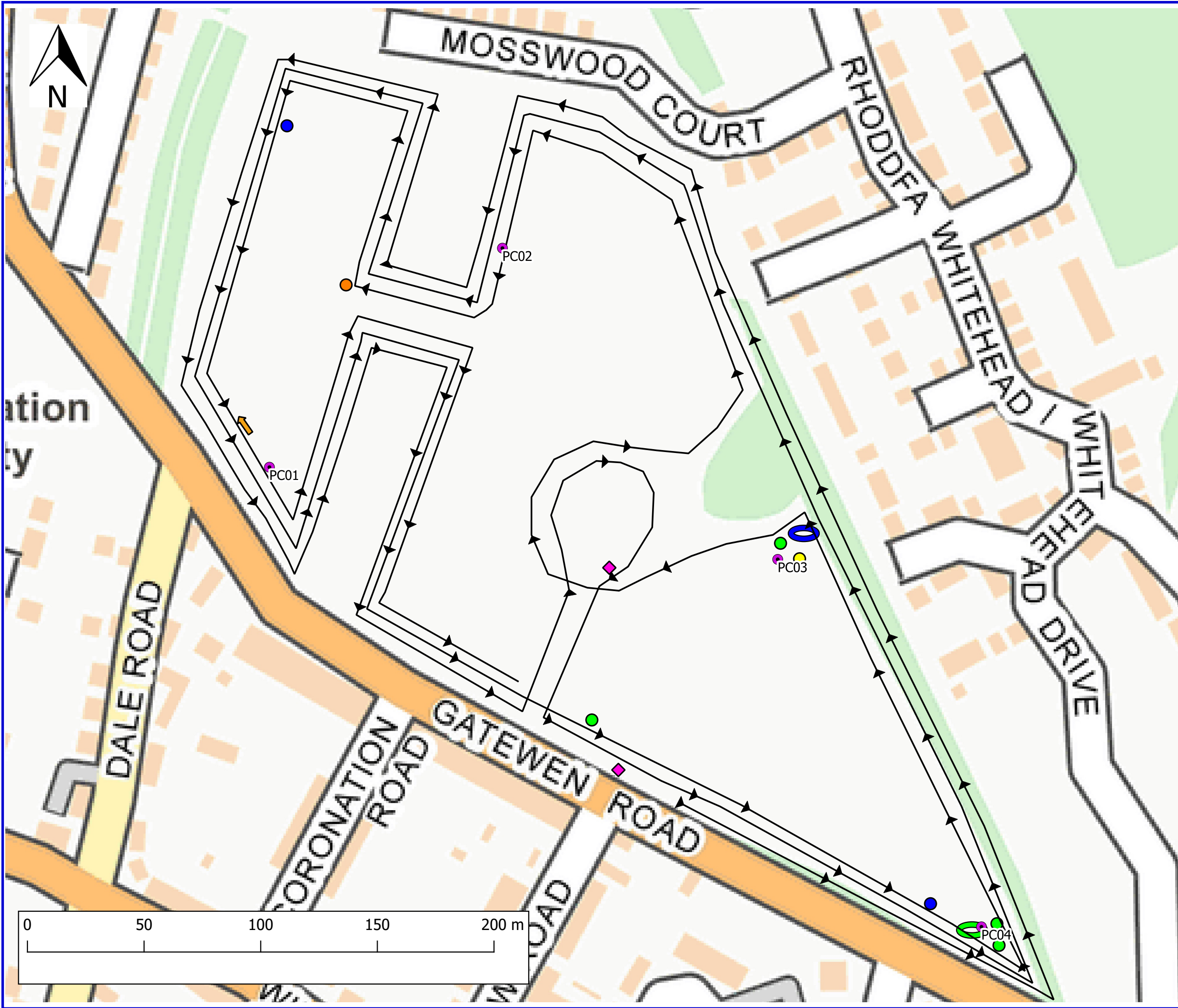
P:\Clear Ecology Projects\Current Projects\A ECO00246 Glyndwr University, Wrexham Additional surveys\4. Data & Maps\Map\Map - Bat Activity Plan (June Transect) 14th June 2018\Map - Bat Activity Plan (June Transect) 14th June 2018.docx



Legend

- ★ Start/finish
- ◆ Static Detectors
- Point count
- Bat Pass**
 - Common Pipistrelle Pass (Bat Not Seen)
 - Soprano Pipistrelle Pass (Bat Not Seen)
 - Noctule Bat Pass (Bat Not Seen)
- Bat Commuting**
 - ↑ Common Pipistrelle Pass
 - ↑ Soprano Pipistrelle Pass
- Bat Foraging**
 - Common Pipistrelle Foraging
 - Soprano Pipistrelle Foraging

Date Drawn June 2018	Date Reviewed June 2018
Drawn By AT	Reviewed By PW
Project Title ECO00246 Glyndwr University, Gatewen Road	
Drawing Title Bat Activity Plan (June Transect)	
Client Glyndwyr University	
Issue Appendix C	Revision DRAFT
Scale 1:1560 @A3	
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Legend

- Static Detectors
- Point count
- Transect Route

Bat Pass

- Common Pipistrelle Pass (Bat Not Seen)
- Soprano Pipistrelle Pass (Bat Not Seen)
- Myotis Bat Pass (Bat Not Seen)
- Noctule Bat Pass (Bat Not Seen)

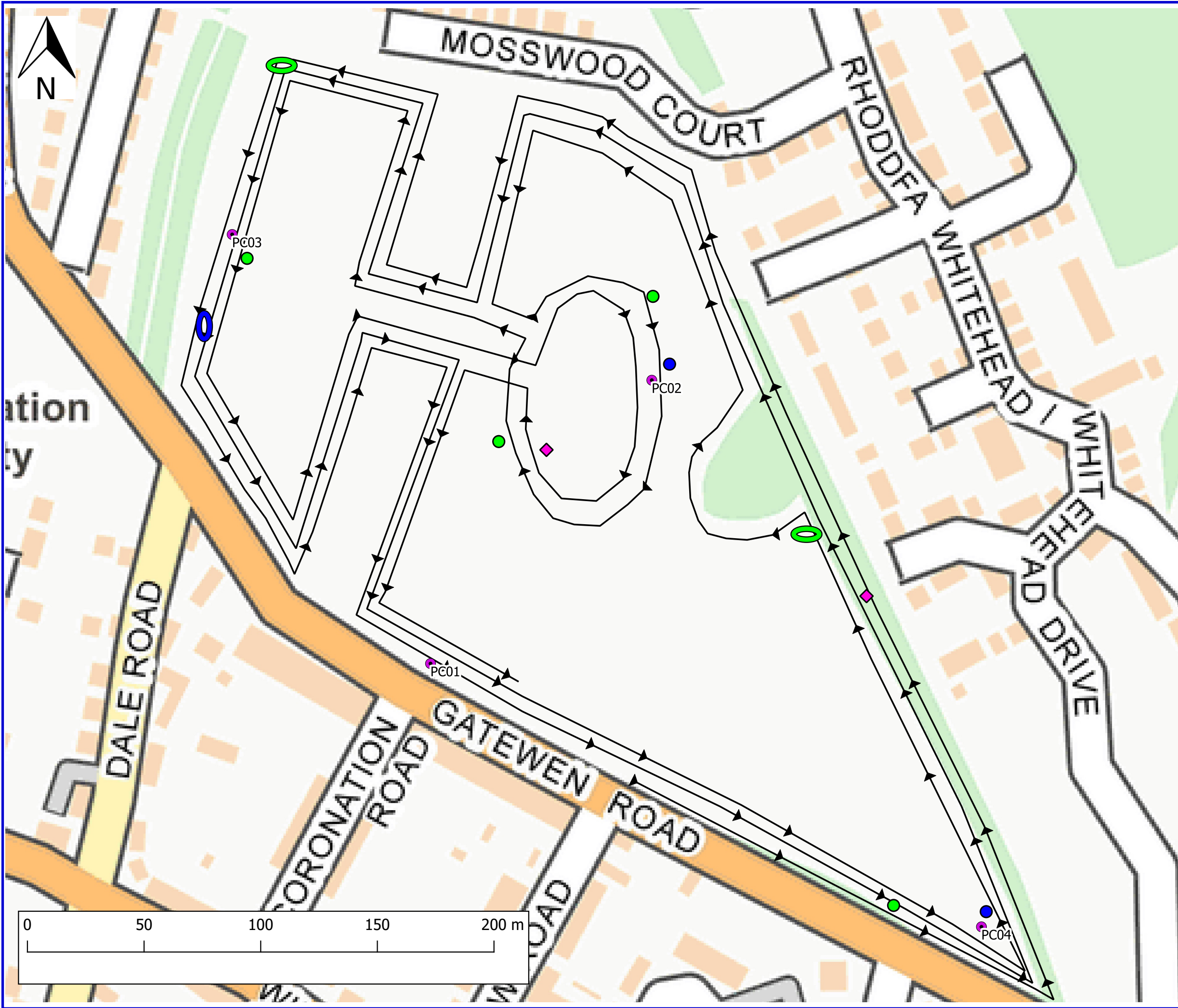
Bat Commuting

- Noctule Pass

Bat Foraging

- Common Pipistrelle Foraging
- Soprano Pipistrelle Foraging

Date Drawn Sept 2018	Date Reviewed Sept 2018
Drawn By AT	Reviewed By PM
Project Title ECO00246 Glyndwr University, Gatewen Road	
Drawing Title Bat Activity Plan (Sept Transect)	
Client Glyndwyr University	
Issue Appendix C	Revision DRAFT
Scale 1:1560 @A3	



- Legend**
- Static Detectors
 - Point count
 - Transect Route
 - Bat Pass**
 - Common Pipistrelle Pass (Bat Not Seen)
 - Soprano Pipistrelle Pass (Bat Not Seen)
 - Bat Foraging**
 - Common Pipistrelle Foraging
 - Soprano Pipistrelle Foraging

Date Drawn Sept 2018	Date Reviewed Sept 2018
Drawn By RP-S	Reviewed By PM
Project Title ECO00246 Glyndwr University, Gatewen Road	
Drawing Title Bat Activity Plan (October Transect)	
Client Glyndwyr University	
Issue Appendix C	Revision DRAFT
Scale 1:1560 @A3	
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Folio No: E3095
Report No:
Order No: 0308525
Client: RPS GROUP
Contact: Phillipa Mudd
Contact Details: phillipa.mudd@rpsgroup.com
Date: 06/06/2018

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS

Date sample received at Laboratory: 30/05/2018

Date Reported: 06/06/2018

Matters Affecting Results:

RESULTS

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
2797	Gatewen Road, Pond 3	-	Pass	Pass	Pass	Negative	0
2798	Gatewen Road, Pond 2	-	Pass	Pass	Pass	Negative	0
2799	Gatewen Road, Pond 1	-	Pass	Pass	Pass	Negative	0

SUMMARY

When Great Crested Newts (GCN); *Triturus cristatus* inhabit a pond, they deposit traces of their DNA in the water as evidence of their presence. By sampling the water, we can analyse these small environmental DNA (eDNA) traces to confirm GCN habitation, or establish GCN absence.

The water samples detailed below were submitted for eDNA analysis to the protocol stated in DEFRA WC1067 (Latest Amendments). Details on the sample submission form were used as the

unique sample identity.

RESULTS INTERPRETATION

Lab Sample No.- When a kit is made it is given a unique sample number. When the pond samples have been taken and the kit has been received back in to the laboratory, this sample number is tracked throughout the laboratory.

Site Name- Information on the pond.

O/S Reference - Location/co-ordinates of pond.

SIC- Sample Integrity Check. Refers to quality of packaging, absence of tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to results errors. Inspection upon receipt of sample at the laboratory. To check if the Sample is of adequate integrity when received. Pass or Fail.

DC- Degradation Check. Analysis of the spiked DNA marker to see if there has been degradation of the kit since made in the laboratory to sampling to analysis. Pass or Fail.

IC- Inhibition Check- PCR inhibitors can cause false results. Inhibitors are analysed to check the quality of the result. Every effort is made to clean the sample pre-analysis however some inhibitors cannot be extracted. An unacceptable inhibition check will cause an indeterminate sample and must be sampled again.

Result- NEGATIVE means that GCN eDNA was not detected or is below the threshold detection level and the test result should be considered as no evidence of GCN presence. POSITIVE means that GCN eDNA was found at or above the threshold level and the presence of GCN at this location at the time of sampling or in the recent past is confirmed. Positive or Negative.

Positive Replicates- To generate the results all of the tubes from each pond are combined to produce one eDNA extract. Then twelve separate analyses are undertaken. If one or more of these analyses are positive the pond is declared positive for the presence of GCN. It may be assumed that small fractions of positive analyses suggest low level presence but this cannot currently be used for population studies. In accordance with Natural England protocol, even a score of 1/12 is declared positive.

METHODOLOGY

The laboratory testing adheres to strict guidelines laid down in WC1067 Analytical and Methodological Development for Improved Surveillance of The Great Crested Newt, Version 1.1

The analysis is conducted in two phases. The sample first goes through an extraction process where all six tubes are pooled together to acquire as much eDNA as possible. The pooled sample is then tested via real time PCR (also called q-PCR). This process amplifies select part of DNA allowing it to be detected and measured in 'real time' as the analytical process develops. qPCR combines PCR amplification and detection into a single step. This eliminates the need to detect products using gel electrophoresis. With qPCR, fluorescent dyes specific to the target sequence are used to label PCR products during thermal cycling. The accumulation of fluorescent signals during the exponential phase of the reaction is measured for fast and objective data analysis. The point at which amplification begins (the Ct value) is an indicator of the quality of the sample. True positive controls, negatives and blanks as well as spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared so they act as additional quality control measures.

The primers used in this process are specific to a part of mitochondrial DNA only found in GCN ensuring no DNA from other species present in the water is amplified. The unique sequence appropriate for GCN analysis is quoted in DEFRA WC 1067 and means there should be no detection of closely related species. We have tested our system exhaustively to ensure this is the case in

our laboratory. We can offer eDNA analysis for most other species including other newts.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. Kits are manufactured by SureScreen Scientifics to strict quality procedures in a separate building and with separate staff, adopting best practice from WC1067 and WC1067 Appendix 5. Kits contain a 'spiked' DNA marker used as a quality control tracer (SureScreen patent pending) to ensure any DNA contained in the sampled water has not deteriorated in transit. Stages of the DNA analysis are also conducted in different buildings at our premises for added

SureScreen Scientifics Ltd also participate in Natural England's proficiency testing scheme and we also carry out inter-laboratory checks on accuracy of results as part of our quality procedures.

Reported by: Sam Humphrey

Approved by: Derry Hickman

End Of Report

Folio No: E3213
Report No:
Order No: 0308525
Client: RPS GROUP
Contact: Phillipa Mudd
Contact Details: phillipa.mudd@rpsgroup.com
Date: 12/06/2018

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS

Date sample received at Laboratory: 07/06/2018

Date Reported: 12/06/2018

Matters Affecting Results:

RESULTS

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
3119	Gatewen Road	SJ 312 519	Pass	Pass	Pass	Negative	0

SUMMARY

When Great Crested Newts (GCN); *Triturus cristatus* inhabit a pond, they deposit traces of their DNA in the water as evidence of their presence. By sampling the water, we can analyse these small environmental DNA (eDNA) traces to confirm GCN habitation, or establish GCN absence.

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Reported by: Sam Humphrey

Approved by: Derry Hickman

End Of Report
